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THE

ENCYCLOPÆDIA BRITANNICA

A

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— **Shipka Pass.**

J. K. I. JOHN KELLS INGRAM, LL.D.
See the biographical article: INGRAM, JOHN KELLS.
— **Say, Jean Baptiste; Senior, Nassau.**

J. L. M. JOHN LINTON MYRES, M.A., F.S.A., F.R.G.S.
Wykeham Professor of Ancient History in the University of Oxford, and Fellow of Magdalen College. Formerly Gladstone Professor of Greek and Lecturer in Ancient Geography, University of Liverpool. Lecturer in Classical Archaeology in the University of Oxford, and Student and Tutor of Christ Church. Author of *A History of Rome*; &c.
— **Salamis:** *Cyprus.*

J. M. M. JOHN MALCOLM MITCHELL.
Sometime Scholar of Queen's College, Oxford. Lecturer in Classics, East London College (University of London). Joint-editor of Grote's *History of Greece.*
— **Schelling** (*in part*); **Shaftesbury, 3rd Earl of** (*in part*).

J. P.-B. JAMES GEORGE JOSEPH PENDEREL-BRODHURST.
Editor of the *Guardian*, London.
— **Sheraton, Thomas.**

J. S. F. JOHN SMITH FLETT, D.Sc., F.G.S.
Petrographer to the Geological Survey of the United Kingdom. Formerly Lecturer on Petrology in Edinburgh University. Neill Medallist of the Royal Society of Edinburgh. Bigsby Medallist of the Geological Society of London.
— **Sand; Sandstone; Scapolite** (*Rocks*); **Schorl.**

J. S. R. JAMES SMITH REID, M.A., LL.D., LITT.D.
Professor of Ancient History and Fellow and Tutor of Gonville and Caius College, Cambridge. Hon. Fellow, formerly Fellow and Lecturer of Christ's College. Browne's and Chancellor's Medals. Editor of editions of Cicero's *Academia*; *De Amicitia*; &c.
— **Severus, Lucius Septimius.**

J. T. Be. JOHN THOMAS BEALBY.
Joint-author of Stanford's Europe. Formerly Editor of the *Scottish Geographical Magazine.* Translator of Sven Hedin's *Through Asia, Central Asia and Tibet*; &c.
— **St Petersburg** (*in part*); **Sakhalin** (*in part*); **Samara:** *Government* (*in part*); **Samarkand:** *City* (*in part*); **Saratov:** *Government* (*in part*)

J. T. C. JOSEPH THOMAS CUNNINGHAM, M.A., F.Z.S.
Lecturer on Zoology at the South-Western Polytechnic, London. Formerly Fellow of University College, Oxford. Assistant Professor of Natural History in the University of Edinburgh. Naturalist to the Marine Biological Association.
— **Scaphopoda; Sea-Serpent** (*in part*).

J. T. S.* JAMES THOMSON SHOTWELL, PH.D.
Professor of History in Columbia University, New York City.
— **Saint-Simon, Comte de** (*in part*).

J. W. JAMES WILLIAMS, M.A., D.C.L., LL.D.
All Souls' Reader in Roman Law in the University of Oxford, and Fellow of Lincoln College. Author of *Wills and Succession*; &c.
— **Seamen, Laws relating to; Sheriff.**

J. W. He. JAMES WYCLIFFE HEADLAM, M.A.
Staff Inspector of Secondary Schools under the Board of Education, London. Formerly Fellow of King's College, Cambridge. Professor of Greek and Ancient History at Queen's College, London. Author of *Bismarck and the foundation of the German Empire*; &c.
— **Schmerling, Anton von.**

K. G. J. KINGSLEY GARLAND JAYNE.
Sometime Scholar of Wadham College, Oxford. Matthew Arnold Prizeman, 1903. Author of *Vasco da Gama and his Successors.*
— **Salamanca.**

K. S. KATHLEEN SCHLESINGER.
Editor of the *Portfolio of Musical Archaeology.* Author of *The Instruments of the Orchestra.*
— **Sambuca; Saxhorn; Saxophone; Serpent:** *Music*; **Shawm; Shofar.**

L. Be. LÉONCE BÉNÉDITE.
Keeper of the Musée National du Luxembourg, Paris. Chevalier of the Legion of Honour. President of the Société des Peintres orientalistes français. Author of *Histoire des Beaux Arts*; &c.
— **Sculpture:** *Modern French.*

L. J. S. LEONARD JAMES SPENCER, M.A.
Assistant in the Department of Mineralogy, British Museum. Formerly Scholar of Sidney Sussex College, Cambridge, and Harkness Scholar. Editor of the *Mineralogical Magazine.*
— **Scapolite; Scolecite.**

L. V. LINDA MARY VILLARI.
See the biographical article: VILLARI, PASQUALE.
— **Savonarola.**

L. V.* LUIGI VILLARI.
Italian Foreign Office (Emigration Department). Formerly Newspaper Correspondent in the East of Europe. Italian Vice-Consul in New Orleans, 1906, Philadelphia, 1907, and Boston, U.S.A., 1907–1910. Author of *Italian Life in Town and Country*; &c.
— **Savoy, House of.**

M. A. C. MAURICE ARTHUR CANNEY, M.A.
Assistant Lecturer in Semitic Languages in the University of Manchester. Formerly Exhibitioner of St John's College, Oxford. Pusey and Ellerton Hebrew Scholar, Oxford, 1892; Kennicott Hebrew Scholar, 1895; Houghton Syriac Prize, 1896.
— **Schenkel, Daniel.**

M. Be.	MALCOLM BELL. Author of *Pewter Plate*; &c.	**Sheffield Plate.**
M. Bt.	MICHAEL BRETT. Barrister-at-Law, Middle Temple.	**Salvage**: *Military.*
M. D. Ch.	SIR MACKENZIE DALZELL CHALMERS, K.C.B., C.S.I., M.A. Trinity College, Oxford. Barrister-at-Law. Formerly Permanent Under-Secretary of State for the Home Department, London, and First Parliamentary Counsel to the Treasury. Author of *Digest of the Law of Bills of Exchange*; &c.	**Sale of Goods.**
M. Ha.	MARCUS HARTOG, M.A., D.Sc., F.L.S. Professor of Zoology, University College, Cork. Author of "Protozoa," in the *Cambridge Natural History*; and papers for various scientific journals.	**Sarcodina.**
M. H. S.	MARION H. SPIELMANN, F.S.A. Formerly Editor of the *Magazine of Art*. Member of Fine Art Committee of International Exhibitions of Brussels, Paris, Buenos Aires, Rome and the Franco-British Exhibition, London. Author of *History of "Punch"*; *British Portrait Painting to the Opening of the 19th Century*; *Works of G. F. Watts, R.A.*; *British Sculpture and Sculptors of To-Day*; *Henriette Ronner*; &c.	**Sculpture** (*in part*); **Shakespeare**: *Portraits.*
M. Ja.	MORRIS JASTROW, PH.D. Professor of Semitic Languages, University of Pennsylvania. Author of *Religion of the Babylonians and Assyrians*; &c.	**Shamash.**
M. O. B. C.	MAXIMILIAN OTTO BISMARCK CASPARI, M.A. Reader in Ancient History in London University. Lecturer in Greek in Birmingham University, 1905–1908.	**Salamis**; **Samos** (*in part*).
M. P.*	LÉON JACQUES MAXIME PRINET. Auxiliary of the Institute of France (Academy of Moral and Political Sciences). Author of *L'Industrie du sel en Franche-Comté.*	**St Nectaire**; **St Pol, Counts of.**
M. T. H.	M. TH. HOUTSMA. Professor of Semitic Languages in the University of Utrecht	**Seljūks.**
O. A.	OSMUND AIRY, M.A., LL.D. H.M. Inspector of Schools and Inspector of Training Colleges, Board of Education, London. Author of *Louis XIV. and the English Restoration*; *Charles II.*; &c. Editor of the *Lauderdale Papers*; &c.	**Shaftesbury, 1st Earl of.**
P. A. K.	PRINCE PETER ALEXEIVITCH KROPOTKIN. See the biographical article: KROPOTKIN, PRINCE P. A.	**St Petersburg** (*in part*); **Sakhalin** (*in part*); **Samara**: *Government* (*in part*); **Samarkand**: *City* (*in part*); **Saratov**: *Government* (*in part*).
P. C. M.	PETER CHALMERS MITCHELL, M.A., F.R.S., F.Z.S., D.Sc., LL.D. Secretary of the Zoological Society of London. University Demonstrator in Comparative Anatomy and Assistant to Linacre Professor at Oxford, 1888–1891. Author of *Outlines of Biology*; &c.	**Sex.**
P. G.	PERCY GARDNER, LL.D., F.S.A., D.LITT. See the biographical article: GARDNER, PERCY.	**Scopas.**
P. G. K.	PAUL GEORGE KONODY. Art Critic of the *Observer* and the *Daily Mail*. Formerly Editor of the *Artist*. Author of *The Art of Walter Crane*; *Velasquez, Life and Work*; &c.	**Sculpture** (*in part*).
P. St.	PERCY SOMERS TYRINGHAM STEPHENS, J.P. Contributor to the *Badminton Magazine*.	**Shooting.**
P. Vi.	PAUL VINOGRADOFF, D.C.L., LL.D. See the biographical article: VINOGRADOFF, PAUL.	**Serfdom.**
P. Wa.	SIR PHILLIP WATTS, K.C.B., F.R.S., LL.D. Director of Naval Construction for the British Navy. Chairman of the Federation of Shipbuilders. Naval Architect and Director of War Shipbuilding Department of Sir W. G. Armstrong, Whitworth & Co., Ltd., 1885–1901.	**Ship**: *History since the Invention of Steamships*; **Shipbuilding.**
R. Ad.	ROBERT ADAMSON, LL.D. See the biographical article: ADAMSON, ROBERT.	**Schelling** (*in part*).
R. A. S. M.	ROBERT ALEXANDER STEWART MACALISTER, M.A., F.S.A. St John's College, Cambridge. Director of Excavations for the Palestine Exploration Fund.	**Samaria**; **Shechem.**
R. A. W.	COLONEL ROBERT ALEXANDER WAHAB, C.B., C.M.G., C.I.E. Formerly H.M. Commissioner, Aden Boundary Delimitation. Served with Tirah Expeditionary Force, 1897–1898, and on the Anglo-Russian Boundary Commission, Pamirs, 1895.	**Sana.**
R. C. C.	RICHARD COPLEY CHRISTIE. See the biographical article: CHRISTIE, RICHARD COPLEY.	**Scaliger** (*in part*).
R. D. H.	ROBERT DREW HICKS, M.A. Fellow, formerly Lecturer in Classics, Trinity College, Cambridge.	**Seneca** (*in part*).
R. G.	RICHARD GARNETT, LL.D. See the biographical article: GARNETT, RICHARD.	**Sarpi, Paolo**; **Satire.**
R. I. P.	REGINALD INNES POCOCK, F.Z.S. Superintendent of the Zoological Gardens, London.	**Scorpion.**

R. J. M. RONALD JOHN MCNEILL, M.A.
Christ Church, Oxford. Barrister-at-Law. Formerly Editor of the *St James's Gazette* (London).
— **St John, Oliver ; St Leger, Sir Anthony ; Scroggs, Sir William ; Scrope Family ; Ship-money ; Shrewsbury, Duke of.**

R. L.* RICHARD LYDEKKER, F.R.S., F.G.S., F.Z.S.
Member of the Staff of the Geological Survey of India, 1874-1882. Author of *Catalogue of Fossil Mammals, Reptiles and Birds in the British Museum* ; *The Deer of all Lands* ; *The Game Animals of Africa* ; &c.
— **Seal** (*in part*) ; **Serow ; Sheep** (*in part*).

R. L. A. SIR REGINALD LAURENCE ANTROBUS, K.C.M.G.
Crown Agent for the Colonies, London. Assistant Under-Secretary of State for the Colonies, 1898-1909.
— **St Helena** (*in part*).

R. N. B. ROBERT NISBET BAIN (d. 1909).
Assistant Librarian, British Museum, 1883–1909. Author of *Scandinavia : The Political History of Denmark, Norway and Sweden, 1513–1900* ; *The First Romanovs, 1613–1725* ; *Slavonic Europe : The Political History of Poland and Russia from 1469 to 1796* ; &c.
— **Sehested, Hannibal ; Shafirov, Peter.**

R. P.* ROBERT PEELE.
Professor of Mining in Columbia University, New York.
— **Shaft-sinking.**

R. S. C. ROBERT SEYMOUR CONWAY, M.A., D.LITT.
Professor of Latin and Indo-European Philology in the University of Manchester. Formerly Professor of Latin in University College, Cardiff ; and Fellow of Gonville and Caius College, Cambridge. Author of *The Italic Dialects*.
— **Samnites.**

R. W. ROBERT WALLACE, F.R.S. (Edin.), F.L.S.
Professor of Agriculture and Rural Economy at Edinburgh University, and Garton. Lecturer on Colonial and Indian Agriculture. Professor of Agriculture, R.A.C., Cirencester, 1882–1885. Author of *Farm Live Stock of Great Britain* ; *The Agriculture and Rural Economy of Australia and New Zealand* ; *Farming Industries of Cape Colony* ; &c.
— **Sheep** (*in part*).

S. A. C. STANLEY ARTHUR COOK, M.A.
Lecturer in Hebrew and Syriac, and formerly Fellow, Gonville and Caius College, Cambridge. Editor for the Palestine Exploration Fund. Author of *Glossary of Aramaic Inscriptions* ; *The Laws of Moses and the Code of Hammurabi* ; *Critical Notes on Old Testament History* ; *Religion of Ancient Palestine* ; &c.
— **Samson ; Samuel ; Samuel, Books of ; Saul ; Serpent-worship.**

S. N. SIMON NEWCOMB, LL.D., D.Sc.
See the biographical article : NEWCOMB, SIMON.
— **Saturn :** *Planet*.

T. As. THOMAS ASHBY, M.A., D.LITT.
Director of the British School of Archaeology at Rome. Formerly Scholar of Christ Church, Oxford. Craven Fellow, 1897. Conington Prizeman, 1906. Member of the Imperial German Archaeological Institute. Author of *The Classical Topography of the Roman Campagna*.
— **Salerno ; Sardinia ; Sassari ; Satricum ; Saturnia ; Segesta ; Segusio ; Selinus ; Sessa Aurunca ; Severiana, Via.**

T. A. A. THÓMAS ANDREW ARCHER, M.A.
Author of *The Crusade of Richard I.* ; &c.
— **Salvian.**

T. A. I. THOMAS ALLAN INGRAM, M.A.; LL.D.
Trinity College, Dublin.
— **Savings Banks** (*in part*).

T. Ba. SIR THOMAS BARCLAY, M.P.
Member of the Institute of International Law. Officer of the Legion of Honour. Author of *Problems of International Practice and Diplomacy* ; &c. M.P. for Blackburn, 1910.
— **Search.**

T. C. A. SIR THOMAS CLIFFORD ALLBUTT, K.C.B., M.A., M.D., D.Sc., LL.D., F.R.S.
Regius Professor of Physic in the University of Cambridge, and Fellow of Gonville and Caius College. Physician to Addenbrooke's Hospital, Cambridge. Editor of *Systems of Medicine*.
— **Semmelweiss, Ignatz.**

T. F. REV. THOMAS FOWLER, M.A., D.D., LL.D. (1832–1904).
President of Corpus Christi College, Oxford, 1881–1904. Honorary Fellow of Lincoln College. Professor of Logic, 1873 1888. Vice-Chancellor of the University of Oxford, 1899–1901. Author of *Elements of Deductive Logic* ; *Shaftesbury and Hutcheson* ; &c.
— **Shaftesbury, 3rd Earl of** (*in part*).

T. G. C. THOMAS GILBERT CARVER, M.A., K.C. (1848–1906).
Formerly Judge of County Courts. Author of *On the Law relating to the Carriage of Goods by Sea*.
— **Salvage.**

T. K. THOMAS KIRKUP, M.A., LL.D.
Author of *An Inquiry into Socialism* ; *Primer of Socialism* ; &c.
— **Saint-Simon, Comte de** (*in part*).

T. K. C. REV. THOMAS KELLY CHEYNE, D.LITT., D.C.L., D.D.
See the biographical article : CHEYNE, T. K.
— **Seraphim.**

T. L. H. SIR THOMAS LITTLE HEATH, K.C.B., D.Sc.
Assistant Secretary to the Treasury. Formerly Fellow of Trinity College, Cambridge. Author of *Treatise on Conic Sections* ; &c.
— **Serenus "of Antissa."**

Th. N.	THEODOR NÖLDEKE. See the biographical article : NÖLDEKE THEODOR.	**Semitic Languages.**
T. T.	SIR TRAVERS TWISS, K.C., D.C.L., F.R.S. See the biographical article : TWISS, SIR TRAVERS.	**Sea Laws.**
T. W. F.	THOMAS WILLIAM FOX. Professor of Textiles in the University of Manchester. Author of *Mechanics of Weaving*.	**Shuttle.**
T. W. R. D.	THOMAS WILLIAM RHYS DAVIDS, LL.D., PH.D. Professor of Comparative Religion, Manchester University. President of the Pali Text Society. Fellow of the British Academy. Secretary and Librarian of the Royal Asiatic Society, 1885–1902. Author of *Buddhism*; *Sacred Books of the Buddhists*; *Early Buddhism*; *Buddhist India*; *Dialogues of the Buddha*; &c.	**Sānchi ; Sāriputta ; Sāsana Vamsa.**
W. A. B. C.	REV. WILLIAM AUGUSTUS BREVOORT COOLIDGE, M.A., F.R.G.S., PH.D. Fellow of Magdalen College, Oxford. Professor of English History, St David's College, Lampeter, 1880–1881. Author of *Guide du Haut Dauphiné*; *The Range of the Todi*; *Guide to Grindelwald*; *Guide to Switzerland*; *The Alps in Nature and in History*; &c. Editor of the *Alpine Journal*, 1880–1881; &c.	**St Gall : *Canton* ; St Gall : *Town* ; St Gotthard Pass ; St Moritz ; Sarnen ; Saussure, Horace Bénédict de ; Savoie ; Schaffhausen : *Canton* ; Schaffhausen : *Town* ; Scheuchzer, Johann ; Schwyz ; Sempach.**
W. A. D.	WILLIAM ARCHIBALD DUNNING, PH.D., LL.D. Lieber Professor of History and Political Philosophy, Columbia University, New York. Author of *Essays on the Civil War and Reconstruction*; *A History of Political Theories*.	**Sherman, John.**
W. A. P.	WALTER ALISON PHILLIPS, M.A. Formerly Exhibitioner of Merton College and Senior Scholar of St John's College, Oxford. Author of *Modern Europe*; &c.	**St John of Jerusalem, Order of ; Schleswig-Holstein Question.**
W. Ba.	WILLIAM BACHER, PH.D. Professor of Biblical Science at the Rabbinical Seminary, Budapest.	**Shammai.**
W. C. D. W.	WILLIAM CECIL DAMPIER WHETHAM, M.A., F.R.S. Fellow and Tutor of Trinity College, Cambridge. Author of *Theory of Solution*; *Recent Development of Physical Science*; &c.	**Science.**
W. E. A. A.	WILLIAM EDMUND ARMYTAGE AXON, LL.D. Formerly Deputy Chief Librarian of the Manchester Free Libraries. On Literary Staff of *Manchester Guardian*, 1874–1905. Member of the Gorsedd, with the bardic name of Manceinion. Author of *Annals of Manchester*; &c.	**Salford.**
W. E. Ho.	WILLIAM EVANS HOYLE, M.A., D.Sc., F.Z.S., M.R.C.S. Christ Church, Oxford. Director of the National Museum of Wales. Director of the Manchester Museum, 1889–1899.	**Sea-Serpent** (*in part*).
W. Fr.	WILLIAM FREAM, LL.D. (d. 1906). Formerly Lecturer on Agricultural Entomology, University of Edinburgh, and Agricultural Correspondent of *The Times*.	**Sheep** (*in part*).
W. F. K.	WINIFRED F. KNOX. Author of *The Court of a Saint*.	**Saladin.**
W. Hu.	REV. WILLIAM HUNT, M.A., LITT.D. President of the Royal Historical Society, 1905–1909. Author of *History of the English Church, 597–1066*; *The Church of England in the Middle Ages*; *Political History of England, 1760–1801*.	**Seeley, Sir J. R.**
W. H. Be.	WILLIAM HENRY BENNETT, M.A., D.D., D.LITT. Professor of Old Testament Exegesis in New and Hackney Colleges, London. Formerly Fellow of St John's College, Cambridge, and Lecturer in Hebrew at Firth College, Sheffield. Author of *Religion of the Post-Exilic Prophets*; &c.	**Seth.**
W. H. F.	SIR WILLIAM HENRY FLOWER, F.R.S. See the biographical article : FLOWER, SIR W. H.	**Seal** (*in part*).
W. H. Ha.	WILLIAM HENRY HADOW, M.A., MUS.DOC. Principal of Armstrong College, Newcastle-on-Tyne. Formerly Fellow and Tutor of Worcester College, Oxford. Member of Council, Royal College of Music. Editor of *Oxford History of Music*. Author of *Studies in Modern Music*; &c.	**Schubert.**
W. L. F.	WALTER LYNWOOD FLEMING, A.M., PH.D. Professor of History in Louisiana State University. Editor of *Documentary History of Reconstruction*; &c.	**Secession.**
W. L. G.	WILLIAM LAWSON GRANT, M.A. Professor of History at Queen's University, Kingston, Canada. Formerly Beit Lecturer in Colonial History at Oxford University. Editor of *Acts of the Privy Council* (*Colonial Series*); *Canadian Constitutional Development*.	**St John : *Canada* ; St Pierre and Miquelon.**
W. L.-W.	SIR WILLIAM LEE-WARNER, M.A., G.C.S.I. Member of the Council of India. Formerly Secretary in the Political and Secret Department of the India Office. Author of *Life of the Marquis of Dalhousie*; *Memoirs of Field-Marshal Sir Henry Wylie Norman*; &c.	**Sayyid Ahmad Khan, Sir.**

W. M.	WILLIAM MINTO, M.A. See the biographical article : MINTO, WILLIAM.	**Scott, Sir Walter** (*in part*).
W. M. R.	WILLIAM MICHAEL ROSSETTI. See the biographical article : ROSSETTI, DANTE G.	**Sebastiano del Piombo ; Shelley.**
W. P. A.	LIEUT.-COLONEL WILLIAM PATRICK ANDERSON, M.INST.C.E., F.R.G.S. Chief-Engineer, Department of Marine and Fisheries of Canada. Member of the Geographic Board of Canada. Past President of Canadian Society of Civil Engineers.	**St Lawrence :** *River.*
W. R. S.	WILLIAM ROBERTSON SMITH, LL.D. See the biographical article : SMITH, W. R.	**Salt :** *Ancient History and Religious Symbolism.*
W. T. Ca.	WILLIAM THOMAS CALMAN, D.SC., F.Z.S. Assistant in charge of Crustacea, Natural History Museum, South Kensington. Author of "Crustacea," in a *Treatise on Zoology*, edited by Sir E. Ray Lankester.	**Shrimp.**
W. W.	WILLIAM WALLACE. See the biographical article : WALLACE, WILLIAM (1844–1897).	**Schopenhauer** (*in part*).
W. W. R.*	WILLIAM WALKER ROCKWELL, PH.D. Assistant Professor of Church History, Union Theological Seminary, New York. Author of *Die Doppelehe des Landgrafen Philipp von Hessen.*	**Saragossa, Councils of**

PRINCIPAL UNSIGNED ARTICLES

St Vitus's Dance.
Sal Ammoniac.
Salicylic Acid.
Salisbury.
Salt Lake City
Saltpetre.
Salt.
Salvador.
Salvation Army.
Salzburg.
Samoa.
Samoyedes.
Sanctuary.
San Francisco.
Santo Domingo.
Sarsaparilla.
Saskatchewan.
Savannah.
Saxe-Coburg-Gotha.
Saxe-Meiningen.
Saxe-Weimar-Eisenach.
Saxony.
Scarlet Fever.
Schleswig-Holstein.
Scilly Isles.
Scipio.
Scrophulariaceae.
Scurvy.
Seal-Fisheries.
Seattle.
Sea-Urchin.
Sedition.
Seismometer.
Selenium.
Selkirkshire.
Senna.
Sennar.
Sequoia.
Serjeant.
Servo-Bulgarian War.
Settlement.
Severn.
Sewing Machines.
Sextant.
Seychelles.
Shadow.
Shakers.
Shamash.
Sheffield.
Shell-heaps.
Shell-money.
Sheridan.
Shetland.
Shoe.
Shorthand (*modern*).
Shropshire.

ENCYCLOPÆDIA BRITANNICA

ELEVENTH EDITION

VOLUME XXIV

SAINTE-CLAIRE DEVILLE, ÉTIENNE HENRI (1818–1881), French chemist, was born on the 11th of March 1818 in the island of St Thomas, West Indies, where his father was French consul. Together with his elder brother Charles he was educated in Paris at the Collège Rollin. In 1844, having graduated as doctor of medicine and doctor of science, he was appointed to organize the new faculty of science at Besançon, where he acted as dean and professor of chemistry from 1845 to 1851. Returning to Paris in the latter year he succeeded A. J. Balard at the École Normale, and in 1859 became professor at the Sorbonne in place of J. B. A. Dumas, for whom he had begun to lecture in 1853. He died at Boulogne-sur-Seine on the 1st of July 1881.

He began his experimental work in 1841 with investigations of oil of turpentine and tolu balsam, in the course of which he discovered toluene. But his most important work was in inorganic and thermal chemistry. In 1849 he discovered anhydrous nitric acid (nitrogen pentoxide), a substance interesting as the first obtained of the so-called "anhydrides" of the monobasic acids. In 1855, ignorant of what Wöhler had done ten years previously, he succeeded in obtaining metallic aluminium, and ultimately he devised a method by which the metal could be prepared on a large scale by the aid of sodium, the manufacture of which he also developed. With H. J. Debray (1827–1888) he worked at the platinum metals, his object being on the one hand to prepare them pure, and on the other to find a suitable metal for the standard metre for the International Metric Commission then sitting at Paris. With L. J. Troost (b. 1825) he devised a method for determining vapour densities at temperatures up to 1400° C., and, partly with F. Wöhler, he investigated the allotropic forms of silicon and boron. The artificial preparation of minerals, especially of apatite and isomorphous minerals and of crystalline oxides, was another subject in which he made many experiments. But his best known contribution to general chemistry is his work on the phenomena of reversible reactions, which he comprehended under a general theory of "dissociation." He first took up the subject about 1857, and it was in the course of his investigations on it that he devised the apparatus known as the "Deville hot and cold tube."

His brother, CHARLES JOSEPH SAINTE-CLAIRE DEVILLE (1814–1876), geologist and meteorologist, was born in St Thomas on the 26th of February 1814. Having attended at the École des Mines in Paris, he assisted Elie de Beaumont in the chair of geology at the Collège de France from 1855 until he succeeded him in 1874. He made researches on volcanic phenomena, especially on the gaseous emanations. He investigated also the variations of temperature in the atmosphere and ocean. He died at Paris on the 10th of October 1876.

His published works include: *Études géologiques sur les îles de Ténériffe et de Fogo* (1848); *Voyage géologique aux Antilles et aux îles de Ténériffe et de Fogo* (1848–1859); *Recherches sur les principaux phénomènes de météorologie et de physique générale aux Antilles* (1849); *Sur les variations périodiques de la température* (1866), and *Coup d'œil historique sur la géologie* (1878).

ST ELMO'S FIRE, the glow accompanying the slow discharge of electricity to earth from the atmosphere. This discharge, which is identical with the "brush" discharge of laboratory experiments, usually appears as a tip of light on the extremities of pointed objects such as church towers, the masts of ships, or even the fingers of the outstretched hand: it is commonly accompanied by a crackling or fizzing noise. St Elmo's fire is most frequently observed at low levels through the winter season during and after snowstorms.

The name St Elmo is an Italian corruption through *Sant' Ermo* of St Erasmus, a bishop, during the reign of Domitian, of Formiae, Italy, who was broken on the wheel about the 2nd of June 304. He has ever been the patron saint of Mediterranean sailors, who regard St Elmo's fire as the visible sign of his guardianship. The phenomenon was known to the ancient Greeks, and Pliny in his *Natural History* states that when there were two lights sailors called them Castor and Pollux and invoked them as gods. To English sailors St Elmo's fires were known as "corposants" (Ital. *corpo santo*).

See Hazlitt's edition of Brand's *Antiquities* (1905) under "Castor and Pollux."

ST EMILION, a town of south-western France, in the department of Gironde, 2½ m. from the right bank of the Dordogne and 27 m. E.N.E. of Bordeaux by rail. Pop. (1906), town, 1091; commune, 3546. The town derives its name from a hermit who lived here in the 7th and 8th centuries. Picturesquely situated on the slope of a hill, the town has remains of ramparts of the 12th and 13th centuries, with ditches hewn in the rock, and several medieval buildings. Of these the chief is the parish, once collegiate, church of the 12th and 13th centuries. A Gothic cloister adjoins the church. A fine belfry (12th, 13th and 15th centuries) commanding the town is built on the terrace, beneath which are hollowed in the rock the oratory and hermitage of St Emilion, and adjoining them an ancient monolithic church of considerable dimensions. Remains of a monastery of the Cordeliers (15th and 17th centuries), of a building (13th century) known as the Palais Cardinal, and a square keep (the chief relic of a stronghold founded by Louis VIII.) are also to be seen. Disused stone quarries in the side of the hill are used as dwellings by the inhabitants. St Emilion is celebrated for its wines. Its medieval importance, due to the pilgrimages to the tomb of the saint and to the commerce in its wines, began to decline towards the end of the 13th century owing to the foundation of Libourne. In 1272 it was the first of the towns of Guyenne to join the confederation headed by Bordeaux.

SAINTE-PALAYE, JEAN BAPTISTE LA CURNE (or LACURNE) **DE** (1697–1781), French scholar, was born at Auxerre on the 6th of June 1697. His father, Edme, had been gentleman of the bed-chamber to the duke of Orleans, brother of Louis XIV. Sainte-Palaye had a twin brother to whom he was greatly attached, refusing to marry so as not to be separated from him. For some time he held the same position under the regent Orleans as his father had under the duke of Orleans. He had received a thorough education in Latin and Greek, and had a taste for history. In 1724 he had been elected an associate of the *Académie des Inscriptions et Belles-Lettres*, merely from his reputation, as nothing had been written by him before that date. From this time he devoted himself exclusively to the work of this society. After having published numerous memoirs on Roman history, he began a series of studies on the chroniclers of the middle ages for the *Historiens des Gaules et de la France* (edited by Dom Bouquet): Raoul Glaber, Helgaud, the *Gesta* of Louis VII., the chronicle of Morigny, Rigord and his continuator, William le Breton, the monk of St Denis, Jean de Venette, Froissart and the Jouvencel. He made two journeys into Italy with his brother, the first in 1739–1740, accompanied by his compatriot, the president Charles de Brosses, who related many humorous anecdotes about the two brothers, particularly about Jean Baptiste, whom he called "the bilious Sainte-Palaye!" On returning from this tour he saw one of Joinville's manuscripts at the house of the senator Fiorentini, well known in the history of the text of this pleasing memorialist. The manuscript was bought for the king in 1741 and is still at the Bibliothèque nationale. After the second journey (1749) Lacurne published a letter to de Brosses, on *Le Goût dans les arts* (1751). In this he showed that he was not only attracted by manuscripts, but that he could see and admire works of art. In 1759 he published the first edition of his *Mémoires sur l'ancienne chevalerie, considérée comme un établissement politique et militaire*, for which unfortunately he only used works of fiction and ancient stories as sources, neglecting the heroic poems which would have shown him the nobler aspects of this institution so soon corrupted by "courteous" manners; a second edition appeared at the time of his death (3 vols. 1781, 3rd ed. 1826). He prepared an edition of the works of Eustache Deschamps, which was never published, and also made a collection of more than a hundred volumes of extracts from ancient authors relating to French antiquities and the French language of the middle ages. His *Glossaire de la langue française* was ready in 1756, and a prospectus had been published, but the great length of the work prevented him finding a publisher. It remained in manuscript for more than a century. In 1764 a collection of his manuscripts was bought by the government and after his death were placed in the king's library; they are still there (fonds Moreau), with the exception of some which were given to the marquess of Paulmy in exchange, and were later placed in the Arsenal. Lacurne de Sainte-Palaye ceased work about 1771; the death of his brother was greatly felt by him, he became childish, and died on the 1st of March 1781.

Sainte-Palaye had been a member of the Académie Française since 1758. His life was written for this *Académie* by Chamfort and for the Académie des Inscriptions by Dupuy; both works are of no value. See, however, the biography of Lacurne, with a list of his published works and those in manuscript, at the beginning of the tenth and last volume of the *Dictionnaire historique de l'ancien langage françois, ou glossaire de la langue françoise depuis son origine jusqu'au siècle de Louis XIV*, published by Louis Favre (1875–1882).

SAINTES, a town of western France, capital of an arrondissement in the department of Charente-Inférieure, 47 m. S.E. of La Rochelle by the railway from Nantes to Bordeaux. Pop. (1906), town, 13,744; commune, 19,025. Saintes is pleasantly situated on the left bank of the Charente, which separates it from its suburb of Les Dames. It is of interest for its Roman remains, of which the best preserved is the triumphal arch of Germanicus, dating from the reign of Tiberius. This formerly stood on a Roman bridge destroyed in 1843, when it was removed and reconstructed on the right bank of the river. Ruins of baths and of an amphitheatre are also to be seen. The amphitheatre, larger than that of Nîmes, and in area surpassed only by the Coliseum, dates probably from the close of the 1st or the beginning of the 2nd century and was capable of holding 20,000 spectators. A Roman building known as the Capitol was destroyed after the capture of the town from the English by Charles of Alençon, brother of Philip of Valois, in 1330, and its site is occupied by a hospital. Saintes was a bishop's see till 1790; the cathedral of St Peter, built in the first half of the 12th century, was rebuilt in the 15th century, and again after it had been almost destroyed by the Huguenots in 1568. The interior has now an unattractive appearance. The tower (15th century) is 236 ft. high. The church of St Eutropius (founded at the close of the 6th century, rebuilt in the 11th, and had its nave destroyed in the Wars of Religion) stands above a very interesting well-lighted crypt—the largest in France after that of Chartres—adorned with richly sculptured capitals and containing the tomb of St Eutropius (4th or 5th century). The fine stone spire dates from the 15th century. Notre-Dame, a splendid example of the architecture of the 11th and 12th centuries, with a noble clock-tower, is no longer devoted to religious purposes. The old hôtel de ville (16th and 18th centuries) contains a library, and the present hôtel de ville a museum. Bernard Palissy, the porcelain-maker, has a statue in the town, where he lived from 1542 to 1562. Small vessels ascend the river as far as Saintes, which carries on trade in grain, brandy and wine, has iron foundries, works of the state railway, and manufactures earthenware, tiles, &c.

Saintes (*Mediolanum* or *Mediolanium*), the capital of the Santones, was a flourishing town before Caesar's conquest of Gaul; in the middle ages it was capital of the Saintonge. Christianity was introduced by St Eutropius, its first bishop, in the middle of the 3rd century. Charlemagne rebuilt its cathedral. The Normans burned the town in 845 and 854. Richard Cœur de Lion fortified himself within its walls against his father Henry II., who captured it after a destructive siege. In 1242 St Louis defeated the English under its walls and was received into the town. It was not, however, till the reign of Charles V. that Saintes was permanently recovered from the English. The Protestants did great damage during the Wars of Religion.

ST ÉTIENNE, an industrial town of east-central France, capital of the department of Loire, 310 m. S.S.E. of Paris and 36 m. S.S.W. of Lyons by rail. Pop. (1906), town, 130,940; commune, 146,788. St Étienne is situated on the Furens, which flows through it from S.E. to N.W., partly underground, and is an important adjunct to the silk manufacture. The town is uniformly built, its principal feature being the straight thoroughfare nearly 4 m. long which traverses it from N. to S. The chief of the squares is the Place Marengo, which has a statue of F. Garnier, the explorer, and is overlooked by the town hall and the prefecture, both modern. The church of St Étienne dates from the 15th century, and the Romanesque church of the abbey of Valbenoîte is on the S.E. outskirts of the town. A valuable collection of arms and armour, a picture gallery, industrial collections, and a library with numerous manuscripts are in the Palais des Arts. St Étienne is the seat of a prefect, and has an important school of mining, and schools of music, chemistry and dyeing, &c.

The town owes its importance chiefly to the coal-basin which extends between Firminy and Rive-de-Gier over an area 20 m. long by 5 m. wide, and is second only to those of Nord and Pas-de-Calais in France. There are concessions giving employment to some 18,000 workmen and producing annually between 3,000,000 and 4,000,000 tons. The mineral is of two kinds—smelting coal, said to be the best in France, and gas coal. There are manufactures of ribbons, trimmings and other goods made from silk and mixtures of cotton and silk. This industry dates from the early 17th century, is carried on chiefly in small factories (electricity supplying the motive power), and employs at its maximum some 50,000 hands. The attendant industry of dyeing is carried on on a large scale. The manufacture of steel and iron and of heavy iron goods such as armour-plating occupies about 3000 workmen, and about half that number are employed in the production of ironmongery generally. Weaving machinery, cycles, automobiles and agricultural implements are also made. The manufacture of fire-arms, carried on at the national factory under the direction of artillery officers, employs at busy times more than 10,000 men, and can turn out 480,000 rifles in the year. Private firms, employing 4500 hands, make both military rifles and sporting-guns, revolvers, &c. To these industries must be added the manufacture of elastic fabrics, glass, cartridges, liqueurs, hemp-cables, &c.

At the close of the 12th century St Étienne was a parish of the Pays de Gier belonging to the abbey of Valbenoîte. By the middle of the 14th century the coal trade had reached a certain development, and at the beginning of the 15th century Charles VII. permitted the town to erect fortifications. The manufacture of fire-arms for the state was begun at St Étienne under Francis I. and was put under the surveillance of state inspectors early in the 18th century. In 1789 the town was producing at the rate of 12,000 muskets per annum; between September 1794 and May 1796 they delivered over 170,000; and 100,000 was the annual average throughout the period of the empire. The first railways opened in France were the line between St Étienne and Andrézieux on the Loire in 1828 and that between St Étienne and Lyons in 1831. In 1856 St Étienne became the administrative centre of the department instead of Montbrison.

ST EUSTATIUS and **SABA,** two islands in the Dutch West Indies. St Eustatius lies 12 m. N.W. of St Kitts in 17° 50′ N. and 62° 40′ W. It is 8 sq. m. in area and is composed of several volcanic hills and intervening valleys. It contains Orangetown, situated on an open roadstead on the W., with a small export trade in yams and sweet potatoes. Pop. (1908) 1283.

A few miles to the N.W. is the island of SABA, 5 sq. m. in extent. It consists of a single volcanic cone rising abruptly from the sea to the height of nearly 2800 ft. The town, Bottom, standing on the floor of an old crater, can only be approached from the shore 800 ft. below, by a series of steps cut in the solid rock and known as the "Ladder." The best boats in the Caribbees are built here; the wood is imported and the vessels, when complete, are lowered over the face of the cliffs. Pop. (1908) 2294. The islands form part of the colony of Curaçao (*q.v.*).

SAINT-ÉVREMOND, CHARLES DE MARGUETEL DE SAINT-DENIS, SEIGNEUR DE (1610–1703), was born at Saint-Denis-le-Guast, near Coutances, the seat of his family in Normandy, on the 1st of April 1610. He was a pupil of the Jesuits at the *Collège de Clermont* (now Louis-le-Grand), Paris; then a student at Caen. For a time he studied law at the *Collège d'Harcourt.* He soon, however, took to arms, and in 1629 went with Marshal Bassompierre to Italy. He served through great part of the Thirty Years' War, distinguishing himself at the siege of Landrecies (1637), when he was made captain. During his campaigns he studied the works of Montaigne and the Spanish and Italian languages. In 1639 he met Gassendi in Paris, and became one of his disciples. He was present at Rocroy, at Nordlingen and at Lerida. For a time he was personally attached to Condé, but offended him by a satirical remark and was deprived of his command in the prince's guards in 1648. During the Fronde, Saint-Évremond was a steady royalist. The duke of Candale (of whom he has left a very severe portrait) gave him a command in Guienne, and Saint-Évremond, who had reached the grade of *maréchal de camp,* is said to have saved 50,000 livres in less than three years. He was one of the numerous victims involved in the fall of Fouquet. His letter to Marshal Créqui on the peace of the Pyrenees, which is said to have been discovered by Colbert's agents at the seizure of Fouquet's papers, seems a very inadequate cause for his disgrace. Saint-Évremond fled to Holland and to England, where he was kindly received by Charles II. and was pensioned. After James II.'s flight to France Saint-Évremond was invited to return, but he declined. Hortense Mancini, the most attractive of Mazarin's attractive group of nieces, came to England in 1670, and set up a *salon* for love-making, gambling and witty conversation, and here Saint-Évremond was for many years at home. He died on the 29th of September 1703 and was buried in Westminster Abbey, where his monument still is in Poet's Corner close to that of Prior.

Saint-Évremond never authorized the printing of any of his works during his lifetime, though Barbin in 1668 published an unauthorized collection. But he empowered Des Maizeaux to publish his works after his death, and they were published in London (2 vols., 1705), and often reprinted. His masterpiece in irony is the so-called *Conversation du maréchal d'Hocquincourt avec le père Canaye* (the latter a Jesuit and Saint-Évremond's master at school), which has been frequently classed with the *Lettres provinciales.*

His *Œuvres mêlées,* edited from the MSS. by Silvestre and Des Maizeaux, were printed by Jacob Tonson (London, 1705, 2 vols.; 2nd ed., 3 vols., 1709), with a notice by Des Maizeaux. His correspondence with Ninon de Lenclos, whose fast friend he was, was published in 1752; *La Comédie des académistes,* written in 1643, was printed in 1650. Modern editions of his works are by Hippeau (Paris, 1852), C. Giraud (Paris, 1865), and a selection (1881) with a notice by M. de Lescure.

ST FLORENTIN, a town of north-central France, in the department of Yonne, 37 m. S.E. of Sens on the Paris-Lyon-Méditerranée railway. Pop. (1906) 2303. It stands on a hill on the right bank of the Armance, half a mile from its confluence with the Armançon and the canal of Burgundy. In the highest part of the town stands the church, begun in the latter half of the 15th century, and though retaining the Gothic form, with great flying buttresses, is mainly in the Renaissance style. It is approached through a narrow alley up a steep flight of steps, and contains a fine Holy Sepulchre in bas-relief and a choir-screen and stained glass of admirable Renaissance workmanship. The nave, left incomplete, was restored and finished between 1857 and 1862. The market-gardens of St Florentin produce large quantities of asparagus. The town stands on the site of the Roman military post *Castrodunum,* the scene of the martyrdom in the 3rd century of Saints Florentin and Hilaire, round whose tomb it grew up. The abbey established here in the 9th century afterwards became a priory of the abbey of St Germain at Auxerre. The town and its territory belonged, under the Merovingians, to Burgundy, and in later times to the counts of Champagne, from whom it passed to the kings of France. Louis XV. raised it from the rank of viscounty to that of county and bestowed it on Louis Phelypeaux, afterwards Duc de la Vrillière.

ST FLOUR, a town of south-central France, capital of an arrondissement in the department of Cantal, situated at a height of 2900 ft. on a basaltic plateau overlooking the Lander, a tributary of the Truyère, 47 m. E.N.E. of Aurillac by rail. Pop. (1906) 4090. The streets are dark and narrow, but the town has spacious promenades established in the 18th century. St Flour grew up round the tomb of St Florus, the apostle of Auvergne, who died there in the 4th century. The abbey founded there about the beginning of the 11th century became in 1317 an episcopal chapter, and the town is still the seat of a bishopric. The cathedral (1396–1466) is the principal building. The manufacture of coarse woollen fabrics, of earthenware and candles is carried on. A few miles S.E. of the town the gorge of the Truyère is spanned by the fine railway viaduct of Garabit over 600 yds. long and at a height of 400 ft. above the river.

ST GALL (Ger. *St Gallen*), one of the cantons of north-east Switzerland, on the border of the Austrian province of the Vorarlberg and of the independent principality of Liechtenstein. It entirely surrounds the canton of Appenzell, which, like a great part of this canton, formerly belonged to the abbots of St Gall, while the "enclave" of Horn is in the canton of Thurgau.

Its area is 779·3 sq. m., of which 710·1 sq. m. are reckoned "productive," forests covering 157·1 sq. m. and vineyards 1·8 sq. m., while of the remainder 2·8 sq. m. are occupied by glaciers. The altitude above the sea-level varies from 1306 ft. (the lake of Constance) to 10,667 ft. (the Ringelspitz). The canton includes portions of the lake of Constance (21½ sq. m.), of the Walensee (rather over 7 sq. m.), and of the lake of Zürich (4 sq. m.), and several small lakes wholly within its limits. Hilly in its N. region, the height gradually increases towards the S. border, while to its S.W. and E. extend considerable alluvial plains on the banks of the Linth and of the Rhine. The two rivers just named form in part its frontiers, the principal stream within the canton being the Thur (as regards its upper course), with the middle reach of its principal affluent, the Sitter, both forming part of the Rhine basin. It has ports on the lake of Constance (Rorschach) and of Zurich (Rapperswil), as well as Weesen and Walenstadt on the Walensee, while the watering place of Ragatz (*q.v.*) is supplied with hot mineral waters from Pfäfers. The main railway lines from Zürich past Sargans for Coire, and from Sargans past Altstätten and Rorschach for Constance, skirt its borders, while the capital is on the direct railway line from Zürich past Wil to Rorschach, and communicates by rail with Appenzell and with Frauenfeld. In 1900 the population of the canton was 250,285, of whom 243,358 were German-speaking, 5300 Italian-speaking and 710 French-speaking, while there were 150,412 "Catholics" (whether

Roman or "Old"), 99,114 Protestants and 556 Jews (mostly in the town of St Gall). Its capital is St Gall, the other most populous places being Tablat (pop. 12,590), Rorschach (9140), Altstätten (8724), Straubenzell (8090), Gossau (6055) and Wattwil (4971). In the southern and more Alpine portion of the canton the inhabitants mainly follow pastoral pursuits. In 1896 the number of "alps" or mountain pastures in the canton amounted to 304, capable of supporting 21,744 cows, and of an estimated total value of nearly 14 million francs. In the central and northern regions agriculture is generally combined with manufactures.

The canton is one of the most industrial in Switzerland. Cotton-spinning is widely spread, though cloth-weaving has declined. But the characteristic industry is the manufacture, mostly by machines, of muslin, embroidery and lace. It is reckoned that the value of the embroideries and lace exported from the canton amounts to about one-seventh of the total value of the exports from Switzerland. The canton is divided into fifteen administrative districts, which comprise ninety-three communes.

The existing constitution dates from 1890. The legislature or *Grossrat* is elected by the communes, each commune of 1500 inhabitants or less having a right to one member, and as many more as the divisor 1500, or fraction over 750, justifies. Members hold office for three years. For the election of the seven members of the executive or *Regierungsrat*, who also hold office for three years, all the communes form a single electoral circle. The two members of the federal *Ständerat* are named by the legislature, while the thirteen members of the federal *Nationalrat* are chosen by a popular vote. The right of "facultative referendum" or of "initiative" as to legislative projects belongs to any 4000 citizens, but in case of the revision of the cantonal constitution 10,000 must sign the demand. The canton of St Gall was formed in 1803 and was augmented by many districts that had belonged since 1798 to the canton Linth or Glarus—the upper Toggenburg, Sargans (held since 1483 by the Swiss), Gaster and Uznach (belonging since 1438 to Schwyz and Glarus), Gams (since 1497 the property of the same two members), Werdenberg (owned by Glarus since 1517), Sax (bought by Zürich in 1615), and Rapperswil (since 1712 under the protection of Zürich, Bern and Glarus).

AUTHORITIES.—I. von Arx, *Geschichte d. Kant. St Gall* (3 vols., 1810–1813); G. J. Baumgartner, *Geschichte d. schweiz. Freistaates u. Kant. St Gall* (3 vols., Zurich and Stuttgart, 1868–1890); H. Fehr, *Staat u. Kirche in St Gall* (1899); W. Götzinger, *Die romanischen Namen d. Kant. St Gall* (1891); O. Henne am Rhyn, *Geschichte d. Kant. St Gall von 1861* (1896); *Der Kanton St Gall, 1803–1903* (1903); J. Kuoni, *Sagen des Kantons St Gallen* (St Gall, 1903); *St Gallische Geschichtsquellen*, edited by G. Meyer von Knonau; *Mitteilungen z. vaterländischen Geschichte* (publ. by the Cantonal Hist. Soc., from 1861); Th. Schlatter, *Romanische Volksnamen und Verwandtes* (St Gall, 1903); T. Schneider, *Die Alpwirtschaft im Kanton St Gall* (Soleure, 1896); A. Steinmann, *Die ostschweizerische Stickerei-Industrie* (Zürich, 1905); *Urkundenbuch d. Abtei St Gall*, edited by H. Wartmann; H. Wartmann, "Die geschichtliche Entwickelung d. Stadt St Gall bis 1454" (article in vol. xvi., 1868, of the *Archiv f. Schweizer Geschichte*), and Franz Weidmann, *Geschichte d. Stifts u. Landschaft St Gall* (1834). (W. A. B. C.)

ST GALL, capital of the Swiss canton of that name, is situated in the upland valley of the Steinach, 2195 ft. above the sea-level. It is by rail 9 m. S.W. of Rorschach, its port on the lake of Constance, and 53 m. E. of Zürich. The older or central portion of the town retains the air of a small rural capital, but the newer quarters present the aspect of a modern commercial centre. At either extremity considerable suburbs merge in the neighbouring towns of Tablat and of Straubenzell. Its chief building is the abbey church of the celebrated old monastery. This has been a cathedral church since 1846. In its present form it was constructed in 1756–1765. The famous library is housed in the former palace of the abbot, and is one of the most renowned in Europe by reason of its rich treasures of early MSS. and printed books. Other portions of the monastic buildings are used as the offices of the cantonal authorities, and contain the extensive archives both of this monastery and of that of Pfäfers. The ancient churches of St Magnus (Old Catholics) and of St Lawrence (Protestant) were restored in the 19th century. The town library, which is rich in Reformation and post-Reformation MSS. and books, is in the buildings of the cantonal school. The museum contains antiquarian, historical and natural history collections, while the new museum of industrial art has an extensive collection of embroideries of all ages and dates. There are a number of fine modern buildings, such as the Bourse. The town is the centre of the Swiss muslin, embroidery and lace trade. About 10,000 persons were in 1900 occupied in and near the town with the embroidery industry, and about 49,000 in the canton. Cold and fogs prevail in winter (though the town is protected against the north wind), but the heat in summer is rarely intense. In 1900 the population was 33,116 (having just doubled since 1870), of whom almost all were German-speaking, while the Protestants numbered 17,572, the Catholics (Roman or "Old") 15,006 and the Jews 419.

The town of St Gall owes its origin to St Gall, an Irish hermit, who in 614, built his cell in the thick forest which then covered the site of the future monastery, and lived there, with a few companions, till his death in 640. Many pilgrims later found their way to his cell, and about the middle of the 8th century the collection of hermits' dwellings was transformed into a regularly organized Benedictine monastery. For the next three centuries this was one of the chief seats of learning and education in Europe. About 954 the monastery and its buildings were surrounded by walls as a protection against the Saracens, and this was the origin of the town. The temporal powers of the abbots vastly increased, while in the 13th century the town obtained divers privileges from the emperor and from the abbot, who about 1205 became a prince of the Empire. In 1311 St Gall became a free imperial city, and about 1353 the gilds, headed by that of the cloth-weavers, obtained the control of the civic government, while in 1415 it bought its liberty from the German king Sigismund. This growing independence did not please the abbot, who struggled long against it and his rebellious subjects in Appenzell, which formed the central portion of his dominions. After the victory of the Appenzellers at the battle of the Stoss (1405) they became (1411) "allies" of the Swiss confederation, as did the town of St Gall a few months later, this connexion becoming an "everlasting" alliance in 1454, while in 1457 the town was finally freed from the abbot. The abbot, too, became (in 1451) the ally of Zürich, Lucerne, Schwyz and Glarus. In 1468 he bought the county of the Toggenburg from the representatives of its counts, a family which had died out in 1436, and in 1487 built a monastery above Rorschach as a place of refuge against the turbulent citizens, who, however, destroyed it in 1489. The Swiss intervened to protect the abbot, who (1490) concluded an alliance with them which reduced his position almost to that of a "subject district." The townsmen adopted the Reformation in 1524, and this new cause of difference further envenomed their relations with the abbots. Both abbot and town were admitted regularly to the Swiss diet, occupying a higher position than the rest of the "allies" save Bienne, which was on the same footing. But neither succeeded in its attempts to be received a full member of the Confederation, the abbot being too much like a petty monarch and at the same time a kind of "subject" already, while the town could not help much in the way of soldiers. In 1798 and finally in 1805 the abbey was secularized, while out of its dominions (save the Upper Toggenburg, but with the Altstätten district, held since 1490 by the Swiss) and those of the town the canton Säntis was formed, with St Gall as capital. (W. A. B. C.)

SAINT-GAUDENS, AUGUSTUS (1848–1907), American sculptor, was born in Dublin, Ireland, of a French father (a shoemaker by trade), and an Irish mother, Mary McGuinness, on the 1st of March 1848, and was taken to America in infancy. He was apprenticed to a cameo-cutter, studying in the schools of the Cooper Union (1861) and the National Academy of Design, New York (1865–1866). His earliest work in sculpture was a bronze bust (1867) of his father, Bernard P. E. Saint-Gaudens. In 1868 he went to Paris and became a pupil of Jouffroy in the École des Beaux-Arts. Two years later, with his fellow-student Mercié, he went to Italy, where he spent three years. At Rome he executed his statues "Hiawatha" and "Silence." He then settled in New York. In 1874 he made a bust of the statesman, William M. Evarts, and was commissioned to execute a large relief for St Thomas's Church, New York, which brought him

into prominence. His statue of Admiral Farragut, Madison Square, New York, was commissioned in 1878, exhibited at the Paris Salon in 1880 and completed in 1881. It immediately brought the sculptor widespread fame, which was increased by his statue of Lincoln (unveiled 1887), for Lincoln Park, Chicago. In Springfield, Mass., is his "Deacon Chapin," known as "The Puritan." His figure of "Grief" (also known as "Death" and "The Peace of God") for the Adams (Mrs Henry Adams) Memorial, in Rock Creek Cemetery, Washington, D.C., has been described as "an idealization complete and absolute, the rendering of a simple, natural fact—a woman in grief—yet with such deep and embracing comprehension that the individual is magnified into a type." His Shaw Memorial in Boston, a monument to Robert G. Shaw, colonel of a negro regiment in the civil war, was undertaken in 1884 and completed in 1897; it is a relief in bronze, 11 ft. by 15, containing many figures of soldiers, led by their young officer on horseback, a female figure in the clouds pointing onward. In 1903 was unveiled his equestrian statue (begun in 1892) to General Sherman, at the entrance to Central Park, New York; preceding the Union commander is a winged figure of "Victory." This work, with others, formed a group at the Paris exposition of 1900. A bronze copy of his "Amor Caritas" is in the Luxembourg, Paris. Among his other works are relief medallion portraits of Robert Louis Stevenson (in St Giles's Cathedral, Edinburgh) and the French painter Jules Bastien-Lepage; Garfield Memorial, Fairmont Park, Philadelphia; General Logan, Chicago; the Peter Cooper Memorial; and Charles Stewart Parnell in Dublin. Saint-Gaudens was made an officer of the Legion of Honour and corresponding member of the Institute of France. He died at Cornish, N.H., on the 3rd of August 1907. His monument of Phillips Brooks for Boston was left practically completed. Saint-Gaudens is rightly regarded as the greatest sculptor produced by America, and his work had a most powerful influence on art in the United States. In 1877 he married Augusta F. Homer and left a son, Homer Saint-Gaudens. His brother Louis (b. 1854), also a sculptor, assisted Augustus Saint-Gaudens in some of his works.

See Royal Cortissoz, *Augustus St Gaudens* (1907); Lorado Taft, *History of American Sculpture* (1903), containing two chapters devoted to Saint-Gaudens; Kenyon Cox, *Old Masters and New* (1905); C. Lewis Hind, *Augustus St Gaudens* (1908).

ST GAUDENS, a town of south-western France, capital of an arrondissement in the department of Haute-Garonne, 1 m. from the left bank of the Garonne, 57 m. S.S.W. of Toulouse, on the railway to Tarbes. Pop. (1906), town, 4535; commune, 7120. The church, once collegiate, dates chiefly from the 11th and 12th centuries, but the main entrance is in the flamboyant Gothic style. The town has sawing-, oil- and flour-mills, manufactures woollen goods, and is a market for horses, sheep and agricultural produce. St Gaudens derives its name from a martyr of the 5th century, at whose tomb a college of canons was afterwards established. It was important as capital of the Nébouzan, as the residence of the bishops of Comminges and for its cloth industry.

SAINT-GELAIS, MELIN DE (1487–1558), French poet, was born at Angoulême on the 3rd of November 1487. He was the natural son of Octavien de St Gelais (1466–1502), afterwards bishop of Angoulême, himself a poet who had translated the Aeneid into French. Melin, who had studied at Bologna and Padua, had the reputation of being doctor, astrologer and musician as well as poet. He returned to France in 1515, and soon gained favour at the court of Francis I. by his skill in light verse. He was made almoner to the Dauphin, abbot of Reclus in the diocese of Troyes and librarian to the king at Fontainebleau. He enjoyed immense popularity until the appearance of Du Bellay's *Deffense et illustration* . . . in 1549, where St Gelais was not excepted from the scorn poured on contemporary poets. He attempted to ridicule the innovators by reading aloud the Odes of Ronsard with burlesque emphasis before Henry II., when the king's sister, Margaret of Valois, seized the book and read them herself. Ronsard accepted Saint-Gelais's apology for this incident, but Du Bellay satirized the offender in the *Poète courtisan.* In 1554 he collaborated, perhaps with François Habert (1520–1574 ?), in a translation of the *Sophonisbe* of Trissino which was represented (1554) before Catherine de Medicis at Blois. Saint-Gelais was the champion of the *style marotique* and the earliest of French sonneteers. He died in 1558.

His *Œuvres* were edited in 1873 (3 vols., *Bibl. elzévirienne*) by Prosper Blanchemain.

SAINT-GEORGES, GEORGES HENRI VERNOY DE (1799–1875), French dramatist, was born in Paris on the 7th of November 1799. *Saint-Louis ou les deux dîners* (1823), a vaudeville written in collaboration with Alexandre Tardif, was followed by a series of operas and ballets. In 1829 he became manager of the Opéra Comique. Among his more famous libretti are: *Le Val d'Andorre* (1848) for Halévy, and *La Fille du régiment* (1840) for Donizetti. He wrote some fifty pieces in collaboration with Eugène Scribe, Adolphe de Leuven, or Joseph Mazillier, and a great number in collaboration with other authors. Among his novels may be mentioned *Un Mariage de prince.* Saint-Georges died in Paris on the 23rd of December 1875.

SAINT-GERMAIN, COMTE DE (*c.* 1710–*c.* 1780) called *der Wundermann,* a celebrated adventurer who by the assertion of his discovery of some extraordinary secrets of nature exercised considerable influence at several European courts. Of his parentage and place of birth nothing is definitely known; the common version is that he was a Portuguese Jew, but various surmises have been made as to his being of royal birth. It was also stated that he obtained his money, of which he had abundance, from acting as spy to one of the European courts. But this is hard to maintain. He knew nearly all the European languages, and spoke German, English, Italian, French (with a Piedmontese accent), Portuguese and Spanish. Grimm affirms him to have been the man of the best parts he had ever known. He was a musical composer and a capable violinist. His knowledge of history was comprehensive, and his accomplishments as a chemist, on which he based his reputation, were in many ways real and considerable. He pretended to have a secret for removing flaws from diamonds, and to be able to transmute metals. The most remarkable of his professed discoveries was of a liquid which could prolong life, and by which he asserted he had himself lived 2000 years. After spending some time in Persia, Saint-Germain is mentioned in a letter of Horace Walpole's as being in London about 1743, and as being arrested as a Jacobite spy and released. Walpole says: "He is called an Italian, a Spaniard, a Pole; a somebody that married a great fortune in Mexico and ran away with her jewels to Constantinople; a priest, a fiddler, a vast nobleman." At the court of Louis XV., where he appeared about 1748, he exercised for a time extraordinary influence and was employed on secret missions by Louis XV.; but, having interfered in the dispute between Austria and France, he was compelled in June 1760, on account of the hostility of the duke of Choiseul, to remove to England. He appears to have resided in London for one or two years, but was at St Petersburg in 1762, and is asserted to have played an important part in connexion with the conspiracy against the emperor Peter III. in July of that year, a plot which placed Catherine II. on the Russian throne. He then went to Germany, where, according to the *Mémoires authentiques* of Cagliostro, he was the founder of freemasonry, and initiated Cagliostro into that rite. He was again in Paris from 1770 to 1774, and after frequenting several of the German courts he took up his residence in Schleswig-Holstein, where he and the Landgrave Charles of Hesse pursued together the study of the "secret" sciences. He died at Schleswig in or about 1780–1785, although he is said to have been seen in Paris in 1789.

Andrew Lang in his *Historical Mysteries* (1904) discusses the career of Saint-Germain, and cites the various authorities for it. Saint-Germain figures prominently in the correspondence of Grimm and of Voltaire. See also Oettinger, *Graf Saint-German* (1846); F. Bülau, *Geheime Geschichten und räthselhafte Menschen,* Band i. (1850–1860); Lascelles Wraxall, *Remarkable Adventures* (1863); and U. Birch in the *Nineteenth Century* (January 1908).

SAINT-GERMAIN, CLAUDE LOUIS, COMTE DE (1707–1778), French general, was born on the 15th of April 1707, at the Château of Vertamboz. Educated at Jesuit schools, he intended to enter the priesthood, but at the last minute obtained from

Louis XV. an appointment as sub-lieutenant. He left France, according to the gossip of the time, because of a duel; served under the elector palatine; fought for Hungary against the Turks, and on the outbreak of the war of the Austrian Succession (1740) joined the army of the elector of Bavaria (who later became emperor under the name of Charles VII.), displaying such bravery that he was promoted to the grade of lieutenant field-marshal He left Bavaria on the death of Charles VII., and after brief service under Frederick the Great joined Marshal Saxe in the Netherlands and was created a field-marshal of the French army. He distinguished himself especially at Lawfeld, Rancoux and Maastricht. On the outbreak of the Seven Years' War (1756) he was appointed lieutenant-general, and although he showed greater ability than any of his fellow-commanders and was admired by his soldiers, he fell a victim to court intrigues, professional jealousy and hostile criticism. He resigned his commission in 1760 and accepted an appointment as field-marshal from Frederick V. of Denmark, being charged in 1762 with the reorganization of the Danish army. On the death of Frederick in 1766 he returned to France, bought a small estate in Alsace near Lauterbach, and devoted his time to religion and farming. A financial crisis swept away the funds that he had saved from his Danish service and rendered him dependent on the bounty of the French ministry of war. Saint-Germain was presented at court by the reformers Turgot and Malesherbes, and was appointed minister of war by Louis XVI. on the 25th of October 1775. He sought to lessen the number of officers and to establish order and regularity in the service. His efforts to introduce Prussian discipline in the French army brought on such opposition that he resigned in September 1777. He accepted quarters from the king and a pension of 40,000 livres, and died in his apartment at the arsenal on the 15th of January 1778.

ST GERMAIN-EN-LAYE, a town of northern France, in the department of Seine-et-Oise, 13 m. W.N.W. of Paris by rail. Pop. (1906), town, 14,974; commune, 17,288. Built on a hill on the left bank of the Seine, nearly 300 ft. above the river, and on the edge of a forest 10,000 to 11,000 acres in extent, St Germain has a bracing climate, which makes it a place of summer residence for Parisians. The terrace of St Germain, constructed by A. Lenôtre in 1672, is 1½ m. long and 100 ft. wide; it was planted with lime trees in 1745 and affords an extensive view over the valley of the Seine as far as Paris and the surrounding hills: it ranks as one of the finest promenades in Europe.

A monastery in honour of St Germain, bishop of Paris, was built in the forest of Laye by King Robert. Louis VI. erected a castle close by. Burned by the English, rebuilt by Louis IX., and again by Charles V., this castle did not reach its full development till the time of Francis I., who may be regarded as the real founder of the building. A new castle was begun by Henry II. and completed by Henry IV.; it was subsequently demolished, with the exception of the so-called Henry IV. pavilion, where Thiers died in 1877. The old castle has been restored to the state in which it was under Francis I. The restoration is particularly skilful in the case of the chapel, which dates from the first half of the 13th century. In the church of St Germain is a mausoleum erected by George IV. of England (and restored by Queen Victoria) to the memory of James II. of England, who after his deposition resided in the castle for twelve years and died there in 1701. In one of the public squares is a statue of Thiers. At no great distance in the forest is the Couvent des Loges, a branch of the educational establishment of the Legion of Honour (St Denis). The fête des Loges (end of August and beginning of September) is one of the most popular in the neighbourhood of Paris.

ST GERMANS, a small town in the Bodmin parliamentary division of Cornwall, England, pleasantly situated on the river Lynher, 9½ m. W. by N. of Plymouth by the Great Western railway. Pop. (1901) 2384. It contains a fine church dedicated to St Germanus. The west front is flanked by towers both of which are Norman in the lower parts, the upper part being in the one Early English and in the other Perpendicular. The front itself is wholly Norman, having three windows above a porch with a beautiful ornate doorway. Some Norman work remains in the body of the church, but the most part is Perpendicular or Decorated. Port Eliot, a neighbouring mansion, contains an excellent collection of pictures, notably several works of Sir Joshua Reynolds.

St Germans is supposed to have been the original seat of the Cornish bishopric. It was the see of Bishop Burhwold, who died in 1027. Under Leofric, who became bishop of Crediton and Cornwall in 1046, the see was removed to Exeter. Bishop Leofric founded a priory at St Germans and bestowed upon it twelve of the twenty-four hides which in the time of the Confessor constituted the bishops' manor of St Germans.. There was then a market on Sundays, but at the time of the Domesday Survey this had been reduced to nothing owing to a market established by the count of Mortain on the same day at Trematon castle. In 1302 the grant of infangenethef, assize of bread and ale, waif and stray by Henry III. was confirmed to the bishop, who in 1311 obtained a further grant of a market on Fridays and a fair at the feast of St Peter ad Vincula. In 1343 the prior sustained his claim to a prescriptive market and fair at St Germans. After the suppression the borough belonging to the priory remained with the crown until 1610. Meanwhile Queen Elizabeth created it a parliamentary borough. From 1563 to 1832 it returned two members to the House of Commons. In 1815 John Eliot was created earl of St Germans, and in 1905 the first suffragan bishop of Truro was consecrated bishop of St Germans.

ST GILLES, a town of southern France, in the department of Gard, on the canal from the Rhone to Cette, 12½ m. S.S.E. of Nîmes by road. Pop. (1906) 5292. In the middle ages St Gilles, the ancient *Vallis Flaviana*, was the seat of an abbey founded towards the end of the 7th century by St Aegidius (St Gilles). It acquired wealth and power under the counts of Toulouse, who added to their title that of counts of St Gilles. The church, which survives, was founded in 1116 when the abbey was at the height of its prosperity. The lower part of the front (12th century) has three bays decorated with columns and bas-reliefs, and is the richest example of Romanesque art in Provence. The rest of the church is unfinished, only the crypt (12th century) and part of the choir, containing a spiral staircase, being of interest. Besides the church there is a Romanesque house serving as presbytery. The decadence of the abbey dates from the early years of the 13th century when the pilgrimage to the tomb of the saint became less popular; the monks also lost the patronage of the counts of Toulouse, owing to the penance inflicted by them on Raymond VI. in 1209 for the murder of the papal legate Pierre de Castelnau. St Gilles was the seat of the first grand priory of the Knights Hospitallers in Europe (12th century) and was of special importance as their place of embarkation for the East. In 1226 the countship of St Gilles was united to the crown. In 1562 the Protestants ravaged the abbey, which they occupied till 1622, and in 1774 it was suppressed.

ST GIRONS, a town of south-western France, capital of an arrondissement in the department of Ariège, 29 m. W. of Foix by rail. Pop. (1906) 5216. The town is situated on the Salat at the foot of the Pyrenees. There are mineral springs at Audinac in the vicinity, and the watering-place of Aulus, about 20 m. to the S.S.E., is reached by road from St Girons. St Lizier-de-Couserans (*q.v.*), an ancient episcopal town, is 1 m. N.N.W.

ST GOAR, a town of Germany, in the Prussian Rhine Province, on the left bank of the Rhine, opposite St Goarshausen and just below the famous Lorelei, 12 m. above Boppard by the railway from Coblenz to Mainz. Pop. (1905) 1475. It is in part surrounded by the ruins of its old walls, and contains an Evangelical church, with some Renaissance monuments, and a Roman Catholic church with an image of St Goar of Aquitania, around whose chapel the place originally arose. Below the town, high on an eminence above the Rhine, stands Schloss Rheinfels, the property of the king of Prussia, the most perfect of the feudal castles on the banks of the river. In the later middle ages St Goar was the capital of the county of Katzenelnbogen, and on the extinction of this family it passed to Hesse-Cassel. It came into the possession of Prussia in 1815.

ST GOTTHARD PASS, the principal route from northern Europe to Italy. It takes its name (it is not known wherefore) from St Gotthard, bishop of Hildesheim (d. 1038), but does not seem to be mentioned before the early 13th century, perhaps because the access to it lies through two very narrow Alpine

valleys, much exposed to avalanches. The hospice on the summit is first mentioned in 1331, and from 1683 onwards was in charge of two Capuchin friars. But in 1775 the buildings near it were damaged by an avalanche, while in 1799-1800 everything was destroyed by the French soldiery. Rebuilt in 1834, the hospice was burnt in March 1905. The mule path (dating from about 1293) across the pass served for many centuries, for though Mr Greville, in 1775, succeeded in taking a light carriage across, the carriage-road was only constructed between 1820 and 1830. Now the pass is deserted in favour of the great tunnel (pierced in 1872–1880, 9¼ m. in length, and attaining a height of 3786 ft.), through which runs the railway (opened in 1882) from Lucerne to Milan (175½ m.), one of the greatest engineering feats of the 19th century. It runs mainly along the eastern shore of the Lake of Lucerne, from Lucerne to Flüelen (32¼ m.), and then up the Reuss valley past Altdorf and Wassen, near which is the first of the famous spiral tunnels, to Goeschenen (56 m. from Lucerne). Here the line leaves the Reuss valley to pass through the tunnel and so gain, at Airolo, the valley of the Ticino or the Val Leventina, which it descends, through several spiral tunnels, till at Biasca (38 m. from Goeschenen) it reaches more level ground. Thence it runs past Bellinzona to Lugano (30½ m. from Biasca) and reaches Italian territory at Chiasso, 35 m. from Milan. In 1909 the Swiss government exercised the right accorded to it by the agreement of 1879 of buying the St Gotthard Railway from the company which built it within thirty years of that date. (W. A. B. C.)

ST HELENA, an island and British possession in the South Atlantic in 15° 55′ 26″ S., 5° 42′ 30″ W. (Ladder Hill Observatory). It lies 700 m. S.E. of the island of Ascension (the nearest land), 1200 m. W. of Mossamedes (the nearest African port), 1695 N.W. of Cape Town, and is distant from Southampton 4477 m. It has an area of about 47 sq. m., the extreme length from S.W. to N.E. being 10¼ m. and the extreme breadth 8¼. The island is of volcanic formation, but greatly changed by oceanic abrasion and atmospheric denudation. Its principal feature, a semi-circular ridge of mountains, open towards the south-east and south, with the culminating summit of Diana's Peak (2704 ft.) is the northern rim of a great crater; the southern rim has disappeared, though its débris apparently keeps the sea shallow (from 20 to 50 fathoms) for some 2 m. S.E. of Sandy Bay, which hypothetically forms the centre of the ring. From the crater wall outwards water-cut gorges stretch in all directions, widening as they approach the sea into valleys, some of which are 1000 ft. deep, and measure one-eighth of a mile across at bottom and three-eighths across the top (Melliss). These valleys contain small streams, but the island has no rivers properly so called. Springs of pure water are, however, abundant. Along the enclosing hillsides caves have been formed by the washing out of the softer rocks. Basalts, andesites and phonolites represent the chief flows. Many dikes and masses of basaltic rock seem to have been injected subsequently to the last volcanic eruptions from the central crater. The Ass's Ears and Lot's Wife, picturesque pinnacles standing out on the S.E. part of the crater ridge, and the Chimney on the coast south of Sandy Bay, are formed out of such injected dikes and masses. In the neighbourhood of Man and Horse (S.W. corner of the island), throughout an area of about 40 acres, scarcely 50 sq. yds. exist not crossed by a dyke. On the leeward (northern) side of St Helena the sea-face is generally formed by cliffs from 600 to 1000 ft. high, and on the windward side these heights rise to about 2000 ft., as at Holdfast Tom, Stone Top and Old Joan Point. The only practicable landing-place is on the leeward side at St James's Bay—an open roadstead. From the head of the bay a narrow valley extends for 1½ m. The greatest extent of level ground is in the N.E. of the island, where are the Deadwood and Long-wood plains, over 1700 ft. above the sea.

Climate.—Although it lies within the tropics the climate of the island is healthy and temperate. This is due to the south-east trade-wind, constant throughout the year, and to the effect of the cold waters of the South Atlantic current. As a result the temperature varies little, ranging on the sea level from 68° to 84° in summer and 57° to 70° in winter. The higher regions are about 10° cooler. The rainfall varies considerably, being from 30 to 50 in. a year in the hills.

Flora.—St Helena is divided into three vegetation zones: (1) the coast zone, extending inland for 1 m. to 1½ m., formerly clothed with a luxuriant vegetation, but now "dry, barren, soilless, lichen-coated, and rocky," with little save prickly pears, wire grass and *Mesembryanthemum*; (2) the middle zone (400-1800 ft.), extending about three-quarters of a mile inland, with shallower valleys and grassier slopes—the English broom and gorse, brambles, willows, poplars, Scotch pines, &c., being the prevailing forms; and (3) the central zone, about 3 m. long and 2 m. wide, the home, for the most part, of the indigenous flora. According to W. B. Hemsley (in his report on the botany of the Atlantic Islands),[1] the certainly indigenous species of plants are 65, the probably indigenous 24 and the doubtfully indigenous 5; total 94. Of the 38 flowering plants 20 are shrubs or small trees. With the exception of *Scirpus nodosus*, all the 38 are peculiar to the island; and the same is true of 12 of the 27 vascular cryptogams (a remarkable proportion). Since the flora began to be studied, two species—*Melhania melanoxylon* and *Acalypha rubra*—are known to have become extinct; and at least two others have probably shared the same fate—*Heliotropium pennifolium* and *Demazeria obliterata*. *Melhania melanoxylon*, or "native ebony," once abounded in parts of the island now barren; but the young trees were allowed to be destroyed by the goats of the early settlers, and it is now extinct. Its beautiful congener *Melhania erythroxylon* ("redwood") was still tolerably plentiful in 1810, but is now reduced to a few specimens. Very rare, too, has become *Pelargonium cotyledonis*, called "Old Father Live-for-ever," from its retaining vitality for months without soil or water. *Commidendron robustum* ("gumwood"), a tree about 20 ft. high, once the most abundant in the island, was represented in 1868 by about 1300 or 1400 examples; and *Commidendron rugosum* ("scrubwood") is confined to somewhat limited regions. Both these plants are characterized by a daisy- or aster-like blossom. The affinities of the indigenous flora of St Helena were described by Sir Joseph Hooker as African, but George Bentham points out that the *Compositae* shows, at least in its older forms, a connexion rather with South America. The exotic flora introduced from all parts of the world gives the island almost the aspect of a botanic garden. The oak, thoroughly naturalized, grows alongside of the bamboo and banana. Among other trees and plants are the common English gorse; *Rubus pinnatus*, probably introduced from Africa about 1775; *Hypochaeris radicata*, which above 1500 ft. forms the dandelion of the country; the beautiful but aggressive *Buddleia Madagascariensis*; *Physalis peruviana*; the common castor-oil plant; and the pride of India. The peepul is the principal shade tree in Jamestown, and in Jamestown valley the date-palm grows freely. Orange and lemon trees, once common, are now scarce.

Fauna.—St Helena possesses no indigenous vertebrate land fauna. The only land groups well represented are the beetles and the land shells. T. V. Wollaston, in *Coleoptera Sanctae Helenae* (1877), shows that out of a total list of 203 species of beetles 129 are probably aboriginal and 128 peculiar to the island—an individuality perhaps unequalled in the world. More than two-thirds are weevils and a vast majority wood-borers, a fact which bears out the tradition of forests having once covered the island. The *Hemiptera* and the land-shells also show a strong residuum of peculiar genera and species. A South American white ant (*Termes tenuis*, Hagen.), introduced from a slave-ship in 1840, soon became a plague at Jamestown, where it consumed a large part of the public library and the woodwork of many buildings, public and private. Practically everything had to be rebuilt with teak or cypress—the only woods the white ant cannot devour. Fortunately it cannot live in the higher parts of the island. The honey-bee, which throve for some time after its introduction, again died out (cf. A. R. Wallace, *Island Life*, 1880). Besides domestic animals the only land mammals are rabbits, rats and mice, the rats being especially abundant and building their nests in the highest trees. Probably the only endemic land bird is the wire bird, *Aegialitis sanctae Helenae*; the averdevat, Java sparrow, cardinal, ground-dove, partridge (possibly the Indian *chukar*), pheasant and guinea-fowl are all common. The pea-fowl, at one time not uncommon in a wild state, is long since exterminated. There are no freshwater fish, beetles or shells. Of sixty-five species of sea-fish caught off the island seventeen are peculiar to St Helena; economically the more important kinds are gurnard, eel, cod, mackerel, tunny, bullseye, cavalley, flounder, hog-fish, mullet and skulpin.

Inhabitants.—When discovered the island was uninhabited. The majority of the population are of mixed European (British, Dutch, Portuguese), East Indian and African descent—the Asiatic strain perhaps predominating; the majority of the early settlers having been previously members of the crews of ships returning to Europe from the East. From 1840 onward for a considerable period numbers of freed slaves of West African origin were settled here by men-of-war engaged in suppressing the slave trade. Their descendants form a distinct element

[1] In the "Challenger" expedition reports, *Botany*, vol. i. (1885).

in the population. Since the substitution of steamships for sailing vessels and the introduction of new methods of preserving meat and vegetables (which made it unnecessary for sailing vessels to take fresh provisions from St Helena to avoid scurvy) the population has greatly diminished. In 1871 there were 6444 inhabitants; in 1909 the civil population was estimated at 3553. The death-rate that year, 6·4 per 1000, was the lowest on record in the island. The only town, in which live more than half the total population, is Jamestown. Longwood, where Napoleon died in 1821, is 3½ m. E. by S. of Jamestown. In 1858 the house in which he lived and died was presented by Queen Victoria to Napoleon III., who had it restored to the condition, but unfurnished, in which it was at the time of Bonaparte's death.

Agriculture, Industries, &c.—Less than a third of the area of the island is suitable for farming, while much of the area which might be (and formerly was) devoted to raising crops is under grass. The principal crop is potatoes, which are of very good quality. They were chiefly sold to ships—especially to "passing" ships. They are now occasionally exported to the Cape. Cattle and sheep were raised in large numbers when a garrison was maintained, so that difficulty has been found in disposing of surplus stock now that the troops have been withdrawn. The economic conditions which formerly prevailed were entirely altered by the substitution of steamers for sailing vessels, which caused a great decrease in the number of ships calling at Jamestown. A remedy was sought in the establishment of industries. An attempt made in 1869–1872 to cultivate cinchona proved unsuccessful. Attention was also turned to the aloe (*Furcraea gigantea*), which grows wild at mid elevations, and the New Zealand flax (*Phormium tenax*), an introduced plant, for their utilization in the manufacture of fibre. From 1875 to 1881 a company ran a mill at which they turned out both aloe and flax fibre, but the enterprise proved unremunerative. In 1907 the government, aided by a grant of £4070 from the imperial exchequer, started a mill at Longwood for the manufacture of phormium fibre, with encouraging results. Fish curing and lace making are also carried on to some extent.

Trade is chiefly dependent upon the few ships that call at Jamestown—now mostly whalers or vessels in distress. There is also some trade with ships that "pass" without "calling."[1] In thirty years (1877–1907) the number of ships "calling" at the port sank from 664 with 449,724 tonnage to 57 with 149,182 tonnage. In the last-named year the imports were valued at £35,614; the exports (excluding specie) at £1787 but the goods supplied to "passing" vessels do not figure in these returns. In 1908 fibre and tow (valued at £3557) were added to the exports, and in 1909 a good trade was done with Ascension in sheep. St Helena is in direct telegraphic communication with Europe and South Africa, and there is a regular monthly mail steamship service.

Government, Revenue, &c.—St Helena is a Crown colony. The island has never had any form of local legislative chamber, but the governor (who also acts as chief justice) is aided by an executive council. The governor alone makes laws, called ordinances, but legislation can also be effected by the Crown by order in council. The revenue, £10,287 in 1905, had fallen in 1909 to £8778 (including a grant in aid of £2500), the expenditure in each of the five years (1905–1909) being in excess of the revenue. Elementary education is provided in government and private schools. St Helena is the seat of an Anglican bishopric established in 1859. Ascension and Tristan da Cunha are included in the diocese.

History.—The island was discovered on the 21st of May 1502 by the Portuguese navigator João de Nova, on his voyage home from India, and by him named St Helena. The Portuguese found it uninhabited, imported live stock, fruit-trees and vegetables, built a chapel and one or two houses, and left their sick there to be taken home, if recovered, by the next ship, but they formed no permanent settlement. Its first known permanent resident was Fernando Lopez, a Portuguese in India, who had turned traitor and had been mutilated by order of Albuquerque. He preferred being marooned to returning to Portugal in his maimed condition, and was landed at St Helena in 1513 with three or four negro slaves. By royal command he visited Portugal some time later, but returned to St Helena, where he died in 1546. In 1584 two Japanese ambassadors to Rome landed at the island. The first Englishman known to have visited it was Thomas Cavendish, who touched there in June 1588 during his voyage round the world. Another English seaman, Captain Kendall, visited St Helena in 1591, and in 1593 Sir James Lancaster stopped at the island on his way home from the East. In 1603 the same commander again visited St Helena on his return from the first voyage equipped by the East India Company. The Portuguese had by this time given up calling at the island, which appears to have been occupied by the Dutch about 1645. The Dutch occupation was temporary and ceased in 1651, the year before they founded Cape Town. The British East India Company appropriated the island immediately after the departure of the Dutch, and they were confirmed in possession by a clause in their charter of 1661. The company built a fort (1658), named after the duke of York (James II.), and established a garrison in the island. In 1673 the Dutch succeeded in obtaining possession, but were ejected after a few months' occupation. Since that date St Helena has been in the undisturbed possession of Great Britain, though in 1706 two ships anchored off Jamestown were carried off by the French. In 1673 the Dutch had been expelled by the forces of the Crown, but by a new charter granted in December of the same year the East India Company were declared "the true and absolute lords and proprietors" of the island. At this time the inhabitants numbered about 1000, of whom nearly half were negro slaves. In 1810 the company began the importation of Chinese from their factory at Canton. During the company's rule the island prospered, thousands of homeward-bound vessels anchored in the roadstead in a year, staying for considerable periods, refitting and revictualling. Large sums of money were thus expended in the island, where wealthy merchants and officials had their residence. The plantations were worked by the slaves, who were subjected to very barbarous laws until 1792, when a new code of regulations ensured their humane treatment and prohibited the importation of any new slaves. Later it was enacted that all children of slaves born on or after Christmas Day 1818 should be free, and between 1826 and 1836 all slaves were set at liberty.

Among the governors appointed by the company to rule at St Helena was one of the Huguenot refugees, Captain Stephen Poirier (1697–1707), who attempted unsuccessfully to introduce the cultivation of the vine. A later governor (1741–1742) was Robert Jenkin (*q.v.*) of "Jenkin's ear" fame. Dampier visited the island twice, in 1691 and 1701; Halley's Mount commemorates the visit paid by the astronomer Edmund Halley in 1676–1678—the first of a number of scientific men who have pursued their studies on the island.

In 1815 the British government selected St Helena as the place of detention of Napoleon Bonaparte. He was brought to the island in October of that year and lodged at Longwood, where he died in May 1821. During this period the island was strongly garrisoned by regular troops, and the governor, Sir Hudson Lowe, was nominated by the Crown. After Napoleon's death the East India Company resumed full control of St Helena until the 22nd of April 1834, on which date it was in virtue of an act passed in 1833 vested in the Crown. As a port of call the island continued to enjoy a fair measure of prosperity until about 1870. Since that date the great decrease in the number of vessels visiting Jamestown has deprived the islanders of their principal means of subsistence. When steamers began to be substituted for sailing vessels and when the Suez Canal was opened (in 1869) fewer ships passed the island, while of those that still pass the greater number are so well found that it is unnecessary for them to call (see also § *Inhabitants*). The withdrawal in 1906 of the small garrison, hitherto maintained by the imperial government, was another cause of depression. During the Anglo-Boer war of 1899–1902 some thousands of Boer prisoners were detained at St Helena, which has also served as the place of exile of several Zulu chiefs, including Dinizulu.

BIBLIOGRAPHY.—J. C. Melliss, *St Helena: a Physical, Historical and Topographical Description of the Island, including its Geology, Fauna, Flora and Meteorology* (London, 1875); E. L. Jackson, *St Helena* (London, 1903); T. H. Brooke, *History of the Island of St Helena . . . to 1823* (2nd ed., London, 1824), in this book are cited many early accounts of the island; General A. Beatson (governor of the island 1808–1813), *Tracts Relative to the Island of St Helena*

[1] "Calling" ships are those which have been boarded by the harbour master and given pratique. Since 1886 boatmen are allowed to communicate with ships that have not obtained pratique, and these are known as "passing" ships.

(London? 1816); *Extracts from the St Helena Records from 1673 to 1835* (compiled by H. R. Janisch, sometime governor of the island, Jamestown, 1885); Charles Darwin, *Geological Observations on Volcanic Islands* (1844). For a condensed general account consult (Sir) C. P. Lucas, *Historical Geography of the British Colonies* (vol. iii., *West Africa*, 2nd ed., Oxford, 1900). See also M. Danvers, *Report on the Records of the India Office*, vol. i. pt. i. (London, 1887); *The Africa Pilot*, pt. ii. (5th ed., 1901); *Report on the Present Position and Prospects of the Agricultural Resources of the Island of St Helena*, by (Sir) D. Morris (1884; reprinted 1906). (R. L. A.; F. R. C.)

ST HELENS, a market town and municipal, county, and parliamentary borough of Lancashire, England, 14 m. E.N.E. from Liverpool, on the London & North-Western and Great Central railways. Pop. (1891) 72,413; (1901) 84,410. A canal communicates with the Mersey. The town is wholly of modern development. Besides the town hall and other public buildings and institutions there may be mentioned the Gamble Institute, erected and presented by Sir David Gamble, Bart., for a technical school, educating some 2000 students, and library. Among several public pleasure grounds the principal are the Taylor Park of 48 acres, and the smaller Victoria and Thatto Heath Parks. This is the principal seat in England for the manufacture of crown, plate, and sheet glass; there are also art glass works, and extensive copper smelting and refining works, as well as chemical works, iron and brass foundries, potteries and patent medicine works. There are collieries in the neighbourhood. To the north of the town are a few ecclesiastical ruins, known as Windleshaw Abbey, together with a well called St Thomas' well, but the history of the foundation is not known. The parliamentary borough (1885) returns one member. The county borough was created in 1888. The town was incorporated in 1868, and the corporation consists of a mayor, 9 aldermen and 27 councillors. Area 7285 acres.

ST HELIER, the chief town of Jersey, the largest of the Channel Islands. Pop. (1901) 27,866. It lies on the south coast of the island on the eastern side of St Aubin's Bay. The harbour is flanked on the W. by a rocky ridge on which stands Elizabeth Castle, and commanded on the east by Fort Regent on its lofty promontory. The parish church is a cruciform building with embattled tower, dating in part from the 14th century. It contains a monument to Major Peirson, who on the occasion of a French attack on Jersey in 1781 headed the militia to oppose them, and forced them to surrender, but was killed as his followers were at the point of victory. The French leader, Baron de Rullecourt, is buried in the churchyard. The spot where Peirson fell, in what is now called Peirson Place, is marked by a tablet. A large canvas by John Singleton Copley depicting the scene is in the National Gallery, London, and a copy is in the court house of St Helier. This building (*la Cohue*), in Royal Square, is the meeting-place of the royal court and deliberative States of Jersey. Victoria College was opened in 1852 and commemorates a visit of Queen Victoria and the prince consort to the island in 1846. A house in Marine Terrace is distinguished as the residence of Victor Hugo (1851–1855). Elizabeth Castle, which is connected with the mainland by a causeway, dates from 1551–1590; and in 1646 and 1649 Prince Charles resided here. In 1649 he was proclaimed king, as Charles II., in Jersey by the royalist governor George Carteret. On actually coming to the throne he gave the island the mace which is still used at the meetings of the court and States. Close to the castle are remnants of a chapel or cell, from which the rock on which it stands is known as the Hermitage, dating probably from the 9th or 10th century, and traditionally connected with the patron saint Helerius.

SAINT-HILAIRE, AUGUSTIN FRANÇOIS CÉSAR PROUVENÇAL DE, commonly known as AUGUSTE DE (1799–1853), French botanist and traveller, was born at Orleans on the 4th of October 1799. He began to publish memoirs on botanical subjects at an early age. In 1816–1822 and in 1830 he travelled in South America, especially in south and central Brazil, and the results of his study of the rich flora of the regions through which he passed appeared in several books and numerous articles in scientific journals. The works by which he is best known are the *Flora Brasiliae Meridionalis* (3 vols., folio, with 192 coloured plates, 1825–1832), published in conjunction with A. de Jussieu and J. Cambessèdes, *Histoire des plantes les plus remarquables du Brésil et de Paraguay* (1 vol. 4to, 30 plates, 1824), *Plantes usuelles des Brésiliens* (1 vol. 4to, 70 plates, 1827–1828), also in conjunction with De Jussieu and Cambessèdes, and *Voyage dans le district des diamants et sur le littoral du Brésil* (2 vols., 8vo, 1833). His *Leçons de botanique, comprenant principalement la morphologie végétale* (1840), was a comprehensive exposition of botanical morphology and of its application to systematic botany. He died at Orleans on the 30th of September 1853.

ST HUBERT, a small town of Belgium in the province of Luxemburg and in the heart of the Ardennes. Pop. (1904) 3204. It is famous for its abbey church containing the shrine of St Hubert, and for its annual pilgrimage. According to tradition the church and a monastery attached to it were founded in the 7th century by Plectrude, wife of Pippin of Herstal. The second church was built in the 12th century, but burnt by a French army under Condé in the 16th century. The present building is its successor, but has been restored in modern times and presents no special feature. The tomb of St Hubert—a marble sarcophagus ornamented with bas-reliefs and having four statuettes of other saints at the angles—stands in one of the side chapels. The legend of the conversion of St Hubert—a hunter before he was a saint—by his meeting in the forest a stag with a crucifix between its antlers, is well known, and explains how he became the patron saint of huntsmen. The place where he is supposed to have met the stag is still known as "*la converserie*" and is almost 5 m. from St Hubert on the road to La Roche. The pilgrimage of St Hubert in May attracts annually between thirty and fifty thousand pilgrims. The buildings of the old monastery have been utilized for a state training-school for waifs and strays, which contains on an average five hundred pupils. In the middle ages the abbey of St Hubert was one of the most important in Europe, owning forty villages with an annual income of over 80,000 crowns. During the French Revolution, when Belgium was divided into several departments, the possessions of the abbey were sold for £75,000, but the bishop of Namur was permitted to buy the church itself for £1350.

ST HYACINTHE, a city and port of entry of Quebec, Canada, and capital of St Hyacinthe county, 32 m. E.N.E. of Montreal, on the left bank of the river Yamaska and on the Grand Trunk, Canadian Pacific, Intercolonial, and Quebec Southern railways. Pop. (1901) 9210. It is the seat of a Roman Catholic bishop, and contains a classical college, dairy school, two monasteries and several other educational and charitable institutions. It has manufactures of organs, leather, woollens and agricultural implements, and is an important distributing centre for the surrounding district.

SAINTINE, JOSEPH XAVIER (1798–1865), French novelist and dramatist, whose real surname was BONIFACE, was born in Paris on the 10th of July 1798. In 1823 he produced a volume of poetry in the manner of the Romanticists, entitled *Poèmes, odes, épîtres*. In 1836 appeared *Picciola*, the story of the comte de Charney, a political prisoner in Piedmont, whose reason was saved by his cult of a tiny flower growing between the paving stones of his prison yard. This story is a masterpiece of the sentimental kind, and has been translated into many European languages. He produced many other novels, none of striking individuality with the exception of *Seul* (1857), which purported to be the authentic record of Alexander Selkirk on his desert island. Saintine was a prolific dramatist, and collaborated in some hundred pieces with Scribe and others, usually under the name of Xavier. He died on the 21st of January 1865.

ST INGBERT, a town of Germany, in the kingdom of Bavaria on the Rohrbach, 14 m. by rail W. of Zweibrücken. Pop. (1905) 15,521. It has coal-mines and manufactures of glass and machinery. There are also large iron and steel works in the town, and other industries are the making of powder, leather, cigars, soap and cotton. St Ingbert is named after the Irish saint, St Ingobert, and belonged for 300 years to the electorate of Trier.

ST IVES, a market town, municipal borough and seaport in the St Ives parliamentary division of Cornwall, England, 10 m. N.N.E. of Penzance, on a branch of the Great Western railway. Pop. (1901) 6699. It lies near the W. horn of St Ives Bay on the N. coast. The older streets near the harbour are narrow and irregular, but on the upper slopes there are modern terraces with good houses. The small harbour, protected by a breakwater, originally built by John Smeaton in 1767, has suffered from the accumulation of sand, and at the lowest tides is dry. The fisheries for pilchard, herring and mackerel are important. Boat-building and sail-making are carried on. An eminence south of the town is marked by a granite monument erected in 1782 by John Knill, a native of the town, who intended to be buried here; to maintain a quinquennial celebration on the spot he bequeathed property to the town authorities. The borough is under a mayor, 4 aldermen and 12 councillors. Area, 1890 acres.

The town takes name from St Hya, or Ia, an Irish virgin and martyr who is said to have accompanied St Piran on his missionary journey to Cornwall in the 5th century, and to have landed near this place. The Patent Rolls disclose an almost continuous series of trials for piracy and plunder by St Ives sailors from the beginning of the 14th to the end of the 16th century. A mere chapelry of Lelant and the less important member of the distant manor of Ludgvan Leaze, which in Domesday Book appears as Luduam, it had no fostering hand to minister to its growth. In order to augment the influence of the Tudors in the House of Commons, Philip and Mary in 1558 invested it with the privilege of returning 2 members. Its affairs were at that time administered by a headwarden, who after 1598 appears under the name of portreeve, 12 chief burgesses and 24 ordinary burgesses. The portreeve was elected by the 24; the 12 by the chief inhabitants. This body had control over the fishing, the harbour and harbour dues, the fabric of the church, sanitation and the poor. In 1639 a charter of incorporation was granted under which the portreeve became mayor, the 12 became aldermen, and the 24 were styled burgesses. Provision was made for four fairs and for markets on Wednesdays and Saturdays, also for a grammar school. This charter was surrendered to Charles II. and a new one granted in 1685, the latter reducing the number of aldermen to 10 and of burgesses also to 10. It ratified the parliamentary franchise and the fairs and markets, and provided a court of pie-powder; it also contained a clause safeguarding the rights of the marquess of Winchester, lord of the manor of Ludgvan Leaze and Porthia. In 1835 a mayor, 4 aldermen and 12 councillors were invested with the administration of the borough. In 1832 St Ives lost one of its members, and in 1885 the other. Both markets are now held, but only one of the fairs. This takes place on the Saturday nearest St Andrew's day.

ST IVES, a market town and municipal borough in the northern parliamentary division of Huntingdonshire, England, mainly on the left (north) bank of the Ouse, 5 m. E. of Huntingdon by the Great Eastern railway. Pop. (1901) 2910. The river is crossed by an old bridge said to have been built by the abbots of Ramsey early in the 15th century. A building over the centre pier of the bridge was once used as a chapel. The causeway (1827) on the south side of the river is built on arches so as to assist the flow of the river in time of flood. The church of All Saints is Perpendicular, with earlier portions. A curious custom is practised annually in this church in connexion with a bequest made by a certain Dr Robert Wilde in 1678: it is the distribution of Bibles to six boys and six girls of the town. The original provision was that the Bibles should be cast for by dice on the Communion table. Oliver Cromwell was a resident in St Ives in 1634–1635, but the house which he inhabited—Slepe Hall—was demolished in the middle of the 19th century. St Ives has a considerable agricultural trade. It is governed by a mayor, 4 aldermen and 12 councillors. Area 2326 acres.

The manor of "Slepe" is said to have been given by Æthelstan "Mannessune" to the abbot of Ramsey and confirmed to him by King Edgar. It owed its change of name to the supposed discovery of the grave of St Ive, a Persian bishop, in 1001, and a priory was founded in the same year by Abbot Ednoth as a cell to Ramsey. St Ives was chiefly noted for its fair, which was first granted to the abbot of Ramsey by Henry I. to be held on Monday in Easter week and eight days following. In the reign of Henry III. merchants from Flanders came to the fair, which had become so important that the king granted it to be continued beyond the eight days if the abbot agreed to pay a farm of £50 yearly for the extra days. The fair, with a market on Monday granted to the abbot in 1286, survives, and was purchased in 1874 by the corporation from the duke of Manchester. The town was incorporated in 1874.

ST JEAN-D'ANGÉLY, a town of western France, capital of an arrondissement in the department of Charente-Inférieure, 33 m. E. of Rochefort by rail. Pop. (1906) 6242. St Jean lies on the right bank of the Boutonne, which is navigable for small vessels. The parish church of St Jean stands on the site of an abbey church of the 13th century, of which some remains are left. In 1568 the monastery was destroyed by the Huguenots, but much of it was rebuilt in the 17th and 18th centuries, to which period belong two towers and the façade of an unfinished church.

St Jean owes the suffix of its name to the neighbouring forest of Angéry (*Angeriacum*). Pippin I. of Aquitaine in the 9th century established there a Benedictine monastery which was afterwards reputed to possess the head of John the Baptist. This relic attracted hosts of pilgrims; a town grew up, took the name of St Jean d'Angeri, afterwards d'Angély, was fortified in 1131, and in 1204 received a charter from Philip Augustus. The possession of the place was disputed between French and English in the Hundred Years' War, and between Catholics and Protestants at a later date. In 1569 it capitulated to the duke of Anjou (afterwards Henry III.). Louis XIII. again took it from the Protestants in 1621 and deprived it of its privileges and its very name, which he changed to Bourg-Louis.

ST JEAN-DE-LUZ, a coast town of south-western France, in the department of Basses-Pyrénées, at the mouth of the Nivelle, 14 m. S.W. of Bayonne on a branch of the Southern railway. Pop. (1906) 3424. St Jean-de-Luz is situated in the Basque country on the bay of St Jean-de-Luz, the entrance to which is protected by breakwaters and moles. It has a 13th-century church, the chief features of which are the galleries in the nave, which, according to the Basque custom, are reserved for men. The Maison Lohobiague, the Maison de l'Infante (both 17th cent.), and the hôtel de ville (1657) are picturesque old buildings. St Jean is well known for its bathing and as a winter resort. Fishing is a considerable industry.

From the 14th to the 17th century St Jean-de-Luz enjoyed a prosperity due to its mariners and fishermen. Its vessels were the first to set out for Newfoundland in 1520. In 1558, owing to the depredations of its privateers, the Spaniards attacked and burned the town. In 1627, however, it was able to equip 80 vessels, which succeeded in saving the island of Ré from the duke of Buckingham. In 1660 the treaty of the Pyrenees was signed at St Jean-de-Luz, and was followed by the marriage there of the Infanta Maria Theresa and Louis XIV. At that time the population numbered 15,000. The cession of Newfoundland to England in 1713, the loss of Canada, and the silting-up of the harbour were the three causes which contributed to the decline of the town.

ST JOHN, CHARLES WILLIAM GEORGE (1809–1856), English naturalist and sportsman, son of General the Hon. Frederick St John, second son of Frederick, second Viscount Bolingbroke, was born on the 3rd of December 1809. He was educated at Midhurst, Sussex, and about 1828 obtained a clerkship in the treasury, but resigned in 1834, in which year he married a lady with some fortune. He ultimately settled in the "Laigh" of Moray, "within easy distance of mountain sport." In 1853 a paralytic seizure deprived him of the use of his limbs, and for the benefit of his health he removed to the south of England. He died at Woolston, near Southampton, on the 22nd of July 1856. His works are *Wild Sports and Natural History of the Highlands* (1846, 2nd ed. 1848, 3rd ed. 1861); *Tour in Sutherland* (1849, 2nd ed., with recollections by Captain H. St John, 1884); *Notes of Natural History and Sport in Morayshire*, with Memoir by C. Innes (1863, 2nd ed. 1884). They are written in a graphic style, and illustrated with engravings, many of them from clever pen-and-ink sketches of his own.

ST JOHN, JAMES AUGUSTUS (1801–1875), British author and traveller, was born in Carmarthenshire, Wales, on the 24th

of September 1801. He received private instruction in the classics, and also acquired proficiency in French, Italian, Spanish, Arabic and Persian. He obtained a connexion with a Plymouth newspaper, and when, in 1824, James Silk Buckingham started the *Oriental Herald*, St John became assistant editor. In 1827, together with D. L. Richardson, he founded the *London Weekly Review*, subsequently purchased by Colburn and transformed into the *Court Journal*. He lived for some years on the Continent and went in 1832 to Egypt and Nubia, travelling mostly on foot. The results of his journey were published under the titles *Egypt and Mohammed Ali, or Travels in the Valley of the Nile* (2 vols., 1834), *Egypt and Nubia* (1844), and *Isis, an Egyptian Pilgrimage* (2 vols., 1853). On his return he settled in London, and for many years wrote political "leaders" for the *Daily Telegraph*. In 1868 he published a *Life of Sir Walter Raleigh*, based on researches in the archives at Madrid and elsewhere. He died in London on the 22nd of September 1875.

Besides the works mentioned St John was also the author of *Journal of a Residence in Normandy* (1830); *Lives of Celebrated Travellers* (1830); *Anatomy of Society* (1831); *History, Manners and Customs of the Hindus* (1831); *Margaret Ravenscroft, or Second Love* (3 vols., 1835); *The Hellenes, or Manners and Customs of Ancient Greece* (1842); *Sir Cosmo Digby*, a novel (1844); *There and Back Again in Search of Beauty* (1853); *The Nemesis of Power* (1854); *Philosophy at the Foot of the Cross* (1854); *The Preaching of Christ* (1855); *The Ring and the Veil*, a novel (1856); *Life of Louis Napoleon* (1857); *History of the Four Conquests of England* (1862); and *Weighed in the Balance*, a novel (1864). He also edited, with notes, various English classics.

Of his four sons, all journalists and authors of some literary distinction - Percy Bolingbroke (1821–1889), Bayle, Spenser and Horace Roscoe (1832–1888) the second, BAYLE ST JOHN (1822–1869), began contributing to the periodicals when only thirteen. When twenty he wrote a series of papers for *Fraser* under the title "De re vehiculari, or a Comic History of Chariots." To the same magazine he contributed a series of essays on Montaigne, and published in 1857 *Montaigne the Essayist, a Biography*, in 4 volumes. During a residence of two years in Egypt he wrote *The Libyan Desert* (1849). While in Egypt he learnt Arabic and visited the oasis of Siwa. On his return he settled for some time in Paris and published *Two Years in a Levantine Family* (1850) and *Views in the Oasis of Siwah* (1850). After a second visit to the East he published *Village Life in Egypt* (1852); *Purple Tints of Paris: Characters and Manners in the New Empire* (1854); *The Louvre, or Biography of a Museum* (1855); the *Subalpine Kingdom, or Experiences and Studies in Savoy* (1856); *Travels of an Arab Merchant in the Soudan* (1854); *Maretimo, a Story of Adventure* (1856); and *Memoirs of the Duke of Saint-Simon in the Reign of Louis XIV.* (4 vols., 1857).

ST JOHN, OLIVER (*c.* 1598–1673), English statesman and judge, was the son of Oliver St John. There were two branches of the ancient family to which he belonged, namely, the St Johns of Bletso in Bedfordshire, and the St Johns of Lydiard Tregoze in Wiltshire, both descendants of the St Johns of Staunton St John in Oxfordshire. Oliver St John was a member of the senior branch, being great-grandson of Oliver St John, who was created Baron St John of Bletso [1] in 1559, and a distant cousin of the 4th baron who was created earl of Bolingbroke in 1624, and who took an active part on the parliamentary side in the Civil War, being killed at the battle of Edgehill. Oliver was educated at Queens' College, Cambridge, and was called to the bar in 1626. He appears to have got into trouble with the court in connexion with a seditious publication, and to have associated himself with the future popular leaders John Pym and Lord Saye. In 1638 he defended Hampden on his refusal to pay Ship Money, on which occasion he made a notable speech. In the same year he married, as his second wife, Elizabeth Cromwell, a cousin of Oliver Cromwell, to whom his first wife also had been distantly related. The marriage led to an intimate friendship with Cromwell. St John was member for Totnes in both the Short and the Long Parliament, where he acted in close alliance with Hampden and Pym, especially in opposition to the impost of Ship Money (*q.v.*). In 1641, with a view to securing his support, the king appointed St John solicitor-general. None the less he took an active part in promoting the impeachment of Strafford and in preparing the bills brought forward by the popular party in the Commons, and was dismissed from office in 1643. On the outbreak of the Civil War, he became recognized as one of the parliamentary leaders. In the quarrel between the parliament and the army in 1647 he sided with the latter, and throughout this period he enjoyed Cromwell's entire confidence.

In 1648 St John was appointed chief justice of the common pleas; and from this time he devoted himself mainly to his judicial duties. He refused to act as one of the commissioners for the trial of Charles. He had no hand in Pride's Purge, nor in the constitution of the Commonwealth. In 1651 he went to the Hague as one of the envoys to negotiate a union between England and Holland, a mission in which he entirely failed; but in the same year he successfully conducted a similar negotiation with Scotland. After the Restoration he published an account of his past conduct (*The Case of Oliver St John*, 1660), and this apologia enabled him to escape any more severe vengeance than exclusion from public office. He retired to his country house in Northamptonshire till 1662, when he went to live abroad. He died on the 31st of December 1673.

By his first wife St John had two sons and two daughters. His daughter Johanna married Sir Walter St John of Lydiard Tregoze and was the grandmother of Viscount Bolingbroke. By his second wife he had two children, and after her death he married, in 1645, Elizabeth, daughter of Daniel Oxenbridge.

See the above-mentioned *Case of Oliver St John* (London, 1660), and St John's *Speech to the Lords, Jan. 7th, 1640, concerning Ship money* (London, 1640). See also Mark Noble, *Memoirs of the Protectoral House of Cromwell*, vol. ii. (2 vols., London, 1787); Anthony à Wood, *Fasti Oxonienses*, edited by P. Bliss (4 vols., London, 1813); Edward Foss, *The Judges of England*, vol. vi. (9 vols., London, 1848); S. R. Gardiner, *History of the Great Civil War* (3 vols., London, 1886–1891), and *History of the Commonwealth and Protectorate* (3 vols., London, 1894–1901); Lord Clarendon, *History of the Rebellion and Civil Wars in England* (7 vols., Oxford, 1839); *Thurloe State Papers* (7 vols., London, 1742); Edmund Ludlow, *Memoirs*, edited by C. H. Firth (2 vols., Oxford, 1894); Thomas Carlyle, *Oliver Cromwell's Letters and Speeches*; C. H. Firth's art. in *Dict. of Nat. Biog.*, vol. l. (London, 1897) (R. J. M.)

ST JOHN, the capital of St John county, New Brunswick, Canada, in 45° 14′ N., and 66° 3′ W., 481 m. from Montreal by the Canadian Pacific railway. Pop. (1901) 40,711. It is situated at the mouth of the St John river on a rocky peninsula. With it are incorporated the neighbouring towns of Carleton and (since 1889) Portland. The river, which is spanned by two bridges, enters the harbour through a rocky gorge, which is passable by ships for forty-five minutes during each ebb and flow of the tide. The harbour level at high tide (see FUNDY, BAY OF) is 6 to 12 ft. higher than that of the river, but at low tide about as much below it, hence the phenomenon of a fall outwards and inwards at every tide. St John is an important station of the Intercolonial, Canadian Pacific, and New Brunswick Southern railways, and shares with Halifax the honour of being the chief winter port of the Dominion, the harbour being deep, sheltered and free from ice. It is the distributing centre for a large district, rich in agricultural produce and lumber, and has larger exports than Halifax, though less imports. It is also the centre of fisheries which employ nearly 1000 men, and has important industries, such as saw, grist, cotton and woollen mills, carriage, box and furniture factories, boiler and engine shops. The beauty of the scenery makes it a pleasant residential city.

St John was visited in 1604 by the Sieur de Monts (1560–*c.* 1630) and his lieutenant Champlain, but it was not until 1635 that Charles de la Tour (d. 1666) established a trading post, called Fort St Jean (see Parkman, *The Old Régime in Canada*), which existed under French rule until 1758, when it passed into the hands of Britain. In 1783 a body of United Empire Loyalists landed at St John and established a city, called Parr Town until 1785, when it was incorporated with Conway (Carleton), under royal charter, as the city of St John. It soon became and has remained the largest town in the province, but for military reasons was not chosen as the capital (*see* FREDERICTON). Its growth has been checked by several destructive fires, especially that of June 1877, when half of it was swept away, but it has since been rebuilt in great part of more solid materials. (W. L. G.)

[1] This title is still held by the family lineally descended from the 1st baron, said by J. H. Round to be the only peerage family descended in the male line from an ancestor living in the time of Domesday Book.

ST JOHN, an island in the Danish West Indies. It lies 4 m. E. of St Thomas, is 10 m. long and 2½ m. wide; area 21 sq. m. It is a mass of rugged mountains, the highest of which is Camel Mountain (1270 ft.). Although one of the best watered and most fertile of the Virgin Group, it has little commerce. It is a free port, and possesses in Coral Bay the best harbour of refuge in the Antilles. The village of Cruxbay lies on the northern coast. Pop. (1901) 925.

ST JOHN, a river of New Brunswick, Canada, rising in two branches, in the state of Maine, U.S.A., and in the province of Quebec. The American branch, known as the Walloostook, flows N.E. to the New Brunswick frontier, where it turns S.E. and for 80 m. forms the international boundary. A little above Grand Falls it enters Canadian territory and flows through New Brunswick into the Bay of Fundy at St John. Its total length is about 450 m. It is navigable for large steamers as far as Fredericton (86 m.), and in spring and early summer for smaller vessels to Grand Falls (220 m.), where a series of falls and rapids form a descent of 70 or 80 ft. Above the falls it is navigable for 65 m. It drains an area of 26,000 sq. m., of which half is in New Brunswick, and receives numerous tributaries, of which the chief are the Aroostook, Allagash, Madawaska (draining Lake Temiscouata in Quebec), Tobique and Nashwaak.

ST JOHN OF JERUSALEM, KNIGHTS OF THE ORDER OF THE HOSPITAL OF (*Ordo fratrum hospitalariorum Hierosolymitanorum, Ordo militiae Sancti Johannis Baptistae hospitalis Hierosolymitani*), known also later as the KNIGHTS OF RHODES and the SOVEREIGN ORDER OF THE KNIGHTS OF MALTA. The history of this order divides itself naturally into four periods: (1) From its foundation in Jerusalem during the First Crusade to its expulsion from the Holy Land after the fall of the Latin kingdom in 1291; (2) from 1309–1310, when the order was established in Rhodes, to its expulsion from the island in 1522; (3) from 1529 to 1798, during which its headquarters were in Malta; (4) its development, as reconstituted after its virtual destruction in 1798, to the present day.

Early Developments.—Medieval legend set back the beginnings to the days of the Maccabees, with King Antiochus as the founder and Zacharias, father of the Baptist, as one of the first masters; later historians of the order maintained that it was established as a military order contemporaneously with the Latin conquest of Jerusalem, and that it had no connexion with any earlier foundation (so P. A. Paoli, *De origine*). This view would now seem to be disproved, and it is clear that the order was connected with an earlier *Hospitale Hierosolymitanum.*[1] Such a hospital had existed in the Holy City, with rare interruptions, ever since it had become a centre of Christian pilgrimage. About 1023 certain merchants of Amalfi had purchased the site of the Latin hospice established by Charlemagne, destroyed in 1010 with the other Christian establishments by order of the fanatical caliph Hakim Biamrillah,[2] and had there founded a hospital for pilgrims, served by Benedictines and later dedicated to St John the Baptist.[3] When, in 1087, the crusaders surrounded the Holy City, the head of this hospital was a certain Gerard or Gerald,[4] who earned their gratitude by assisting them in some way during the siege.[5] After the capture of the city he used his popularity to enlarge and reconstitute the hospital. If, as M. Le Roulx surmises, he had previously been affiliated to the Benedictines, he now left them and adopted for his order the Augustinian rule. Donations and privileges were showered upon the new establishment. Godfrey de Bouillon led the way by granting to it in Jerusalem itself the *casal Hessilia* (Es Silsileh) and two bakehouses.[6] Kings, nobles and prelates followed suit, not in the Holy Land only, but in Provence, France, Spain, Portugal, England and Italy: in Portugal a whole province was in 1114 made over to Gerard and his brethren (*Cartul.* i. No. 34). In 1113 Pope Paschal II. took the order and its possessions under his immediate protection (bull of Feb. 15th to Gerard, *Cartul.* i. No. 30), his act being confirmed in 1119 by Calixtus II. and subsequently by other popes. Gerard was indeed, as Pope Paschal called him, the "institutor" of the order, if not its founder. It retained, however, during his lifetime its purely eleemosynary character. The armed defence of pilgrims may have been part of its functions, but its organization as an aggressive military force was the outcome of special circumstances—the renewed activity of the Saracens—and was the work of Raymond du Puy, who succeeded as grand master on the death of Gerard (3rd of September 1120).[7]

Not that Raymond can be proved to have given to his order anything of its later aristocratic constitution. There is no mention in his Rule[8] of the division into knights, chaplains and sergeants; indeed, there is no mention of any military duties whatever. It merely lays down certain rules of conduct and discipline for the brethren. They are to be bound by the threefold vow of chastity, poverty and obedience. They are to claim nothing for themselves save bread, water and raiment; and this latter is to be of poor quality, "since our Lord's poor, whose servants we say we are, go naked and sordid, and it is a disgrace for the servant to be proud when his master is humble." Finally, the brethren are to wear crosses on the breast of their capes and mantles, "ut Deus per ipsum vexillum et fidem et operationem et obedientiam nos custodiat."[9] Yet that Raymond laid down military regulations for the brethren is certain. Their underlying principle is revealed by a bull of Pope Alexander III addressed (1178–1180) to the grand master Roger des Moulins, in which he bids him, "according to the custom of Raymond," abstain from bearing arms save when the standard of the Cross is displayed either for the defence of the kingdom or in an attack on a "pagan" city.[10]

The statesmanlike qualities of Raymond du Puy rendered his long mastership epoch-making for the order. When it was decided to fortify Ibelin (Beit-Jibrin) as an outpost against attacks from the side of Ascalon, it was to the Hospitallers that the building and defence of the new castle were assigned; and from 1137 onwards they took a regular part in the wars of the Cross. It was owing to Raymond's diplomatic skill, too, that the order was enabled to profit by the bequest made to it by Alphonso I. of Aragon, who had died childless, of a third of his kingdom. To have claimed the literal fulfilment of this bequest would have been to risk losing it all, and Raymond acted wisely in transferring the bequest, with certain important reservations, to Raymond Berenger IV., count of Barcelona and regent of

[1] Cf. the bull of Pope Celestine II. to Raymond du Puy, in the matter of the Teutonic order, which describes the Hospital as "Hospitalem domum sancte civitatis Jerusalem, que a longis retro temporibus Christi pauperum usibus dedicata, tam christianorum quam etiam Sarracenorum tempore . . . . " (Le Roulx, *Cartulaire*, i. No. 154).

[2] This solution of the much debated question of the connexion of the Hospital with the Benedictine foundation of Sancta Maria Latina is worked out in much detail by M. Delaville Le Roulx in his *Les Hospitaliers en Terre Sainte*, chap. i.

[3] William of Tyre says that they erected in that place an altar to St John Eleemon, patriarch of Alexandria, renowned for his charities. This mistake led to the widespread belief that this saint, and not St John the Baptist, was the original patron of the order. A passage in the bull addressed by Pope Paschal to Gerard (*Cartulaire*, No. 30) would seem to leave the dedication in doubt: "Xenodochium, quod . . . juxta beati Johannis Baptistae ecclesiam instituisti." The patronage of St John may thus have merely been the result of this juxtaposition, as the Templars took their name from the site of the mother-house.

[4] In spite of his fame, nothing is known of his origin. The surname "Tunc" or "Tonque" often given to him is, as Le Roulx points out, merely the result of a copyist's error for "Gerardus tunc . . ."

[5] According to the legend, he joined the defenders on the walls and, instead of hurling stones, hurled bread at the Christians, who were short of supplies. Haled before the Mussulman governor, his accusers were confounded when the incriminating loaves they produced were discovered to be turned into stones.

[6] "Fours." So the charter of Baldwin I. (*Cartul.* No. 20; cf. No. 225). In his *Hospitaliers* Le Roulx has "tours," *i.e.* two towers, probably a misprint.

[7] The existence of a certain Roger as grand master between Gerard and Raymond, maintained by some historians, is finally disproved by Raymond's own testimony: "Reginmundus, per gratiam Dei post obitum domini Giraldi factus servus pauperum Christi" (*Cartul.* i. No. 46).

[8] The date of this can only be approximately assigned, in so far as it was confirmed by Pope Eugenius III., who died in 1153.

[9] For text see *Cartulaire*, i. No. 70.

[10] *Cartul.* i. No. 527.

Aragon (16th of September 1140).[1] It was probably also during his sojourn in the West for the above purpose that Raymond secured from Pope Celestine II. the bull dated December 7th, 1143, subordinating to his jurisdiction the Teutonic hospice, founded in 1128 by a German pilgrim and his wife in honour of the Blessed Virgin, which was the nucleus of the Teutonic Order (*q.v.*). This order was to remain subordinate to the Hospitallers actually for some fifty years, and nominally for some thirty years longer.[2] Raymond took part in the Second Crusade and was present at the council of the leaders held at Acre, in 1148, which resulted in the ill-fated expedition against Damascus. The failure before Damascus was repaired five years later by the capture of Ascalon (19th of August 1153), in which Raymond du Puy and his knights had a conspicuous share.

Meanwhile, in addition to its ever-growing wealth, the order had received from successive popes privileges which rendered it, like the companion order of the Temple, increasingly independent of and obnoxious to the secular clergy. In 1135 Innocent II. had confirmed to Raymond the privileges accorded by Paschal II., Calixtus II. and Honorious II., and in addition forbade the diocesan bishops to interdict the churches of the Hospitallers, whom he also authorized, in case of a general interdict, to celebrate mass for themselves alone.[3] In 1137 he gave them the privilege of Christian burial during such interdicts and the right to open interdicted churches once a year in order to say mass and collect money.[4] These bulls were confirmed by Eugenius III. in 1153[5] and Anastasius IV. in 1154, the latter adding the permission for the order to have its own priests, independent of the diocesan bishops.[6] In vain the patriarch of Jerusalem, attended by other bishops, journeyed to Rome in 1155 to complain to Adrian IV. of the Hospitallers' abuse of their privileges and to beg him to withdraw his renewal of his predecessor's bull.[7]

Far different was the effect produced by Raymond du Puy's triumphant progress through southern Europe from the spring of 1157 onward. From the popes, the emperor Frederick I., kings and nobles, he received fresh gifts, or the confirmation of old ones. After the 25th of October 1158, when his presence is attested at Verona, this master builder of the order disappears from history; he died some time between this date and 1160, when the name of another grand master appears.

During the thirty years of his rule the Hospital, which Gerard had instituted to meet a local need, had become universal. In the East its growth was beyond calculation: kings, prelates and laity had overwhelmed it with wealth. In the West, all Europe combined to enrich it; from Ireland to Bohemia and Hungary, from Italy and Provence to Scandinavia, men vied with each other to attract it and establish it in their midst. It was clear that for this vast institution an elaborate organization was needed, and this need was probably the occasion of Raymond's presence in Europe. The priory of St Gilles already existed as the nucleus of the later system; the development of this system took place after Raymond's death.

Constitution and Organization.—The rule of the Hospital, as formulated by Raymond du Puy, was based on that of the Augustinian Canons (*q.v.*). Its further developments, of which only the salient characteristics can be mentioned here, were closely analogous to those of the Templars (*q.v.*), whose statutes regulating the life of the brethren, the terms of admission to the order, the maintenance of discipline, and the scale of punishments, culminating in expulsion (*peri de la maison*), are, *mutatis mutandis*, closely paralleled by those of the Hospitallers. These, too, were early (probably in Raymond's time) divided into three classes: knights (*fratres milites*), chaplains (*fratres capellani*), and serjeants (*fratres servientes armigeri*), with affiliated brethren (*confratres*) and "donats" (*donati, i.e.* regular subscribers, as it were, to the order in return for its privileges and the ultimate right to enter the ranks of its knights). Similar, too, was the aristocratic rule which confined admission to the first class to sons born in lawful wedlock of knights[8] or members of knightly families, a rule which applied also to the donats.[9] For the serjeant men-at-arms it sufficed that they should not be serfs. Below these a host of *servientes* did the menial work of the houses of the order, or worked as artisans or as labourers on the farms.

All the higher offices in the order were filled by the knights, except the ecclesiastical—which fell to the chaplains—and those of master of the squires and *turcopolier* (commander of the auxiliary light cavalry), which were reserved for the serjeants-at-arms. Each knight was allowed three horses, each serjeant two. The *fratres capellani* ranked with the knights as eligible for certain temporal posts; at their head was the "conventual prior" (*clericorum magister et ecclesie custos, prior clericorum Hospitalis*).

In two important respects the knights of St John differed from the Templars. The latter were a purely military organization; the Hospitallers, on the other hand, were at the outset preponderatingly a nursing brotherhood, and, though this character was subordinated during their later period of military importance, it never disappeared. It continued to be a rule of the order that in its establishments it was for the sick to give orders, for the brethren to obey. The chapters were largely occupied with the building, furnishing, and improvement of hospitals, to which were attached learned physicians and surgeons, who had the privilege of messing with the knights. The revenues of particular properties were charged with providing luxuries (*e.g.* white bread) for the patients, and the various provinces of the order with the duty of forwarding blankets, clothes, wine and food for their use. The Hospitallers, moreover, encouraged the affiliation of women to their order, which the monastic and purely military rule of the Templars sternly forbade. So early as the First Crusade a Roman lady named Alix or Agnes had founded at Jerusalem a hospice for women in connexion with the order of St John. Until 1187, when they fled to Europe, the sisters had devoted themselves to prayer and sick-nursing. In Europe, however, they developed into a purely contemplative order.[10]

The habit of the order, both in peace and war, was originally a black *cappa clausa* (*i.e.* the long monastic bell-like cloak with a slit on each side for the arms) with a white, eight-pointed "Maltese" cross on the breast. As this was highly inconvenient for fighting, Innocent IV. in 1248 authorized the brethren to wear *in locis suspectis* a large super-tunic with a cross on the breast (*Cartul.* ii. No. 2479), and in 1259 Alexander IV. fixed the habit as, in peace time, a black mantle, and in war a red surcoat with a white cross (*Cartul.* ii. No. 2928).

The unit of the organization of the order was the commandery (preceptory), a small group of knights and serjeants living in community under the rule of a commander, or preceptor,[11] charged with the supervision of several contiguous properties. The commanderies were grouped into priories, each under the rule of a prior (styled unofficially "grand prior," *magnus prior*), and these again into provinces corresponding to certain countries, under the authority of grand commanders. These largest groups crystallized in the 14th century as national divisions under the name of "langues" (languages).[12] At the head of the whole organization was the grand master. The grand master was elected, from the ranks of the knights of justice, by the same process as the grand master of the Templars (*q.v.*). Alone of the bailiffs (*bailivi*), as the officials of the order were generically termed, he held office for life. His authority

[1] *Cartul.* i. No. 136. The arrangement was confirmed by the pope in 1158 (Le Roulx, *Hospitaliers*, p. 59).

[2] The foundation of the Teutonic Order as a separate organization was solemnly proclaimed in the palace of the Templars at Tyre on the 5th of March 1198. Its rule was confirmed by Pope Innocent III. on Feb. 15th, 1199 (*Cartul.* i. No. 1072).

[3] *Cartul.* i. No. 113.

[4] *Ib.* i. No. 122.

[5] *Ib.* i. No. 217.

[6] *Ib.* i. No. 226.

[7] This renewal was dated 19th of December 1154 (*Ib.* i. No. 229.)

[8] The knights were ultimately distinguished as "Knights of Justice" (*chevaliers de justice*) and "Knights of Grace" (*chevaliers de grâce*). The former were those who satisfied the conditions as to birth, and were therefore knights "justly"; the latter were those who were admitted "of grace" for superlative merits.

[9] An exception was made in favour of the natural sons of counts and greater personages (Statute 7 of 1270; *Cartul.* ii. 3396).

[10] Their premier house in Europe was at Sigena in Aragon, which they still occupy. It was granted to them by Sancia of Navarre, queen of Aragon, in 1184, the order being definitively established there in 1188. Their rule, which is that of Augustinian Canonesses, and dates from October 1188, is printed by Le Roulx, *Cartulaire*, i. No. 859. There is no word about nursing in it. In England the most important house was Buckland. The chief Danish house survives in the Lutheran convent of St John the Baptist at Schleswig, a *Stift* for noble ladies, whose superior has the title of prioress. On solemn occasions a realistic wax head of St John the Baptist on a charger is still produced.

[11] Commander (*comandeor, commandeur*), with its Latin translation *preceptor*, came into use as the title of these officials somewhat late. In earlier documents they are styled *ospitalarius, bajulus* (bailiff), *magister* (master).

[12] Omitting the Anglo-Bavarian *langue*, created in 1782, the *langues* (in the 15th century) were eight in number. They were (1) Provence (grand priories of St Gilles and Toulouse), (2) Auvergne (grand priory of Auvergne), (3) France (grand priories of France, Aquitaine, Champagne), (4) Italy (grand priories of Lombardy, Rome, Venice, Pisa, Capua, Barletta, Messina), (5) Aragon (castellany of Amposta, grand priories of Catalonia and Navarre), (6) England (grand priories of England—including Scotland—and Ireland), (7) Germany (grand priories of Germany or Heitersheim, Bohemia, Hungary, Dacia—*i.e.* Scandinavia—and the Bailiwick (*Ballei*) of

was very great, but not absolute. The supreme legislative and controlling power was vested in the general chapter of the knights, at the periodical meetings of which the great officers of the order had to give an account of their stewardship, and which alone had the right to pass statutes binding on the order. The executive power of the grand master, like that of the great dignitaries immediately subordinate to him, was in the nature of a delegation from the chapter. He was assisted in its exercise by four councils: (1) the "convent" or ordinary chapter, a committee of the general chapter,[1] for administrative business; (2) a secret council, for criminal cases and affairs of state; (3) a full council, to hear appeals from the two former;[2] and (4) the "venerable chamber of the treasury" for financial matters. To the general chapter at headquarters corresponded the chapters of the priories and the commanderies, which controlled the action of the priors and commanders.

Immediately subordinate to the grand master were the seven great dignitaries of the order, known as the conventual bailiffs: the grand preceptor,[3] marshal, draper (Fr. *drapier*) or grand conservator, hospitaller, treasurer, admiral, turcopolier.[4] The grand preceptor, elected by the chapter at the same time as the grand master and subject to his approval, was the lieutenant of the latter in his absence, empowered to seal for him and, in the event of his capture by the enemy, to act as vice-master. The functions of the marshal, draper, treasurer and turcopolier were practically identical with those of the officials of the same titles in the order of Knights Templars. That of hospitaller, on the other hand, was naturally a charge of exceptional importance in the order of St John; he had a seal of his own, and was responsible for everything concerning the hospitals of the order, the dispensing of hospitality, and of alms. The admiral, as the name implies, was at sea what the marshal was on land. The office first appears in 1299 when the knights, after their expulsion from the Holy Land, had begun to organize their new sea-power in Cyprus. As to the equipage and suites of the grand master and the great dignitaries, these were practically on the same scale and of the same nature as those described in the article TEMPLARS for the sister order. The grand master had the right himself to nominate his companions and the members of his household (seneschal, squires, secretaries, chaplains, &c.), which, as Le Roulx points out, was such as to enable him to figure as the equal of the kings and princes with whom he consorted.

The grand-mastership of Gilbert d'Assailly was signalized by the participation of the Hospitallers in the abortive expeditions of Amalric of Jerusalem into Egypt in 1162, 1168 and 1169. On the 10th of August 1164 also they shared in the disastrous defeat inflicted by Nur-ed-din at Harran on the count of Tripoli. The important position occupied by them in the councils of the kingdom is shown by the fact that the grand preceptor Guy de Mauny was one of the ambassadors sent in 1169 to ask aid of the princes of the West. Another important development was the bestowal on the order by Bohemund III., prince of Antioch, in 1168, and King Amalric, as regent of Tripoli, in 1170, of considerable territories on the north-eastern frontier, to be held with almost sovereign power as a march against the Saracens (*Cartulaire*, i. Nos. 391, 411). The failure of the expedition to Egypt, however, brought considerable odium on Gilbert d'Assailly, who resigned the grand-mastership, probably in the autumn of 1170.[5] Under the short rule of the grand master Jobert (d. 1177) the question of a renewed attack on Egypt was mooted; but the confusion reigning in the Latin kingdom and, not least, the scandalous quarrels between the Templars and Hospitallers, rendered all aggressive action impossible. In 1179 the growing power of the two military orders received its first set back when, at the instance of the bishops, the Lateran Council forbade them to receive gifts of churches and tithes at the hands of laymen without the consent of the bishops, ordered them to restore all "recent"[6] gifts of this nature, and passed a number of decrees in restraint of the abuse of their privileges.

A more potent discipline was to befall them, however, at the hands of Saladin, sultan of Egypt, who in 1186 began his systematic conquest of the kingdom. It was the Hospitallers who, with the other religious orders, alone offered an organized resistance to his victorious advance. On the 1st of May 1187 occurred the defeat of Tiberias, in which the grand master Gilbert des Moulins fell riddled with arrows, and this was followed on the 4th of July by the still more disastrous battle of Hittin. The flower of the Christian chivalry was slain or captured: the Hospitallers and Templars who fell into his hands Saladin massacred in cold blood. On the 2nd of October Jerusalem fell. Ten brethren of the Hospital were allowed to remain for a year to look after the sick; the rest took refuge at Tyre. In these straits Armengaud d'Asp was elected grand master (1188) and the headquarters of the order were established at Margat (Markab), near the coast some distance northwards of Tripoli. In the interior the knights still held some scattered fortresses; but their great stronghold of Krak[7] was reduced by famine in September 1188 and Beauvoir in the following January.

The news of these disasters once more roused the crusading spirit in Europe; the offensive against Saladin was resumed, the Christians concentrating their forces against Acre in the autumn of 1189. In the campaigns that followed, of which Richard I. of England was the most conspicuous hero, and which ended in the recovery of Acre and the sea-coast generally for the Latin kingdom, the Hospitallers, under their grand master Garnier de Naplouse[8] (Neapoli), played a prominent part. The grand-mastership of Geoffroy de Donjon, who succeeded Garnier in 1192 and ruled the order till 1202,[9] was signalized, not by feats of arms, since the Holy Land enjoyed a precarious peace, but by a steady restoration and development of the property and privileges of the order, by renewed quarrels with the Templars, and in 1198 by the establishment—in face of the protests of the Hospitallers—of the Teutonic knights as a separate order. Under the grand-mastership of the pious Alphonso of Portugal, and of Geoffrey le Rat, who was elected on Alphonso's resignation in 1206, the knights took a vigorous part in the quarrel as to the succession in Antioch; under that of Garin de Montaigu (elected 1207) they shared in the expedition to Egypt (1218–1221), of which he had been a vigorous advocate (see CRUSADES: *The Fifth Crusade*). In 1222, at the instance of the emperor Frederick II., the grand master accompanied the king of Jerusalem and others to Europe to discuss the preparation of a new crusade, visiting Rome, proceeding thence to Paris and London, and returning to the Holy Land in 1225. The expedition failed of its object so far as the organization of

Brandenburg), (8) Castile (grand priories of Castile and Leon, and Portugal). Of the grand priories the most ancient and by far the most important was that of St Gilles, founded early in the 12th century, the authority of which extended originally over the whole of what is now France and a great part of Spain. In the 16th century its seat was transferred to Arles. Out of this developed the *langues* of Auvergne, France, Aragon and Castile, with their subsidiary priories. The date of the creation of the various grand commanderies differs greatly: that of Italy was established in the 13th century, the *langue* of Germany in 1422, that of Castile was split off from Aragon in 1462. The castellany of Amposta (founded 1157) ranked as a priory. The bailiwick of Brandenburg, which had long been practically independent of the grand prior of Germany, obtained the right to elect its own bailiff (*Herrenmeister*) in 1382, subject to the approval of the grand prior. In the Holy Land there were no priors; the commanderies were directly under the grand master, and the commanders (who retained the style of *bailli*, *bailivus*) ranked with the grand priors elsewhere.

[1] This seems to have consisted in practice of the great dignitaries of the order. See Le Roulx, *Hospitaliers*, p. 314.

[2] A peculiarity of the order of St John was the *esgart des frères* (*esgart*, Lat. *sguardium*=court) which could be demanded by any knight who thought himself wronged by a decision of his superiors, even of the grand master.

[3] To be carefully distinguished from the regional grand preceptors or grand commanders, and also from the grand commander *d'outremer*, who represented the grand master in the West generally.

[4] To these the grand bailiff (German, *langue*) and grand chancellor (Castile) were added later.

[5] See Le Roulx, *Hospitaliers*, p. 76 sqq. The resignation led to bitter divisions in the order. It was urged that the resignation was invalid without the consent of the general chapter and the pope; and a temporary schism was the result. Gilbert was drowned in 1183 crossing from Dieppe to England, whither he had gone at the invitation of Henry II.

[6] The words "tempore moderno" were interpreted by Pope Alexander III. in a bull of the 1st of June 1179 as within ten years of the opening of the council (*Cartul.* i. No. 566).

[7] The stupendous ruins of Krak-des-Chevaliers (at Kerak, S.E. of the Dead Sea) attest the wealth and power of the knights (for a restoration see CASTLE, fig. 5). The castle had been given to the Hospitallers by Guillaume du Crac in 1142. In 1193 it was again in their hands, and was subsequently greatly enlarged and strengthened. It was finally captured by the Egyptians under Bibars in 1271.

[8] Garnier had been prior of England and later of France.

[9] So Le Roulx, p. 119.

a general crusade was concerned; but the Hospital received everywhere enormous accessions of property.[1] Garin de Montaigu died in 1228, after consolidating by his statesmanlike attitude the position and power of his order, on the eve of Frederick II.'s crusade. In this crusade, conducted in spite of a papal excommunication, the Hospitallers took no part, being rewarded with the approval of Pope Gregory IX., who, in August 1229, issued a bull to the patriarch of Jerusalem ordering him to maintain the jurisdiction of the Hospital over the Teutonic knights, who had dared to assist the German emperor.[2] In 1233, under the grand master Guerin, the Hospitallers took a leading part in the successful attack on the principality of Hamah. The motive of this, however—which was no more than the refusal of the emir to pay them the tribute due—seems to point to an increasing secularization of their spirit. In 1236 Pope Gregory IX. thought it necessary to threaten both them and the Templars with excommunication, to prevent their forming an alliance with the Assassins,[3] and in 1238 issued a bull in which he inveighed against the scandalous lives and relaxed discipline of the Hospitallers.[4]

Events were soon to expose the order to fresh tests. Under the grand-mastership of Pierre de Vieille Bride[5] occurred the brief "crusade" of Richard of Cornwall (11th of October 1240 to 3rd of May 1241). The truce concluded by Richard with the sultan of Egypt was accepted by the Hospitallers, rejected by the Templars, and after his departure something like a war broke out between the two bodies. In the midst of the strife of parties, in which Richard of Cornwall had recognized the fatal weakness of the Christian cause to lie, came the news of the invasion of the Chorasmians. On the 23rd of August the Tatar horde took and sacked Jerusalem. On the 17th of October, in alliance with the Egyptians under Bibars, it overwhelmed the Christian host at Gaza. Of the Hospitallers only sixteen escaped; 325 of the knights were slain; and among the prisoners was the grand master, Guillaume de Châteauneuf.[6] Amid the general ruin that followed this defeat, the Hospitallers held out in the fortress of Ascalon, until forced to capitulate on the 15th of October 1247. Under the vice-master, the grand preceptor Jean de Ronay, they took part in 1249 in the Egyptian expedition of St Louis of France, only to share in the crushing defeat of Mansurah (11th of February 1250). Of the knights present all were slain, except five who were taken prisoners, the vice-master and one other.[7] At the instance of St Louis, after the conclusion of peace, 25 Hospitallers, together with the grand master Guillaume de Châteauneuf, were released.[8]

On the withdrawal of St Louis from the Holy Land (April 1254), a war of aggression and reprisals broke out between Christians and Mussulmans; and no sooner was this ended by a precarious truce than the Christians fell to quarrelling among themselves. In the war between the Genoese and Venetians and their respective partisans, the Hospitallers and Templars fought on opposite sides. In spite of so great a scandal and of the hopeless case of the Christian cause, the possessions of the order were largely increased during Guillaume de Châteauneuf's mastership, both in the Holy Land and in Europe.

Under the grand-mastership of Hugues de Revel, elected probably in 1255, the menace of a new Tatar invasion led to serious efforts to secure harmony in the kingdom. In 1258 the Templars, Hospitallers, and Teutonic knights decided to submit their disputes in Syria, Cyprus and Armenia to arbitration, a decision which bore fruit in 1260 in the settlement of their differences in Tripoli and Margat. The satisfactory arrangement was possibly affected by the result of a combined attack made in 1259 on the Hospitallers by the Templars and the brethren of St Lazarus and St Thomas, which had resulted in the practical extermination of the aggressors, possibly also by the crushing defeat of the Templars and the Syrian barons by the Turcomans at Tiberias in 1260. However achieved, the concord was badly needed; for Bibars, having in 1260 driven back the Tatars and established himself in the sultanate of Egypt, began the series of campaigns which ended in the destruction of the Latin kingdom. In 1268 Bibars conquered Antioch, and the Christian power was confined to Acre, Château Pélerin, Tyre, Sidon, and the castles of Margat, Krak and Belda (Baldeh), in which the Hospitallers still held out. The respite afforded by the second crusade of St Louis was ended by his death at Tunis in 1270. On the 30th of March 1271 the great fortress of Krak, the key to the county of Tripoli, surrendered after a short siege. The crusade of Prince Edward of England did little to avert the ultimate fate of the kingdom, and with it that of the Hospitallers in the Holy Land. This was merely delayed by the preoccupations of Bibars elsewhere, and by his death in 1277. In 1280 the Mongols overran northern Syria; and the Hospitallers distinguished themselves by two victories against enormous odds, one over the Turcomans and one over the emir of Krak (February 1281). The situation, however, was desperate, and the grand master Nicolas Lorgne, who had succeeded Hugues de Revel in 1277, wrote despairing letters of appeal to Edward I. of England. On the 25th of May 1285, Margat surrendered to the sultan Kalaun (Mansur Saifaldin). Not even the strong character and high courage of Jean de Villiers, who succeeded Nicolas Lorgne as grand master in 1285, could do more than stave off the ultimate disaster. The Hospitallers assisted in the vain defence of Tripoli, which fell on the 26th of April 1289. On the 18th of May 1291 the Mussulmans stormed Acre, the last hope of the Christians in the Holy Land. Jean de Villiers, wounded, was carried on board a ship, and sailed to Limisso in Cyprus, which became the headquarters of the order. For the remaining two years of his life Jean de Villiers was occupied in attempting the reorganization of the shattered order. The demoralization in the East was, however, too profound to admit a ready cure. The knights, represented by the grand dignitaries, addressed a petition to Pope Boniface VIII. in 1295 asking for the appointment of a permanent council of seven *difinitores* to control the grand master, who had become more and more autocratic. The pope did not consent; but in a severe letter to the new grand master, Eudes de Pin, he sternly reproved him for the irregularities of which he had been guilty.[9] In 1296 Eudes was succeeded by Guillaume de Villaret, grand prior of St Gilles, who for three years after his election remained in Europe, regulating the affairs of the order. In 1300, in response to the urgent remonstrances of the knights, he appeared in Cyprus. In 1299 an unnatural alliance of the Christians and Mongols gave a momentary prospect of regaining the Holy Land; in 1300 the Hospitallers took part in the raid of King Henry II. (de Lusignan) of Cyprus in Egypt, and gained some temporary successes on the coast of Syria. Of more advantage for the prestige of the order, however, were the immense additions of property and privileges which Guillaume de Villaret had secured in Europe from the pope and many kings and princes,[10] and the reform of the rule and drastic reorganization of the order promulgated in a series of statutes between 1300 and 1304, the year of Guillaume's death.[11] Of these changes the most significant was the definition of the powers and status of the admiral, a new great dignitary created in 1299.

The grand-mastership of Foulques de Villaret, Guillaume's

[1] Detailed by Le Roulx, *Hospitaliers*, pp. 149-156.

[2] *Cartul.* ii. No. 1944. The Teutonic knights refused to obey. In January 1240 Gregory called on them to explain their insubordination (No. 2247) and in March 1241 again ordered them to submit (No. 2270).

[3] *Cartul.* ii. No. 2149.

[4] *Cartul.* ii. No. 2186.

[5] Not Villebride. The name is a corruption of *Vieille Brioude* (Le Roulx, *Hosp.* p. 183).

[6] It has been generally supposed, on the authority of the *chronica majora* of Matthew of Paris (iv. 307-311), that the grand-master was killed at Gaza.

[7] See the contemporary letter, *Cartulaire*, ii. No. 2521.

[8] *Cartul.* ii. Nos. 2540-2541.

[9] *Cartulaire*, iii. Nos. 4267, 4293; cf. the letter of the chapter-general to Guillaume de Villaret, iii. No. 4310.

[10] Le Roulx, *Hospitaliers*, p. 259 sqq.

[11] These statutes are printed in the *Cartulaire*, iii. Nos. 4515, iv. Nos. 4549, 4574, 4612.

nephew and successor,[1] was destined to be eventful for the order. On the 5th of June 1305 Bertrand de Got became pope as Clement V. The new pope consulted the grand master of the Templars and Hospitallers as to the organization of a new crusade, and at the same time raised the question of the fusion of the military orders, a plan which had already been suggested by St Louis, discussed at the council of Lyons in 1274, and approved by the pope's patron Philip IV. of France. The proposal broke down on the opposition of Jacques de Molay, grand master of the Temple; but the desired result was obtained by other and more questionable means. In October 1307 Philip IV. caused all the Templars in France, including the grand master, to be arrested on charges of heresy and gross immorality; Pope Clement V., a creature of the French king, reluctantly endorsed this action, and at his instance the other sovereigns of Europe followed the example of Philip. The famous long-drawn-out trial of the Templars followed, ending at the council of Vienne in 1314, when Pope Clement decreed the dissolution of the order of the Temple and at the same time assigned the bulk of its property to the Hospital.[2] (See TEMPLARS, KNIGHTS.)

Meanwhile an event had occurred which marks an epoch in the history of the order of the Hospital. In 1306 Foulques de Villaret, anxious to find a centre where the order would be untrammelled by obligations to another power as in Cyprus, came to an agreement with a Genoese pirate named Vignolo de' Vignoli for a concerted attack on Rhodes and other islands belonging to the Greek emperor. The exact date of their completed conquest of the island is uncertain;[3] nor is it clear that the grand master took a personal part in it. By command of the pope he had left Cyprus for Europe at the end of 1306 or the beginning of 1307, and he did not return to the East till late in 1309. He returned, however, not to Cyprus but to Rhodes, and it is with 1310, therefore, when its headquarters were established in the latter island, that the second period of the history of the order of the Hospital opens.[4]

The Knights in Rhodes.—The history of the order for the next fifty years is very obscure. Certain changes, however, took place which profoundly modified its character. The most important of these was its definitive division into "langues." The beginnings of this had been made long before; but the system was only legalized by the general chapter at Montpellier in 1330. Hitherto the order had been a cosmopolitan society, in which the French element had tended to predominate; henceforth it became a federation of national societies united only for purposes of commerce and war. To the headship of each "langue" was attached one of the great dignitaries of the order, which thus came to represent, not the order as a whole but the interests of a section.[5] The motive of this change was probably, as Prutz suggests,[6] fear of the designs of Philip IV. of France and his successors, to which point had been given by the fate of the Templars, and the consequent desire to destroy the preponderance of the French element.[7]

The character and aims of the order were also profoundly affected by their newly acquired sovereignty—for the shadowy overlordship of the Eastern emperor was soon forgotten—and above all by its seat. The Teutonic order had established its sovereignty in Prussia, in wide and ill-defined spheres beyond the north-eastern marches of Germany. The Hospitallers ruled an island too narrow to monopolize their energies, but occupying a position of vast commercial and strategic importance. Close to the Anatolian mainland, commanding the outlet of the Archipelago, and lying in the direct trade route between Europe and the East, Rhodes had become the chief distributing point in the lively commerce which, in spite of papal thunders, Christian traders maintained with the Mahommedan states; and in the new capital of the order representatives to every language and religion of the Levant jostled, haggled and quarrelled.[8] The Hospitallers were thus divided between their duty as sovereign, which was to watch over the interests of their subjects, and their duty as Christian warriors, which was to combat the Infidel. In view of the fact that the crusading spirit was everywhere declining, it is not surprising that their policy was henceforth directed less by religious than by political and commercial considerations. Not that they altogether neglected their duty as protectors of the Cross. Their galleys policed the narrow seas; their consuls in Egypt and Jerusalem watched over the interests of pilgrims; their hospitals were still maintained for the service of the sick and the destitute. But, side by side with this, secularization proceeded apace. In 1341 Pope Clement VI. wrote to the grand master denouncing the luxury of the order and the misuse of its funds; in 1355 Innocent VI. sent the celebrated Juan Fernandez de Heredia, castellan of Amposta and grand commander of Aragon, as his legate to Rhodes, armed with a bull which threatened the order with dissolution if it did not reform itself and effect a settlement in Turkey. In 1348, indeed, the Hospitallers, in alliance with Venice and Cyprus, had captured Smyrna; but the chief outcome of this had been commercial treaties with their allies. Such treaties were, in fact, a matter of life and death; for the island was not self-supporting, and even towards the Infidel the attitude of the knights was necessarily influenced by the fact that their supplies of provisions were mainly drawn from the Mussulman mainland. By the 15th century their crusading spirit had grown so weak that they even attempted to negotiate a commercial treaty with the Ottoman sultan; the project broke down on the refusal of the knights to accept the sultan's suzerainty.

The earlier history of the Hospitallers bristles with obscure questions on which modern scholarship (notably the labours of Delaville Le Roulx) has thrown new light. From 1355 onward, however, the case is different; the essential facts have been established by writers who were able to draw on a mass of well-ordered materials.

Their history during the two centuries of the occupation of Rhodes, so far as its general interest for Europe is concerned, is that of a long series of naval attacks and counter-attacks; its chief outcome, for which the European states owed a debt of gratitude but ill acknowledged, the postponement for some two centuries of the appearance of the Ottomans as a first-rate naval power in the Mediterranean. The seaward advance of Osman the Turk was arrested by their victories; in 1358 they successfully defended Smyrna; in 1365 under their grand master Raymond Béranger (d. 1374), and in alliance with the king of Cyprus, they captured and burned Alexandria. The Ottoman peril, however, grew ever more imminent, and in 1395, under their grand master Philibert de Naillac, the Hospitallers

[1] M. Le Roulx dates his election between the 23rd of November 1304 and the 3rd of November 1305 (*Hosp.* p. 268).

[2] The Templars' property in the Spanish peninsula and Majorca was specially excepted, being subsequently assigned to the sovereigns, who transferred some of it to the native military orders. Nor did the Hospitallers receive by any means all of the rest. Philip IV. charged against the Hospital an enormous bill for expenses incurred in the trial of the Templars, including, as one item, those for torturing the knights. In France at least the Hospitallers complained that they were actually out of pocket. See Finke, *Papsttum und Untergang des Tempelherrenordens*, i. *ad fin.* None the less, the great accession of territorial property necessitated the subdivision of the great regional jurisdictions, notably that of the priory of St Gilles, into new grand priories.

[3] The question is discussed in detail by M. le Roulx, *Hospitaliers*, pp. 278 sqq. He himself dates the surrender of the castle of Rhodes in 1308. Cf. Hans Prutz, "Anfänge der Hospitaliter auf Rhodos" in *Sitzungsber. der K. Bay. Akad. d. Wissenschaften* (1908), i. Abhandlung.

[4] Foulques de Villaret's head seems to have been turned by his success. His early vigour and statesmanlike qualities gave place to luxury, debauchery and a tyrannical temper. He was ultimately deposed, and died at the castle of Teyran in Languedoc in 1327.

[5] The great dignitaries were distributed as follows: Grand commander of Provence, the grand preceptor; Auvergne, the grand marshal; France, the grand hospitaller; Italy, the grand admiral; Aragon, the grand conservator or draper; England, the turcopolier; Germany, the grand bailiff; Castile, the grand chancellor.

[6] "Die Anfänge der Hospitaliter auf Rhodos."

[7] Philip IV. strenuously opposed the change for this reason. Prutz, *Die geistlichen Ritterorden*, pp. 358 sqq. Compare the division of the general councils of Basel and Constance into "nations."

[8] See the regulations made, soon after the capture of the island, in the *Capitula Rodi*, a fragment of a code, published by Ewald in *Neues Archiv* iv. pp. 265-269.

shared in the disastrous defeat of Nicopolis. The invasion followed of Timur the Tatar, invited to his aid by the Eastern emperor. Sultan Bayezid, the victor of Nicopolis, was overthrown; but Timur turned against the Christians and in 1402 captured Smyrna, putting the Hospitallers who defended it to the sword. It was after this disaster that the knights built, on a narrow promontory jutting from the mainland opposite the island of Kos, the fortress of St Peter the Liberator. The castle, which still stands, its name corrupted into Budrun (from Bedros, Peter), was long a place of refuge for Christians flying from slavery.[1] Some years later the position of the order as a Mediterranean sea-power was strengthened by commercial treaties with Venice, Pisa, Genoa, and even with Egypt (1423). The zenith of its power was reached a few years later, when, under the grand master Jean Bonpar de Lastic, it twice defeated an Egyptian attack by sea (1440 and 1444). A new and more imminent peril, however, arose with the capture of Constantinople by the Turks in 1453, for Mahommed II. had announced his intention of making Rhodes his next objective. The attack was delayed for twenty-seven years by the sultan's wars in south-eastern Europe; and meanwhile, in 1476, Pierre d'Aubusson (*q.v.*), the second great hero of the order, had been elected grand master. Under his inspiration, when in June 1480 the Turks, led by three renegades, attacked the island, the knights made so gallant a resistance that, in July, after repeated and decisive repulses, the Turks retreated. In 1503 Pierre d'Aubusson was succeeded by Aymar d'Amboise, who directed a long series of naval battles. In 1521 the famous Philippe de Villiers de l'Isle d'Adam was elected grand master, just as the dreaded sultan Suleiman the Magnificent directed his attack on Rhodes. In 1522 he besieged the island, reinforcements failed, the European powers sent no assistance, and in 1523 the knights capitulated, and withdrew with all the honours of war to Candia (Crete). The emperor Charles V., when the news was brought to him, exclaimed, "Nothing in the world has been so well lost as Rhodes!" But he refused to assist the grand master in his plans for its recovery, and instead, five years later (1530), handed over to the Hospitallers the island of Malta and the fortress of Tripoli in Africa.

The Knights in Malta.—The settlement of the Hospitallers in Malta was contemporaneous with the Reformation, which profoundly affected the order. The master and knights of the bailiwick of Brandenburg accepted the reformed religion, without, however, breaking off all connexion with the order (see below). In England, on the other hand, the refusal of the grand prior and knights to acknowledge the royal supremacy led to the confiscation of their estates by Henry VIII., and, though not formally suppressed, the English "langue" practically ceased to exist.[2] The knights of Malta, as they came to be known, none the less continued their vigorous warfare. Under Pierre du Pont, who succeeded Villiers de l'Isle d'Adam in 1534, they took a conspicuous part in Charles V.'s attack on Goletta and Tunis (1535). In 1550 they defeated the redoubtable corsair Dragut, but in 1551 their position in Tripoli, always precarious, became untenable and they capitulated to the Turks under Dragut, concentrating their forces in Malta. In 1557 Jean Parisot de la Vallette (1494–1548) was elected grand master, and under his vigorous rule strenuous efforts were made to put the defences of Malta into a fit state to resist the expected Turkish attack. On the 18th of May 1565 the Ottoman fleet, under Dragut, appeared before the city, and one of the most famous sieges in history began.[3] It was ultimately raised on the 8th of September, on the appearance of a large relieving force despatched by the Spanish viceroy of Sicily, after Dragut and 25,000 of his followers had fallen. The memory of La Vallette, the hero of the siege, who died in 1568, is preserved in the city of Valletta, which was built on the site of the struggle.

In 1571 the knights shared in the victory of Lepanto; but this crowning success was followed during the 17th century by a long period of depression, due to internal dissensions and culminating during the Thirty Years' War, the position of the order being seriously affected by the terms of the peace of Westphalia (1648). The order was also troubled by quarrels with the popes, who claimed to nominate its officials (a claim renounced by Innocent XII. in 1697), and by rivalry with the Mediterranean powers, especially Venice. In Malta itself there were four rival claimants to independent jurisdiction: the grand master, the bishop of Malta, the grand inquisitor, whose office was instituted in 1572, and the Society of Jesus, introduced by Bishop Gargallo in 1592. The order, indeed, saw much fighting: *e.g.* the frequent expeditions undertaken during the grand-mastership of Alof de Vignacourt (1601–1622); the defence of Candia—which fell after a twenty years' siege in 1669—under Nicholas Cottoner, grand master from 1665 to 1680; and, during the grand mastership of Gregorio Caraffa (1680–1690), a campaign (1683) with John Sobieski, king of Poland, against the Turks in Hungary, and the attack in alliance with Venice on the Morea in 1687, which involved the Hospitallers in the defeat at Negropont in 1689. The decline of the order was hastened by the practice of electing aged grand masters to ensure frequent vacancies; such were Luiz Mendez de Vasconcellos (1622–1623) and Antonio da Paula (1623–1636) and Giovanni Paolo Lascaris (de Castellar), in 1636, who died twenty-one years later at the age of ninety-seven. The character of the order at this date became more exclusively aristocratic, and its wealth, partly acquired by commerce, partly derived from the contributions of the commanderies scattered throughout Europe, was enormous. The wonderful fortifications, planned by French architects and improved by every grand master in turn, the gorgeous churches, chapels and *auberges*, the great library founded in 1650, were the outward and visible sign of the growth of a corresponding luxury in the private life of the order. Nevertheless, under Raymond Perellos de Roccaful (1697–1720) and Antonio Manoel de Vilhena (1722–1736), the knights restored their prestige in the Mediterranean by victories over the Turks. In 1741 Emmanuele Pinto de Fonseca, a man of strong character, became grand master. He expelled the Jesuits, resisted papal encroachments on his authority and, refusing to summon the general chapter, ruled as a despot.

Emanuel, prince de Rohan, who was elected grand master in succession to Francesco Jimenes de Texada in 1775, made serious efforts to revive the old spirit of the order. Under him, for the first time since 1603, a general chapter was convoked; the orders of St Anthony and St Lazarus were incorporated, and the statutes were revised and codified (1782). In 1782 also Rohan, with the approval of George III. established the new Anglo-Bavarian "langue." The last great expedition of the Maltese galleys was worthy of the noblest traditions of the order; they were sent to carry supplies for the sufferers from the great earthquake in Sicily. They had long ceased to be effective fighting ships, and survived mainly as gorgeous state barges in which the knights sailed on ceremonial pleasure trips.

The French Revolution was fatal to the order. Rohan made no secret of his sympathy with the losing cause in France, and Malta became a refuge-place for the *émigrés*. In 1792 the vast possessions of the order in France were confiscated, and six years later the Directory resolved on the forcible seizure of Malta

[1] There is a reproduction of a photograph of the castle in Bedford and Holbeche's *Order of the Hospital*, p. 20. The building materials were largely taken from the Mausoleum of Halicarnassus.

[2] The great priory church at Clerkenwell in London was almost wholly destroyed by the Protector Somerset, who used the materials for his palace in the Strand. Only the great gateway, spanning St John Street, now survives above ground of the priory buildings. It is the headquarters of the revived English "langue." Sir John Rawson, prior of Kilmainham, the headquarters of the order in Ireland, accepted the royal supremacy and was created Lord Clontarf. In 1679 the duke of Ormonde erected the present hospital on the site of the ancient priory. The preceptory of Torphichen, headquarters of the order in Scotland, was surrendered in 1547 by the preceptor Sir James Sandilands of Calder, who was created Lord Torphichen. As "Lord of St John" he had had precedence of all the barons of Scotland, and this right—originally exercised as a spiritual peer—was retained by him and his successors.

[3] In Protestant England public prayers were offered for the success of the knights. Yet a few years later Queen Elizabeth was seeking the alliance of the sultan against Spain, on the ground of their common religion as against "the idolators"!

itself. Rohan had died in 1797, and his feeble successor, Baron Ferdinand von Hompesch,[1] though fully warned, made no preparations to resist. In the early summer of 1798, after a siege of only a few days, he surrendered the island, with its impregnable fortifications, to Bonaparte, and retired ignominiously to Trieste, carrying with him the precious relics of the order—the hand of St John the Baptist presented by the sultan Bayezid, the miraculous image of Our Lady of Philermo, and a fragment of the true cross.

With this the history of the order of St John practically ends. Efforts were, however, made to preserve it. Many of the knights had taken refuge at the court of Paul I. of Russia, with whom in 1797 Hompesch had made an alliance. In October 1798 these elected the emperor Paul grand master, and in the following year Hompesch was induced to resign in his favour. The half-mad tsar took his new functions very seriously, but his murder in 1801 ruined any hope of recovering Malta with Russian assistance. A chapter of the order now granted the right of nomination to the pope, who appointed Giovanni di Tommasi grand master. From his death in 1805 until 1879, when Leo XIII. restored the title of grand master in favour of Fra Giovanni Ceschi a Santa Croce, the heads of the order received only the title of lieutenant master. In 1814 the French knights summoned a chapter general and elected a permanent commission for the government of the order, which was recognized by the Italian and Spanish knights, by the pope and by King Louis XVIII. In the Italian states much of the property of the order was restored at the instance of Austria, and in 1841 the emperor Ferdinand founded the grand priory of Lombardo-Venetia.

Present Constitution of the Order — The "Sovereign Order of Malta" is now divided into the Italian and German langues, both under the Sacred Council (Sagro consiglio) at Rome. The Italian langue embraces the grand priories of Rome, Lombardy and Venice, and Sicily; the German langue consists of (1) the grand priory of Bohemia, (2) the association of the honorary knights (*Ehrenritter*) in Silesia, (3) the association of *Ehrenritter* in Westphalia and the Rhine country, (4) the association of English knights (not to be confused with the English order), (5) the knights received *in gremio religionis*, *i.e.* those not attached to any of the preceding divisions. At the head of the order is the grand master. Each priory has a certain number of bailiffs (grand commanders, *commendatori*), commanders, professed knights (*i.e.* those who have taken the vows), knights of justice (novices), honorary knights, knights of grace, donats and chaplains.

Candidates for knighthood have to prove sixteen quarterings of nobility and, if under age, must be sons of a landowner of the province and of a mother born within its limits. If an Austrian subject, the postulant must obtain the emperor's leave to join the order; the election is by the chapter, and subject to confirmation by the pope. Knights of justice take a yearly oath to fulfil the duties laid on them by the order. After ten years they may take the full oath as professed knights. At any time before doing so, however, they are free to retire from the order and may receive the *croix de dévotion* as honorary knights, their sole obligation being an annual subscription to the order. The *croix de dévotion* is also bestowed on ladies of sufficiently impeccable descent. The grand master also has the right, *motu proprio*, to bestow the cross on distinguished people not of noble birth, who are known as knights of grace. The grand cross[2] of the order is sometimes given, *honoris causa*, to sovereigns and others, who then rank as honorary bailiffs. This is a gold, white enamelled "Maltese" cross, surmounted by a crown, which is worn suspended round the neck by a black ribbon. Bailiffs, professed knights and chaplains wear in addition a white linen cross sewn on to the left breast. The grand priory of Bohemia has made the nursing of the sick its speciality, and especially the organization of military hospitals. The hospice between Bethlehem and Jerusalem is under the protection of the Austrian emperor.

Protestant Orders.—In addition to the Sovereign Order of the Knights of Malta, there exist two Orders of St John of Jerusalem which derive their origin from the same source: the Prussian *Johanniterorden* and the English Order of St John of Jerusalem. Of these the Prussian order has the most interesting history. At the Reformation the master and knights of the bailiwick of Brandenburg adopted the new religion. They continued, however, like other *Ritterstifter*, to enjoy their corporate rights; they even continued to acknowledge the jurisdiction of the grand preceptor of the German langue, in so far as the confirmation of official appointments was concerned, and to send their contributions to the common fund of the order. On the 30th of October 1810, under stress of the miseries of the Napoleonic occupation of Prussia, the order was secularized and its estates confiscated; in 1812 King Frederick William III. founded the chivalrous order of St John, to which the expropriated knights were admitted as honorary knights. In 1853 Frederick William IV. reversed this action, abolished the new chivalrous order and reconstituted the bailiwick of Brandenburg, on the ostensible ground that its maintenance had been guaranteed by the treaty of Westphalia (1648). The master (*Herrenmeister*) is elected by the chapter. All members of the order must be of noble birth and belong to the Evangelical Church. The cross worn is of white enamelled gold with four black eagles between the arms; a white linen cross is also sewn on the left breast of the red tunic which forms part of the uniform. The order has founded, and supports, many hospitals, including a hospice at Jerusalem (see Herrlich, *Die Ballei Brandenburg*, 4th ed., Berlin, 1904).

As already mentioned, the English langue, though deprived of its lands, was never formally suppressed. In 1826–1827 the commission instituted by the French knights in 1814, which was aiming at taking advantage of the Greek War of Independence to reconquer Rhodes or to secure some other island in the Levant, suggested the restoration of the English langue, obviously with the idea of securing the help of Great Britain for their project. Certain eminent Englishmen, *e.g.* Sir Sydney Smith, had already been affiliated to the order by the grand master Baron von Hompesch; the commission now placed itself in communication with the Rev. Sir William Peat, chaplain to King George IV., and other English gentlemen of position. The negotiations resulted in articles of convention reviving the English langue. In 1834 Sir William Peat, elected prior of the English langue, qualified himself by taking the oath *de fideli administratione* in the court of King's Bench, under the charter (never repealed) of Philip and Mary re-establishing the order.[3] For fifty years this was all the official recognition obtained by this curious and characteristic sham-Gothic restoration of the Romantic period. The "English langue," however, though somewhat absurd, did good service in organizing hospital work, notably in the creation of the St John's Ambulance Association, and this work was recognized in high quarters, the princess of Wales (afterwards Queen Alexandra) becoming a lady of justice in 1876 and the duke of Albany joining the order in 1883. In 1888 Queen Victoria granted a charter formally incorporating the order, the headquarters of which had been established in the ancient gate-way of the priory at Clerkenwell. In 1889 the prince of Wales (King Edward VII.) was installed as grand prior.

The objects and constitution of the order are practically the same as those of its Prussian equivalent. The sovereign is its supreme head and patron, the heir to the throne for the time being its grand prior. It is essentially aristocratic, though—for obvious reasons—proof of sixteen quarterings of nobility is not exacted as a condition of membership. The cross is the gold, white-enamelled Maltese cross, differenced by two lions and two unicorns placed between the arms. The order also gives medals to persons of all ranks "for service in the cause of humanity." Among other good works, it supports an ophthalmic hospital at Jerusalem. Unlike the Prussian order, the members need not be Protestants, though they must profess Christianity.[4]

AUTHORITIES.—From the 12th century onwards the knights exercised peculiar care in the preservation of their records, and the vast archives of the order are still preserved, all but intact, at Malta. These include not only those of the central establishment but also a large number of those of the separate commanderies. They include papal bulls, the records of the general chapter, the statutes of the grand masters, title deeds, charters, and from 1629 onwards the special transactions of the *Conseil d'état*. These materials were exploited by several writers in the 17th and 18th centuries. The first was Giacomo Bosio, the 3rd edition of whose *Istoria della . . . illustrissima militia di S. Giov. Gierosolimitano* was published in 3 vols. at Rome in 1676. This was followed by S. Pauli's *Codice diplomatico del sacro militare ordine Geros.* (2 vols., Lucca, 1733–1737) and P. A. Paoli's *Dell' origine ed istituto del sacro militar ordine &c.* (Rome, 1781). These are still useful sources as containing references to, and extracts from, documents since lost. In 1883 J. Delaville Le Roulx published *Les Archives de l'Ordre de Saint-Jean* an analysis of the records preserved at Malta. This was followed in 1904 by his monumental *Cartulaire général des Hospitaliers de Saint-Jean de Jérusalem* (1100–1310), 4 vols. folio. This gives (1) all documents anterior to 1120, (2) all those emanating from the great dignitaries of the order, (3) all those emanating from popes, emperors, kings and great feudatories, (4) those which fix the date of the foundation of particular commanderies, (5) those regulating the relations of the Hospitallers with the lay and ecclesiastical authorities and with the other military orders, (6) the rules, statutes and customs of the order. Hitherto unpublished documents (from the archives of Malta and elsewhere) are published in full; those already published, and the place where they may be found, being indicated in proper sequence. Based on the *Cartulaire* is Le Roulx's *Les*

[1] He was the only German in the list of grand masters.

[2] So called because the dignitaries wore a larger cross than the generality of the knights.

[3] See Bedford and Holbeche, Appendix D.

[4] The medieval vows are, of course, not taken.

Hospitallers en Terre Sainte et en Chypre (Paris, 1904), an invaluable work in which many hitherto obscure problems have been solved. It contains a full list of published authorities. Of English works may be mentioned John Taaffe's *History of the Order of Malta* (1852); J. M. Kemble's Historical introduction to *The Knights Hospitallers in England* (Camden Soc., London, 1857); W. Porter, *Hist. of the Knights of Malta* (2 vols. 1858, new ed. 1883); Bedford and Holbeche, *The Order of the Hospital of St John of Jerusalem* (1902), for the modern order. (W. A. P.)

ST JOHNS, the capital of Newfoundland, situated on the east coast of the island, in the peninsula of Avalon, in 47° 33′ 54″ N., and 52° 40′ 18″ W. It is the most easterly city of America, only 1700 m. from Queenstown in Ireland, and 2030 from Liverpool. It stands on rising ground on the north side of a land-locked harbour, which opens suddenly in the lofty iron-bound coast. The entrance, known as The Narrows, guarded by Signal Hill (520 ft.) and South Side Hill (620 ft.), is about 1400 ft. wide, narrowing to 600 ft. between Pancake and Chain Rocks. At the termination of the Narrows the harbour trends suddenly to the west, thus completely shutting out the ocean swell. Vessels of the largest tonnage can enter at all periods of the tide. There is good wharf accommodation and a well-equipped dry dock. St Johns practically monopolizes the commerce of the island (see NEWFOUNDLAND), being the centre of the cod, seal and whale fisheries. The chief industries are connected with the fitting out of the fishing vessels, or with the disposal and manufacture of their catch. Steamship lines run to Liverpool, New York, Halifax (N.S.) and Saint Pierre. Nearly all the commerce of the island is sea-borne, and well-equipped steamers connect St Johns with the numerous bays and outports. It is the eastern terminus of the government railway across the island to Port-aux-Basques, whence there is steamer connexion with the mainland at Sydney.

The finest buildings in the city are the Anglican and Roman Catholic cathedrals. Education is controlled by the various religious bodies; many of the young men complete their studies in Canada or Great Britain. St Johns is not an incorporated town. A municipal council was abolished after having largely increased the debt of the city, and it is now governed by commissioners appointed by the governor in council.

St Johns was first settled by Devonshire fishermen early in the 16th century. It was twice sacked by the French, and captured by them in the Seven Years War (1762), but recaptured in the same year, since when it has remained in British possession. Both in the war of American independence and in that of 1812 it was the headquarters of the British fleet, and at one time the western end of the harbour was filled up with American prizes. The old city, built entirely of wood, was twice destroyed by fire (1816–1817 and 1846). Half of it was again swept away in 1892, but new and more substantial buildings have been erected.

The population, chiefly of the Roman Catholic faith and of Irish descent, increases slowly. In 1901 the electoral district of St Johns contained 39,994 inhabitants, of whom 30,486 were within the limits of the city.

ST JOHNS, a town and port of entry of Quebec, Canada, and capital of St Johns county, 27 m. S.E. of Montreal by rail, on the river Richelieu and at the head of the Chambly canal. Pop. (1901) 4030. A large export trade in lumber, grain and farm produce is carried on, and its mills and factories produce flour, silk, pottery, hats, &c. Three railways, the Grand Trunk, Canadian Pacific and Central Vermont, enter St Johns. On the opposite bank of the river is the flourishing town of St Jean d'Iberville (usually known simply as Iberville), connected with St Johns by several bridges.

SAINT JOHNSBURY, a township and the county-seat of Caledonia county, Vermont, U.S.A., on the Passumpsic river, about 34 m. E.N.E. of Montpelier. Pop. (1890) 6567; (1900) 7010, of whom 5666 (including 1309 foreign-born) were inhabitants of the village of the same name. Area of the township, about 47 sq. m. Saint Johnsbury is served by the Boston & Maine and the Saint Johnsbury & Lake Champlain railways. The farms of the township are devoted largely to dairying. In the village are a Y.M.C.A. building (1885); the Saint Johnsbury Academy (1842); the Saint Johnsbury Athenaeum (1871), with a library (about 18,000 volumes in 1909) and an art gallery; the Fairbanks Museum of Natural Science (1891), founded by Colonel Franklin Fairbanks; St Johnsbury Hospital (1895); Brightlook Hospital (1899, private); the large scales manufactory of the E. & T. Fairbanks Company (see FAIRBANKS, ERASTUS), and also manufactories of agricultural implements, steam hammers, granite work, furniture and carriages. There are two systems of water-works, one being owned by the village.

The township of Saint Johnsbury was granted to Dr Jonathan Arnold (1741–1793) and associates in 1786; in the same year a settlement was established and the place was named in honour of Jean Hector Saint John de Crèvecœur (1731–1813), who wrote *Letters of an American Farmer* (1782), a glowing description of America, which brought thither many immigrants, and who introduced potato planting into France. The township government was organized in 1790, and the village was incorporated in 1853.

ST JOHN'S WORT, in botany, the general name for species of *Hypericum*, especially *H. perforatum*, small shrubby plants with slender stems, sessile opposite leaves which are often dotted with pellucid glands, and showy yellow flowers. *H. Androsaemum* is Tutsan (Fr. *tout saine*), so called from its healing properties. *H. calycinum* (Rose of Sharon), a creeping plant with large almost solitary flowers 3 to 4 in. across, is a south-east European plant which has become naturalized in Britain in various places in hedges and thickets.

SAINT JOSEPH, a city and the county-seat of Berrien county, Michigan, U.S.A., on Lake Michigan at the mouth of the Saint Joseph river, near the S.W. corner of the state. Pop. (1890) 3733; (1900) 5155, of whom 1183 were foreign-born; (1904, state census) 5322. It is served by the Michigan Central and the Père Marquette railways, by electric interurban railway to South Bend, Indiana, and by a steamboat line to Chicago. Benton Harbor, about 1 m. S.W., with which St Joseph is connected by electric line, is a terminus of the Cleveland, Cincinnati, Chicago & St Louis railway. The U.S. government has deepened the harbour channel to 18 ft.; and the St Joseph river has been made navigable for vessels drawing 3 ft. from St Joseph to Berrien Springs (25 m. by river). A canal, 1 m. long, extends from the upper part of the harbour to Benton Harbor. St Joseph has a public library. The city is a summer and health resort; it has mineral (saline sulphur) springs and a large mineral-water bath house. The general offices and the hospital (1902) of the Michigan Children's Home Society are here. The city has an important trade in fruit, and has various manufactures, including paper, fruit packages, baskets, motor boats, gasolene launches, automobile supplies, hosiery and knit goods, air guns and sashes and blinds. The municipality owns and operates its water-works and electric-lighting plant.

On or near the site of the present city La Salle built in 1679 Fort Miami. In the same county, on or near the site of the present city of Niles (pop. 1904, 4641), French Jesuits established an Indian mission in 1690, and the French government in 1697 erected Fort St Joseph, which was captured from the English by the Indians in 1763, and in 1781 was seized by a Spanish party from St Louis. Fort Miami has often been confused with this Fort St Joseph, 60 m farther up the river. St Joseph was settled in 1829, incorporated as a village in 1836 and first chartered as a city in 1891.

SAINT JOSEPH, a city and the county-seat of Buchanan county, Missouri, U.S.A., and a port of entry, situated in the north-western corner of the state on the E. bank of the Missouri river. It is the third in size among the cities of the state. Pop. (1880) 32,431; (1890) 52,324; (1900) 102,979, of whom 8424 were foreign-born and 6260 were negroes; (1910 census) 77,403. St Joseph is a transportation centre of great importance. It is served by six railways, the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Missouri Pacific, and the St Joseph & Grand Island; in addition there are two terminal railways. A steel bridge across the Missouri (built in 1872; rebuilt in 1906) connects the city with Elwood, Kansas (pop. 1905, 711), and is used by two railways. The city is laid out on hills above the bluffs of the river. The site was completely remade, however (especially in 1866–1873), and the entire business portion has been much graded down. The principal public buildings are the Federal building, the court house, an auditorium seating 7000, a Union Station and a

public library. There are six city parks, of which the largest are Krug Park (30 acres) and Bartlett Park (20 acres). The State Hospital (No. 2) for the Insane (opened 1874) is immediately E. of St Joseph; in the city are the Ensworth, St Joseph and Woodson hospitals, a Memorial Home for needy old people and the Home for Little Wanderers. South St Joseph, a manufacturing suburb, has a library and so has the northern part of the city. The great stock-yards of South St Joseph are sights of great interest. In 1909 the state legislature provided for a commission form of government which took effect in April 1910; a council of five, elected by the city at large, has only legislative powers; the mayor appoints members of a utilities commission, a park commission and a board of public works, and all officers except the city auditor and treasurer; and the charter provides for the initiative, the referendum and the recall. The city maintains a workhouse (1882), also two market houses, and owns and manages an electric-lighting plant. Natural gas is also furnished to the city from oil-fields in Kansas. A private company owns the water-works, first built in 1879 and since greatly improved. The water is drawn from the Missouri, 3 m. above the city, and is pumped thence into reservoirs and settling basins. Beside the local trade of a rich surrounding farming country, the railway facilities of St Joseph have enabled it to build up a great jobbing trade (especially in dry goods), and this is still the greatest economic interest of the city. Commerce and transport were the only distinctive basis of the city's growth and wealth until after 1890, when there was a great increase in manufacturing, especially, in South St Joseph, of the slaughtering and meat-packing industry in the last three years of the decade. In 1900 the manufactured product of the city and its immediate suburbs was valued at $31,690,736, of which $19,009,332 were credited to slaughtering and packing. In the decade of 1890–1900 the increase in the value of manufactures (165·9 %) was almost five times as great in St Joseph as in any other of the largest four cities of the state, and this was due almost entirely to the growth of the slaughtering and meat-packing business, which is for the most part located outside the municipal limits. In 1905 the census reports did not include manufactures outside the actual city limits; the total value of the factory product of the city proper in 1905 was $11,573,720; besides slaughtering and packing the other manufactures in 1905 included men's factory-made clothing (valued at $1,556,655) flour and grist-mill products (valued at $683,464), saddlery and harness (valued at $524,918), confectionery ($437,096), malt liquors ($407,054), boots and shoes ($350,384) and farm implements.

[1] In 1826 Joseph Robidoux, a French half-breed trader, established a trading post on the site of St Joseph. Following the purchase from the Indians of the country, now known as the Platte Purchase, in 1836, a settlement grew up about this trading post, and in 1843 Robidoux laid out a town here and named it St Joseph in honour of his patron saint. St Joseph became the county-seat in 1846, and in 1851 was first chartered as a city. It early became a trading centre of importance, well known as an outfitting point for miners and other emigrants to the Rocky Mountain region and the Pacific coast. During the Civil War it was held continuously by the Unionists, but local sentiment was bitterly divided. After the war a rapid development began. In 1885 St Joseph became a city of the second class. Under the state constitution of 1875 it has had the right, since attaining a population of 100,000, to form a charter for itself. In September 1909, at a special election, it adopted the commission charter described above.

ST JUNIEN, a town of west-central France in the department of Haute-Vienne, on the right bank of the Vienne, 26 m. W. by N. of Limoges on the railway from Limoges to Angoulême. Pop. (1906) town, 8484; commune, 11,400. The 12th century collegiate church, a fine example of the Romanesque style of Limousin, contains a richly sculptured tomb of St Junien, the hermit of the 6th century from whom the town takes its name. Another interesting building is the Gothic chapel of Notre-Dame, with three naves, rebuilt by Louis XI., standing close to a medieval bridge over the Vienne. The town, which ranks second in the department in population and industry, is noted for leather-dressing and the manufacture of gloves and straw paper.

SAINT-JUST, ANTOINE LOUIS LÉON DE RICHEBOURG DE (1767–1794), French revolutionary leader, was born at Decize in the Nivernais on the 25th of August 1767. At the outbreak of the Revolution, intoxicated with republican ideas, he threw himself with enthusiasm into politics, was elected an officer in the National Guard of the Aisne, and by fraud—he being yet under age—admitted as a member of the electoral assembly of his district. Early in 1789 he had published twenty cantos of licentious verse, in the fashion of the time, under the title of *Organt au Vatican.* Henceforward, however, he assumed a stoical demeanour, which, united to a policy tyrannical and pitilessly thorough, became the characteristic of his life. He entered into correspondence with Robespierre, who, flattered by his worship, admitted him to his friendship. Thus supported, Saint-Just became deputy of the department of Aisne to the National Convention, where he made his first speech on the condemnation of Louis XVI.—gloomy, fanatical, remorseless in tone—on the 13th of November 1792. In the Convention, in the Jacobin Club, and among the populace his relations with Robespierre became known, and he was dubbed the "St John of the Messiah of the People." His appointment as a member of the Committee of Public Safety placed him at the centre of the political fever-heat. In the name of this committee he was charged with the drawing up of reports to the Convention upon the absorbing themes of the overthrow of the party of the Gironde (report of the 8th of July 1793), of the Hébertists, and finally, of that denunciation of Danton which consigned him and his followers to the guillotine. What were then called reports were rather appeals to the passions; in Saint-Just's hands they furnished the occasion for a display of fanatical daring, of gloomy eloquence, and of undoubted genius; and—with the shadow of Robespierre behind him—they served their turn. Camille Desmoulins, in jest and mockery, said of Saint-Just—the youth with the beautiful countenance and the long fair locks—"He carries his head like a Holy Sacrament." "And I," savagely replied Saint-Just, "will make him carry his like a Saint Denis." The threat was not vain: Desmoulins accompanied Danton to the scaffold. The same ferocious inflexibility animated Saint-Just with reference to the external policy of France. He proposed that the National Convention should itself, through its committees, direct all military movements and all branches of the government (report of the 10th of October 1793). This was agreed to, and Saint-Just was despatched to Strassburg, in company with another deputy, to superintend the military operations. It was suspected that the enemy without was being aided by treason within. Saint-Just's remedy was direct and terrible: he followed his experience in Paris, "organized the Terror," and soon the heads of all suspects sent to Paris were falling under the guillotine. But there were no executions at Strassburg, and Saint-Just repressed the excesses of J. G. Schneider, who as public prosecutor to the revolutionary tribunal of the Lower Rhine had ruthlessly applied the Terror in Alsace. Schneider was sent to Paris and guillotined. The conspiracy was defeated, and the armies of the Rhine and Moselle having been inspirited by success—Saint-Just himself taking a fearless part in the actual fighting—and having effected a junction, the frontier was delivered and Germany invaded. On his return Saint-Just was made president of the Convention. Later, with the army of the North, he placed before the generals the dilemma of victory over the enemies of France or trial by the dreaded revolutionary tribunal; and before the eyes of the army itself he organized a force specially charged with the slaughter of those who should seek refuge by flight. Success again crowned his efforts, and Belgium was gained for France (May, 1794). Meanwhile affairs in Paris looked gloomier than ever, and Robespierre recalled Saint-Just to the capital. Saint-Just proposed a dictatorship as the only remedy for the convulsions of society. At last, at the famous sitting of the 9th Thermidor, he ventured to present as the report of the committees of General Security and Public Safety a document expressing his own views, a sight of which, however, had been refused to the other members of committee on the previous evening. Then the storm broke. He was vehemently interrupted, and the sitting ended with an order for Robespierre's

arrest (see ROBESPIERRE). On the following day, the 28th of July 1794, twenty-two men, nearly all young, were guillotined. Saint-Just maintained his proud self-possession to the last.

See *Œuvres de Saint-Just, précédées d'une notice historique sur sa vie* (Paris, 1833–1834); E. Fleury, *Études révolutionnaires* (2 vols., 1851), with which cf. articles by Sainte Beuve (*Causeries du lundi*, vol. v.), Cuvillier-Fleury (*Portraits politiques et révolutionnaires*); E. Hamel, *Histoire de Saint-Just* (1859), which brought a fine to the publishers for outrage on public decency; F. A. Aulard, *Les Orateurs de la Législative et de la Convention* (2nd ed., Paris, 1905). The *Œuvres complètes de Saint-Just* have been edited with notes by C. Vellay (Paris, 1908).

ST JUST (St Just in Penwith), a market town in the St Ives parliamentary division of Cornwall, England, 7½m. by road W. of Penzance. Pop. of urban district (1901) 5646. This is the most westerly town in England, lying in a wild district 1 m. inland from Cape Cornwall, which is 4 m. N. of Land's End. The urban district has an area of 7633 acres, and includes the small industrial colonies near some of the most important mines in Cornwall. The Levant mine is the chief, the workings extending beneath the sea. Traces of ancient workings and several exhausted mines are seen. The church of St Just is Perpendicular, with portions of the fabric of earlier date. There are ruins of an oratory dedicated to St Helen on Cape Cornwall.

ST KILDA, a city of Bourke county, Victoria, Australia, 3½ m. by rail S. of, and suburban to, Melbourne. Pop. (1901) 20,544. It is a fashionable watering-place on Hobson's Bay, and possesses the longest pier in Australia. The esplanade and the public park are finely laid out; and portions of the sea are fenced in to protect bathers. The town hall, the public library, the assembly hall, and the great Anglican church of All Saints are the chief buildings.

ST KILDA (Gaelic *Hirta*, "the western land"), the largest of a small group of about sixteen islets of the Outer Hebrides, Inverness-shire, Scotland. It is included in the civil parish of Harris, and is situated 40 m. W. of North Uist. It measures 3 m. from E. to W. and 2 m. from N. to S., has an area of about 3500 acres, and is 7 m. in circumference. Except at the landing-place on the south-east, the cliffs rise sheer out of deep water, and on the north-east side the highest eminence in the island, Conagher, forms a precipice 1220 ft. high. St Kilda is probably the core of a Tertiary volcano, but, besides volcanic rocks, contains hills of sandstone in which the stratification is distinct. The boldness of its scenery is softened by the richness of its verdure. The inhabitants, an industrious Gaelic-speaking community (110 in 1851 and 77 in 1901), cultivate about 40 acres of land (potatoes, oats, barley), keep about 1000 sheep and a few head of cattle. They catch puffins, fulmar petrels, guillemots, razor-birds, Manx shearwaters and solan geese both for their oil and for food. Fishing is generally neglected. Coarse tweeds and blanketing are manufactured for home use from the sheep's wool which is plucked from the animal, not shorn. The houses are collected in a little village at the head of the East Bay. The island is practically inaccessible for eight months of the year, but the inhabitants communicate with the outer world by means of "sea messages," which are despatched in boxes when a strong west wind is blowing, and generally make the western islands or mainland of Scotland in a week.

The island has been in the possession of the Macleods for hundreds of years. In 1779 the chief of that day sold it, but in 1871 Macleod of Macleod bought it back, it is stated, for £3000. In 1724 the population was reduced by smallpox to thirty souls. They appear to catch what is called the "boat-cold" caused by the arrival of strange boats, and at one time the children suffered severely from a form of lockjaw known as the "eight days' sickness."

See works by Donald Munro, high dean of the Isles (1585), M. Martin (1698), Rev. K. Macaulay (1764), R. Connell (1887); Miss Goodrich-Freer, *The Outer Isles*; Richard and Cherry Kearton, *With Nature and a Camera* (1896).

ST KITTS, or ST CHRISTOPHER, an island in the British West Indies, forming, with Nevis and Anguilla, one of the presidencies in the colony of the Leeward Islands. It is a long oval with a narrow neck of land projecting from the south-eastern end; total length 23 m., area 63 sq. m. Mountains traverse the central part from N.W. to S.E., the greatest height being Mount Misery (3771 ft.). The island is well watered, fertile and healthy, and its climate is cool and dry (temperature between 78° and 85° F.; average annual rainfall 38 in.). The circle of land formed by the skirts of the mountains, and the valley of Basseterre constitute nearly the whole of the cultivated portion. The higher slopes of the hills afford excellent pasturage, while the summits are crowned with dense woods. Sugar, molasses, rum, salt, coffee and tobacco are the chief products; horses and cattle are bred. Primary education is compulsory. The principal towns are Old Road, Sandy Point and the capital Basseterre, which lies on the S.W. coast (pop. about 10,000). One good main road, macadamized throughout, encircles the island. The local legislature consists of 6 official and 6 unofficial members nominated by the Crown. St Kitts was discovered by Columbus in 1493 and first settled by Sir Thomas Warner in 1623. Five years later it was divided between the British and the French, but at the Peace of Utrecht in 1713 it was entirely ceded to the British Crown. Population, mostly negroes, 29,782.

SAINT-LAMBERT, JEAN FRANÇOIS DE (1716–1803), French poet, was born at Nancy on the 26th of December 1716. He entered the army and, when Stanislaus Leszczynski was established in 1737 as duke of Lorraine, he became an official at his court at Lunéville. He left the army after the Hanoverian campaign of 1756–57, and devoted himself to literature, producing a volume of descriptive verse, *Les Saisons* (1769), now never read, many articles for the *Encyclopédie*, and some miscellaneous works. He was admitted to the Academy in 1770. His fame, however, comes chiefly from his amours. He was already high in the favour of the marquise de Boufflers, Stanislaus's mistress, whom he addressed in his verses as *Doris* and *Thémire*, when Voltaire in 1748 came to Lunéville with the marquise de Châtelet. Her infatuation for him and its fatal termination are known to all readers of the life of Voltaire. His subsequent liaison with Madame d'Houdetot, Rousseau's Sophie, though hardly less disastrous to his rival, continued for the whole lives of himself and his mistress. Saint Lambert's later years were given to philosophy. He published in 1798 the *Principe des mœurs chez toutes les nations ou catéchisme universel*, and published his *Œuvres philosophiques* (1803), two years before his death on the 9th of February 1803. Madame d'Houdetot survived until the 28th of January 1813.

See G. Maugras, *La Cour de Lunéville* (1904) and *La Marquise de Boufflers* (1907); also the literature dealing with Rousseau and Voltaire.

ST LAWRENCE. The river St Lawrence, in North America, with the five fresh-water inland seas (see GREAT LAKES), Superior, Michigan, Huron, Erie and Ontario, forms one of the great river systems of the world, having a length, from the source of the river St Louis (which rises near the source of the river Mississippi and falls into the head of Lake Superior) to Cape Gaspé, where it empties into the Gulf of St Lawrence, of 2100 m. The river is here considered as rising at the foot of Lake Ontario, in 44° 10′ N., 76° 30′ W., where the name St Lawrence is first applied to it.

The river, to the point where it crosses 45° N. in its north-westerly course, forms the boundary line between the state of New York and the province of Ontario; thence to the sea it is wholly within Canadian territory, running through the province of Quebec. At Point des Monts, 260 m. below Quebec, it is 26 m. wide, and where it finally merges into the Gulf of St Lawrence, 150 m. farther on, it is 90 m. wide, this stretch being broken by the large island of Anticosti, lying fairly in the mouth. The character of the river banks varies with the geological formations through which it runs. Passing over the Archaean rocks of the Laurentian from Kingston to Brockville the shores are very irregular, and the river is broken up by protrusions of glaciated summits of the granites and gneisses into a large number of picturesque islands, "The Thousand Islands," greatly frequented as a summer resort. From Brockville to Montreal the river runs through flat-bedded Cambro-silurian limestones, with rapids at several points, which are all run by light-draught passenger boats. For the up trip the rapids are avoided by canalization. From Montreal to Three Rivers the course is through an alluvial plain over-lying the limestones,

the river at one point expanding into Lake St Peter, 20 m. long by 10 m. wide, with a practically uniform depth of 10 ft. Below Three Rivers the banks grow gradually higher until, after passing Quebec through a cleft in slate rocks of Cambrian age, the river widens, washing the feet of the Laurentian Mountains on its north shore; while a more moderately hilly country, terminating in the Shickshock Mountains of the Gaspé Peninsula, skirts its south shore.

From Kingston, at the head of the river, to Montreal, a distance of 170 m., navigation is limited to vessels of 14 ft. draught by the capacity of the canals. From Montreal to Quebec, 160 m., a ship channel has been dredged to a depth of 30 ft.; below Quebec the river is tidally navigable by vessels of any draught. The canals on the St Lawrence above Montreal have been enlarged to the capacity of the Welland canal, the improved system having been opened to commerce in the autumn of 1899. Instead of enlarging the Beauharnois canal, on the south side of the river, a new canal, the "Soulanges," was built from Coteau Landing to Cascades Point, on the north side, the Beauharnois canal still being used for small barges. The locks of the enlarged canals are all 45 ft. wide, with an available depth of 14 ft. and a minimum length of 270 ft. The following table shows the canalized stretches in this portion of the river:—

Name	From	To	Length in Miles.	Number of Locks.	Fall in Feet
Galops	Head of Galops Rapids	Iroquois	7½	3	15½
River	..	..	4	..	..
Rapide Plat	Head of Ogden Island	Morrisburg	3⅜	2	11½
River	..	..	10½	..	..
Farran Point	Head of Croil Island	Farran Point	1	1	3½
River	..	..	5	..	..
Cornwall Canal	Dickinson Landing	Cornwall	11	6	48
Lake St Francis	..	..	30½	..	..
Soulanges	Coteau Landing	Cascades Point	14	4	82½
Lake St Louis	..	..	14	..	.
Lachine	Lachine	Montreal	8½	5	45
			109½	21	206

In the stretch between Montreal and Quebec the ship channel, begun by the Montreal Harbour Commissioners, has been assumed by the Dominion government as a national work, and improvements, involving extensive dredging, have been undertaken with the aim of securing everywhere a minimum depth of 30 ft. with a minimum width of 450 ft. The whole river from Kingston to the sea is well supplied with aids to navigation. In the dredged portions lights are arranged in pairs of leading lights on foundations sufficiently high and solid to resist the pressure of ice movement, and there is an elaborate system of fog alarms, gas-lighted and other buoys, as well as telegraphic, wireless and telephonic communication, storm signal, weather and ice reporting stations and a life-saving service.

Montreal, at the head of ocean navigation, the largest city in Canada, is an important distributing centre for all points in western Canada, and enjoys an extensive shipping trade with the United Kingdom, the sea-going shipping exceeding 1,500,000 tons, and the inland shipping approximating 2,000,000 tons, annually. Quebec is the summer port used by the largest steamers in the Canadian trade. There are numerous flourishing towns on both banks of the river, from Kingston, a grain transferring port, to the sea. Large quantities of lumber, principally spruce (fir) and paper pulp, are manufactured at small mills along the river, and shipped over sea directly from the place of production. The mail steamers land and embark mails at Rimouski, to or from which they are conveyed by rail along the south shore.

The importance to Canada of the river St Lawrence as a national trade route cannot be over-estimated. As a natural highway between all points west of the Maritime Provinces and Europe it is unique in permitting ocean traffic to penetrate 1000 m. into the heart of a country. It is, moreover, the shortest freight route from the Great Lakes to Europe. From Buffalo to Liverpool via New York involves rail or 7-ft. canal transport of 496 m. and an ocean voyage of 3034 nautical miles. Via Montreal there is a 14-ft. transport of 348 m. and river and ocean voyage of 2772 nautical miles. From Quebec to Liverpool by Cape Race is 2801 nautical miles, while the route by Belle Isle, more nearly a great circle course, usually taken between July and October, is only 2633 nautical miles. On the other hand the St Lawrence is not open throughout the year; the average time between the arrival of the first vessel at Montreal from sea and the departure of the last ocean vessel is seven months. From Kingston to Quebec the river freezes over every winter, except at points where the current is rapid. Below Quebec, although there is heavy border ice, the river never freezes over. For a few winters, while the bridge accommodation at Montreal was restricted to the old single-track Victoria bridge, railway freight trains were run across the ice bridge on temporary winter tracks. Efforts have been made to lengthen the season of navigation by using specially constructed steamers to break the ice; and it is claimed that the season of navigation could be materially lengthened, and winter floods prevented by keeping the river open to Montreal. Winter ferries are maintained at Quebec, between Prince Edward Island and Nova Scotia, and between Newfoundland and Sydney, Cape Breton. In the winter of 1898–1899 an attempt was made to run a winter steamer from Paspebiac to England, but it was not successful, principally because an unsuitable vessel was used. To pass through the field of ice that is always present in the gulf, in greater or lesser quantity, specially strengthened vessels are required.

The river above tide water is not subject to excessive flooding, the maximum rise in the spring and early summer months, chiefly from northern tributaries from the Ottawa eastward, being 10 ft. The Great Lakes serve as impounding reservoirs for the gradual distribution of all overflows in the west. At Montreal, soon after the river freezes over each winter, there is a local rise of about 10 ft. in the level of the water in the harbour, caused by restriction of the channel by anchor ice; and in the spring of the year, when the volume of the water is augmented, this obstruction leads to a further rise, in 1886 reaching a height of 27 ft. above ordinary low water. To prevent flooding of the lower parts of the city a dike was in 1887 built along the river front, which prevented a serious flooding in 1899

Tides enter the Gulf of St Lawrence from the Atlantic chiefly through Cabot Strait (between Cape Breton and Newfoundland), which is 75 m. wide and 250 fathoms deep. The tide entering through Belle Isle Strait, 10 m. wide and 30 fathoms deep, is comparatively little felt. The tidal undulation, in passing through the gulf, expands so widely as to be almost inappreciable in places, as, for example, at the Magdalen Islands, in the middle of the gulf, where the range amounts to about 3 ft. at springs, becoming effaced at neaps. There is also little more tide than this at some points on the north shore of Prince Edward Island. The greatest range is attained in Northumberland Strait and in Chaleur Bay, where it amounts to 10 ft. At the entrance to the estuary at Anticosti it has again the oceanic range of about 6 ft., and proceeds up the estuary with an ever-increasing range, which attains its maximum of 19 ft. at the lower end of Orleans Island, 650 m. from the ocean at Cabot Strait. This must be considered the true head of the estuary. At Quebec, 30 m. farther up, the range is nearly as great; but at 40 m. above Quebec it is largely cut off by the Richelieu Rapids, and finally ceases to be felt at Three Rivers, at the lower end of Lake St Peter, 700 m. from the ocean.

The St Lawrence provides ample water-power, which is being increasingly used. Its rapids have long been used for milling and factory purposes; a wing dam on the north side of Lachine Rapids furnishes electricity to Montreal; the falls of Montmorency light Quebec and run electric street cars; and from Lake Superior to the gulf there are numerous points on the tributaries to the St Lawrence where power could be used.

Nearly all the rivers flowing into the St Lawrence below Quebec are stocked with salmon (*Salmo salar*), and are preserved and leased to anglers by the provincial government. In the salt

water of the gulf and lower river, mackerel, cod, herring, smelt, sea-trout, striped bass and other fish are caught for market.

The St Lawrence is spanned by the following railway bridges: (1) A truss bridge built near Cornwall in 1900 by the New York & Ottawa railroad, now operated by the New York Central railroad. (2) A truss bridge with a swing, built in 1890 by the Canada Atlantic railway at Coteau Landing. (3) A cantilever bridge built in 1887 by the Canadian Pacific railway at Caughnawaga. (4) The Victoria Jubilee bridge, built as a tubular bridge by the Grand Trunk railway in 1860, and transformed into a truss bridge in 1897–1898. The new bridge rests on the piers of the old one, enlarged to receive it, is 6592 ft. long by 67 ft. wide, has 25 spans, double railway and trolley tracks, driveways and sidewalks, and was erected without interruption of traffic. (5) A very large cantilever bridge, having a central span of 1800 ft., crosses the river at a point 7 m. above Quebec. The southern half of the superstructure, while in course of erection in August 1907, fell, killing 78 men, and necessitating a serious delay in the completion of the work.

The river St Lawrence was discovered by Jacques Cartier, commissioned by the king of France to explore and trade on the American coast. Cartier entered the strait of Belle Isle in 1534: but Breton fishermen had previously resorted there in summer and penetrated as far as Brest, eleven leagues west of Blanc Sablon, the dividing line between Quebec and Labrador. Cartier circled the whole gulf, but missed the entrance to the river. On his second voyage in 1536 he named a bay on the north shore of the gulf, which he entered on the 10th of August, the feast of St Lawrence, *Baye Sainct Laurens*, and the name gradually extended over the whole river, though Cartier himself always wrote of the River of Canada. Early in September, he reached "Canada," now Quebec, and on the 2nd of October reached Hochelaga, now Montreal. No permanent settlement was then made. The first, Tadousac, at the mouth of the Saguenay, was established by Champlain in 1603, and Quebec was settled by him in 1608. Between that time and 1616 Champlain explored the whole river system as far west as Lake Huron, reaching it by way of the Ottawa river, and taking possession of the country in the name of the king of France. It became British by the treaty of Paris, in 1763.

See S. E. Dawson, *The St Lawrence, its Basin and Border Lands* (New York, 1905) (historical); *St Lawrence Pilot* (7th ed., Hydrographic Office, Admiralty, London, 1906); *Sailing Directions for the St Lawrence River to Montreal* (United States Hydrographic Office publication, No. 108 D, Washington, 1907); *Annual Reports* of the Canadian Departments of Marine and Fisheries, Public Works, and Railways and Canals, Ottawa); *Transactions* (Royal Society, Canada, 1898-1899), vol. iv. sec. iii.; T. C. Keefer on "Ice Floods and Winter Navigation of the St Lawrence," *Transactions* (Canadian Society of Civil Engineers, Presidential Address of W. P. Anderson, on improvements to navigation on St Lawrence, 1904).

(W. P. A.)[1]

ST LEGER, SIR ANTHONY (*c.* 1496–1559), lord deputy of Ireland, eldest son of Ralph St Leger, a gentleman of Kent, was educated abroad and at Cambridge. He quickly gained the favour of Henry VIII., and was appointed in 1537 president of a commission for inquiring into the condition of Ireland. This work he carried out with ability and obtained much useful knowledge of the country. In 1540 he was appointed lord deputy of Ireland. His first task was to repress disorder, and he at once proceeded with severity against the Kavanaghs, permitting them, however, to retain their lands, on their accepting feudal tenure on the English model. By a similar policy he exacted obedience from the O'Mores, the O'Tooles and the O'Conors in Leix and Offaly; and having conciliated the O'Briens in the west and the earl of Desmond in the south, the lord deputy carried an act in the Irish parliament in Dublin conferring the title of king of Ireland on Henry VIII. and his heirs. Conn O'Neill, who in the north had remained sullenly hostile, was brought to submission by vigorous measures. For the most part, however, St Leger's policy was one of moderation and conciliation—rather more so, indeed, than Henry VIII. approved. He recommended The O'Brien, when he gave token of a submissive disposition, for the title of earl of Thomond; O'Neill was created earl of Tyrone; an administrative council was instituted in the province of Munster; and in 1544 a levy of Irish soldiers was raised for service in Henry VIII.'s wars. St Leger's personal influence was proved by an outbreak of disturbance when he visited England in 1544, and the prompt restoration of order on his return some months later. St Leger retained his office under Edward VI., and again effectually quelled attempts at rebellion by the O'Conors and O'Byrnes. From 1548 to 1550 he was in England. He returned charged with the duty of introducing the reformed liturgy into Ireland. His conciliatory methods brought upon him the accusation that he lacked zeal in the cause, and led to his recall in the summer of 1551. After the accession of Mary he was again appointed lord deputy in October 1553, but in consequence of a charge against him of keeping false accounts he was recalled for the third time in 1556. While the accusation was still under investigation, he died on the 16th of March 1559.

By his wife Agnes, daughter of Hugh Warham, a niece of Archbishop Warham, he had three sons, William, Warham and Anthony. William died in his father's lifetime leaving a son, Sir Warham St Leger (d. 1600), who was father of Sir William St Leger (d. 1642), president of Munster. Sir William took part in "the flight of the earls" (see O'Neill) in 1607, and spent several years abroad. Having received a pardon from James I. and extensive grants of land in Ireland, he was appointed president of Munster by Charles I. in 1627. He warmly supported the arbitrary government of Strafford, actively assisting in raising and drilling the Irish levies destined for the service of the king against the Parliament. In the great rebellion of 1641 he bore the chief responsibility for dealing with the insurgents in Munster; but the forces and supplies placed at his disposal were utterly inadequate. He executed martial law in his province with the greatest severity, hanging large numbers of rebels, often without much proof of guilt. He was still struggling with the insurrection when he died at Cork on the 2nd of July 1642. Sir William's daughter Margaret married Murrough O'Brien, 1st earl of Inchiquin; his son John was father of Arthur St Leger, created Viscount Doneraile in 1703.

A biography of Sir Anthony St Leger will be found in *Athenae Cantabrigienses*, by C. H. Cooper and T. Cooper (Cambridge, 1858); see also *Calendar of State Papers relating to Ireland, Hen. VIII.-Eliz.*; *Calendar of Letters and Papers of the Reign of Henry VIII*; *Calendar of State Papers* (*Domestic Series*), *Edward VI.—James I.*; *Calendar of Carew MSS.*; J. O'Donovan's edition of *Annals of Ireland by the Four Masters* (7 vols., Dublin, 1851); Richard Bagwell, *Ireland under the Tudors* (3 vols., London, 1885–1890); J. A. Froude, *History of England* (12 vols., London, 1856–1870). For Sir William St Leger, see *Strafford's Letters and Despatches* (2 vols., London, 1739); Thomas Carte, *History of the Life of James, Duke of Ormonde* (6 vols., Oxford, 1851); *History of the Irish Confederation and the War in Ireland*, edited by Sir J. T. Gilbert (Dublin, 1882–1891). (R. J. M.)

ST LEONARDS, EDWARD BURTENSHAW SUGDEN, 1ST BARON (1781–1875), lord chancellor of Great Britain, was the son of a hairdresser of Duke Street, Westminster, and was born on the 12th of February 1781. After practising for some years as a conveyancer, he was called to the bar at Lincoln's Inn in 1807, having already published his well-known treatise on the *Law of Vendors and Purchasers* (14th ed., 1862). In 1822 he was made king's counsel and chosen a bencher of Lincoln's Inn. He was returned at different times for various boroughs to the House of Commons, where he made himself prominent by his opposition to the Reform Bill of 1832. He was appointed solicitor-general in 1829, was named lord chancellor of Ireland in 1834, and again filled the same office from 1841 to 1846. Under Lord Derby's first administration in 1852 he became lord chancellor and was raised to the peerage as Lord St Leonards. In this position he devoted himself with energy and vigour to the reform of the law; Lord Derby on his return to power in 1858 again offered him the same office, which from considerations of health he declined. He continued, however, to take an active interest especially in the legal matters that came before the House of Lords, and bestowed his particular attention on the reform of the law of property. He died at Boyle Farm, Thames Ditton, on the 29th of January 1875.

After his death his will was missing, but his daughter, Miss Charlotte Sugden, was able to recollect the contents of a most intricate document, and in the action of *Sugden* v. *Lord St Leonards* (L.R. 1 P.D. 154) the court accepted her evidence and granted probate of a paper propounded as containing the provisions of the lost will. This decision established the proposition that the contents of a lost will may be proved by secondary evidence, even of a single witness.

Lord St Leonards was the author of various important legal publications, many of which have passed through several editions Besides the treatise on purchasers already mentioned, they include *Powers, Cases decided by the House of Lords, Gilbert on Uses, New Real Property Laws* and *Handybook of Property Law, Misrepresentations in Campbell's Lives of Lyndhurst and Brougham, corrected by St Leonards.* See *The Times* (30th of January 1875); E. Manson, *Builders of our Law* (1904); J. R. Atlay, *Lives of the Victorian Chancellors*, vol. ii.

ST LIZIER-DE-COUSERANS, a village of south-western France in the department of Ariège on the right bank of the Salat, 1 m. N.N.W. of St Girons. Pop. (1906) 615; commune 1295. St Lizier, in ancient times one of the twelve cities of Novempopulania under the name of *Lugdunum Consoranorum*, was later capital of the Couserans and seat of a bishopric (suppressed at the Revolution) to the holders of which the town belonged. It has a cathedral of the 12th and 14th centuries with a fine Romanesque cloister and preserves remarkable remains of Roman ramparts. The old episcopal palace (17th century) and the adjoining church (14th and 17th centuries), once the cathedral with its fine chapter-hall (12th century), form part of a lunatic asylum. The Salat is crossed by a bridge of the 12th or 13th century. The town owes its name to its bishop Lycerius, who is said to have saved it from the Vandals in the 7th century. The chief event in its history was its devastation in 1130 by Bernard III., count of Comminges, a disaster from which it never completely recovered.

ST LÔ, a town of north-western France, capital of the department of Manche, 47½ m. W. by S. of Caen by rail. Pop. (1906) town 9379; commune, 12,181. St Lô is situated on a rocky hill on the right bank of the Vire. Its chief building is the Gothic church of Notre-Dame, dating mainly from the 16th century. The façade, flanked by two lofty towers and richly decorated, is impressive, despite its lack of harmony. There is a Gothic pulpit outside the choir. In the hôtel-de-ville is the "Torigni marble," the pedestal of an ancient statue, the inscriptions on which relate chiefly to the annual assemblies of the Gallic deputies held at Lyons under the Romans. The modern church of Sainte-Croix preserves a Romanesque portal which belonged to the church of an ancient Benedictine abbey. St Lô is the seat of a prefect and has tribunals of first instance and of commerce, a training college for masters, a school of drawing, a branch of the Bank of France, a chamber of arts and manufactures, and a government stud. The town has trade in grain, fat stock, troop-horses and farm produce, and carries on tanning, wool-spinning and bleaching and the manufacture of woollen and other fabrics.

St Lô, called *Briovera* in the Gallo-Roman period, owes its present name to St Lô (Laudus), bishop of Coutances (d. 568). In the middle ages St Lô became an important fortress as well as a centre for the weaving industry. It sustained numerous sieges, the last in 1574, when the town, which had embraced Calvinism, was stormed by the Catholics and many of its inhabitants massacred. In 1800 the town was made capital of its department in place of Coutances.

ST LOUIS, the chief city and a port of entry of Missouri, and the fourth in population among the cities of the United States, situated on the W. bank of the Mississippi river, about 20 m. below its confluence with the Missouri, 200 m. above the influx of the Ohio, and 1270 m. above the Gulf of Mexico, occupying a land area of 61·37 sq. m. in a commanding central position in the great drainage basin of the Mississippi system, the richest portion of the continent. Pop. (1880) 350,518, (1890) 451,770, (1900) 575,238, (1910) 687,029.

The central site is marked by an abrupt terraced rise from the river to an easily sloping tableland, 4 or 5 m. long and somewhat less than 1 m. broad, behind which are rolling hills. The length of the river-front is about 19 m. The average elevation of the city is more than 425 ft.; and the recorded extremes of low and high water on the river are 379 and 428 ft. (both established in 1844). The higher portions of the city lie about 200 ft. above the river level, and in general the site is so elevated that there can be no serious interruption of business except by extraordinary floods. The natural drainage is excellent, and the sewerage system, long very imperfect, has been made adequate. The street plan is approximately rectilinear. The stone-paved wharf or river-front, known as the Levee or Front Street, is 3·7 m. long. Market Street, running E. and W., is regarded as the central thoroughfare; and the numbering of the streets is systematized with reference to this line and the river. Broadway (or Fifth Street, from the river) and Olive Street are the chief shopping centres; Washington Avenue, First (or Main) and Second Streets are devoted to wholesale trade; and Fourth Street is the financial centre. The most important public buildings are the federal building, built of Maine granite; the county court house (1839–1862, $1,199,872),—a semi-classic, plain, massive stone structure, the Four Courts (1871, $755,000), built of cream-coloured Joliet stone, and a rather effective city hall (1890–1904, $2,000,000), in Victorian Gothic style in brick and stone. The chief slave-market before the War was in front of the Court House. The City Art Museum, a handsome semi-classic structure of original design, and the Tudor-Gothic buildings of the Washington University, are perhaps the most satisfying structures in the city architecturally. Among other noteworthy buildings are the Public Library, the Mercantile Library, the Mercantile, the Mississippi Valley, the Missouri-Lincoln, and the St Louis Union Trust Company buildings; the German-Renaissance home of the Mercantile Club; the florid building of the St Louis Club; the Merchants' Exchange; the Missouri School for the Blind; the Coliseum, built in 1897 for conventions, horse shows, &c., torn down in 1907 and rebuilt in Jefferson Avenue, and the Union Station, used by all the railways entering the city. This last was opened in 1894, and cost, including the site, $6,500,000; has a train-shed with thirty-two tracks, covers some eleven acres, and is one of the largest and finest railway stations in the world. The city owns a number of markets. In 1907 a special architectural commission, appointed to supervise the construction of new municipal buildings, purchased a site adjacent to the City Hall, for new city courts and jail, which were begun soon afterwards.

The valley of Mill Creek (once a lake bed, "Chouteau Pond," and afterwards the central sewer) traverses the city from W. to E. and gives entry to railways coming from the W. into the Union Station. The terminal system for connecting Missouri with Illinois includes, in addition to the central passenger station, vast centralized freight warehouses and depots; an elevated railway along the levee; passenger and freight ferries across the Mississippi with railway connexions; two bridges across the river; and a tunnel leading to one of them under the streets of the city along the river front. The Merchants' Bridge (1887–1890, $3,000,000), used solely by the railways, is 1366·5 ft. long in channel span, with approaches almost twice as long. The Eads Bridge (1868–1874; construction cost $6,536,730, total cost about $10,000,000) is 3 m. farther down the river; it carries both wagon ways and railway tracks, is 1627 ft. clear between shore abutments, and has three spans. Built entirely of steel above the piers, it is a happy combination of strength and grace, and was considered a marvel when erected.

St Louis has exceptionally fine residential streets that are accounted among the handsomest in the world. The most notable are Portland Place, Westmoreland Place, Vandeventer Place, Kingsbury Place, &c., in the neighbourhood of Forest Park: broad parked avenues, closed with ornamental gateways, and flanked by large houses in fine grounds. The park system of the city is among the finest in the country, containing in 1910 2641·5 acres (cost to 1909, $6,417,745). Forest Park (1372 acres), maintained mainly in a natural, open-country state, is the largest single member of the system. In one end of it was held the Louisiana Purchase Exposition in 1904. Tower Grove Park (277 acres) and the Missouri Botanical Gardens

(45 acres), probably the finest of their kind in the country, were gifts to the city from a public-spirited citizen, Henry Shaw (1800–1889), who also endowed the botanical school of Washington University. Carondelet (180 acres), O'Fallon (158 acres), and Fairground (129 acres, including a 65-acre athletic field) are the finest of the other parks. King's Highway is a boulevard (partly completed in 1910) from the Mississippi on the S. to the Mississippi on the N., crossing the western part of the city. In accord with a general movement in American cities late in the 19th century, St Louis made a beginning in the provision of small "neighbourhood parks," intended primarily to better the lives of the city's poor, and vacation playgrounds for children; and for this purpose five blocks of tenements were condemned by the city. In the different parks and public places are statues of Columbus, Shakespeare (Tower Grove Park) and Humboldt (Tower Grove Park), by Ferdinand von Mueller of Munich; a replica of the Schiller monument at Marbach in Germany, and of Houdon's Washington (Lafayette Park); statues of Thomas Hart Benton (Lafayette Park; by Harriet Hosmer), of Francis Preston Blair (W. W. Gardner) and Edward Bates (J. W. McDonald), both in Forest Park, and of General Grant (R. P. Bringhurst) in the City Hall Park; all of these being in bronze. In the cemeteries of the city—of which the largest are Bellefontaine (350 acres) and Calvary (415 acres)—there are notable monuments to Henry Shaw, and to Nathaniel Lyon, Sterling Price, Stephen W. Kearny and W. T. Sherman, all closely associated with St Louis or Missouri. There are various lake, river and highland pleasure-resorts near the city; and about 12 m. S. is Jefferson Barracks, a national military post of the first class. The old arsenal within the city, about which centred the opening events of the Civil War in Missouri, has been mainly abandoned, and part of the grounds given to the municipality for a park.

The annual fair, or exposition, was held in the autumn of each year—except in war time—from 1855 to 1902, ceasing with the preparations for the World's Fair of 1904. One day of Fair Week ("Big Thursday") was a city holiday; and one evening of the week was given over after 1878 to a nocturnal illuminated pageant known as the Procession of the Veiled Prophet, with accompaniments in the style of the carnival (Mardi Gras) at New Orleans; this pageant is still continued.

Among the educational institutions of the city, Washington University, a largely endowed, non-sectarian, co-educational school opened in 1857, is the most prominent. Under its control are three secondary schools, Smith Academy and the Manual Training School for Boys, and Mary Institute for Girls. The university embraces a department of arts and sciences, which includes a college and a school of engineering and architecture, and special schools of law, medicine (1899), dentistry, fine arts, social economy and botany. Affiliated with the university is the St Louis School of Social Economy, called until 1909 the St Louis School of Philanthropy, and in 1906–1909 affiliated with the university of Missouri. The Russell Sage Foundation co-operates with this school. In 1909 Washington University had 1045 students. In 1905 the department of arts and sciences and the law school were removed to the outskirts of the city, where a group of buildings of Tudor-Gothic style in red Missouri granite were erected upon grounds, which with about $6,000,000 for buildings and endowment, were given to the university. St Louis University had its beginnings (1818) as a Latin academy, became a college in 1820, and was incorporated as a university in 1832. One of the leading Jesuit colleges of the United States, it is the parent-school of six other prominent Jesuit colleges in the Middle West. In 1910 it comprised a school of philosophy and science (1832), a divinity school (1834), a medical school (1836), a law school (1843), a dental school (1908), a college, three academies and a commercial department; and its enrolment was 1181. It is the third largest, and the Christian Brothers' College (1851), also Roman Catholic, is the fourth largest educational institution in the state. The Christian Brothers' College had in 1910 30 instructors and 500 students, most of whom were in the preparatory department. Besides the Divinity School of St Louis University, there are three theological seminaries, Concordia (Evangelical Lutheran, 1839), Eden Evangelical College (German Evangelical Synod of North America, 1850) and Kenrick Theological Seminary (Roman Catholic, 1894). There are two evening law schools, Benton College (1896) and Metropolitan College (1901).

The public school system came into national prominence under the administration (1867–1880) of William T. Harris, and for many years has been recognized as one of the best in the United States. The first permanent kindergarten in the country in connexion with the public schools was established in St Louis in 1873 by W. T. Harris (*q.v.*), then superintendent of schools, and Miss Susan Ellen Blow. The first public kindergarten training school was established at the same time. There is a teachers' college in the city school system, and there are special schools for backward children. Several school buildings have been successfully used as civic centres. The city has an excellent educational museum, material from which is available for object lessons in nature study, history, geography, art, &c., in all public schools. In the year 1907–1908 the total receipts for public education were $4,219,000, and the expenditure was $3,789,604. The City Board of Education was chartered in 1897.

The German element has lent strength to musical and gymnastic societies. The Museum and School of Fine Arts was established in 1879 as the Art Department of Washington University. In 1908 it first received the proceeds of a city tax of one-fifth mill per dollar, and in 1909 it was reorganized as the City Art Museum. In its building (the "Art Palace," built in 1903–1904 at a cost of $943,000 for the Louisiana Purchase Exposition; now owned by the city) in Forest Park are excellent collections (largely loaned) of sculpture and paintings (illustrating particularly the development of American art) and of art objects. The School of Fine Arts, now separate from the museum and a part of Washington University, has classes in painting, drawing, design, illustration, modelling, pottery, bookbinding, &c. Among the libraries the greatest collections are those of the Mercantile Library (in 1910, 136,000 volumes and pamphlets), a subscription library founded in 1846, and the public library (1865)—a fine city library since 1894, with 312,000 volumes in 1910 and six branch libraries, the gift of Andrew Carnegie, who also gave the city $500,000 towards the new public library, which was begun in 1909 and cost $1,500,000. Other notable collections are those of the St Louis Academy of Science and of the Missouri Botanical Gardens. There are at least three newspapers of national repute: the *Republic*, established in 1808 as the *Missouri Gazette*, and in 1822–1886 called the *Missouri Republican*; the *Globe-Democrat* (1852); and the *Westliche Post* (1857).

In trade, industry and wealth St Louis is one of the most substantial cities of the Union. Its growth has been steady; but without such "booms" as have marked the history of many western cities, and especially Chicago, of which St Louis was for several decades the avowed rival. The primacy of the northern city was clear, however, by 1880. St Louis has borne a reputation for conservatism and solidity. Its manufactures aggregate three-fifths the value of the total output of the state. In 1880 their value was $114,333,375, and in 1890 $228,700,000; the value of the factory product was $193,732,788 in 1900, and in 1905 $267,307,038 (increase 1900–1905, 38%).

Tobacco goods, malt liquors, boots and shoes and slaughtering and meat-packing products were the leading items in 1905. The packing industry is even more largely developed outside the city limits and across the river in East St Louis. St Louis is the greatest manufacturer of tobacco products among American cities, and probably in the world; the total in 1905 was 8·96% of the total output of manufactured tobacco in the United States; and the output of chewing and smoking tobacco and snuff in 1900 constituted 23·5%, and in 1905 23·7% of the product of the country. St Louis is also the foremost producer of white lead, street and railway cars, and wooden ware; and in addition to these and the items above particularized, has immense manufactories of clothing, coffee and spices (roasted), paints, stoves and furnaces, flour, hardware, drugs and chemicals and clay products. One of its breweries is said to be the largest in the world.

Aside from traffic in its own products, the central position of the city in the Mississippi Valley gives it an immense trade in the products of that tributary region, among which grains, cotton, tobacco, lumber, live stock and their derived products are the staples. In addition, it is a jobbing centre of immense interests in the distribution of other goods. The greatest lines of wholesale trade are dry goods, millinery and notions; groceries and allied lines; boots and shoes; tobacco; shelf and heavy hardware; furniture; railway supplies; street and railway cars; foundry and allied products; drugs, chemicals and proprietary medicines; beer; wooden-ware; agricultural implements; hides; paints; paint oils and white lead; electrical supplies; stoves, ranges and furnaces; and furs—the value of these different items ranging from 70 to 10 million dollars each.[1] According to the St Louis Board of Trade, St Louis is the largest primary fur market of the world, drawing supplies even from northern Canada. As a wool market Boston alone surpasses it, and as a vehicle market it stands in the second or third place. In the other industries just named, it claims to stand first among the cities of the Union. It is one of the greatest interior cotton markets of the country—drawing its supplies mainly from Arkansas, Texas and Oklahoma—but a large part of its receipts are for shipment on through bills of lading, and are not net receipts handled by its

[1] These are arranged in the order shown by the *Annual Statement* for 1906 reported to the Merchants' Exchange.

own factors. The gross cotton movement continues to increase, but the field of supply has been progressively lessened by the development of Galveston and other ports on the gulf. As a grain and stock market St Louis has felt the competition of Kansas City and St Joseph.

River and railway transportation built up in turn the commanding commercial position of the city. The enormous growth of river traffic in the decade before 1860 gave it at the opening of the Civil War an incontestable primacy in the west. In 1910 about twenty independent railway systems, great and small (including two terminal roads within the city), gave outlet and inlet to commerce at St Louis; and of these fifteen are among the greatest systems of the country: the Baltimore & Ohio South-Western, the Chicago, Burlington & Quincy, the Chicago & Alton, the Cleveland, Cincinnati, Chicago & St Louis, the St Louis & San Francisco, the Illinois Central, the Missouri, Kansas & Texas, the Missouri Pacific, the Pennsylvania, the St Louis South-Western, the Southern, the Wabash, the Louisville & Nashville, the Mobile & Ohio, and the Toledo, St Louis & Western. The construction of the Missouri Pacific Railway system was begun at St Louis in 1850, and various other roads were started in the next two years. For several decades railway development served only to increase the commercial primacy of the city in the southern Mississippi Valley, but in more recent years the concentration of roads at Kansas City enabled that place to draw from the west and south-west an immense trade once held by St Louis. River freighting is of very slight importance. St Louis is a port of entry for foreign commerce; its imports in 1907 were valued at $7,442,967; in 1909 at $6,362,770.

The population of St Louis in 1840 was 16,469; in 1850 it was 77,860 (seventh in size of the cities of the country); in 1860, 160,773; in 1870, 310,864 (third in size); in 1880, 350,518; in 1890, 451,770; in 1900, 575,238; and in 1910, 687,029. Since 1890 it has been fourth in population among the cities of the United States. Of the population in 1900 (575,238) 111,356 were foreign-born and 35,516 were negroes. Of the foreign-born in 1900, 58,781 were Germans, 19,421 were Irish, 5800 were English, 4785 Russian. In 1900, 154,746 inhabitants of St Louis were children of German parents.

Under the state constitution of 1875 St Louis, as a city of 100,000 inhabitants, was authorized to frame its own charter, and also to separate from St Louis county. These rights were exercised in 1876. The general assembly of the state holds the same powers over St Louis as over other cities. The electorate may pass upon proposed amendments to the charter at any election, after due precedent publication thereof. The mayor holds office for four years. In 1823 the mayor was first elected by popular vote and the municipal legislature became unicameral. The bicameral system was again adopted in 1839. The municipal assembly consists of a Council of 13 chosen at large for four years—half each two years—and a House of Delegates, 28 in number, chosen by wards for two years. A number of chief executive officers are elected for four years; the mayor and Council appoint others, and the appointment is made at the middle of the mayor's term in order to lessen the immediate influence of municipal patronage upon elections. Single commissioners control the parks, streets, water service, harbour and wharves, and sewers, and these constitute, with the mayor, a board of public improvement. Under an enabling act of 1907 the municipal assembly in 1909 created a public service commission, of three members, appointed by the mayor. The measure of control exercised by the state is important, the governor appointing the excise (liquor-licence) commissioner, the board of election commissioners, the inspector of petroleum and of tobacco, and (since 1861) the police board. St Louis is normally Republican in politics, and Missouri Democratic. Taxes for state and municipal purposes are collected by the city. The school board, as in very few other cities of the country, has independent taxing power. The city owns the steamboat landings and draws a small revenue from their rental. The heaviest expenses are for streets and parks, debt payments, police and education. The bonded debt in 1910 was $27,815,312, and the assessed valuation of property in that year was $550,207,640. The city maintains hospitals, a poor-house, a reformatory workhouse, an industrial school for children, and an asylum for the insane.

The water-supply of the city is derived from the Mississippi, and is therefore potentially inexhaustible. Settling basins and a coagulant chemical plant (1904) are used to purify the water before distribution. After the completion of the Chicago drainage canal the state of Missouri endeavoured to compel its closure, on the ground that it polluted the Mississippi; but it was established to the satisfaction of the Supreme Court of the United States that the back-flush from Lake Michigan had the contrary effect upon the Illinois river, and therefore upon the Mississippi. Except for sediment the water-supply is not impure or objectionable. No public utilities, except the water-works, markets and public grain elevators, are owned by the city. The street railways are controlled—since a state law of 1899 permitted their consolidation—by one corporation, though a one-fare, universal transfer 5-cent rate is in general operation. A single corporation has controlled the gas service from 1846 to 1873 and since 1890, though under no exclusive franchise; and the city has not the right of purchase.

St Louis was settled as a trading post in 1764 by Pierre Laclède Liguest (1724–1778), representative of a company to which the French crown had granted a monopoly of the trade of the Missouri river country. When, by the treaty of Paris of 1763, the portion of Louisiana E. of the Mississippi was ceded by France to Great Britain, many of the French inhabitants of the district of the Illinois removed into the portion of Louisiana W. of the river, which had passed in 1762 under Spanish sovereignty; and of this lessened territory of upper Louisiana St Louis became the seat of government. In 1767 it was a log-cabin village of perhaps 500 inhabitants. Spanish rule became an actuality in 1770 and continued until 1804, when it was momentarily supplanted by French authority—existent theoretically since 1800—and then, after the Louisiana Purchase, by the sovereignty of the United States. In 1780 the town was attacked by Indian allies of Great Britain. Canadian-French hunters and trappers and boatmen, a few Spaniards and other Europeans, some Indians, more half-breeds, and a considerable body of Americans and negro slaves made up the motley population that became inhabitants of the United States. The fur trade was growing rapidly. Under American rule there was added the trade of a military supply-point for the great West, and in 1817–1819 steamship traffic was begun with Louisville, New Orleans, and the lower Missouri river. Meanwhile, in 1808, St Louis was incorporated as a town, and in 1823 it became a city. The city charter became effective in March 1823. The early 'thirties marked the beginning of its great prosperity, and the decade 1850–1860 was one of colossal growth, due largely to the river trade. All freights were being moved by steamship as early as 1825. The first railway was begun in 1850. At the opening of the Civil War the commercial position of the city was most commanding. Its prosperity, however, was dependent upon the prosperity of the South, and received a fearful set-back in the war. When the issue of secession or adherence to the Union had been made up in 1861, the outcome in St Louis, where the fate of the state must necessarily be decided, was of national importance. St Louis was headquarters for an army department and contained a great national arsenal. The secessionists tried to manœuvre the state out of the Union by strategy, and to seize the arsenal. The last was prevented by Congressman Francis Preston Blair, Jr., and Captain Nathaniel Lyon, first a subordinate and later commander at the arsenal. The garrison was strengthened; in April the president entrusted Blair and other loyal civilians with power to enlist loyal citizens, and put the city under martial law if necessary; in May ten regiments were ready—made up largely of German-American Republican clubs ("Wide Awakes"), which had been at first purely political, then—when force became necessary to secure election rights to anti-slavery men—semi-military, and which now were quickly made available for war; and on the 10th of May Captain Lyon surrounded and made prisoners a force of secessionists quartered in Camp Jackson on the outskirts of the city. A street riot followed, and 28 persons were killed by the volleys of the military. St Louis was held by the Union forces throughout the war.

During a quarter century following 1857 the city was the centre of an idealistic philosophical movement that has had hardly any counterpart in American culture except New England transcendentalism. Its founders were William T. Harris (*q.v.*) and Henry C. Brockmeyer (b. 1828), who was lieutenant-governor of the state in 1876–1880. A. Bronson Alcott was one of the early lecturers to the group which gathered around these two, a group which studied Hegel and Kant, Plato and Aristotle. Brockmeyer published excellent versions of Hegel's *Unabridged Logic, Phenomenology* and *Psychology*. Harris became the greatest of American exponents of Hegel. Other members of the group were Thomas Davidson (1840–1900), Adolph E. Kroeger, the translator of Fichte, Anna Callender Brackett (b. 1836), who published in 1886 an English version of Rosenkranz's *History of Education*, Denton Jaques Snider (b. 1841), whose best work has been on Froebel, and William McKendree Bryant (b. 1843), who wrote *Hegel's Philosophy of Art* (1879) and *Hegel's Educational Ideas* (1896). This Philosophical Society published (1867–1893) at St Louis *The Journal of Speculative Philosophy*, the first periodical of the sort in English.

Since the war the city's history has been signalized chiefly by economic development. A period in this was auspiciously closed in 1904 by the holding of a world's fair to celebrate the centennial of the purchase from France, in 1803, of the Louisiana territory—since then divided into 13 states, and containing in 1900 some 12,500,000 inhabitants. Preparations for this Louisiana Purchase Exposition began in 1898. It was the largest world's fair held to date, the site covering 1240 acres, of which 250 were under roof. The total cost, apart from individual exhibitions, was about $42,500,000, of which the national government contributed $5,000,000 and the city of St Louis and its citizens $10,000,000. Altogether 12,804,616 paid admissions were collected (total admissions 19,694,855) during the seven months that it was open, and there was a favourable balance at the close of about $1,000,000.

Up to 1848 St Louis was controlled in politics almost absolutely by the Whigs; since then it has been more or less evenly contested by the Democrats against the Whigs and Republicans. The Republicans now usually have the advantage. As mentioned before, the state is habitually Democratic; "boss" rule in St Louis was particularly vicious in the late 'nineties, and corruption was the natural result of ring rule—the Democratic bosses have at times had great power—and of the low pay—only $25 monthly—of the city's delegates and councilmen. But the reaction came, and with it a strong movement for independent voting. Fire, floods, epidemics, and wind have repeatedly attacked the city. A great fire in 1849 burned along the levee and adjacent streets, destroying steamers, buildings, and goods worth, by the estimate of the city assessor, more than $6,000,000. Cholera broke out in 1832–1833, 1849–1851, and 1866, causing in three months of 1849 almost 4000 deaths, or the death of a twentieth of all inhabitants. Smallpox raged in 1872–1875. These epidemics probably reflect the one-time lamentable lack of proper sewerage. Great floods occurred in 1785, 1811, 1826, 1844, 1872, 1885 and 1903; those of 1785 and 1844 being the most remarkable. There were tornadoes in 1833, 1852 and 1871; and in 1896 a cyclone of 20 minutes' duration, accompanied by fire but followed fortunately by a tremendous rain, destroyed or wrecked 8500 buildings and caused a loss of property valued at more than $10,000,000.

EAST ST LOUIS, a city of St Clair county, Illinois, U.S.A., on the E. bank of the Mississippi, lies opposite St Louis, Missouri. Pop. (1880), 9185; (1890), 15,169; (1900), 29,655, of whom 3920 were foreign born (mostly German and Irish); (1900, census) 58,547. It is one of the great railway centres of the country. Into it enter from the east sixteen lines of railway, which cross to St Louis by the celebrated steel arch bridge and by the Merchants' Bridge. It is also served by three inter-urban electric railways. The site of East St Louis is in the "American Bottom," little above the high-water mark of the river. This "bottom" stretches a long distance up and down the river, with a breadth of 10 or 12 m. It is intersected by many sloughs and crescent-shaped lakes which indicate former courses of the river. The manufacturing interests of East St Louis are important, among the manufactories being packing establishments, iron and steel works, rolling-mills and foundries, flour-mills, glass works, paint works and wheel works. By far the most important industry is slaughtering and meat packing: both in 1900 and in 1905 East St Louis ranked sixth among the cities of the United States in this industry; its product in 1900 was valued at $27,676,818 (out of a total for all industries of $32,460,957), and in 1905 the value of the product of the slaughtering and meat-packing establishments in and near the limits of East St Louis was valued at $39,972,245, in the same year the total for all industries within the corporate limits being only $37,586,198. The city has a large horse and mule market. East St Louis was laid out about 1818, incorporated as a town in 1859, and chartered as a city in 1865.

Consult the *Encyclopaedia of the History of St Louis* (4 vols., St Louis, 1899); J. T. Scharf, *History of St Louis City and County . . . including Biographical Sketches* (2 vols., Philadelphia, 1883); E. H. Shepherd, *Early History of St Louis and Missouri . . . 1763–1843* (St Louis, 1870); F. Billon, *Annals of St Louis . . . 1804 to 1821* (2 vols., St Louis, 1886–1888); G. Anderson, *Story of a Border City during the Civil War* (Boston, 1908); *The Annual Statement of the Trade and Commerce of St Louis . . . reported to the Merchants' Exchange*, by its secretary.

ST LOUIS, the capital of the French colony of Senegal, West Africa, with a population (1904) of 24,070, or including the suburbs, 28,469. St Louis, known to the natives as N'dar, is 163 m. by rail N.N.E. of Dakar and is situated on an island 11½ m. above the mouth of the Senegal river, near the right bank, there separated from the sea by a narrow strip of sand called the Langue de Barbarie. This strip of sand is occupied by the villages of N'dar Toute and Guet N'dar. Three bridges connect the town with the villages; and the Pont Faidherbe, 2132 ft. long, affords communication with Bouetville, a suburb on the left bank, and the terminus of the railway to Dakar. The houses of the European quarter have for the most part flat roofs, balconies and terraces. Besides the governor's residence the most prominent buildings are the cathedral, the great mosque, the court-house, the barracks and military offices, and the docks. The round beehive huts of Guet N'dar are mainly inhabited by native fishermen. N'dar Toute consists of villas with gardens, and is a summer watering-place. There is a pleasant public garden, and N'dar Toute is approached by a magnificent alley of palm-trees. The low-lying position of St Louis and the extreme heat render it unhealthy, whilst the sandy nature of the soil causes intense inconvenience. The mouth of the Senegal being obstructed by a shifting bar of sand, the steamships of the great European lines do not come up to St Louis; passengers embark and land at Dakar, on the eastern side of Cape Verde. Ships for St Louis have often to wait outside or inside the bar for days or weeks, and partial unloading is frequently necessary. From July to the end of September—that is during flood-time—the water over the bar is, however, deep enough to enable vessels to reach St Louis without difficulty.

St Louis is believed to have been the site of a European settlement since the 15th century, but the present town was founded in 1626 by Dieppe merchants known as the *Compagnie normande*. It is the oldest colonial establishment in Africa belonging to France (see SENEGAL). Its modern development dates from 1854. The town, however, did not receive municipal government till 1872. All citizens, irrespective of colour, can vote. From 1895 to 1903 St Louis was not only the capital of Senegal, but the residence of the governor-general of French West Africa. In November of the last-named year the governor-general removed to Dakar. Small forts defend St Louis from the land side—the surrounding country, the Cayor, being inhabited by a warlike race, which previously to the building (1882–1885) of the St Louis-Dakar railway was a continual source of trouble.

The town carries on a very active trade with all the countries watered by the Senegal and the middle Niger. St Louis is connected with Brest by a direct cable, and with Cadiz via the Canary Islands.

ST LUCIA, the largest of the British Windward Islands, West Indies, in 14° N., 61° W., 24 m. S. of Martinique and 21 m. N.E. of St Vincent. Its area is 233 sq. m., length 42 m., maximum breadth 12 m., and its coast-line is 150 m. long. It is considered one of the loveliest of all the West Indian islands. It is a mass

of mountains, rising sheer from the water, their summits bathed in perpetual mist. Impenetrable forests alternate with fertile plains, and deep ravines and frowning precipices with beautiful bays and coves. Everywhere there is luxuriant vegetation.

Les Pitons (2720 and 2680 ft.) are the chief natural feature—two immense pyramids of rock rising abruptly from the sea, their slopes, inclined at an angle of 60°, being clad on three sides with densest verdure. No connexion has been traced between them and the mountain system of the island. In the S.W. also is the volcano of Soufrière (about 4000 ft.), whose crater is 3 acres in size and covered with sulphur and cinders. The climate is humid, the rainfall varying from 70 to 120 in. per annum, with an average temperature of 80° F. The soil is deep and rich; the main products are sugar, cocoa, logwood, coffee, nutmegs, mace, kola-nuts and vanilla, all of which are exported. Tobacco also is grown, but not for export. The *usine* or central factory system is established, there being four government sugar-mills. Snakes, formerly prevalent, have been almost exterminated by the introduction of the mongoose. Only about a third of the island is cultivated, the rest being crown land under virgin forest, abounding in timber suitable for the finest cabinet work. The main import trade up to 1904 was from Great Britain; since then, owing to the increased coal imports from the United States, the imports are chiefly from other countries. The majority of the exports go to the United States and to Canada. In the ten years 1898–1907 the imports averaged £322,000 a year; the exports £105,000 a year. Bunker coal forms a large item both in imports and exports. Coal, sugar, cocoa and logwood form the chief exports.

Education is denominational, assisted by government grants. The large majority of the schools are under the control of the Roman Catholics, to whom all the government primary schools were handed over in 1898. There is a government agricultural school. St Lucia is controlled by an administrator (responsible to the governor of the Windward Islands), assisted by an executive council. The legislature consists of the administrator and a council of nominated members. Revenue and expenditure in the period 1901–1907 balanced at about £60,000 a year. The law of the island preserves, in a modified form, the laws of the French monarchy.

Castries, the capital, on the N.W. coast, has a magnificent land-locked harbour. There is a concrete wharf 650 ft. long with a depth alongside of 27 ft., and a wharf of wood 552 ft. in length. It is the principal coaling station of the British fleet in the West Indies, was strongly fortified, and has been the military headquarters. (The troops were removed and the military works stopped in 1905.) It is a port of registry, and the facilities it offers as a port of call are widely recognized, the tonnage of ships cleared and entered rising from 1,555,000 in 1898 to 2,627,000 in 1907. Pop. (1901) 7910. Soufrière, in the south, the only other town of any importance, had a population of 2394. The Caribs have disappeared from the island, and the bulk of the inhabitants are negroes. Their language is a French *patois*, but English is gradually replacing it. There is a small colony of East Indian coolies, and the white inhabitants are mostly creoles of French descent. The total population of the island (1901) is 49,833.

History.—St Lucia is supposed to have been discovered by Columbus in 1502, and to have been named by the Spaniards after the saint on whose day it was discovered. It was inhabited by Caribs, who killed the majority of the first white people (Englishmen) who attempted to settle on the island (1605). For two centuries St Lucia was claimed both by France and by England. In 1627 the famous Carlisle grant included St Lucia among British possessions, while in 1635 the king of France granted it to two of his subjects. In 1638 some 130 English from St Kitts formed a settlement, but in 1641 were killed or driven away by the Caribs. The French in 1650 sent settlers from Martinique who concluded a treaty of peace with the Caribs in 1660. Thomas Warner, natural son of the governor of St Kitts, attacked and overpowered the French settlers in 1663, but the peace of Breda (1667) restored it to France and it became nominally a dependency of Martinique. The British still claimed the island as a dependency of Barbadoes, and in 1722 George I. made a grant of it to the duke of Montague. The year following French troops from Martinique compelled the British settlers to evacuate the island. In 1748 both France and Great Britain recognized the island as "neutral." In 1762 its inhabitants surrendered to Admiral Rodney and General Monckton. By the treaty of Paris (1763), however, the British acknowledged the claims of France, and steps were taken to develop the resources of the island. French planters came from St Vincent and Grenada, cotton and sugar plantations were formed, and in 1772 the island was said to have a population of 15,000, largely slaves. In 1778 it was captured by the British; its harbours were a rendezvous for the British squadrons and Gros Ilet Bay was Rodney's starting-point before his victory over the Comte de Grasse (April 1782). The peace of Versailles (1783) restored St Lucia to France, but in 1794 it was surrendered to Admiral Jervis (Lord St Vincent). Victor Hugues, a partisan of Robespierre, aided by insurgent slaves, made a strenuous resistance and recovered the island in June 1795. Sir Ralph Abercromby and Sir John Moore, at the head of 12,000 troops, were sent in 1796 to reduce the island, but it was not until 1797 that the revolutionists laid down their arms. By the treaty of Amiens St Lucia was anew declared French. Bonaparte intended to make it the capital of the Antilles, but it once more capitulated to the British (June 1803) and was finally ceded to Great Britain in 1814. In 1834, when the slaves were emancipated, there were in St Lucia over 13,000 negro slaves, 2600 free men of colour and 2300 whites. The development of the island—half ruined by the revolutionary war—has been retarded by epidemics of cholera and smallpox, by the decline of the sugar-cane industry and other causes, such as the low level of education. The depression in the sugar trade led to the adoption of cocoa cultivation. Efforts were also made to plant settlers on the crown lands—with a fair amount of success. The colony successfully surmounted the financial stringency caused by the withdrawal of the imperial troops in 1905.

Pigeon Island, formerly an important military port, lies off the N.W. end of St Lucia, by Gros Ilet Bay.

See Sir C. P. Lucas, *Historical Geography in the British Colonies*, vol. ii., "The West Indies" (2nd ed. revised by C. Atchley, Oxford, 1905), and the works there cited; also the annual reports on St Lucia issued by the Colonial Office.

ST MACAIRE, a town of south-western France, in the department of Gironde, on the Garonne, 29 m. S.E. of Bordeaux by rail. Pop. (1906), 2085. St Macaire is important for its medieval remains, which include a triple line of ramparts with old gateways. There are also several houses of the 13th and 14th centuries. The imposing church of St Sauveur (11th to 15th centuries) has a doorway with beautiful 13th-century carving and interesting mural paintings. St Macaire (anc. *Ligena*) owes its name to the saint whose relics were preserved in the monastery of which the church of St Sauveur is the principal remnant.

ST MAIXENT, a town of western France, in the department of Deux-Sèvres, on the Sèvre Niortaise, 15 m. N.E. of Niort by rail. Pop. (1906), 4102. The town has a fine abbey church built from the 12th to the 15th century, but in great part destroyed by the Protestants in the 16th century and rebuilt from 1670 to 1682 in the flamboyant Gothic style. The chief parts anterior to this date are the nave, which is Romanesque, and a lofty 15th-century tower over the west front. The crypt contains the tomb of Saint Maxentius, second abbot of the monastery, which was founded about 460. The town has a communal college, a chamber of arts and manufactures, and an infantry school for non-commissioned officers preparing for the rank of sub-lieutenant. It was the birthplace of Colonel Denfert-Rochereau, defender of Belfort in 1870–1871, and has a statue to him. The industries include dyeing and the manufacture of hosiery, mustard and plaster. The prosperity of the town was at its height after the promulgation of the edict of Nantes, when it numbered 12,000 inhabitants.

ST MALO, a seaport of western France, capital of an arrondissement in the department of Ille-et-Vilaine, 51 m. N.N.W. of Rennes by rail. Pop. (1906) town, 8727; commune, 10,647. St Malo is situated on the English Channel on the right bank of the estuary of the Rance at its mouth. It is a garrison town surrounded by ramparts which include portions dating from the 14th, 15th and 16th centuries, but as a whole were rebuilt at the end of the 17th century according to Vauban's plans, and restored in the 19th century. The most important of the gates are that of St Vincent and the Grande Porte, defended by two massive 15th-century towers. The granite island on which St Malo stands communicates with the mainland on the north-east by a causeway known as the "Sillon" (furrow), 650 ft. long, and at one time only 46 ft. broad, though now three times that breadth. In the sea round about lie other granite rocks,

which have been turned to account in the defences of the coast; on the islet of the Grand Bey is the tomb (1848) of François Auguste, vicomte de Chateaubriand, a native of the town. The rocks and beach are continually changing their appearance, owing to the violence of the tides; spring-tides sometimes rise 50 ft. above low-water level, and the sea sometimes washes over the ramparts. The harbour of St Malo lies south of the town in the creek separating it from the neighbouring town of St Servan. Including the contiguous and connected basins belonging more especially to St Servan, it comprises an outer basin, a tidal harbour, two wet-docks and an inner reservoir, affording a total length of quayage of over 2 m. The wet-docks have a minimum depth of 13 to 15 ft. on sill, but the tidal harbour is dry at low water. The vessels entered at St Malo-St Servan in 1906 numbered 1004 of 279,217 tons; cleared 1023 of 298,720 tons. The great bulk of trade is with England, the exports comprising large quantities of fruit, dairy-produce, early potatoes and other vegetables and slate. The chief imports are coal and timber. The London and South-Western railway maintains a regular service of steamers between Southampton and St Malo. The port carries on shipbuilding and equips a fleet for the Newfoundland cod-fisheries. The industries also include iron- and copper-founding and the manufacture of portable forges and other iron goods, cement, rope and artificial manures. The town is the seat of a sub-prefect and has tribunals of first instance and of commerce. Communication between the quays of St Malo and St Servan is maintained by a travelling bridge.

St Malo is largely frequented for sea-bathing, but not so much as Dinard, on the opposite side of the Rance. The town presents a tortuous maze of narrow streets and small squares lined with high and sometimes quaint buildings (*e.g.* the 16th-century house in which René Duguay-Trouin was born). Above all rises the stone spire (1859) of the cathedral, a building begun in the 12th century but added to and rebuilt at several subsequent periods. The castle (15th cent.), which defends the town towards the "Sillon," is flanked with four towers, one of which, the great keep, is an older and loftier structure, breached in 1378 by the duke of Lancaster. St Malo has statues to Chateaubriand, Duguay-Trouin and the privateer Robert Surcouf (1773–1827), natives of the town. The museum contains remains of the ship "La Petite Hermine," in which Jacques Cartier sailed to the St Lawrence (*q.v.*), and a natural history collection.

In the 6th century the island on which St Malo stands was the retreat of Abbot Aaron, who gave asylum in his monastery to Malo (Maclovius or Malovius), a Cambrian priest, who came hither to escape the episcopal dignity, but afterwards became bishop of Aleth (now St Servan); the see was transferred to St Malo only in the 12th century. Henceforth the bishops of St Malo claimed the temporal sovereignty over the town, a claim which was resolutely disputed by the dukes of Brittany. The policy of the citizens themselves, who thus gained substantial powers of self-government, was directed by consistent hostility to England and consequently to the dukes. They took the side of Bishop Josselin de Rohan and his successor in their quarrel with dukes John IV. and John V., and it was not till 1424 that John V., by the agency of Charles VI. of France and with the sanction of the pope, finally established his authority over the town. In 1488 St Malo unsuccessfully resisted the French troops on behalf of the duke. During the troubles of the League the citizens hoped to establish a republican government, and on the 11th of March 1590 they exterminated the royal garrison and imprisoned their bishop and the canons. But four years later they surrendered to Henry IV. of France. During the following century the maritime power of St Malo attained some importance. In November 1693 and July 1695 the English vainly bombarded it. The people of St Malo had in the course of a single war captured upwards of 1500 vessels (several of them laden with gold and other treasure) and burned a considerable number more. Enriched by these successes and by the wealth they drew from the New World, the shipowners of the town not only supplied the king with the means necessary for the famous Rio de Janeiro expedition conducted by Duguay-Trouin in 1711, but also lent him large sums for carrying on the war of the Spanish Succession. In June 1758 the English sent a third expedition against St Malo under the command of Charles Spencer, third duke of Marlborough, and inflicted great loss on the royal shipping in the harbour of St Servan. But another expedition undertaken in the following September received a complete check. In 1778 and during the wars of the Empire the St Malo privateers resumed their activity. In 1789 St Servan was separated from St Malo and in 1801 St Malo lost its bishopric. During the Reign of Terror the town was the scene of sanguinary executions.

See M. J. Poulain, *Histoire de Saint-Malo . . . d après les documents inédits* (2nd ed., Lille, 1887).

SAINT-MARC GIRARDIN (1801–1873), French politician and man of letters, whose real name was MARC GIRARDIN, was born in Paris on the 22nd of February 1801. After a brilliant university career in Paris he began in 1828 to contribute to the *Journal des Débats*, on the staff of which he remained for nearly half a century. At the accession of Louis Philippe he was appointed professor of history at the Sorbonne and master of requests in the Conseil d'État. Soon afterwards he exchanged his chair of history for one of poetry, continuing to contribute political articles to the *Débats*, and sitting as deputy in the chamber from 1835 to 1848. He was charged in 1833 with a mission to study German methods of education, and issued a report advocating the necessity of newer methods and of technical instruction. In 1844 he was elected a member of the Academy. During the revolution of February 1848 Girardin was for a moment a minister, but after the establishment of the republic he was not re-elected deputy. After the war of 1870–71 he was returned to the Bordeaux assembly by his old department—the Haute Vienne. His Orleanist tendencies and his objections to the republic were strong, and though he at first supported Thiers, he afterwards became a leader of the opposition to the president. He died, however, on the 1st of April 1873 at Morsang-sur-Seine, before Thiers was actually driven from power.

His chief work is his *Cours de littérature dramatique* (1843–1863), a series of lectures better described by its second title *De l'usage des passions dans le drame*. The author examines the passions, discussing the mode in which they are treated in ancient and modern drama, poetry and romance. The book is really a defence of the ancients against the moderns, and Girardin did not take into account the fact that only the best of ancient literature has come down to us. Against the Romanticists he waged untiring war. Among his other works may be noticed *Essais de littérature* (2 vols. 1844), made up chiefly of contributions to the *Débats*, his *Notices sur l'Allemagne* (1834), and many volumes of collected *Souvenirs*, *Réflexions*, &c., on foreign countries and passing events. His latest works of literary importance were *La Fontaine et les Fabulistes* (1867) and an *Étude sur J.-J. Rousseau* (1870) which had appeared in the *Revue des deux mondes*.

See Ch. Labitte, "Saint-Marc Girardin," in the *Revue des deux mondes* (Feb. 1845); Tamisier, *Saint-Marc Girardin; étude littéraire* (1876); Hatzfield and Meunier, *Les Critiques littéraires du XIXe siècle* (1894).

SAINT-MARTIN, LOUIS CLAUDE DE (1743–1803), French philosopher, known as "le philosophe inconnu," the name under which his works were published, was born at Amboise of a poor but noble family, on the 18th of January 1743. By his father's desire he tried first law and then the army as a profession. While in garrison at Bordeaux he came under the influence of Martinez de Pasquales, usually called a Portuguese Jew (although later research has made it probable that he was a Spanish Catholic), who taught a species of mysticism drawn from cabbalistic sources, and endeavoured to found thereon a secret cult with magical or theurgical rites. In 1771 Saint-Martin left the army to become a preacher of mysticism. His conversational powers made him welcome in Parisian salons, but his zeal led him to England, where he made the acquaintance of William Law (*q.v.*), the English mystic, to Italy and to Switzerland, as well as to the chief towns of France. At Strassburg in 1788 he met Charlotte de Boecklin, who initiated him into the writings of Jacob Boehme, and inspired in his breast a semi-romantic attachment. His later years were devoted almost entirely to the composition of his chief works and to the translation of those of Boehme. Although he was not subjected to any persecution in consequence of his

opinions, his property was confiscated after the Revolution because of his social position. He was brought up a strict Catholic, and always remained attached to the church, although his first work, *Of Errors and Truth*, was placed upon the Index. He died at Aunay, near Paris, on the 23rd of October 1803.

His chief works are—*Lettre à un ami sur la Révolution Française*; *Éclair sur l'association humaine*; *De l'esprit des choses*; *Ministère de l'homme-esprit*. Other treatises appeared in his *Œuvres posthumes* (1807). Saint-Martin regarded the French Revolution as a sermon in action, if not indeed a miniature of the last judgment. His ideal society was "a natural and spiritual theocracy," in which God would raise up men of mark and endowment, who would regard themselves strictly as "divine commissioners" to guide the people. All ecclesiastical organization was to disappear, giving place to a purely spiritual Christianity, based on the assertion of a faculty superior to the reason - moral sense, from which we derive knowledge of God. God exists as an eternal personality, and the creation is an overflowing of the divine love, which was unable to contain itself. The human soul, the human intellect or spirit, the spirit of the universe, and the elements or matter are the four stages of this divine emanation, man being the immediate reflection of God, and nature in turn a reflection of man. Man, however, has fallen from his high estate, and matter is one of the consequences of his fall. But divine love, united to humanity in Christ, will work the final regeneration.

See J. B. Gence, *Notice biographique* (1824); L. I. Moreau, *Le Philosophe inconnu* (1850); E. M. Caro, *Essai sur la vie et la doctrine de Saint-Martin* (1852); Sainte-Beuve, *Causeries du lundi*, x. 190; A. J. Matter, *Saint-Martin, le philosophe inconnu* (1862); A. Franck, *La Philosophie mystique en France à la fin du dix-huitième siècle* (1866); A. E. Waite, *The Life of Louis Claude de Saint-Martin* (1901). There are English translations of *The Ministry of Man the Spirit* (1864) and of *Select Correspondence* (1863) by E. B. Penny.

ST MARTIN, an island in the West Indies, about 5 m. S. of the British island of Anguilla in 18° N. and 63° W. It is 38 sq. m. in area and nearly triangular in form, composed of conical hills, culminating in Paradise Peak (1920 ft.). It is the only island in the Antilles owned by two European powers; 17 sq. m. in the N., belonging to France, form a dependency of Guadeloupe, while the rest of the island, belonging to Holland, is a dependency of Curaçao. Sugar, formerly its staple, has been succeeded by salt. The chief town of the French area is Marigot, a free port on the W. coast; of the Dutch, Philipsburg, on the S. St Martin was first occupied by French freebooters in 1638, but ten years later the division between France and Holland was peaceably made. The inhabitants, mostly English-speaking negroes, number about 3000 in the French part, and in the Dutch the population in 1908 was 3817.

ST MARY (Santa Maria), an island in the Atlantic Ocean, belonging to Portugal and forming part of the Azores (*q.v.*). Pop. (1900), 6383; area, 40 sq. m. St Mary is the southernmost and easternmost of the Azores, lying south of the larger island of St Michael's, through the medium of which its trade is conducted, as it has no good harbours of its own. It produces wheat in abundance, of which a considerable quantity is exported. Various volcanic rocks are the predominant formations, but beds of limestone also occur, giving rise to numerous stalactite grottoes all over the island. The chief town is Villa do Porto (2506).

ST MARYLEBONE (commonly called MARYLEBONE), a north-western metropolitan borough of London, England, bounded N. by Hampstead, E. by St Pancras and Holborn, S. by the City of Westminster, and W. by Paddington. Pop. (1901), 133,301. It is mainly a rich residential quarter; the most fashionable part is found in the south, in the vicinity of Cavendish and Portman Squares, but there are numerous fine houses surrounding Regent's Park and in the north-western district of St John's Wood. Oxford Street, with its handsome shops, bounds the borough on the south, crossing Regent Street at Oxford Circus; Edgware Road on the west; Marylebone Road crosses from east to west, and from this Upper Baker Street gives access to Park, Wellington, and Finchley Roads; and Baker Street leads southward. Poor and squalid streets are found, in close proximity to the wealthiest localities, between Marylebone Road and St John's Wood Road, and about High Street in the south, the site of the original village. The formation of the Great Central Railway, the Marylebone terminus of which, in Marylebone Road, was opened in 1899, caused an extensive demolition of streets and houses in the west central district. St Marylebone was in the manor of Tyburn, which takes name from the Tyburn, a stream which flowed south to the Thames through the centre of the present borough. The church was called St Mary at the Bourne. The name Tyburn (*q.v.*) was notorious chiefly as applied to the gallows which stood near the existing junction of Edgware Road and Oxford Street (Marble Arch). The manor at the Domesday Survey was in the possession of the nunnery at Barking, but the borough includes several estates, such as the manor of Lyllestone in the west, the name of which is preserved in Lisson Grove. From 1738 to 1776 Marylebone Gardens (which had existed under other names from the close of the 17th century) became one of the most favoured evening resorts in London. They extended east of High Street as far as Harley Street, but by 1778 the ground was being built over. Another historic site is Horace Street near Edgware Road, formerly Cato Street, from which the conspiracy which bore that name was directed against the ministry in 1820.

The borough includes almost the whole of Regent's Park, with a portion of Primrose Hill north of it. These have altogether an area of 472 acres. The park, originally Marylebone Park, was enclosed by James I., and received its modern name from the Prince Regent, afterwards George IV. It contains the Zoological Gardens, one of the most noteworthy institutions of its kind, attracting numerous visitors to its splendid collections of living animals. Here are also the gardens of the Royal Botanic Society, incorporated in 1839. They are enclosed and beautifully laid out, and contain hot-houses and a museum. Exhibitions are held each year. The Toxophilite Society, founded in 1781, has also occupied grounds here since 1883. The picturesque lake is supplied by the ancient Tyburn. The Regent's Canal skirts the north side of the park. Another famous enclosure is Lord's Cricket Ground, St John's Wood Road. The founder, Thomas Lord (1814), at first established a cricket ground in the present Dorset Square, but it was soon moved here. Lord's, as it is called, is the headquarters of the M.C.C. (Marylebone Cricket Club), the governing body of the game; here are played the home matches of this club and of the Middlesex County Cricket Club, the Oxford and Cambridge, Eton and Harrow, and other well-known fixtures. The Wallace Art Collection, Hertford House, Manchester Square, was bequeathed by Sir Richard Wallace to the nation on the death of his wife in 1897. The waxwork exhibition named after Madame Tussaud, who founded it in Paris in 1780, occupies large buildings in Marylebone Road. The Parkes Museum of the Sanitary Institute is in Margaret Street. The Queen's Hall, Langham Place, is used for concerts, including a notable annual series of orchestral promenade concerts. St Marylebone contains a great number of hospitals, among which are the Middlesex, Mortimer Street; Throat Hospital and Dental Hospital and School, Great Portland Street; Lying-in and Ophthalmic Hospitals, Marylebone Road; Samaritan Hospital for women, Seymour Street; Consumption Hospital, Margaret Street; and the Home for incurable children, St John's Wood Road. There are also several industrial homes. Harley Street, between Marylebone Road and Cavendish Square, is noted as the residence of medical practitioners. Educational institutions include the Trinity and the Victoria Colleges of Music, in Manchester Square and Berners Street respectively; the Bedford College for women, and the Regent's Park Baptist College. The parliamentary borough of Marylebone has east and west divisions, each returning one member. The borough council consists of a mayor, 10 aldermen and 60 councillors. Area, 1472·8 acres.

SAINT MARYS, a city of Auglaize county, Ohio, U.S.A., on the Saint Marys river and the Miami & Erie canal, about 85 m. W.N.W. of Columbus. Pop. (1900), 5359. Saint Marys is served by the Lake Erie & Western, the Western Ohio (electric), and the Toledo & Ohio Central railways. About 1 m. west is a feeding reservoir of the canal covering about 17,600 acres. Saint Marys is in the Ohio oil region. The city occupies the site of a former Shawnee village, in which a trading post was established in 1782 by James Girty,[1] from whom the place was for some years

[1] James Girty (1743–1817) was one of the notorious Girty brothers, the sons of Simon Girty (d. 1751), an Irish immigrant. The brothers were taken prisoners by the French and Indian force which in 1756 captured Fort Granville, in what is now Mifflin county, Pennsylvania. James was adopted by the Shawnees and lived among them for three years, after which he acted as an interpreter and trader; he frequently accompanied the Indians against the English settlers, and exhibited the greatest ferocity. He conducted a profitable trading business with the Indians at St Marys in 1783–1794, when he withdrew to Canada upon the approach of General Wayne, and again from 1795 until just before the war of 1812, when he again withdrew to Canada, where he died. His brother Simon (1741-1818), who lived with the Senecas for several years after his capture, was even more bloodthirsty; he served against the Indians in Lord Dunmore's War, and in 1776, during the War of Independence, entered the

called Girty's Town. Fort St Marys was built in 1784 or 1785 by a detachment of General Anthony Wayne's troops, and in 1812 Ft. Barbee was erected at the instance of General W. H. Harrison by Colonel Joshua Barbee. During the war of 1812 the place was for some time the headquarters of General Harrison's army. St Marys was laid out as a town in 1823, and became a city in 1903 under the general municipal code which came into effect in that year.

ST MARY'S LOCH, a fresh-water lake of Selkirkshire, Scotland. It lies in the high land towards the western border, and is visited from Selkirk (16 m. E. by N.) or Moffat (15 m. S.W.). It is 814 ft. above the sea, is from 80 to 90 ft. deep, 3 m. long, about 1 m. wide at its widest, and has a shore-line of 7½ m. A narrow isthmus divides its head from the small Loch of the Lowes (about 1 m. long), which is believed to have been once part of it, the difference of level being only 15 in. St Mary's is emptied by the Yarrow, and its principal feeder is Megget Water, a noted angling stream. It takes its name from St Mary's Kirk, the ruins of which lie near the northern shore. From the 13th century, when the church is first mentioned, till its destruction in 1557, it was variously known as the Forest Kirk (in which William Wallace was elected Warden of Scotland), St Mary's of Farmainishope, an old name of the adjoining lands of Kirkstead, St Mary of the Lowes, and the Kirk of Yarrow. It had been partly restored, but gradually fell into decay, its place being taken by the church of Yarrow farther down the vale. In the graveyard was buried John Grieve (1781–1836), the Edinburgh hatter, a poet of some capacity, patron of James Hogg, the Ettrick Shepherd. At the head of the lake is the celebrated inn opened by Tibbie Shiel (Mrs Richardson, d. 1878), which was visited by many distinguished men of letters.

ST MAUR-DES-FOSSÉS, a south-eastern suburb of Paris, on the right bank of the Marne, 7 m. from the centre of the city. Pop. (1906), 28,016. St Maur and the residential district surrounding it cover a peninsula formed by a loop in the Marne, the neck of which is crossed by the canal of St Maur. In the reign of Clovis II. the monastery of Les Fossés was founded; the amplification of the name came when the body of St Maurus was brought there by the monks of St Maur-sur-Loire. About the same time was inaugurated the pilgrimage of Notre-Dame des Miracles, which still takes place annually. In 1465 a treaty of peace, putting an end to the "War of the Public Weal," was concluded between Louis XI. and his revolted barons at St Maur.

ST MAUR-SUR-LOIRE, a village of western France in the department of Maine-et-Loire on the Loire about 15 m. below Saumur. Here St Maurus towards the middle of the 6th century founded the first Benedictine monastery in Gaul. About the middle of the 9th century it was reduced to ruins by the Normans; in anticipation of the disaster the relics of the saint were transferred to the abbey of Fossés (afterwards St Maur-des-Fossés: see above). St Maur-sur-Loire was afterwards restored and fortified; the extant remains consist of a part of the church (12th and 17th centuries) and buildings of the 17th and 18th centuries.

ST MAWES, a small seaport in the St Austell parliamentary division of Cornwall, England, beautifully situated on an arm of Falmouth Harbour. Pop. (1901), 1178. The inlet admits only small vessels to the little harbour, but there is a considerable fishing industry. A large circular castle, *vis-à-vis* with that of Pendennis near Falmouth, and dating from the same period (Henry VIII.), guards the entrance. Near the shore of the inlet opposite St Mawes is the small church of St Anthony in Roseland, an excellent example of Early English work, retaining a good Norman doorway.

The history of St Mawes is simple. The saint of that name is said to have made the creek of the Fal a halting-place in the 5th century. The chapel of St Mawes, pulled down in 1812, was licensed by the bishop in 1381, and both chapel and village were situated within the manor of Bogullos, which in the 16th century belonged to the family of Wydeslade. In the 16th century John Leland speaks of the castle as lately begun and describes St Mawes as "a quarter of a mile from the castle, a pretty village or fishertown with a pier called St Mawes and there is a chapel of the saint and his chair of stone and hard by his well." The number of houses half a century later did not exceed twenty, and John Wydeslade, as lord of the manor of Bogullos, owned the village. For the part which he took in the rebellion of 1549 Wydeslade was hanged and his lands forfeited, and in 1562 the manor was granted by Queen Elizabeth to Sir Reginald Mohun of Hall. In the same year St Mawes was incorporated and invested with the right of returning two members to the House of Commons, a privilege which it enjoyed until 1832. In 1607 the portion of the manor of Bogullos which embraced St Mawes was sold by Sir Thomas Arundell, who had married a daughter of Sir William Mohun, to Thomas Walker, and by the latter it was resold to Sir George Parry, who represented the borough in parliament from 1640 to 1642. Sir George Parry sold St Mawes to John Tredenham, whose sons, Sir William and Sir Joseph, and Sir Joseph's son, John Tredenham, became successively its parliamentary representatives. On the death of the last named St Mawes passed by sale to John Knight, whose widow married Robert Nugent, afterwards Earl Nugent, and until the Reform Act of 1832 the Nugents controlled the elections at St Mawes. The corporation, founded in 1562, which consisted of a mayor, or portreeve, and other officers elected by about twenty free tenants, was dissolved under the Municipal Corporations Act in 1835. Its silver mace now belongs to the corporation of Wolverhampton, to whom it passed after the great sale of the effects of the duke of Buckingham at Stowe in 1848 the duke having obtained it as the heir of the Earls Nugent.

ST MICHAEL'S (*São Miguel*), the largest island in the Portuguese archipelago of the Azores. Pop. (1900), 121,340; area, 297 sq. m. The east end of St Michael's rises from a headland 1400 ft. high to the inland peak of Vara (3573 ft.), whence a central range (2000 to 2500 ft.) runs westward, terminating on the south coast in the Serra da Agoa do Pau, about halfway across the island. The range gradually declines in approaching its last point, where it is not more than 100 ft. high. The middle part of the island is lower, and more undulating, its western extremity being marked by the conspicuous Serra Gorda (1572 ft.); its shores on both sides are low, broken and rocky. The aspect of the western portion of the island is that of a vast truncated cone, irregularly cut off at an elevation of about 800 ft., and falling on the north, south and west sides to a perpendicular coast between 300 and 800 ft. high. In the highest parts an undergrowth of shrubs gives the mountains a rich and wooded appearance. Like all volcanic countries, the island has an uneven surface with numerous ravines, and streams of semi-vitrified and scoriaceous lava which resist all atmospheric influences and repel vegetation. Heavy rains falling on the mountains afford a constant supply of water to four lakes at the bottom of extinct craters, to a number of minor reservoirs, and through them, to small rapid streams on all sides.

Hot springs abound in many parts, and vapour issues from almost every crevice. But the most remarkable phenomena are the *Caldeiras* ("Cauldrons"), or *Olhos* ("Eyes"), *i.e.* boiling fountains, which rise chiefly from a valley called the Furnas ("Furnaces"), near the western extremity of the island. The water rises in columns about 12 ft. high and dissolves in vapour. The ground in the vicinity is entirely covered with native sulphur, like hoar-frost. At a small distance is the Muddy Crater, 45 ft. in diameter, on a level with the plain. Its contents are in a state of continual and violent ebullition, accompanied with a sound resembling that of a tempestuous ocean. Yet they

British service as an interpreter, and after the war instigated Indian attacks on the frontier and fought with the Indians against General Arthur St Clair and General Anthony Wayne. Another brother, George Girty (1745–*c.* 1812), lived among the Delawares for several years, was also a trader and interpreter, and was likewise a renegade. Thomas (1739–1820), though he associated much with the Indians, did not participate in their wars. See W. Butterfield's *History of the Girtys* (Cincinnati, 1890).

never rise above its level, unless occasionally to throw to a small distance a spray of the consistence of melted lead. The Furnas abounds also in hot springs, some of them of a very high temperature. There is almost always, however, a cold spring near the hot one. These have long been visited by sufferers from palsy, rheumatism, scrofula and similar maladies. Bath-rooms and other buildings have been erected.

The plains of St Michael's are fertile, producing wheat, barley and Indian corn; vines, oranges and other fruit trees grow luxuriantly on the sides of the mountains. The plants are made to spring even from the interstices of the volcanic rocks, which are sometimes blasted to receive them. Raised in this manner, these fruits are of superior quality; but the expense of such a mode of cultivation necessarily restricts it. The western part of the island yields hemp.

The principal town and seaport is Ponta Delgada (*q.v.*), with 17,675 inhabitants in 1900. The other chief towns are Arrifes (5044), Lagoa (7950), Povoacão (5093), Ribeira Grande (8496) and Villa Franca do Campo (8162). (See also AZORES.)

ST MICHAEL'S MOUNT, a lofty pyramidal island, exhibiting a curious combination of slate and granite, rising 400 yds. from the shore of Mount's Bay, in Cornwall, England. It is united with Marazion by a natural causeway cast up by the sea, and passable only at low tide. If its identity with the Mictis of Timaeus and the Ictis of Diodorus Siculus be allowed, St Michael's Mount is one of the most historic spots in the west of England. It was possibly held by a body of religious in the Confessor's time and given by Robert, count of Mortain, to Mount St Michael, of which Norman abbey it continued to be a priory until the dissolution of the alien houses by Henry V., when it was given to the abbess and Convent of Syon. It was a resort of pilgrims, whose devotions were encouraged by an indulgence granted by Pope Gregory in the 11th century. The Mount was captured on behalf of Prince John by Henry Pomeroy in the reign of Richard I. John de Vere, earl of Oxford, seized it and held it during a siege of twenty-three weeks against 6000 of the king's troops in 1473. Perkin Warbeck occupied the Mount in 1497. Humphry Arundell, governor of St Michael's Mount, led the rebellion of 1549. During the reign of Queen Elizabeth it was given to Robert, earl of Salisbury, by whose son it was sold to Sir Francis Basset. Sir Arthur Basset, brother of Sir Francis, held the Mount against the parliament until July 1646. It was sold in 1659 to Colonel John St Aubyn and is now the property of his descendant Lord Levan. The chapel is extra-diocesan and the castle is the residence of Lord St Levan.

Many relics, chiefly armour and antique furniture, are preserved in the castle. The chapel of St Michael, a beautiful 15th-century building, has an embattled tower, in one angle of which is a small turret, which served for the guidance of ships. Chapel rock, on the beach, marks the site of a shrine dedicated to the Virgin Mary, where pilgrims paused to worship before ascending the Mount. A few houses are built on the hillside facing Marazion, and a spring supplies them with water. The harbour, widened in 1823 to allow vessels of 500 tons to enter, has a pier dating from the 15th century, and subsequently enlarged and restored. Pop. (1901), 111.

ST MIHIEL, a town of north-eastern France, in the department of Meuse, on the right bank of the Meuse and the Canal de l'Est, 23 m. S. by E. of Verdun by rail. Pop. (1906) of the town, 5943 (not including a large garrison), of the commune, 9661. St Mihiel is famous for its Benedictine abbey of St Michael, founded in 709, to which it owes its name. The abbey buildings (occupied by the municipal offices) date from the end of the 17th century and the beginning of the 18th century, and the church from the 17th century. The latter contains a wooden carving of the Virgin by the sculptor Ligier Richier, born at St Mihiel in 1506. Other interesting buildings are the church of St Étienne, chiefly in the flamboyant Gothic style, which contains a magnificent Holy Sepulchre by Ligier Richier, and several houses dating from the 15th, 16th and 17th centuries. On the road to Verdun are seven huge rocks, in one of which a sepulchre (18th century), containing a life-sized figure of Christ, has been hollowed. St Mihiel formerly possessed fortifications and two castles which were destroyed in 1635 by the royal troops in the course of a quarrel between Louis XIII. and Charles IV., duke of Lorraine. The town is the seat of a court of assizes, and has the tribunal of first instance belonging to the arrondissement of Commercy and a communal college.

ST MORITZ (in Ladin, *San Murezzan*), the loftiest (6037 ft.) and the most populous village of the Upper Engadine in the Swiss canton of the Grisons. It is built above the north shore of the lake of the same name (formed by the Inn), and is by rail 56 m. from Coire by the Albula railway, or by road 48½ m. from Martinsbruck (the last village in the Engadine), or by road 30 m., over the Maloja Pass, from Chiavenna. In 1900 it had a population of 1603, 475 being German-speaking, 433 Ladin-speaking, and 504 (railway workmen) Italian-speaking, while 837 were Protestants and 743 Catholics. The village is about 1 m. north of the baths, an electric tramway connecting the two. Both are now much frequented by foreign visitors. The baths (chalybeate, sparkling with free carbonic acid) were known and much resorted to in the 16th century, when they were described by Paracelsus; they were visited in 1779 by Archdeacon W. Coxe. They are frequented chiefly by non-English visitors in summer, the English season at St Moritz being mainly the winter, for the sake of skating and tobogganing. (W. A. B. C.)

ST NAZAIRE, a town of western France, capital of an arrondissement in the department of Loire-Inférieure, 40 m. W.N.W. of Nantes by rail and 29 m. by river. Pop. (1906), 30,345. St Nazaire, situated on the right bank of the Loire at its mouth, is a modern town with straight thoroughfares crossing one another at right angles. It possesses nothing of antiquarian interest except a granite dolmen 10 ft. long and 5 ft. wide resting horizontally on two other stones sunk in the soil, above which they rise 6½ ft. The only noteworthy building is a modern church in the Gothic style of the 14th century. The harbour, which constitutes the outport of Nantes and is accessible to ships of the largest size, is separated from the estuary by a narrow strip of land, and comprises an outer harbour and entrance, two floating docks (the old dock and the Penhouët dock), three graving docks, and the extensive shipbuilding yards of the Loire Company and of the General Transatlantic Company whose steamers connect St Nazaire with Mexico, the Antilles and the Isthmus of Panama. Ships for the navy and the mercantile marine are built, and there are important steel-works, blast-furnaces, forges, and steam saw-mills. The town is the seat of a sub-prefect, and has a tribunal of first instance, a board of trade-arbitration, an exchange, a chamber of commerce, a communal college, and schools of navigation and industry. Next to British and French, Spanish, Norwegian and Swedish vessels most frequent the port. In the decade 1898–1907 the value of imports greatly fluctuated, being highest in 1898 (£2,800,000) and lowest in 1904 (£1,688,000), the average for each of the ten years being £2,280,000. The value of the exports in the same period varied between £3,724,000 in 1899 and £1,396,000 in 1906, the average being £2,935,200. Imports include coal and patent fuel, iron ore and pyrites, timber, rice and hemp; exports include iron ore, coal and patent fuel, pit wood, sugar, garments and woven goods, preserved fish, and wine and spirits.

According to remains discovered on excavating the docks, St Nazaire seems to occupy the site of the ancient *Corbilo*, placed by Strabo among the more important maritime towns of Gaul. At the close of the 4th century the site of Corbilo was occupied by Saxons, and, their conversion to Christianity being effected one or two hundred years later by St Felix of Nantes, the place took the name of St Nazaire. It was still only a little "bourg" of some 3000 inhabitants when under the second empire it was chosen as the site of the new harbour for Nantes, because the ascent of the Loire was becoming more and more difficult. In 1868 the sub-prefecture was transferred to St Nazaire from Savenay.

ST NECTAIRE (corrupted into Sennecterre and Senneterre), the name of an estate in Auvergne, France, which gave its name to a feudal house holding distinguished rank in the 13th century. The eldest branch of this family held the marquisate of La Ferté (*q.v.*), and produced a heroine of the religious wars of the 16th century, Madeleine de St Nectaire, who married Guy de St Exupéry, seigneur de Miremont, in 1548, and fought successfully at the head of the Protestants in her territory against the troops of the League. To the same house belonged the branches of the marquises of Châteauneuf, the seigneurs of Brinon-sur-Sauldre

and St Victour, and the seigneurs of Clavelier and Fontenilles, all of which are now extinct. (M. P.*)

ST NEOTS (pronounced St Neets), a market town in the southern parliamentary division of Huntingdonshire, England, on the right (east) bank of the Ouse, 51½ m. N. of London by the Great Northern railway. Pop. of urban district (1901), 3880. A stone bridge crosses the river, built in 1589 from the ruins of a former priory. The parish church of St Mary is a fine Perpendicular building of the later 15th century. The original oak roof is noteworthy. Among other buildings may be mentioned the Victoria museum (1887), the library and literary institute, and the endowed school (1760). Paper-mills, breweries, flour-mills, and engineering works furnish the chief industries of the town.

The name of St Neots is derived from the monastery founded in the adjoining parish of Eynesbury in the reign of King Edgar (967-975). St Neot, a priest of Glastonbury Abbey in Somerset, became a recluse at a place which he named Neotstoke, near Bodmin in Cornwall, where he died about the end of the 9th century. His shrine at Eynesbury being threatened by the incursion of the Danes early in the 11th century, the relics were conveyed to Crowland Abbey, in Lincolnshire, of which he became one of the patron saints. But in 1112 the monastery was refounded from that of Bec in Normandy. An Anglo-Saxon enamelled mosaic in the Ashmolean Museum at Oxford is supposed to contain a portrait of St Neot. In 1648 a troop of Royalists under the command of Villiers, duke of Buckingham, was routed in St Neots by the Parliamentarians.

ST NICOLAS, a town of Belgium in the province of East Flanders, about 12 m. S.W. of Antwerp. Pop. (1904), 32,767. It is the principal town of Waes, formerly a district of bleak and barren downs, but now the most productive part of Belgium. St Nicolas is the centre and distributing point of this district, being an important junction on the direct line from Antwerp to Ghent; it has also many manufactures of its own. The principal church dedicated to St Nicolas was finished in 1696, but the other public buildings are only of the 19th century.

ST NICOLAS, or ST NICOLAS DU PORT, a town of north-eastern France, in the department of Meurthe-et-Moselle, on the left bank of the Meurthe, 8 m. S.E. of Nancy by rail. Pop. (1906), 4796. The town has a fine Gothic church dating from the end of the 15th and the first half of the 16th century, and possessing a finger-joint of St Nicolas formerly the object of pilgrimages which were themselves the origin of well-known fairs. The latter became less important after 1635, when the Swedes sacked the town. There are important salt-workings in the vicinity; cotton spinning and weaving are carried on. Its port, shared with Varangéville on the opposite side of the river, has an active trade.

ST OMER, a town and fortress of northern France, capital of the department of Pas-de-Calais, 42 m. W.N.W. of Lille on the railway to Calais. Pop. (1906), 17,261. At St Omer begins the canalized portion of the Aa, which reaches the sea at Gravelines, and under its walls it connects with the Neuffossé canal, which ends at the Lys. The fortifications were demolished during the last decade of the 19th century and boulevards and new thoroughfares made in their place. There are two harbours outside and one within the city. St Omer has wide streets and spacious squares, but little animation. The old cathedral belongs almost entirely to the 13th, 14th and 15th centuries. A heavy square tower finished in 1499 surmounts the west portal. The church contains interesting paintings, a colossal statue of Christ seated between the Virgin and St John (13th century, originally belonging to the cathedral of Thérouanne and presented by the emperor Charles V.), the cenotaph of St Omer (13th century) and numerous ex-votos. The richly decorated chapel in the transept contains a wooden figure of the Virgin (12th century), the object of pilgrimages. Of St Bertin, the church of the abbey (built between 1326 and 1520 on the site of previous churches) where Childeric III. retired to end his days, there remain some arches and a lofty tower, which serve to adorn a public garden. Several other churches or convent chapels are of interest, among them St Sepulchre (14th century), which has a beautiful stone spire and stained-glass windows. A fine collection of records, a picture-gallery, and a theatre are all accommodated in the town hall, built of the materials of the abbey of St Bertin. There are several houses of the 16th and 17th centuries; of the latter the finest is the Hôtel Colbert, once the royal lodging, and now occupied by an archaeological museum. Among the hospitals the military hospital is of note as occupying the well-known college opened by the English Jesuits in 1592. The old episcopal palace adjoining the cathedral is used as a court-house. The chief statue in the town is that of Jacqueline Robin (see below). St Omer is the seat of a sub-prefect, of a court of assizes, of tribunals of first instance and of commerce, of a chamber of commerce, and of a board of trade arbitration. Besides the lycée, there are schools of music and of art. The industries include the manufacture of linen goods, sugar, soap, tobacco-pipes, and mustard, the distilling of oil and liqueurs, dyeing, salt-refining, malting and brewing. The suburb of Haut Pont to the north of St Omer is inhabited by a special stock, which has remained faithful to the Flemish tongue, its original costume and its peculiar customs, and is distinguished by honesty and industry. The ground which these people cultivate has been reclaimed from the marsh, and the *lègres* (*i.e.* the square blocks of land) communicate with each other only by boats floated on the ditches and canals that divide them. At the end of the marsh, on the borders of the forest of Clairmarais, are the ruins of the abbey founded in 1140 by Thierry d'Alsace, to which Thomas Becket betook himself in 1165. To the south of St Omer, on a hill commanding the Aa, lies the camp of Helfaut, often called the camp of St Omer. On the Canal de Neuf-Fossé, near the town, is the Ascenseur des Fontinettes, a hydraulic lift enabling canal boats to surmount a difference of level of over 40 ft.

Omer, bishop of Thérouanne, in the 7th century established the monastery of St Bertin, from which that of Notre-Dame was an offshoot. Rivalry and dissension, which lasted till the Revolution, soon sprang up between the two monasteries, becoming especially virulent when in 1559 St Omer became a bishopric and Notre-Dame was raised to the rank of cathedral. In the 9th century the village which grew up round the monasteries took the name of St Omer. The Normans laid the place waste about 860 and 880, but ten years later found town and monastery surrounded by walls and safe from their attack. Situated on the borders of territories frequently disputed by French, Flemish, English and Spaniards, St Omer long continued subject to siege and military disaster. In 1071 Philip I. and Count Arnulf III. of Flanders were defeated at St Omer by Robert the Frisian. In 1127 the town received a communal charter from William Clito, count of Flanders. In 1493 it came to the Low Countries as part of the Spanish dominion. The French made futile attempts against it between 1551 and 1596, and again in 1638 (under Richelieu) and 1647. But in 1677, after seventeen days' siege, Louis XIV. forced the town to capitulate; and the peace of Nijmwegen permanently confirmed the conquest. In 1711 St Omer, on the verge of surrendering to Prince Eugene and the duke of Marlborough, owing to famine, was saved by the daring of Jacqueline Robin, who risked her life in bringing provisions into the place. St Omer ceased to be a bishopric in 1801.

See L. Deschamps de Pas, *Hist. de la ville de Saint-Omer* (2nd ed., Arras, 1881). For a full bibliography of other works see U. Chevalier, *Répertoire des sources hist. topo-bibliographie* (Montbéliard, 1903), ii. 2743 seq.

SAINTON, PROSPER PHILIPPE CATHERINE (1813–1890), French violinist, was the son of a merchant at Toulouse, where he was born on the 5th of June 1813. He entered the Paris Conservatoire under Habeneck in 1831, and became professor of the violin in the Conservatoire of Toulouse. In 1844 he made his first appearance in England, at a Philharmonic concert directed by Mendelssohn. Settling in London, he was in 1845 appointed professor at the Royal Academy of Music. In the early organizations for chamber music which culminated in the establishment of the Popular concerts, Sainton bore an important

part; and when the Royal Italian Opera was started at Covent Garden, he led the orchestra under Costa, with whom he migrated to Her Majesty's Theatre in 1871. From 1848 to 1855 he was leader of the Queen's Band, and in 1862 he conducted the music at the opening of the International Exhibition. In 1860, he married the famous contralto singer, Miss Charlotte Dolby (see below). He was leader of the principal provincial festivals for many years, and gave a farewell concert at the Albert Hall in 1883. He died on the 17th of October 1890. His method was sound, his style artistic, and his educational work of great value, the majority of the most successful orchestral violinists having been his pupils.

SAINTON-DOLBY, CHARLOTTE HELEN (1821–1885), English contralto singer, was born in London on the 17th of May 1821, studied at the Royal Academy of Music from 1832 to 1837, Crivelli being her principal singing-master. In 1837 she was elected to a king's scholarship, and first appeared at a Philharmonic concert in 1841. In October 1845 she sang at the Gewandhaus, Leipzig, through the influence of Mendelssohn, who had been delighted by her singing in *St Paul*. The contralto music in his *Elijah* was written for her voice, but she did not appear in that work till the performance at Exeter Hall on the 16th of April 1847. She married M. Sainton in 1860, and in 1870 she retired from the career of a public singer, but two years afterwards started a "vocal academy" in London. She made various successful attempts as a composer, and the cantatas "The Legend of St Dorothea" (1876), "The Story of the Faithful Soul" (1879), and "Florimel" (1885), enjoyed considerable success. Her last public appearance was at her husband's farewell concert in June 1883, and she died on the 18th of February 1885. A scholarship in her memory was founded at the Royal Academy of Music. Her voice was of moderate power and of fine quality, but it was her dignified and artistic style that gave her the high place she held for so many years both in oratorio and ballads.

SAINTONGE, one of the old provinces of France, of which Saintes (*q.v.*) was the capital, was bounded on the N.W. by Aunis, on the N.E. by Poitou, on the E. by Angoumois, on the S. by Guienne, and on the W. by Guienne and the Atlantic. It now forms a small portion of the department of Charente and the greater part of that of Charente Inférieure. In the time of Caesar, Saintonge was occupied by the Santones, whose capital was Mediolanum; afterwards it was part of Aquitania Secunda. The *civitas Santonum*, which formed the bishopric of Saintes, was divided into two *pagi*: *Santonicus* (whence *Sanctonia*, Saintonge) and *Alienensis*, later *Alniensis* (Aunis). Halved by the treaty of 1259, it was wholly ceded to the king of England in 1360, but reconquered by Du Guesclin in 1371. Up to 1789 it was in the same *gouvernement* with Angoumois, but from a judiciary point of view Saintonge was under the parlement of Bordeaux and Angoumois under that of Paris.

See D. Massiou, *Histoire politique, civile et religieuse de la Saintonge et de l'Aunis* (6 vols., 1836–1839; 2nd ed., 1846); P. D. Rainguet, *Biographie saintongeaise* (1852). See also the publications of the *Société des archives historiques de la Saintonge et de l'Aunis* (1874 fol.).

ST OUEN, an industrial town of northern France, in the department of Seine, on the right bank of the Seine 1 m. N. of the fortifications of Paris. Pop. (1906) 37,673. A château of the early 19th century occupies the site of a château of the 17th century bought by Madame de Pompadour in 1745, where in 1814 Louis XVIII. signed the declaration promising a constitutional charter to France. Previously there existed a château built by Charles of Valois in the early years of the 14th century, where King John the Good inaugurated the short-lived order of the Knights of "Notre Dame de la noble maison," called also the "ordre de l'étoile." The industries of St Ouen include metal founding, engineering and machine construction and the manufacture of government uniforms, pianos, chemical products, &c. It has important docks on the Seine and a race-course.

ST PANCRAS, a northern metropolitan borough of London, England, bounded E. by Islington, S.E. by Finsbury, S. by Holborn, and W. by St Marylebone and Hampstead, and extending N. to the boundary of the county of London. Pop. (1901) 235,317. In the south it includes a residential district, containing boarding-houses and private hotels. In the centre are Camden Town and Kentish Town, and in the north, where part of Highgate is included, are numerous villas, in the vicinity of Parliament Hill, adjoining Hampstead Heath. A thoroughfare called successively Tottenham Court Road, Hampstead Road, High Street Camden Town, Kentish Town Road, and Highgate Road, runs from south to north; Euston Road crosses it in the south, and Camden Road and Chalk Farm Road branch from it at Camden Town. Besides the greater part of Parliament Hill (267 acres), purchased for the public use in 1886, the borough includes a small part of Regent's Park (mainly in the borough of St Marylebone) and Waterlow Park (29 acres) on the slope of Highgate Hill. It also contains the termini, King's Cross, St Pancras, and Euston, of the Great Northern, Midland, and London and North Western railways, with extensive goods depôts of these companies. The parish church of St Pancras in the Fields, near Pancras Road, has lost its ancient character owing to reconstruction, though retaining several early monuments. The new church in Euston Road (1822) is a remarkable adaptation of classical models. Among institutions, University College, Gower Street, was founded in 1826, and provides education in all branches common to universities excepting theology. With the department of medicine is connected the University College Hospital (1833) opposite the College. There are several other hospitals; among them the Royal Free Hospital (Gray's Inn Road), the North-west London hospital, Kentish Town, and, in Euston Road, the British (Forbes Winslow memorial) hospital for mental disorders, British hospital for skin diseases, and New hospital for women, administered by female physicians. St Katherine's Hospital, a picturesque building overlooking Regent's Park, with a chapel containing some relics of antiquity, was settled here (1825) on the formation of the St Katherine's Docks near the Tower of London, where it was founded by Queen Matilda in 1148. Its patronage has always been associated with queens, and here was established the Queen Victoria Home for Nurses of the poor, founded out of the women's gift of money to the Queen at her jubilee (1887). Other institutions are the London School of Medicine for women, the Royal Veterinary College and the Aldenham technical institute. The Passmore Edwards Settlement, taking name from its principal benefactor, was founded largely through the instrumentality of Mrs Humphry Ward. Near Regent's Park is Cumberland Market. The parliamentary borough of St Pancras has north, south, east and west divisions, each returning one member. The borough council consists of a mayor, 10 aldermen and 60 councillors. Area, 2694·4 acres.

St Pancras is mentioned in Domesday as belonging to the chapter of St Paul's Cathedral, in which body the lordship of the manors of Cantelows (Kentish Town) and Totenhall (Tottenham Court) was also invested. Camden Town takes name from Baron Camden (d. 1794), lord chancellor under George III. King's Cross was so called from a statue of George IV., erected in 1830, greatly ridiculed and removed in 1845, but an earlier name, Battle Bridge, is traditionally derived from the stand of Queen Boadicea against the Romans, or from one of Alfred's contests with the Danes. Somers Town, between King's Cross and Camden Town, was formerly inhabited by refugees from the French Revolution, many of whom were buried in St Pancras churchyard. In the locality of Somers Town there were formerly to be traced earthworks of unknown age, which William Stukeley argued had belonged to a Roman camp of Julius Caesar. Attached to the former manor-house of Totenhall was one of the famous pleasure resorts of the 17th and 18th centuries, and from *c.* 1760 to the middle of the 19th century the gardens at Bagnigge Wells (King's Cross Road) were greatly favoured; there were here, moreover, medicinal springs.

ST PAUL, a volcanic island in the southern Indian Ocean, in 38° 42′ 50″ S., 77° 32′ 29″ E., 60 m. S. of Amsterdam Island, belonging to France. The two islands belong to two separate eruptive areas characterized by quite different products; and the comparative bareness of St Paul contrasts with the dense vegetation of Amsterdam. On the north-east of St Paul, which has an area of 2¾ sq. m., is a land-locked bay, representing the old crater, with its rim broken down on one side by the sea.

The highest ridge of the island is not more than 820 ft. above the sea. On the south-west side the coasts are inaccessible. According to Vélain, the island originally rose above the ocean as a mass of rhyolitic trachyte similar to that which still forms the Nine Pin rock to the north of the entrance to the crater. Next followed a period of activity in which basic rocks were produced by submarine eruptions—lavas and scoriae of anorthitic character, palagonitic tuffs, and basaltic ashes; and finally from the crater, which must have been a vast lake of fire like those in the Sandwich Islands, poured forth quiet streams of basaltic lavas which are seen dipping from the centre of the island towards the cliffs at angles of 20° to 30°. The only remaining indications of volcanic activity are the warm springs and emanations of carbon dioxide.

See C. Vélain, *Passage de Vénus sur le soleil (9 décembre 1874) Expédition française aux Îles St Paul et Amsterdam* (Paris, 1877); *Description géologique de la presqu'île d'Aden . . . Réunion . . . St Paul et Amsterdam* (Paris, 1878); and an article in *Annales de géographie*, 1893.

ST PAUL, the capital of Minnesota, U.S.A., and the county-seat of Ramsey county, situated on the Mississippi river, about 2150 m. above its mouth, at the practical head of navigation, just below the Falls of St Anthony. It is about 360 m. N.W. of Chicago, Illinois, and its W. limits directly touch the limits of Minneapolis. Pop. (1880) 41,473; (1890) 133,156; (1900) 163,632, of whom 46,819 were foreign-born (12,935 Germans, 9852 Swedes, 4892 Irish, 3557 English-Canadians, 2900 Norwegians, 2005 English, 1488 Austrians, 1343 Bohemians, 1206 Danes, and 1015 French Canadians), 100,599 of foreign parentage (*i.e.* both parents foreign-born), and 2263 negroes; (1910 census) 214,744. Land area (1906) 52·28 sq. m. St Paul is served by the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Northern Pacific, the Minneapolis, St Paul & Sault Ste Marie, the Chicago & North-western, the Chicago, Milwaukee & St Paul, the Great Northern, and the Minneapolis & St Louis railways. Five bridges span the Mississippi, the largest of which, known as High Bridge, is 2770 ft. long and 200 ft. high. Four interurban lines connect with Minneapolis.

St Paul is attractively situated 670-880 ft. above sea-level, on a series of lofty limestone terraces or bluffs, formerly heavily wooded. It lies on both sides of the river, but the principal part is on the east bank. In its park system the numerous lakes within and near the city have been utilized. Of the parks, Como Park (425 acres; including Lake Como and a fine Japanese garden and a lily pond), and Phalen Park (600 acres, more than 400 of which are water area), are the largest. There are also 47 smaller squares and "neighbourhood parks" aggregating 560 acres. In Indian Park (135 acres), at the crest of the bluffs (Dayton's Bluffs), in the east central part of the city, are burial-mounds of the Sioux. Summit Avenue Boulevard, 200 ft. wide and extending for 2½ m. along the heights, is a fine residential street. Boulevards along the bluffs on either side of the river connect with the Minneapolis park system. Harriet Island, in the Mississippi river opposite the business centre of the city, is attractively parked, and on it are public paths. Adjoining the city on the south-west, at the junction of the Minnesota and Mississippi rivers, is the Fort Snelling U.S. Government Military Reservation, with a round stone fort, built in 1820. The principal public building is the State Capitol, completed in 1905. It was designed by Cass Gilbert (b. 1859), is of Minnesota granite and white Georgia marble with a massive central white dome, and has sculptural decorations by D. C. French and interior decorations by John La Farge, E. H. Blashfield, Elmer E. Garnsey (b. 1862), and Edward Simmons (b. 1852). Other prominent buildings are the City Hall and Court House, a Gothic greystone structure; the Federal building, of greystone, opposite Rice Park; a Young Men's Christian Association building; the Metropolitan Opera House; the Auditorium, which was built by public subscription; the St Paul armoury (1905), with a drill hall; the Chamber of Commerce; the Union railway station. Among the principal churches are the Roman Catholic Cathedral, and the People's, the Central Presbyterian, the Park Congregational, and the First Baptist churches. The wholesale district is in the lower part of the city near the Union railway station; the retail shops are mostly in an area bounded by Wabasha, Seventh, Fourth and Roberts streets.

St Paul has an excellent public school system, which included in 1909 three high schools, a teachers' training school, a manual training high school, forty-eight grade schools, and a parental school. Among other educational institutions are the Freeman School; St Paul Academy; Barnard School for Boys; St Paul College of Law (1900); the College of St Thomas (Roman Catholic, 1885); St Paul Seminary (Roman Catholic, 1894), founded by James J. Hill as the provincial seminary of the ecclesiastical province of St Paul with an endowment of $500,000, 40 acres of land, and a library of 10,000 volumes; Luther Theological Seminary (1885); Hamline University (co-educational; Methodist Episcopal), chartered in 1854, with a medical school in Minneapolis (chartered 1883; part of Hamline since 1895), and having in the college and preparatory school, in 1908–1909, 17 instructors and 384 students; Macalester College (Presbyterian; co-educational), founded as Baldwin Institute in 1853, reorganized and renamed in 1874 in honour of a benefactor, Charles Macalester (1798–1873) of Philadelphia; and the School of Agriculture (1888) and the Agricultural Experiment Station (1887) of the University of Minnesota, in St Anthony Park, west of Como Park and south of the fair grounds. Among the libraries are the City Public Library, the State Law Library and the Minnesota Historical Society Library. The Minnesota Historical Society, organized in 1849, has an archaeological collection in the east wing of the Capitol. In the private residence of James J. Hill is a notable art gallery, containing one of the largest and best collections of the Barbizon School in existence. The principal newspapers are the *Dispatch* (Independent, 1878) and the *Pioneer-Press*, the latter established by James M. Goodhue (1800–1852) in 1849. Among the hospitals and charitable institutions are the City and County, St Joseph's and St Luke's hospitals, all having nurses' training schools; the Swedish Hospital, the Scandinavian Orphan Asylum, the Home for the Friendless, the Magdalen Home and the Women's Christian Home. Within the city limits (east of Indian Mounds Park) is the Willowbrook (state) Fish Hatchery, second to none in the United States in completeness of equipment; and adjoining the city on the north-west are the extensive grounds (200 acres) and buildings of the State Agricultural Society, where fairs are held annually.

Although as a manufacturing city St Paul, not possessing the wonderful water-power of its sister city, does not equal Minneapolis, yet as a commercial and wholesale distributing centre it is in some respects superior, and it is the principal jobbing market of the North-west. Situated at the natural head of navigation on the Mississippi, it has several competing lines of river steamboats in addition to the shipping facilities provided by its railways and the lines of the Minnesota Transfer Co., a belt line with 62 m. of track encircling St Paul and Minneapolis. St Paul is the port of entry for the Minnesota Customs District, and imports from Canada and from the Orient via the Pacific railways constitute an important factor in its commercial life; its imports and exports were valued at $6,154,289 and $9,909,940 respectively in 1909. Coal and wood, grain, farm produce and dairy products are important exports. St Paul is the principal market in the United States for the furs of the North-west, and there are extensive stock-yards and slaughtering and packing houses in the neighbouring city of South St Paul (pop. in 1905, 3458). St Paul ranks second to Minneapolis among the cities of the state as a manufacturing centre. The total value of its factory products in 1905 was $38,318,704, an increase of 27·5% since 1900. The following were among the largest items: fur goods; printing and publishing—book (especially law-book) and job, newspapers and periodicals; malt liquors; steam-railway car building and repairing; boots and shoes; foundry and machine-shop products; lumber and planing-mill products; men's clothing; tobacco, cigars and cigarettes; and saddlery and harness.

St Paul is governed under a charter of 1900, which may be amended by popular vote on proposals made by a permanent charter commission. The mayor, comptroller and city treasurer are elected for two years. The mayor has the veto power and appoints the members of boards of police, parks, library, fire, water-supply and education. The legislature is bicameral, consisting of an assembly of nine members elected on a general city ticket and a board of aldermen chosen one from each of the twelve wards. The water-supply is pumped through 275 m. of water mains from a group of lakes north of the city, and the system has a capacity of 40,000,000 gallons per day.

History.— The earliest recorded visit of a European to the site of St Paul was that of the Jesuit Louis Hennepin in 1680. The traders Pierre Le Sueur and Nicholas Perrot visited the region between 1690 and 1700, and apparently established a temporary trading post somewhere in the neighbourhood. The first man of English descent to record his visit was Jonathan Carver, who, according to his journal, spent some time in the vicinity in 1767–1768. In 1805 Lieut. Zebulon M. Pike concluded a treaty with the Sioux. The first steamboat made its way up the river in 1823. The site of St Paul was opened to settlement by the treaty of Prairie du Chien, negotiated by Governor Henry Dodge of Wisconsin with the Chippewas in 1837. Two years later (1839) the first permanent settlement was made by Swiss and Canadian refugees from Lord Selkirk's Red River colony. In 1841 Father Lucien Gaultier erected a log mission chapel, which he named St Paul's; from this the settlement was named St Paul's Landing and finally St Paul. On the erection of Minnesota Territory in 1849, St Paul was incorporated as a village and became the Territorial capital. Its population in 1850 was only 1112. It was chartered as a city in 1854, and continued as the capital of the new state after its admission (1858). The first railway connecting St Paul and Minneapolis was completed in 1862, at which time St Paul's population exceeded 10,000 and in 1869 through railway connexion with Chicago was effected. The city of West St Paul was annexed in 1874. The growth of the city had been comparatively slow until 1870, in which year the population was 20,030; but the rapid railway construction and the settlement and clearing of the Western farm lands increased its commercial and industrial importance as it did that of its sister city, Minneapolis. In 1884 the city limits were extended to the Minneapolis line.

See F. C. Bliss, *St Paul, its Past and Present* (St Paul, 1888); C. C. Andrews, *History of St Paul, Minnesota* (Syracuse, N.Y., 1890); Warner and Foote, *History of Ramsey County and the City of St Paul* (Minneapolis, 1881); C. D. Elfelt, "Early Trade and Traders in St Paul," and A. L. Larpenteur, "Recollections of the City and People of St Paul," both in the Minnesota Historical Society's *Collections*, vol. ix. (1901).

ST PAUL'S CATHEDRAL, the cathedral church of the diocese of London, England, standing in the heart of the City, at the head of Ludgate Hill. (For plan, &c., see ARCHITECTURE: *Renaissance in England.*) The name of a bishop of London, Restitutus, is recorded in 314, but his individuality and even his existence are somewhat doubtful, and nothing is known of the existence of a church until Bede's notice that early in the 7th century one was built here by Æthelberht of Kent at the instance of the missionary Mellitus, who became bishop. Tradition placed upon the site a Roman temple of Diana. The church was dedicated to St Paul, and, after passing through many vicissitudes, was removed in 1083, when Bishop Maurice, with the countenance of William the Conqueror, undertook the erection of a new cathedral. The building was not pressed forward with vigour, and in 1135 much of it was damaged by fire. The tower was completed in 1221; an Early English choir followed shortly after, and was enlarged after 1255 when Bishop Fulk brought great energy to bear upon the repair and elaboration of the building. At the close of the century the cathedral was regarded as finished; but a new spire was built early in the 14th century. Much of the Norman work, particularly in the nave, had been left untouched by the Early English builders (who in other parts merely encased it), and the cathedral was a magnificent monument of these styles, and of the early Decorated. Perpendicular additions were not extensive, and the cathedral remained with little alteration until 1561, when lightning struck the spire and fired the church. The spire was never rebuilt. In the time of James I. the fabric had so far decayed that the king was prevailed upon to make a personal examination of it, and Inigo Jones was entrusted with the work of restoration. In accordance with the architectural tendencies of his time he added a classical portico to the west front, and made similar alterations to the transepts. Again, however, in 1666 the bad state of the fabric necessitated extensive repair, and Dr (afterwards Sir) Christopher Wren furnished a scheme including a central dome. All his plans were complete in August of that year, but in September the great fire of London almost destroyed the building, and rendered what was left unsafe and beyond restoration.

Estimates of the dimensions of the old cathedral differ, Stow making the extreme length 690 ft., but modern investigations give 596 ft. The internal height of the choir was 101 ft., and that of the nave, which was of twelve bays, 93 ft., and the extreme breadth of the building was 104 ft. The summit of the wonderful spire was 489 ft. above the ground. The present building is wider than the old, and its orientation is more northerly, but its northern, eastern and southern extremities approximately correspond with those of old St Paul's, the west front of which, however, with its flanking towers, lay nearly 100 ft. west of Wren's front. It should be noticed that the eastern part of the old cathedral incorporated the original parish church of St Faith after 1255, when part of the new crypt was allotted to the parish in return. Moreover, the ancient church of St Gregory by St Paul actually adjoined the cathedral on the south-west. In the angle west of the south transept lay a cloister, in the midst of which was the octagonal chapter-house, dating from 1332. To the north-east of the cathedral stood Paul's Cross, in an open space devoted to public meetings; it included a pulpit, and here religious disputations were held and papal bulls promulgated. In 1643 it was removed, but a new cross, erected under the will of H. C. Richards, K.C., M.P., was unveiled in 1910.

The formal provision for the rebuilding of the cathedral was made in 1668, and the foundation stone was laid in 1675. The first service was held in it in 1697, and the last stone was set in place in 1710. The cost is variously estimated, but was probably about £850,000, the greater part of which was defrayed by a duty on sea-borne coal. The material is Portland stone. Wren had to face many difficulties. He naturally insisted on the style of the Renaissance, and his first design was for a building in the form of a Greek cross, but the general desire was that at least the ground-plan of the old English cathedrals should be followed, and the form of a Latin cross was forced upon him. He offered various further designs, and one was accepted, but Wren set the broadest construction upon the permission granted him to alter its ornamental details, and luckily so. The extreme length of the building is 513 ft., the breadth across the transepts 248 ft., of the nave 122 ft., of the west front 179 ft. The length of the nave is 223 ft., and of the choir 168 ft., leaving 122 ft. beneath the dome at the crossing. The cross at the top of the lantern above the dome is 363 ft. above the ground.

The cathedral is approached on the west from an open pavement, on which stands a statue of Queen Anne. There is also an inscription marking the spot on which Queen Victoria returned thanks on the occasion of her Diamond Jubilee (1897). A broad flight of steps leads up to the west front, of two orders, flanked by towers. In the north tower is a chime of bells; in the south the clock, with the old great bell (1716), tolled on the death of certain high personages, and the new great bell, placed in 1882, weighing about 17 tons. The nave is of four bays, with aisles, and chapels of one bay width immediately east of the western towers. The transepts are of two bays, and are entered by north and south porches approached by circular flights of steps. On the pediment of the south porch is sculptured a phoenix with the inscription *Resurgam* (I shall rise again), in allusion to a famous episode. Wren, planning his site and desiring to mark in the ground the point of the centre of his dome, bade a workman bring a piece of stone for the purpose. He picked up at hazard a fragment of an ancient tombstone bearing this single word, which Wren adopted as a motto. The choir of four bays terminates in an apse, but the rich and lofty modern reredos stands forward, and the apse is thus divided off from the body of the church and forms the Jesus chapel. The choir stalls are a fine example of the work of Grinling Gibbons. The dome is supported by the four vast piers in the angles of the cross, within which are small chambers, and by eight inner piers. The spandrels between the arches which stand upon these piers are ornamented with mosaics,

from the designs of G. F. Watts and others, executed by Salviati. Wren had looked forward to a comprehensive scheme of decoration in mosaic. The later extension of this work was entrusted to Sir W. B. Richmond. Above the arches is a circular gallery known as the Whispering Gallery from the fact that a whisper can be easily heard from one side to the other. Above this there are pilasters, with square-headed windows, in three out of every four intervening spaces; and above again, the domed ceiling, ornamented in monochrome by Sir James Thornhill immediately after its completion; but the paintings have suffered from the action of the atmosphere and are hardly to be distinguished from below. The inner wall of the dome begins to slope inward from the level of the Whispering Gallery, but this is masked outside by a colonnade, extending up to a point a little above the top of the internal pilasters. From this point upward the dome is of triple construction, consisting of (1) the inner dome of brick, pierced at the top to render the lantern visible from below; (2) a brick cone, the principal member of the structure, bearing the lantern; (3) the dome visible from without, of lead on a wooden frame. The golden gallery at the base of the lantern (top of the outer dome) is about 65 ft. above the top of the inner dome.

The monuments in St Paul's are numerous, though not to be compared with those in Westminster Abbey. The most notable is that in the nave to the duke of Wellington (d. 1852) by Alfred Stevens. In the crypt, which extends beneath the entire building, are many tombs and memorials—that of Nelson in the centre beneath the dome, those of many famous artists in the so-called Painter's Corner, and in the south choir aisle that of Wren himself, whose grave is marked only by a plain slab, with the well-known inscription ending *Si monumentum requiris, circumspice* ("If thou seekest a monument, look about thee"). Above the south-west chapel in the nave is the chapter library, with many interesting printed books, MSS. and drawings relating to the cathedral. For St Paul's School, established by John Colet, dean, and formerly adjacent to the cathedral, see the article on HAMMERSMITH, whither it was subsequently removed.

AUTHORITIES.—*Parentalia or Memoirs* (of Sir Christopher Wren), *completed by his son Christopher, now published by his Grandson, Stephen Wren* (London, 1758); Sir William Dugdale, *History of St Paul's* (1818); Dean Milman, *Annals of St Paul's* (1868); William Longman, *The Three Cathedrals dedicated to St Paul* (1873); *Documents illustrating the History of St Paul's* (Camden Society, 1880); Rev. W. Sparrow-Simpson, *Chapters in the History of Old St Paul's* (1881); *Gleanings from Old St Paul's* (1889); and *St Paul's and Old City Life* (1894); Rev. A. Dimock, *St Paul's* (in Bell's "Cathedral" series, 1901); Rev. Canon Benham, *Old St Paul's* (1902). In this last work and elsewhere are shown the valuable drawings of Wenceslaus Hollar, showing the old cathedral immediately before the great fire.

ST PAUL'S ROCKS, a number of islets in the Atlantic, nearly 1° N. of the equator and 540 m. from South America, in 29° 15′ W. The whole space occupied does not exceed 1400 ft. in length by about half as much in breadth. Besides sea-fowl the only land creatures are insects and spiders. Fish are abundant, seven species (one, *Holocentrum sancti pauli*, peculiar to the locality) being collected by the "Challenger" during a brief stay. Darwin (*On Volcanic Islands*) decided that St Paul's Rocks were not of volcanic origin; later investigators maintain that they probably are eruptive.

See Reports of the *Voyage of H.M.S. Challenger: Narrative of the Cruise*, vol. i.

ST PETER, a city and the county-seat of Nicollet county, Minnesota, U.S.A., on the Minnesota river, about 75 m. S.W. of Minneapolis. Pop. (1905, state census) 4514, of whom 875 were foreign-born. It is served by the Chicago & North-Western railway and by steamboat lines on the Minnesota river, which is navigable for light draft steamboats to this point. The neighbouring lakes with their excellent fishing attract many summer visitors. The city has a Carnegie library, and is the seat of the Minnesota Hospital for the Insane (1866), and of Gustavus Adolphus College (Swedish Evangelical Lutheran; co-educational), which was founded in 1862 and has a college, an Academy and School of Pedagogy, a School of Commerce and a School of Music. St Peter is an important market for lumber and grain; it has stone quarries and various manufactures. Settled about 1852, St Peter was incorporated as a village in 1865, and was chartered as a city in 1891. In 1857 the legislature, a short time before its adjournment for the session, passed a bill to remove the capital of Minnesota to St Peter, but the bill was not presented to the governor for his signature within the prescribed time, and when the legislature re-convened a similar bill could not be passed.

ST PETER PORT, the chief town of Guernsey, one of the Channel Islands. Pop. (1901) 18,264. It lies picturesquely on a steep slope above its harbour on the east coast of the island. The harbour is enclosed by breakwaters, the southern of which connects with the shore and continues beyond a rocky islet on which stands Castle Cornet. It dates from the 12th century and retains portions of that period. Along the sea-front of the town there extends a broad sea-wall, which continues northward nearly as far as the small port of St Sampson's, connected with St Peter Port by an electric tramway. To the south of the town Fort George, with its barracks, stands high above the sea. On the quay there is a bronze statue of Albert, Prince Consort (1862), copied from that on the south side of the Albert Hall, London. St Peter Port was formerly walled, and the sites of the five gates are marked by stones. St Peter's, or the town church, standing low by the side of the quay, was consecrated in 1312, but includes little of the building of that date. It has, however, fine details of the 14th and 15th centuries, and is, as a whole, the most noteworthy ecclesiastical building in the islands. The other principal buildings are the court house, used for the meetings of the royal court and the states, the Elizabeth College for boys, founded by Queen Elizabeth, but occupying a house of the year 1825, and the Victoria Tower, commemorating a visit of Queen Victoria in 1846. Hauteville House, the residence of Victor Hugo from 1856 to 1870, is preserved as he left it, and is open to the public. The harbour is the chief in the island, and a large export trade is carried on especially in vegetables, fruit and flowers. The construction of the harbour was ordered by King Edward I. in 1275.

ST PETERSBURG, a government of north-western Russia, at the head of the Gulf of Finland, stretching for 130 m. along its south-east shore and the southern shore of Lake Ladoga, and bordering on Finland, with an area of 17,221 sq. m. It is hilly on the Finland border, but flat and marshy elsewhere, with the exception of a small plateau in the south (Duderhof Hills), 300 to 550 ft. high. It has a damp and cold climate, the average temperatures being: at St Petersburg, for the year 39° F., for January 15°, for July 64°; yearly rainfall, 18·7 in.; at Sermaks, at the mouth of the Svir on the E. side of Lake Ladoga (60° 28′ N.), for the year 37°, for January 13°, for July 62°; yearly rainfall, 20·8 in. Numerous parallel ridges of glacier origin intersect the government towards Lake Peipus and north of the Neva. Silurian and Devonian rocks appear in the south, the whole covered by a thick glacial deposit with boulders (bottom moraine) and by thick alluvial deposits in the valley of the Neva. The bays of Kronstadt, Koporya, Luga and Narva afford good anchorage, but the coast is for the most part fringed with reefs and sandbanks. The chief river is the Neva. The feeders of Lake Ladoga—the Volkhov, the Syas, and the Svir, the last two forming part of the system of canals connecting the Neva with the Volga—are important channels of commerce, as also is the Narova. Marshes and forests cover about 45% of the area (70% at the end of the 18th century). The population, which was 635,780 in 1882, numbered 873,043 in 1897, without the capital and its suburbs; including the latter it was 2,103,965. Of this latter number 466,750 were women and 160,499 lived in towns. The estimated pop. in 1906 was 2,510,100. The average density was 121 per sq. m. The population is chiefly Russian, with a small admixture of Finns and Germans, and according to religion it is distributed as follows: Greek Orthodox, 78%; Nonconformists, 1·6%; Lutherans, 17%; and Roman Catholics, 2·4%. A remarkable feature is the very slow natural increase of the population. During the 25 years 1867 to 1891 the natural increase was only 867. The government is divided into eight districts, the administrative headquarters of which, with their populations in 1897, are: St Petersburg (*q.v.*), Gdov (2254 inhabitants), Luga (5687), Novaya Ladoga (4144), Peterhof (11,300), Schlüsselburg (5285), Tsarskoye Selo (22,353) and Yamburg (4166). Most of the towns are summer resorts for the population of the capital. Till the latter part of the 19th century education stood at a very low level, but progress has since been made, and now three-quarters of all who

enter the army from this government are able to read. The *zemstvo* (provincial council) has organized village libraries and lectures on a wide scale. Many improvements have been made, especially since 1897, in sanitary organization. Generally speaking, agriculture is at a low ebb. The principal crops are cereals (rye, oats and barley), potatoes and green crops, the total area under cultivation being only 13%. These crops, which are often ruined by heavy rains in the late summer, are insufficient for the population. Flax is cultivated to some extent. Nearly 21% of the area consists of meadows and pasture. Dairy-farming is developing. Timber, shipping, stone-quarrying and fishing are important industries; the chief factories are cotton, tobacco, machinery, sugar, rubber and paper mills, chemical works, distilleries, breweries and printing works.

ST PETERSBURG, the capital of the Russian empire, situated at the head of the Gulf of Finland, at the mouth of the Neva, in 59° 56′ N., and 30° 20′ E., 400 m. from Moscow, 696 m. from Warsaw, 1400 m. from Odessa (via Moscow), and 1390 m. from Astrakhan (also via Moscow). The Neva, before entering the Gulf of Finland, forms a peninsula, on which the main part of St Petersburg stands, and itself subdivides into several branches. The islands so formed are only 10 or 11 ft. above the average level of the water. Their areas are rapidly increasing, while the banks which continue them seaward are gradually disappearing. The mainland is not much higher than the islands. As the river level rises several feet during westerly gales, extensive portions of the islands and of the mainland are flooded every winter. In 1777, when the Neva rose 10·7 ft., and in 1824, when it rose 13·8 ft., nearly the whole of the city was inundated, and the lower parts were again under water in 1890, 1897 and 1898, when the floods rose 8 ft. A ship canal, completed in 1875–1888 at a cost of £1,057,000, has made the capital a seaport. Beginning at Kronstadt, it terminates at Gutuyev Island in a harbour capable of accommodating fifty sea-going ships. It is 23 ft. deep and 17½ m. long. The Neva is crossed by three permanent bridges—the Nicholas, the Troitsky or Trinity (1897–1903), and the Alexander or Liteinyi; all three fine specimens of architecture. One other bridge—the Palace—across the Great Neva connects the left bank of the mainland with Vasilyevskiy or Basil Island; but, being built on boats, it is removed during the autumn and spring. Several wooden or floating bridges connect the islands, while a number of stone bridges span the smaller channels. In winter, when the Neva is covered with ice 2 to 3 ft. thick, temporary roadways for carriages and pedestrians are made across the ice and artificially lighted. In winter, too, thousands of peasants come in from the villages with their small Finnish horses and sledges to ply for hire.

The Neva continues frozen for an average of 147 days in the year (25th November to 21st April). It is unnavigable, however, for some time longer on account of the ice from Lake Ladoga, which is sometimes driven by easterly winds into the river at the end of April and beginning of May. The climate of St Petersburg is changeable and unhealthy. Frosts are made much more trying by the wind which accompanies them; and westerly gales in winter bring oceanic moisture and warmth, and melt the snow before and after hard frosts. The summer is hot, but short, lasting barely more than five or six weeks; a hot day, however, is often followed by cold weather: changes of temperature amounting to 35° Fahr. within twenty-four hours are not uncommon. In autumn a chilly dampness lasts for several weeks, and in spring cold and wet weather alternates with a few warm days.

	January.	July.	The Year.
Mean temperature, Fahr.	15°·0	64°·0	38°·6
Rainfall, inches	0·9	2·6	18·8
Prevailing winds	S.W.	W.	W.
Average daily range of temperature, Fahr.	2°·2	10°·2	7°·7

Topography.—The greater part of St Petersburg is situated on the mainland, on the left bank of the Neva, including the best streets, the largest shops, the bazaars and markets, the palaces, cathedrals and theatres, as well as all the railway stations, except that of the Finland railway. From the Liteinyi bridge to that of Nicholas a granite embankment, bordered by palaces and large private houses, lines the left bank of the Neva. About midway, behind a range of fine houses, stands the Admiralty, the very centre of the capital. Formerly a wharf, on which Peter the Great caused his first Baltic ship to be built in 1706, it is now the seat of the ministry of the navy and of the hydrographical department, the new Admiralty building standing farther down the Neva on the same bank. A broad square, partly laid out as a garden (Alexander Garden), surrounds the Admiralty on the west, south and east. To the west, opposite the senate, stands the fine memorial to Peter the Great, erected in 1782, and now backed by the cathedral of St Isaac. A bronze statue, a masterpiece by the French sculptor Falconet, represents the founder of the city on horseback, at full gallop, ascending a rock and pointing to the Neva. South of the Admiralty is the ministry of war and to the east the imperial winter palace, the work of Rastrelli (1764), a fine building of mixed style; but its admirable proportions mask its huge dimensions. It communicates by a gallery with the Hermitage Fine Arts Gallery. A broad semi-circular square, adorned by the Alexander I. column (1834), separates the palace from the buildings of the general staff and the foreign ministry. The range of palaces and private houses facing the embankment above the Admiralty is interrupted by the macadamized "Field of Mars," formerly a marsh, but transformed at incredible expense into a parade-ground, and the Lyetniy Sad (summer-garden) of Peter the Great. The Neva embankment is continued to a little below the Nicholas bridge under the name of "English embankment," and farther down by the new Admiralty buildings.

The topography of St Petersburg is very simple. Three long streets, the main arteries of the capital, radiate from the Admiralty—the Prospekt Nevskiy (Neva Prospect), the Gorokhovaya, and the Prospekt Voznesenskiy (Ascension Prospect). Three girdles of canals, roughly speaking concentric, intersect these three streets—the Moika, the Catherine and the Fontanka; to these a number of streets run parallel. The Prospekt Nevskiy is a very broad street, running straight east-south-east for 3200 yds. from the Admiralty to the Moscow railway station, and thence 1650 yds. farther, bending a little to the south, until it again reaches the Neva at Kalashnikov Harbour, near the vast complex of the Alexander Nevski monastery (1713), the seat of the metropolitan of St Petersburg. The part of the street first mentioned owes its picturesque aspect to its width, its attractive shops, and still more its animation. But the buildings which border it are architecturally poor. Neither the cathedral of the Virgin of Kazan (an ugly imitation on a small scale of St Peter's in Rome), nor the still uglier Gostiniy Dvor (a two-storied quadrilateral building divided into second-rate shops), nor the Anichkov Palace (which resembles immense barracks), nor even the Roman Catholic and Dutch churches do anything to embellish it. About midway between the public library and the Anichkov Palace an elegant square hides the old-fashioned Alexandra theatre; nor does a profusely adorned memorial (1873) to Catherine II. beautify it much. The Gorokhovaya is narrow and badly paved, and is shut in between gloomy houses occupied mostly by artizans. The Voznesenskiy Prospekt, on the contrary, though as narrow as the last, has better houses. On the north, it passes into a series of large squares connected with that in which the monument of Peter the Great stands. One of them is occupied by the cathedral of St Isaac (of Dalmatia), and another by the memorial (1859) to Nicholas I., the gorgeousness and bad taste of which contrast strangely with the simplicity and significance of that of Peter the Great. The general aspect of the cathedral is imposing both without and within; but on the whole this architectural monument, built between 1819 and 1858 according to a plan of Montferrant, under the personal direction of Nicholas I., does not correspond either with its costliness (£2,431,300) or with the efforts put forth for its decoration by the best Russian artists.

The eastern extremity of Vasilyevskiy Island is the centre of commercial activity; the stock exchange is situated there as well as the quays and storehouses. The remainder of the island is occupied chiefly by scientific and educational institutions—the academy of science, with a small observatory, the university, the philological institute, the academy of the first corps of cadets, the academy of arts, the marine academy, the mining institute and the central physical observatory, all facing the Neva. Petersburg Island contains the fortress of St Peter and St Paul (1703-1740), opposite the Winter Palace; but the fortress is now a state prison. A cathedral which stands within its walls is the burial-place of the emperors and the imperial family. The mint and an artillery museum are also situated within the fortress. The remainder of the island is meanly built, and is the refuge of the poorer officials (*chinovniks*) and of the intellectual proletariat. Its northern part, separated from the main island by a narrow channel, bears the name of Apothecaries' Island, and is occupied by a botanical garden of great scientific value and several fine private gardens and parks. Krestovskiy, Elagin and Kamennyi Islands, as also the opposite (right) bank of the Great Nevka (one of the branches of the Neva) are occupied by public gardens, parks and summer residences. The mainland on the right bank of the Neva above its delta is known as the Viborg Side, and is connected with the main city by the Liteinyi bridge, closely adjoining which are the buildings of the military academy of medicine and spacious hospitals. The small streets (many of them unpaved), with numerous wooden houses, are inhabited by students and workmen; farther north are great textile and iron factories. Vast orchards and the yards of the artillery laboratory stretch north-eastwards, while the railway and the high road to Finland, running north, lead to the park of the Forestry Institute. The two villages of Okhta, on the right bank, are suburbs; higher up, on the left bank, are several factories (Alexandrovsk) which formerly belonged to the crown. The true boundary of St Petersburg on the south is the Obvodnyi Canal, running parallel to the three canals already mentioned and forming a sort of base to the Neva peninsula; but numerous orchards, cemeteries and factories, and even unoccupied spaces, are included within the city boundaries in that direction, though they are being rapidly covered with buildings. Except in a few principal streets, which are paved with wood or asphalt, the pavement is usually of granite setts. There are two government dockyards, the most important of which is the new admiralty yard in the centre of the city. At this yard there are three building slips and a large experimental basin, some 400 ft. in length, for trials with models of vessels. The Galerny Island yard is a little lower down the river, and is devoted entirely to construction. There are two building slips for large vessels, besides numerous workshops, storehouses and so forth. The Baltic Yard is near the mouth of the Neva, and was taken over by the ministry of marine in 1894. Since that time the establishment has been enlarged, and a new stone building slip, 520 ft. in length, completely housed in, has been finished.

Population.—The population of St Petersburg proper at the censuses specified was as follows:—

Year.	Total.	Men.	Women.	Proportion of Men to every 100 Women.
1869	667,207	377,380	289,827	130
1881	861,303	473,229	388,074	122
1890	954,400	512,718	441,682	116
1897	1,132,677	616,855	515,822	119

A further increase was revealed by the municipal census of 1900, when the population of the city was 1,248,739, having thus increased 30·9 % in ten years. In 1905 the total population was estimated to number 1,429,000. The population of the suburbs was 134,710 in 1897, and 190,635 in 1900. Including its suburbs, St Petersburg is the fifth city of Europe in point of size, coming after London, Paris, Berlin and Vienna. The large proportion of men in its population is due to the fact that great numbers come from other parts of Russia to work during the winter in the textile factories, and during the summer at unloading the boats. Russians numbered 828,354 in 1897, or 73·1 % of the population; Germans 43,798, or 3·9 %; Poles 22,307, or 1·9 %; Finns, 16,731, or 1·5 %; and Jews 10,353, or 0·9 %. The various religions are represented by 84·9 % Orthodox Greeks, 9·9 Protestants and 3·3 Roman Catholics. The proportion of illegitimate children is ten times higher than in the rest of Russia, namely 250 to 286 per thousand births. It is thus nearly the same as in Paris, but lower than in Moscow (292 per thousand) and Vienna (349 per thousand). The mortality varies very much in different parts of the city—from 12 per thousand in the best situated, the admiralty quarter, to 16 in other central parts, and 25 and 27 in the outlying quarters. The mortality has, however, notably decreased, as it averaged 36 per thousand in the years 1870 to 1874, and only 27 from 1886 to 1895, and 24 in 1897. Infectious diseases, *i.e.* tuberculosis, diphtheria, inflammation of the lungs, typhoid, scarlet fever and measles, are the cause of 37 to 38 % of all deaths. The high mortality in certain quarters is largely due to overcrowding and bad water.

An interesting feature of the Russian capital is the very high proportion of people living on their own earnings or income ("independent") as compared with those who live on the earnings or income of some one else ("dependent"). Only a few industrial establishments employ more than twenty workmen, the average being less than ten and the figure seldom falling below five. The large factories are beyond the limits of St Petersburg. Although 36 % of the population above six years old are unable to read, the workmen are amongst the most intelligent classes in Russia.

Education, Science and Art.—Notwithstanding the hardships and prosecutions to which it is periodically subjected, the university (nearly 4000 students) exercises a pronounced influence on the life of St Petersburg. The medical faculty forms a separate academy, under military jurisdiction, with about 1500 students. There are, moreover, a philological institute, a technological institute, a forestry academy, an engineering academy, two theological academies (Orthodox Greek and Roman Catholic), an academy of arts, five military academies and a high school of law. Higher instruction for women is provided by a medical academy, a free university, four other institutions for higher education, and a school of agriculture. The scientific institutions include an academy of sciences, opened in 1726, which has rendered immense service in the exploration of Russia. The oft-repeated reproach that it keeps its doors shut to Russian *savants*, while opening them too widely to German ones, is not without foundation. The Pulkovo astronomical observatory, the chief physical (meteorological) observatory (with branches throughout Russia and Siberia), the astronomical observatory at Vilna, the astronomical and magnetical observatory at Peking, and the botanical garden, are all attached to the academy of sciences. The Society of Naturalists and the Physical and Chemical Society have issued most valuable publications. The geological committee is ably pushing forward the geological survey of the country; the Mineralogical Society was founded in 1817. The Geographical Society, with branch societies for West and East Siberia, Caucasus, Orenburg, the north-western and south-western provinces of European Russia, is well known for its valuable work, as is also the Entomological Society. There are four medical societies, and an archaeological society (since 1846), an historical society, an economical society, gardening, forestry, technical and navigation societies. The conservatory of music, with a new building (1891–1896), gives superior musical instruction. The Musical Society is worthy of notice. Art, on the other hand, has not freed itself from the old scholastic methods at the academy. Several independent artistic societies seek to remedy this drawback, and are the true cradle of the Russian *genre* painters.

The imperial public library contains valuable collections of books (1,000,000) and MSS. The library of the academy of sciences contains more than 500,000 volumes, 13,000 MSS., rich collections of works on oriental languages, and valuable collections of periodical publications from scientific societies throughout the world. The museums of the Russian capital occupy a prominent place among those of Europe. That of the Academy of Sciences, of the Navy, of Industrial Art (1896), of the Mineralogical Society, of the Academy of Arts, the Asiatic museum, the Suvorov museum (1901), with pictures by Vereshchagin, the Zoological museum and several others are of great scientific value. The Hermitage Art Gallery contains a first-rate collection of the Flemish school, some pictures of the Russian school, good specimens of the Italian, Spanish and old French schools, invaluable treasures of Greek and Scythian antiquities, and a good collection of 200,000 engravings. Old Christian and old Russian arts are well represented in the museums of the Academy of Arts. The New Michael Palace was in 1895–1898

converted into a museum of Russian art—the Russian museum; it is one of the handsomest buildings in the city.

In the development of the Russian drama St Petersburg has played a far less important part than Moscow, and the stage there has never reached the same standard of excellence as that of the older capital. On the other hand, St Petersburg is the cradle of Russian opera and Russian music. There are in the city only four theatres of importance—all imperial—two for the opera and ballet, one for the native drama, and one for the French and German drama.

Industries and Trade.—St Petersburg is much less of a manufacturing city than Moscow or Berlin. The period 1880 to 1890 was very critical in the history of the northern capital. With the development of the railway system the southern and south-western provinces of Russia began to prosper more rapidly than the upper Volga provinces; St Petersburg began to lose its relative importance in favour of the Baltic ports of Riga and Libau, and its rapid growth since the Crimean War seemed in danger of being arrested. The danger, however, passed away, and in the last decade of the 19th century the city continued its advance with renewed vigour. A great influx of functionaries of all sorts, consequent upon the state taking into its hands the administration of the railways, spirits, &c., resulted in the rapid growth of the population, while the introduction of a cheap railway tariff, and the subsidizing and encouraging in other ways of the great industries, attracted to St Petersburg a considerable number of workers, and favoured the growth of its larger industrial establishments. St Petersburg is now one of the foremost industrial provinces in Russia, its yearly returns placing it immediately after Moscow and before Piotrków, in Poland. The chief factories are cottons and other textiles, metal and machinery works, tobacco, paper, soap and candle factories, breweries, distilleries, sugar refineries, ship-building yards, printing works, potteries, carriage works, pastry and confectionery and chemicals. The export trade of St Petersburg is chiefly in grain (especially rye and oats), flour and bran, oil seeds, oil cakes, naphtha, eggs, flax and timber. It shows very great fluctuations, varying in accordance with the crops, the range being from £8,000,000 to £10,000,000. The exports are almost entirely to western Europe by sea (from £5,500,000 to £6,500,000), and to Finland (£1,500,000 to £3,000,000). The imports consist chiefly of coal, metals, building materials, herrings, coffee and tea, better-class timber, raw cotton, wood pulp and cellulose, and manufactured goods, and amount to about £14,000,000 annually.

Six railways meet at St Petersburg. Two run westwards along both shores of the Gulf of Finland to Hangöudd and to Port Baltic respectively; two short lines connect Oranienbaum, opposite Kronstadt and Tsarskoye Selo (with Pavlovsk) with the capital; and three great trunk lines run—south-west to Warsaw (with branches to Riga and Smolensk), south-east to Moscow (with branches to Novgorod and Rybinsk), and east to Vologda, Vyatka and Perm. The Neva is the principal channel for the trade of St Petersburg with the rest of Russia, by means of the Volga and its tributaries.

Administration.—The municipal affairs of the city are in the hands of a municipality, elected by three categories of electors, and is practically a department of the chief of the police. The city is under a separate governor-general, whose authority, like that of the chief of police, is unlimited.

Environs.—St Petersburg is surrounded by several fine residences, mostly imperial palaces with large and beautiful parks. Tsarskoye Selo, 15 m. to the south-east, and Peterhof, on the Gulf of Finland, are summer residences of the emperor. Pavlovsk, 17 m. S. of the city, has a fine palace and parks, where summer concerts attract thousands of people. There is another imperial palace at Gatchina, 29 m. S. Oranienbaum, 25 m. W. on the south shore of the Gulf of Finland, is a rather neglected place. Pulkovo, on a hill 9 m. S. from St Petersburg, is well known for its observatory; while several villages north of the capital, such as Pargolovo and Murino, are visited in summer by the less wealthy inhabitants.

History.—The region between Lake Ladoga and the Gulf of Finland was inhabited in the 9th century by Finns and some Slavs. Novgorod and Pskov made efforts to secure and maintain dominion over this region, so important for their trade, and in the 13th and 14th centuries they built the forts of Koporya (in the present district of Peterhof), Yam (now Yamburg), and Oryeshek (now Schlüsselburg) at the point where the Neva issues from Lake Ladoga. They found, however, powerful opponents in the Swedes, who erected the fort of Landskrona at the junction of the Okhta and the Neva, and in the Livonians, who had their fortress at Narva. Novgorod and Moscow successively were able by continuous fighting to maintain their supremacy over the region south of the Neva throughout the 16th century; but early in the 17th century Moscow was compelled to cede it to Sweden, which erected a fortress on the Neva at the mouth of the Okhta. In 1700 Peter the Great began his wars with Sweden. Oryeshek was taken in 1702, and in the following year the Swedish fortress on the Neva. Two months later (29th June 1703) Peter laid the foundations of a cathedral to St Peter and St Paul, and of a fort which received his own name (in its Dutch transcription, "Piterburgh"). Next year the fort of Kronslott was erected on the island of Kotlin, as also the Admiralty on the Neva, opposite the fortress. The emperor took most severe and almost barbarous measures for increasing his newly founded city, which was built on marshy ground, the buildings resting on piles. Thousands of people from all parts of Russia were removed thither and died in erecting the fortress and building the houses. Under Elizabeth fresh compulsory measures raised the population to 150,000, and this figure was nearly doubled during the reign of Catherine II. (1762–1796). The chief embellishments of St Petersburg were effected during the reigns of Alexander I. (1801–1825) and Nicholas I. (1825–1855). From the earliest years of Russian history trade had taken this northern direction. Novgorod owed its wealth to this fact; and as far back as the 12th century the Russians had their forts on Lake Ladoga and the Neva. In the 14th and 15th centuries they exchanged their wares with the Danzig merchants at Nu or Nü—now Vasilyevskiy Island. By founding St Petersburg Peter the Great only restored the trade to its old channels. The system of canals for connecting the upper Volga and the Dnieper with the great lakes of the north completed the work; the commercial mouth of the Volga was thus transferred to the Gulf of Finland, and St Petersburg became the export harbour for more than half Russia. Foreigners hastened thither to take possession of the growing export trade, and to this the Russian capital is indebted for its cosmopolitan character. The development of the railway system and the colonization of southern Russia now operate, however, adversely to St Petersburg, while the rapid increase of population in the Black Sea region is tending to shift the Russian centre of gravity; new centres of commercial, industrial, and intellectual life are being developed at Odessa and Rostov. The revival of Little Russia is another influence operating in the same direction. Since the abolition of serfdom and in consequence of the impulse given to Russian thought by this reform, the provinces are coming more and more to dispute the right of St Petersburg to guide the political life of the country. It has been often said that St Petersburg is the head of Russia and Moscow its heart. The first part at least of this saying is true. In the development of thought and in naturalizing in Russia the results of west European culture and philosophy St Petersburg has played a prominent part. It has helped greatly to familiarize the public with the teachings of west European science and thinking, and to give to Russian literature its liberality of mind and freedom from the trammels of tradition. St Petersburg has no traditions, no history beyond that of the palace conspiracies, and there is nothing in its past to attract the writer or the thinker. But, as new centres of intellectual life and new currents of thought develop again at Moscow and Kiev, or arise anew at Odessa and in the eastern provinces, these places claim the right to their own share in the further development of intellectual life in Russia.

(P. A. K.; J. T. Be.)

SAINT-PIERRE, CHARLES IRÉNÉE CASTEL, Abbé de (1658–1743), French writer, was born at the château de Saint-Pierre-l'Église near Cherbourg on the 18th of February 1658. His father was *bailli* of the Cotentin, and Saint-Pierre was educated by the Jesuits. In Paris he frequented the salons of Madame de la Fayette and of the marquise de Lambert. He was presented to the abbacy of Tiron, and was elected to the Academy in 1695. In the same year he gained a footing at court as almoner to Madame. But in 1718, in consequence of the political offence given by his *Discours sur la polysynodie*, he was expelled from the Academy. He afterwards founded the club of the *Entre sol*, an independent society suppressed in 1731 He died in Paris on the 29th of April 1743.

Saint-Pierre's works are almost entirely occupied with an acute though generally visionary criticism of politics, law and social institutions. They had a great influence on Rousseau, who left elaborate examinations of some of them, and reproduced

not a few of their ideas in his own work. His *Projet de paix perpétuelle*, which was destined to exercise considerable influence on the development of the various schemes for securing universal peace which culminated in the Holy Alliance, was published in 1713 at Utrecht, where he was acting as secretary to the French plenipotentiary, the Abbé de Polignac, and his *Polysynodie* contained severe strictures on the government of Louis XIV., with projects for the administration of France by a system of councils for each department of government. His works include a number of memorials and projects for stopping duelling, equalizing taxation, treating mendicancy, reforming education and spelling, &c. It was not, however, for his suggestions for the reform of the constitution that he was disgraced, but because in the *Polysynodie* he had refused to Louis XIV. the title of *le Grand*. Unlike the later reforming abbés of the *philosophe* period, Saint-Pierre was a man of very unworldly character and quite destitute of the Frondeur spirit.

His works were published at Amsterdam in 1738–1740 and his *Annales politiques* in London in 1757. A discussion of his principles, with a view to securing a just estimation of the high value of his political and economic ideas, is given by S. Siégler Pascal in *Un Contemporain égaré au XVIIIe siècle. Les Projets de l'abbé de Saint-Pierre, 1658–1743* (Paris, 1900).

SAINT-PIERRE, JACQUES HENRI BERNARDIN DE (1737–1814), French man of letters, was born at Havre on the 19th of January 1737. He was educated at Caen and at Rouen, and became an engineer. According to his own account he served in the army, taking part in the Hesse campaign of 1760, but was dismissed for insubordination, and, after quarrelling with his family, was in some difficulty. He appears at Malta, St Petersburg, Warsaw, Dresden, Berlin, holding brief commissions as an engineer and rejoicing in romantic adventures. But he came back to Paris in 1765 poorer than he set out. He came into possession of a small sum at his father's death, and in 1768 he set out for the Isle of France (Mauritius) with a government commission, and remained there three years, returning home in 1771. These wanderings supplied Bernardin with the whole of his stock-in-trade, for he never again quitted France. On his return from Mauritius he was introduced to D'Alembert and his friends, but he took no great pleasure in the company of any literary man except J. J. Rousseau, of whom in his last years he saw much, and on whom he formed both his character and his style. His *Voyage à l'Île de France* (2 vols., 1773) gained him a reputation as a champion of innocence and religion, and in consequence, through the exertions of the bishop of Aix, a pension of 1000 livres a year. It is the soberest and therefore the least characteristic of his books. The *Études de la nature* (3 vols., 1784) was an attempt to prove the existence of God from the wonders of nature; he set up a philosophy of sentiment to oppose the materializing tendencies of the Encyclopaedists. His masterpiece, *Paul et Virginie*, appeared in 1789 in a supplementary volume of the *Études*, and his second great success, much less sentimental and showing not a little humour, the *Chaumière indienne*, not till 1790. In 1792 he married a very young girl, Félicité Didot, who brought him a considerable dowry. For a short time in 1792 he was superintendent of the Jardin des Plantes, and on the suppression of the office received a pension of 3000 livres. In 1795 he became a member of the Institute. After his first wife's death he married in 1800, when he was sixty-three, another young girl, Désirée Pelleport, and is said to have been very happy with her. On the 21st of January 1814 he died at his house at Eragny, near Pontoise.

Paul et Virginie has been pronounced gaudy in style and unhealthy in tone. Perhaps Bernardin is not fairly to be judged by this famous story, in which the exuberant sensibility of the time finds equally exuberant expression. His merit lies in his breaking away from the arid vocabulary which more than a century of classical writing had brought upon France, in his genuine preference for the beauties of nature, and in his attempt to describe them faithfully. After Rousseau, and even more than Rousseau, Bernardin was in French literature the apostle of the return to nature, though both in him and his immediate follower Chateaubriand there is still much mannerism and unreality.

Aimé Martin, disciple of Bernardin and the second husband of his second wife, published a complete edition of his works in 18 volumes (Paris, 1818–1820), afterwards increased by seven volumes of correspondence and memoirs (1820). *Paul et Virginie*, the *Chaumière indienne*, &c., have often been separately reprinted. See also Arvède Barin's *Bernardin de Saint Pierre* (1891).

ST PIERRE and **MIQUELON**, two islands 10 m. off the south coast of Newfoundland, united area about 91 sq. m. Both are rugged masses of granite, with a few small streams and lakes, a thin covering of soil and scanty vegetation. Miquelon, the larger of the two, consists of Great Miquelon and Little Miquelon, or Langlade; previous to 1783 these were separated by a navigable channel, but they have since become connected by a dangerous mudbank. St Pierre has a sheltered harbour with about 14 ft. of water, and a good roadstead for large vessels. Their importance is due to their proximity to the great Banks, which makes them the centre of the French Atlantic fisheries. These are kept up by an elaborate system of bounties by the French government, which considers them of great importance as training sailors for the navy. Fishing lasts from May till October, and is carried on by nearly five hundred vessels, of which about two-thirds are fitted out from St Pierre, the remainder coming from St Malo, Cancale and other French coast towns. The resident population, which centres in the town of St Pierre, is about 6500, swelled to over 10,000 for a time each year by extra fishing hands from France, but is steadily declining owing to emigration into Canada. Owing to the low rates of duty, vast quantities of goods, especially French wines and liquors, are imported, and smuggled to Newfoundland, the United States and Canada, though of late years this has been checked by a gradual rise in the scale of duties, and by the presence since 1904 of a British consul. St Pierre is connected with Halifax (N.S.) and St Johns (Newfoundland) by a regular packet service, and is a station of the Anglo American Cable Co. and the *Compagnie française des câbles télégraphiques*. Excellent facilities for primary and secondary education are given, but the attraction of the fisheries prevents their being fully used.

The islands were occupied by the French in 1660, and fortified in 1700. In 1702 they were captured by the British, and held till 1763, when they were given back to France as a fishing station. They are thus the sole remnant of the French colonies in North America. Destroyed by the English in 1778, restored to France in 1783, again captured and depopulated by the English in 1793, recovered by France in 1802 and lost in 1803, the islands have remained in undisputed French possession since 1814 (Treaty of Paris).

See Henrique, *Les Colonies françaises*, t. ii. (Paris, 1889); Levasseur, *La France*, t. ii. (Paris, 1893); *L'Année coloniale*, yearly since 1899, contains statistics and a complete bibliography; P. T. McGrath in *The New England Magazine* (May 1903) describes the daily life of the people. (W. L. G.)

ST POL, COUNTS OF. The countship of St Pol-sur-Ternoise in France (department of Pas-de-Calais), belonged in the 11th and 12th centuries to a family surnamed Candavène. Elizabeth, heiress of this house, carried the countship to her husband, Gaucher de Châtillon, in 1205. By the marriage of Mahaut de Châtillon with Guy VI. of Luxemburg, St Pol passed to the house of Luxemburg. It was in possession of Louis of Luxemburg, constable of France, who was beheaded in 1475. The constable's property was confiscated by Louis XI., but was subsequently restored in 1488 to his granddaughters, Marie and Françoise of Luxemburg. Marie (d. 1542) was countess of St Pol, and married François de Bourbon, count of Vendôme. Their son, François de Bourbon, count of St Pol (1491–1545), was one of the most devoted and courageous generals of Francis I. Marie, daughter of the last-mentioned count, brought the countship of St Pol to the house of Orleans-Longueville. In 1705 Marie of Orleans sold it to Elizabeth of Lorraine-Lillebonne, widow of Louis de Melun, prince of Épinoy, and their daughter married the prince of Rohan-Soubise, who thus became count of St Pol. (M. P.*)

ST POL-DE-LÉON, a town of north-western France, in the department of Finistère, about 1 m. from the shore of the English Channel, and 13½ m. N. of Morlaix by the railway to Roscoff. Pop. (1906), town, 3353; commune, 8140. St Pol-de-Léon is a quaint town with several old houses. The cathedral is

largely in the Norman Gothic style of the 13th and early 14th centuries. The west front has a projecting portico and two towers 180 ft. high with granite spires. Within the church there are beautifully carved stalls of the 16th century and other works of art. On the right of the high altar is a wooden shrine containing the bell of St Pol de Léon, which was said to cure headache and diseases of the ear, and at the side of the main entrance is a huge baptismal font, popularly regarded as the stone coffin of Conan Mériadec, king of the Bretons. Notre Dame de Kreizker, dating mainly from the second half of the 14th century, has a celebrated spire, 252 ft. high, which crowns the central tower. The north porch is a fine specimen of the flamboyant style. In the cemetery, which has a chapel of the 15th century, there are ossuaries of the year 1500.

In the 6th century a Welsh monk, Paul, became bishop of the small town of Léon, and lord of the domain in its vicinity, which passed to his successors and was increased by them. In 1793 the town was the centre of a serious but unsuccessful rising provoked by the recruiting measures of the Convention.

SAINT PRIEST, FRANÇOIS EMMANUEL GUIGNARD, CHEVALIER, then COMTE DE (1735–1821), French statesman, was born at Grenoble on the 12th of March 1735. He was admitted a knight (*chevalier*) of the Order of Malta at five years of age, and at fifteen entered the army. He left active service in 1763 with the grade of colonel, and for the next four years represented the court of France at Lisbon. He was sent in 1768 to Constantinople, where he remained with one short interval till 1785, and married Wilhelmina von Ludolf, daughter of the Neapolitan ambassador. His *Mémoires sur l'ambassade de France en Turquie et le commerce des Français dans le Levant*, prepared during a visit to France, were only published in 1877, when they were edited by C. Schefer. After a few months spent at the court of the Hague, he joined the ministry of Necker as minister without a portfolio, and in Necker's second cabinet in 1789 was secretary of the royal household and minister of the interior. He became a special object of the popular hatred because he was alleged to have replied to women begging for bread, "You had enough while you had only one king; demand bread of your twelve hundred sovereigns." Nevertheless he held office until December 1790. Shortly after his resignation he went to Stockholm, where his brother-in-law was Austrian ambassador. In 1795 he joined the comte de Provence at Verona as minister of the household. He accompanied the exiled court to Blankenburg and Mittau, retiring in 1808 to Switzerland. After vainly seeking permission to return to France he was expelled from Switzerland, and wandered about Europe until the Restoration. Besides the memoirs already mentioned he wrote an *Examen des assemblées provinciales* (1787).

His eldest son, GUILLAUME EMMANUEL (1776–1814), became major-general in the Russian service, and served in the campaigns of Alexander I. against Napoleon. He died at Laon in 1814. The second, ARMAND EMMANUEL CHARLES (1782–1863), became civil governor of Odessa, and married Princess Sophie Galitzin. The third, EMMANUEL LOUIS MARIE GUIGNARD, vicomte de Saint Priest (1789–1881), was a godson of Marie Antoinette. Like his elder brother he took part in the invasion of France in 1814. At the Restoration he was attached to the service of the duke of Angoulême, and during the Hundred Days tried to raise Dauphiné in the royal cause. He served with distinction in Spain in 1823, when he was promoted lieutenant-general. After two years at Berlin he became French ambassador at Madrid, where he negotiated in 1828 the settlement of the Spanish debt. When the revolution of July compelled his retirement, Frederick VII. made him a grandee of Spain, with the title of duke of Almazan, in recognition of his services. He then joined the circle of the duchess of Berry at Naples, and arranged her escapade in Provence in 1832. Saint Priest was arrested, and was only released after ten months' imprisonment. Having arranged for an asylum in Austria for the duchess, he returned to Paris, where he was one of the leaders of legitimist society until his death, which occurred at Saint Priest, near Lyons, on the 26th of February 1881.

ALEXIS GUIGNARD, comte de Saint Priest (1805–1851), was the son of Armand de Saint Priest and Princess Galitzin. Educated in Russia, he returned to France with his father in 1822, and soon made his mark in literary circles. His most important works were *Histoire de la royauté considérée dans ses origines jusqu'à la formation des principales monarchies de l'Europe* (2 vols., 1842); *Histoire de la chute des Jésuites* (1844); *Histoire de la conquête de Naples* (4 vols., 1847–1848). He was elected to the Academy in January 1849. Meanwhile he had departed from the legitimist tradition of his family to become a warm friend to the Orleans monarchy, which he served between 1833 and 1838 as ambassador in Brazil, at Lisbon and at Copenhagen. He died, while on a visit to Moscow, on the 29th of September 1851.

SAINT PRIVAT, a village of Lorraine, 7 m. N.W. of Metz. The village and the slopes to the west played a great part in the battle of Gravelotte (August 18, 1870). (See METZ and FRANCO-GERMAN WAR.) At St Privat occurred the famous repulse of the Prussian Guard by Marshal Canrobert's corps.

ST QUENTIN, a manufacturing town of northern France, capital of an arrondissement in the department of Aisne, 32 m. N.N.W. of Laon by rail. Pop. (1906) 49,305. The town stands on the right bank of the Somme, at its junction with the St Quentin Canal (which unites the Somme with the Scheldt) and the Crozat Canal (which unites it with the Oise). The port carries on an active traffic in building materials, coal, timber, iron, sugar and agricultural produce. Built on a slope, with a southern exposure, the town is dominated by the collegiate church of St Quentin, one of the finest Gothic buildings in the north of France, erected during the 12th, 13th, 14th and 15th centuries. The church, which has no west façade, terminates at that end in a tower and portal of Romanesque architecture; it has double transepts. Its length is 436 ft. and the height of the nave 124 ft. The choir (13th century) has a great resemblance to that of Reims; like the chapels of the apse it is decorated with polychromic paintings. There are remains of a choir-screen of the 14th century. Under the choir is a crypt of the 11th century, rebuilt in the 13th century, and containing the tombs of St Quentin (Quintin) and his fellow-martyrs Victoricus and Gentianus. The Champs Élysées, an extensive promenade, lies east of the cathedral. The hôtel-de-ville of St Quentin is a splendid building of the 14th, 15th and 16th centuries, with a flamboyant façade, adorned with curious sculptures. The council-room is a fine hall with a double wooden ceiling and a huge chimneypiece, partly Gothic partly Renaissance. A monument commemorates the siege of 1557 (see below), and another close to the river the part played by the town in 1870 and 1871. A building of the 20th century is appropriated to the law court, the learned societies, the museum and the library. St Quentin is the seat of a sub-prefect, of tribunals of first instance and of commerce, and of a board of trade-arbitration, and has an exchange, a chamber of commerce and lycées for both sexes. The town is the centre of an industrial district which manufactures cotton and woollen fabrics. St Quentin produces chiefly piqué and window-curtains, and carries on the spinning and preliminary processes and the bleaching and finishing. Other industries are the making of embroideries by machinery and by hand, and the manufacture of iron goods and machinery. Trade is in grain, flax, cotton and wool.

St Quentin (anc. *Augusta Veromanduorum*) stood at the meeting-place of five military roads. In the 3rd century it was the scene of the martyrdom of Gaius Quintinus, who had come thither from Italy as a preacher of Christianity. The date of the foundation of the bishopric is uncertain, but about 532 it was transferred to Noyon. Towards the middle of the 7th century St Eloi (Eligius), bishop of Noyon, established a collegiate chapter at St Quentin's tomb, which became a famous place of pilgrimage. The town thus gained an importance which was increased during the middle ages by the rise of its cloth manufacture. After it had been thrice ravaged by the Normans, the town was surrounded by walls in 883. It became under Pippin, grandson of Charlemagne, one of the principal domains of the counts of Vermandois, and in 1080 received from Count Herbert IV. a charter which was extended in 1103 and is the earliest of those freely granted to the towns of northern France. From 1420 to 1471 St Quentin was occupied by the Burgundians. In 1557 it was taken by the Spaniards (see below). Philip commemorated the victory over the relieving force under the Constable Montmorency by the foundation of the Escurial. Two years later the town was restored to the French, and in 1560 it was assigned as the dowry of Mary Stuart. The

fortifications erected under Louis XIV. were demolished between 1810 and 1820. During the Franco-Prussian War St Quentin repulsed the German attacks of the 8th of October 1870; and in January 1871 it was the centre of the great battle fought by General Faidherbe (below).

1. *Battle of 1557.*—An army of Spaniards under Emmanuel Philibert of Savoy, invading France from the Meuse, joined an allied contingent of English troops under the walls of St Quentin, which was then closely besieged. Admiral Coligny threw himself on to the town, and the old Constable Montmorency prepared to relieve it. On St Lawrence's Day, 10th August, the relieving column reached the town without difficulty, but time was wasted in drawing off the garrison, for the pontoons intended to bridge the canal had marched at the tail of the column, and when brought up were mismanaged. The besiegers, recovering from their surprise, formed the plan of cutting off the retreat of the relieving army. Montmorency had thrown out the necessary protective posts, but at the point which the besiegers chose for their passage the post was composed of poor troops, who fled at the first shot. Thus, while the constable was busy with his boats, the Spanish army filed across the Bridge of Rouvroy, some distance above the town, with impunity, and Montmorency, in the hope of executing his mission without fighting, refused to allow the cavalry under the duc de Nevers to charge them, and miscalculated his time of freedom. The Spaniards, enormously superior in force, cut off and destroyed the French gendarmerie who formed the vanguard of the column, and then headed off the slow-moving infantry south of Essigny-le-Grand. Around the 10,000 French gathered some 40,000 assailants with forty-two guns. The cannon thinned their ranks, and at last the cavalry broke in and slaughtered them. Yet Coligny gallantly held St Quentin for seventeen days longer, Nevers rallied the remnant of the army and, garrisoning Péronne, Ham and other strong places, entrenched himself in front of Compiegne, and the allies, disheartened by a war of sieges and skirmishes, came to a standstill. Soon afterwards Philip, jealous of the renown of his generals and unwilling to waste his highly trained soldados in ineffective fighting, ordered the army to retreat (17th October), disbanded the temporary regiments and dispersed the permanent corps in winter quarters.

2. The *Battle of 1871* was fought between the German I. army under General von Goeben and the French commanded by General Faidherbe. The latter concentrated about St Quentin on the 18th of January, and took up a defensive position on both sides of the Somme Canal. The Germans, though inferior in numbers, were greatly superior in discipline and training, and General von Goeben boldly decided to attack both wings of the French together on the 19th. The attack took the customary enveloping form. After several hours' fighting it was brought to a standstill, but Goeben, using his reserves in masterly fashion, drove a wedge into the centre of the French line between the canal and the railway, and followed this up with another blow on the other bank of the canal, along the Ham road. This was the signal for a decisive attack by the whole of the left wing of the Germans, but the French offered strenuous resistance, and it was not until four o'clock that General Faidherbe made up his mind to retreat. By skilful dispositions and orderly movement most of his infantry and all but six of his guns were brought off safely, but a portion of the army was cut off by the victorious left wing of the Germans, and the defeat, the last act in a long-drawn-out struggle, was sufficiently decisive to deny to the defenders any hope of taking the field again without an interval of rest and reorganization. Ten days later the general armistice was signed.

SAINT-RÉAL, CÉSAR VICHARD DE (1639–1692), French historian, was born in Savoy, but educated in Paris by the Jesuits. Varillas gave him his taste for history and served as his model; he wrote hardly anything but historical novels. The only merit of his *Don Carlos* (1673) is that of having furnished Schiller with several of the speeches in his drama. In the following year he produced the *Conjuration des Espagnols contre la République de Venise en 1618*, which had a phenomenal success, but is all the same merely a literary *pastiche* in the style of Sallust. This work and his reputation as a free-thinker brought him to the notice of Hortense Mancini, duchesse de Mazarin, whose reader and friend he became, and who took him with her to England (1675). The authorship of the duchess's *Mémoires* has been ascribed to him, but without reason. Among his authentic works is included a short treatise *De la critique* (1691), directed against Andry de Boisregard's *Réflexions sur la langue françoise*. His *Œuvres complètes* were published in 3 volumes (1745); a second edition (1757) reached 8 volumes, but this is due to the inclusion of some works falsely attributed to him. Saint-Réal was, in fact, a fashionable writer of his period; the demand for him in the book-market was similar to that for Saint-Évremond, to whom he was inferior. He wrote in an easy and pleasant, but mediocre style.

See Père Lelong, *Bibliothèque historique de la France*, No. 48, 122; Barolo, *Memorie spettanti alla vita di Saint-Réal* (1780; Saint-Réal was an associate of the Academy of Turin); Sayous, *Histoire de la littérature française à l'étranger*.

ST RÉMY, a town of south-eastern France in the department of Bouches-du-Rhône, 15 m. N.E. of Arles by road. Pop. (1906), town, 3668; commune, 6148. It is prettily situated to the north of the range of hills named the Alpines or Alpilles in a valley of olive trees. The town has a modern church with a lofty 14th-century spire. About a mile to the south are Gallo-Roman relics of the ancient Glanum, destroyed about 480. They comprise a triumphal arch and a fine three-storied mausoleum of uncertain date. Near by is the old priory of St Paul-de-Mausole with an interesting church and cloister of Romanesque architecture. In the vicinity of St Rémy there are quarries of building stone, and seed-cultivation is an important industry.

ST RIQUIER, a town of northern France, in the department of Somme, 8 m. N.E. of Abbeville by rail. Pop. (1906) 1158. St Riquier (originally *Centula*) was famous for its abbey, founded about 625 by Riquier (*Richarnis*), son of the governor of the town. It was enriched by King Dagobert and prospered under the abbacy of Angilbert, son-in-law of Charlemagne. The buildings (18th century) are occupied by an ecclesiastical seminary. The church, a magnificent example of flamboyant Gothic architecture of the 15th and 16th centuries, has a richly sculptured west front surmounted by a square tower. In the interior the fine vaulting, the Renaissance font and carved stalls, and the frescoes in the treasury are especially noteworthy. The treasury, among other valuable relics, possesses a copper cross said to be the work of St Eloi (Eligius). The town has a municipal belfry of the 13th or 14th centuries. In 1536 St Riquier repulsed an attack by the Germans, the women especially distinguishing themselves. In 1544 it was burnt by the English, an event which marks the beginning of its decline.

See Hénocque, "Hist. de l'abbaye et de la ville de St Riquier," in *Mém. soc. antiq. Picardie. Documents inédits*, ix.-xi. (Paris, 1880-1888).

SAINTS, BATTLE OF THE. This battle is frequently called by the date on which it took place—the 12th of April 1782. The French know it as the battle of Dominica, near the coast of which it was fought. The Saints are small rocky islets in the channel between the islands of Dominica and Guadaloupe in the West Indies. The battle is of exceptional importance in naval history; it was by far the most considerable fought at sea in the American War of Independence, and was to Great Britain of the nature of a deliverance, since it not only saved Jamaica from a formidable attack, but after the disasters in North America went far to restore British prestige. The comte de Grasse, with 33 sail of the line, was at Fort Royal in Martinique. His aim was to effect a combination with a Spanish force from Cuba, and invade Jamaica. A British fleet (36 sail of the line), commanded by Sir George, afterwards Lord Rodney (*q.v.*), was anchored in Gros Islet Bay, Santa Lucia. On the 8th of April the British lookout frigates reported that the French were at sea, and Rodney immediately sailed in pursuit. Light and variable sea or land breezes made the movements of both fleets uncertain. Some of the ships of each might have a wind, while others were becalmed. On the 9th of April eight ships of the British van, at some distance from the bulk of their fleet, and nearly opposite the mountain called the Morne au Diable in Dominica, were attacked by fifteen of the French. The comte de Grasse, whose own ships were much scattered and partly becalmed, and who moreover was hampered by the transports carrying soldiers and stores, did not press the attack home. His chief wish was to carry his fleet through the channel between Dominica and Guadaloupe, while Rodney was anxious to force a battle. During the night of the 11th-12th the greater part of the French had cleared the channel, but a collision took place between two of their ships by which one was severely damaged. The crippled vessel was seen and pursued by four ships of the

British van. The comte de Grasse recalled all his vessels, and bore down towards the British. Rodney ordered the last of his ships to lead into action, the others following her in succession, and the detached ships falling in behind as they returned from the pursuit. The two fleets in line of battle passed one another, the French steering in a southerly, the British in a northerly direction. Both were going very slowly. Fire was opened about 8 o'clock, and by 10 o'clock the leading British ship had passed the last of the French. While the action was in progress, one of the variable winds of the coast began to blow from the south, while the northern extremities of the fleets were in an easterly breeze. Confusion was produced in both forces, and a great gap was created in the French line just ahead of the "Formidable" (100), Rodney's flagship. The captain of the fleet, Sir Charles Douglas, called his attention to the opening, and urged him to steer through it. The fighting instructions then in force made it incumbent on an admiral to preserve the order in which he began the action unchanged. Rodney hesitated to depart from the traditional order, but after a few moments of doubt accepted the suggestion. The "Formidable" was steered through the opening, followed by six of those immediately behind her. The ships towards the rear passed through the disordered French in the smoke, which was very thick, without knowing what they had done till they were beyond the enemy. About 1 o'clock the British had all either gone beyond the French or were to the east of them. The French were broken into three bodies, and were completely disordered. The comte de Grasse, in his flagship the "Ville de Paris," with five other vessels, was isolated from his van and rear. Rodney directed his attack on these six vessels, which were taken after a very gallant resistance. It was the general belief of the fleet that many more would have been captured if Rodney had pursued more vigorously, but he was content with the prizes he had taken. Two more of the French were captured by Sir Samuel Hood, afterwards Lord Hood, in the Mona Passage on the 19th of April.

See Beatson, *Naval and Military Memoirs* (London, 1804), vol. 5; and a careful analysis from the French side by Chevalier, *Histoire de la marine française pendant la guerre de l'indépendance américaine* (Paris, 1877). (D. H.)

SAINT-SAËNS, CHARLES CAMILLE (1835–), French composer, was born in Paris on the 3rd of October 1835. After having as a child taken lessons in the piano, and learned the elements of composition, he entered the Paris Conservatoire in the organ class, then presided over by Eugène Benoist, obtaining the second prize in 1849, and the first two years later. For a short time he studied composition under Halévy, and in 1852, and again in 1864, competed without success for the Grand Prix de Rome. Notwithstanding these unaccountable failures, Saint-Saëns worked indefatigably. In 1853, when only eighteen, he was appointed organist at the Church of St Merry, and from 1861 to 1877 was organist at the Madeleine, in succession to Lefébure-Wély. An overture entitled "Spartacus," which has remained unpublished, was crowned at a competition instituted in 1863 by the Société Sainte Cécile of Bordeaux. The greatest triumph of his early career was, however, attained in 1867, when the prize was unanimously awarded to him for his cantata "Les Noces de Prométhée" in the competition organized during the International Exhibition of that year—a prize competed for by over two hundred musicians.

Though he had acquired a great name as a pianist, and had made successful concert tours through Europe, he had not succeeded in reaching the ears of the larger public by the production of an opera, which in France counts for more than anything else. After the tragic events of 1870, when Saint-Saëns did his duty as a patriot by serving in the National Guard, the opportunity at last offered itself, and a one-act opera from his pen, *La Princesse jaune*, with words by Louis Gallet, was produced at the Opéra Comique with moderate success on the 12th of June 1872. *Le Timbre d'argent*, a four-act opera performed at the Théâtre Lyrique in 1877, was scarcely more successful. In the meanwhile his "symphonic poems" "Le Rouet d'Omphale," "Danse Macabre," "Phaéton" and "La Jeunesse d'Hercule" obtained for him a world-wide celebrity. These admirable examples of "programme music" count among his best known works.

At last, through the influence of Liszt, his Biblical opera *Samson et Dalila* was brought out at Weimar in 1877. This work, generally accepted as his operatic masterpiece, had been begun as far back as 1869, and an act had been heard at one of Colonne's concerts in 1875. Notwithstanding its great success at Weimar, its first performance on French soil took place at Rouen in 1890. The following year it was given in Paris at the Eden Theatre, and finally in 1892 was produced at the Grand Opéra, where it has remained one of the most attractive works of the *répertoire*. Its Biblical subject stood in the way of its being performed on the London stage until 1909, when it was given at Covent Garden with great success. None of his works is better calculated to exemplify the dual tendencies of his style. The first act, with its somewhat formal choruses, suggests the influence of Bach and Handel, and is treated rather in the manner of an oratorio. The more dramatic portions of the opera are not uninfluenced by Meyerbeer, while in the mellifluous strains allotted to the temptress there are occasional suggestions of Gounod. Of Wagner there is but little trace, save in the fact that the composer has divided his work into scenes, thus avoiding the old-fashioned denominations of "air," "duet," "trio," &c. The score, however, is not devoid of individuality. The influences mentioned above, possibly excepting that of Bach in the earlier scenes, are rather of a superficial nature, for Saint-Saëns has undoubtedly a style of his own. It is a composite style, certainly, and all the materials that go towards forming it may not be absolutely his; that is, the eclecticism of his mind may lead him at one moment to adopt an archaic form of expression, at another to employ the current musical language of his day, and sometimes to blend the two. It is perhaps in the latter case that he shows most individuality; for although his works may denote the varied influences of such totally dissimilar masters as Bach, Beethoven, Liszt and Gounod, he ever contrives to put in something of his own.

After the production of *Samson et Dalila* Saint-Saëns stood at the parting of the ways—looked at askance by the reactionary section of the French musicians, and suspected of harbouring subversive Wagnerian ideas, but ready to be welcomed by the progressive party. Both sides were doomed to disappointment, for in his subsequent operas Saint-Saëns attempted to effect a compromise between the older and the newer forms of opera. He had already entertained the idea of utilizing the history of France for operatic purposes. The first and only result of this project has been *Étienne Marcel*, an opera produced at Lyons in 1879. Although of unequal merit, owing partly to its want of unity of style, this work contains much music of an attractive kind, and scarcely deserves the neglect into which it has fallen. Forsaking the history of France he now composed his opera *Henry VIII.*, produced at the Paris Grand Opéra in 1883. The librettists had concocted a piece that was sufficiently well knit and abounded in dramatic contrasts. While adhering to his system of compromise by retaining certain conventional operatic features, Saint-Saëns had in this instance advanced somewhat by employing *leit motivs* in a more rigorous fashion than hitherto, although he had not gone so far as to discard airs cut after the old pattern, duets and quartets. *Henry VIII.*, which was given at Covent Garden in 1898, occupies an honourable place among the composer's works. *Proserpine*, a lyrical drama produced at the Paris Opéra Comique in 1887, achieved a *succès d'estime* and no more. A not much better fate befell *Ascanio*, an opera founded on Paul Meurice's drama *Benvenuto Cellini*, and brought out at the Grand Opéra in 1890. *Phryné*, however, a two-act trifle of a light description, produced at the Opéra Comique in 1893, met with success. In 1895 *Frédégonde*, an opera begun by Ernest Guiraud and completed by Saint-Saëns, was produced in Paris. The "lyrical drama" *Les Barbares*, given at the Grand Opéra in 1901, was received with marked favour.

Saint-Saëns worked successfully in every field of his art. Besides the operas above alluded to, he composed the following oratorios

and cantatas: "Oratorio de Noël," "Les Noces de Prométhée," Psalm "Coeli enarrant," "Le Déluge," "La Lyre et la harpe"; three symphonies; four symphonic poems ("Le Rouet d'Omphale," "Phaéton," "Danse Macabre," "La Jeunesse d'Hercule"); five pianoforte concertos; three violin concertos; two suites, marches, and other works for orchestra; the ballet *Zavotte*; music to the drama *Déjanire*, given at the open-air theatre of Béziers; a quintet for piano and strings, a quartet for piano and strings, two trios for piano and strings, a string quartet, a septet, violoncello sonata, two violin sonatas; a Mass, a Requiem, besides a quantity of piano and organ music, and many songs, duets and choruses. He also published three books, entitled *Harmonie et mélodie*, *Portraits et souvenirs*, and *Problèmes et mystères*, besides a volume of poems, *Rimes familières*. The honorary degree of Doctor of Music was conferred upon him by Cambridge University in 1893.

SAINTSBURY, GEORGE EDWARD BATEMAN (1845–), English man of letters, was born at Southampton on the 23rd of October 1845. He was educated at King's College School, London, and at Merton College, Oxford (B.A., 1868), and spent six years in Guernsey as senior classical master of Elizabeth College. From 1874 to 1876 he was headmaster of the Elgin Educational Institute. He began his literary career in 1875 as a critic for the *Academy*, and for ten years was actively engaged in journalism, becoming an important member of the staff of the *Saturday Review*. Some of the critical essays contributed to the literary journals were afterwards collected in his *Essays in English Literature, 1780–1860* (2 vols., 1890–1895), *Essays on French Novelists* (1891), *Miscellaneous Essays* (1892), *Corrected Impressions* (1895). His first book, *A Primer of French Literature* (1880), and his *Short History of French Literature* (1882; 6th ed., Oxford, 1901), were followed by a series of editions of French classics and of books and articles on the history of French literature, which made him the most prominent English authority on the subject. His studies in English literature were no less comprehensive, and included the valuable revision of Sir Walter Scott's edition of Dryden's *Works* (Edinburgh, 18 vols., 1882–1893), *Dryden* (1881) in the "English Men of Letters" series, *History of Elizabethan Literature* (1887), *History of Nineteenth Century Literature* (1896), *A Short History of English Literature* (1898, 3rd ed. 1903), an edition of the *Minor Caroline Poets of the Caroline Period* (2 vols., 1905–1906), a collection of rare poems of great value, and editions of English classics. He edited the series of "Periods of European Literature," contributing the volumes on *The Flourishing of Romance and the Rise of Allegory* (1897), and *The Earlier Renaissance* (1901). In 1895 he became professor of rhetoric and English literature at Edinburgh university, and subsequently produced two of his most important works, *A History of Criticism* (3 vols., 1900–1904), with the companion volume *Loci Critici, Passages Illustrative of Critical Theory and Practice* (Boston, U.S.A., and London, 1903), and *A History of English Prosody from the 12th Century to the Present Day* (i., 1906; ii., 1908; iii., 1910); also *The Later Nineteenth Century* (1909).

ST SERVAN, a town of western France, in the department of Ille-et-Vilaine, on the right bank of the Rance, south of St Malo, from which it is separated by the Anse des Sablons, a creek 1 m. wide (see ST MALO). Pop. (1906) 9765. It is not enclosed by walls, and with its new houses, straight wide streets and numerous gardens forms a contrast to its neighbour. North of the town there is a wet-dock, 27 acres in extent, forming part of the harbour of St Malo. The creek on which it opens is dry at low water, but at high water is 30 to 40 ft. deep. The dock is used chiefly by coasting and fishing vessels, a fleet starting annually for the Newfoundland cod-fisheries. Two other ports on the Rance, south-west of the town at the foot of the tower of Solidor, are of small importance. This stronghold, erected towards the close of the 14th century by John IV., duke of Brittany, for the purpose of contesting the claims to the temporal sovereignty of the town of Josselin de Rohan, bishop of St Malo, consists of three distinct towers formed into a triangle by loop-holed and machicolated curtains. To the west St Servan terminates in a peninsula on which stands the "cité," inhabited by work-people, and the "fort de la cité"; near by is a modern chapel which has replaced the cathedral of St Peter of Aleth, the seat of a bishopric from the 6th to the 12th century. The parish church is modern (1742–1842). St Servan has a communal college. It carries on steam-sawing, boat-building, rope-making and the manufacture of ship's biscuits.

The "Cité" occupies the site of the city of Aleth, which at the close of the Roman empire supplanted Corseul as the capital of the Curiosolites. Aleth was a bulwark of Druidism in those regions and was not Christianized till the 6th century, when St Malo became its first bishop. On the removal of the bishopric to St Malo Aleth declined and was almost destroyed by St Louis in 1235; the houses that remained standing became the nucleus of a new community, originating from St Malo, which placed itself under the patronage of St Servan, apostle of the Orkneys. It was not till the Revolution that St Servan became a separate commune from St Malo with a municipality and police of its own.

ST SEVER, a town of south-western France, capital of an arrondissement in the department of Landes, 11 m. S.S.W. of Mont de Marsan on the Southern railway between that town and Bayonne. Pop. (1906) town, 2508; commune, 4644. St Sever stands on an eminence on the left bank of the Adour in the district of the Chalosse. Its streets, bordered in places by old houses, are narrow and winding. The promenade of Morlanne laid out on the site of a Roman camp called Palestrion commands a fine view of the Adour and the pine forests of the Landes. The church of St Sever, a Romanesque building of the 12th century, with seven apses, once belonged to the Benedictine abbey founded in the 10th century. The public institutions of the town include the sub-prefecture, a tribunal of first instance, and a practical school of agriculture and viticulture which occupies a former Dominican convent. There is trade in the agricultural products of the Chalosse, especially geese.

SAINT-SIMON, CLAUDE DE ROUVROY, DUC DE (1607–1693), French courtier, was born in August 1607, being the second son of Louis de Rouvroi, seigneur du Plessis (d. 1643), who had been a warm supporter of Henry of Guise and the League. With his elder brother he entered the service of Louis XIII. as a page and found instant favour with the king. Named first equerry in March 1627 he became in less than three years captain of the châteaux of St Germain and Versailles, master of the hounds, first gentleman of the bed-chamber, royal councillor and governor of Meulan and of Blaye. On the fall of La Rochelle he received lands in the vicinity valued at 80,000 livres. About three years later his seigniory of Saint-Simon in Vermandois was erected into a duchy, and he was created a peer of France. He was at first on good terms with Richelieu and was of service on the Day of Dupes (11th of November 1630). Having suffered disgrace for taking the part of his uncle, the baron of Saint-Léger, after the capture of Catelet (15th of August 1636), he retired to Blaye. He fought in the campaigns of 1638 and 1639, and after the death of Richelieu returned to court, where he was coldly received by the king (18th of February 1643). Thenceforth, with the exception of siding with Condé during the Fronde, he took small part in politics. He died in Paris on the 3rd of May 1693. By his first wife, Diane de Budos de Portes, a relative of Condé, whom he married in 1644 and who died in 1670, he had three daughters. By his second wife, Charlotte de l'Aubespine, whom he married in 1672, he had a son Louis, the "author of the memoirs" (see below).

SAINT-SIMON, CLAUDE HENRI DE ROUVROY, COMTE DE (1760–1825), the founder of French socialism, was born in Paris on the 17th of October 1760. He belonged to a younger branch of the family of the duc de Saint-Simon (above). His education was directed by D'Alembert. At the age of nineteen he assisted the American colonies in their revolt against Britain. From his youth Saint-Simon felt the promptings of an eager ambition. His valet had orders to awake him every morning with the words, "Remember, monsieur le comte, that you have great things to do." Among his early schemes was one to unite the Atlantic and the Pacific by a canal, and another to construct a canal from Madrid to the sea. Although he was imprisoned in the Luxembourg during the Terror, he took no part of any importance in the Revolution, but profited by it to amass a little fortune by land speculation—not on any selfish account, however, as he said, but to facilitate his future projects.

Accordingly, when he was nearly forty years of age he went through a varied course of study and experiment, in order to enlarge and clarify his view of things. One of these experiments was an unhappy marriage—undertaken merely that he might have a salon—which, after a year's duration, was dissolved by mutual consent. The result of his experiments was that he found himself completely impoverished, and lived in penury for the remainder of his life. The first of his numerous writings, *Lettres d'un habitant de Genève*, appeared in 1802; but his early writings were mostly scientific and political. In 1817 he began in a treatise entitled *L'Industrie* to propound his socialistic views, which he further developed in *L'Organisateur* (1819), a periodical on which Augustin Thierry and Auguste Comte collaborated. The first number caused a sensation, but it brought few converts. In 1821 appeared *Du système industriel*, and in 1823–1824 *Catéchisme des industriels*. The last and most important expression of his views is the *Nouveau Christianisme* (1825), which he left unfinished. For many years before his death in 1825 (at Paris on the 19th of May), Saint-Simon had been reduced to the greatest straits. He was obliged to accept a laborious post, working nine hours a day for £40 a year, to live on the generosity of a former valet, and finally to solicit a small pension from his family. In 1823 he attempted suicide in despair. It was not till very late in his career that he attached to himself a few ardent disciples.

As a thinker Saint-Simon was entirely deficient in system, clearness and consecutive strength. But his great influence on modern thought is undeniable, both as the historic founder of French socialism and as suggesting much of what was afterwards elaborated into Comtism. Apart from the details of his socialistic teaching, which are vague and unsystematic, we find that the ideas of Saint-Simon as to the reconstruction of society are very simple. His opinions were conditioned by the French Revolution and by the feudal and military system still prevalent in France. In opposition to the destructive liberalism of the Revolution he insisted on the necessity of a new and positive reorganization of society. So far was he from advocating fresh social revolt that he appealed to Louis XVIII. to inaugurate the new order of things. In opposition, however, to the feudal and military system, the former aspect of which had been strengthened by the restoration, he advocated an arrangement by which the industrial chiefs should control society. In place of the medieval church the spiritual direction of society should fall to the men of science. What Saint-Simon desired, therefore, was an industrialist state directed by modern science in which universal association should suppress war. In short, the men who are fitted to organize society for productive labour are entitled to bear rule in it. The social aim is to produce things useful to life. The contrast between labour and capital so much emphasized by later socialism is not present to Saint-Simon, but it is assumed that the industrial chiefs, to whom the control of production is to be committed, shall rule in the interest of society. Later on the cause of the poor receives greater attention, till in his greatest work, *The New Christianity*, it takes the form of a religion. It was this development of his teaching that occasioned his final quarrel with Comte. Previous to the publication of the *Nouveau Christianisme*, Saint-Simon had not concerned himself with theology. Here he starts from a belief in God, and his object in the treatise is to reduce Christianity to its simple and essential elements. He does this by clearing it of the dogmas and other excrescences and defects which have gathered round the Catholic and Protestant forms of it. He propounds as the comprehensive formula of the new Christianity this precept—"The whole of society ought to strive towards the amelioration of the moral and physical existence of the poorest class; society ought to organize itself in the way best adapted for attaining this end." This principle became the watchword of the entire school of Saint-Simon.

During his lifetime the views of Saint-Simon had very little influence; and he left only a few devoted disciples, who continued to advocate the doctrines of their master, whom they revered as a prophet. Of these the most important were Olinde Rodrigues, the favoured disciple of Saint-Simon, and Barthélemy Prosper Enfantin (*q.v.*), who together had received Saint-Simon's last instructions. Their first step was to establish a journal, *Le Producteur*, but it was discontinued in 1826. The sect, however, had begun to grow, and before the end of 1828, had meetings not only in Paris but in many provincial towns. An important departure was made in 1828 by Amand Bazard, who gave a "complete exposition of the Saint-Simonian faith" in a long course of lectures at Paris, which were well attended. His *Exposition de la doctrine de St Simon* (2 vols., 1828–1830), which is by far the best account of it, won more adherents. The second volume was chiefly by Enfantin, who along with Bazard stood at the head of the society, but who was superior in metaphysical power, and was prone to push his deductions to extremities. The revolution of July (1830) brought a new freedom to the socialist reformers. A proclamation was issued demanding the community of goods, the abolition of the right of inheritance, and the enfranchisement of women. Early next year the school obtained possession of the *Globe* through Pierre Leroux (*q.v.*), who had joined the school, which now numbered some of the ablest and most promising young men of France, many of the pupils of the École Polytechnique having caught its enthusiasm. The members formed themselves into an association arranged in three grades, and constituting a society or family, which lived out of a common purse in the Rue Monsigny. Before long, however, dissensions began to arise in the sect. Bazard, a man of logical and more solid temperament, could no longer work in harmony with Enfantin, who desired to establish an arrogant and fantastic sacerdotalism with lax notions as to marriage and the relation of the sexes. After a time Bazard seceded and many of the strongest supporters of the school followed his example. A series of extravagant entertainments given by the society during the winter of 1832 reduced its financial resources and greatly discredited it in character. They finally removed to Ménilmontant, to a property of Enfantin, where they lived in a communistic society, distinguished by a peculiar dress. Shortly after the chiefs were tried and condemned for proceedings prejudicial to the social order; and the sect was entirely broken up (1832). Many of its members became famous as engineers, economists, and men of business.

In the school of Saint-Simon we find a great advance on the vague and confused views of the master. In the philosophy of history they recognize epochs of two kinds, the critical or negative and the organic or constructive. The former, in which philosophy is the dominating force, is characterized by war, egotism and anarchy; the latter, which is controlled by religion, is marked by the spirit of obedience, devotion, association. The two spirits of antagonism and association are the two great social principles, and on the degree of prevalence of the two depends the character of an epoch. The spirit of association, however, tends more and more to prevail over its opponent, extending from the family to the city, from the city to the nation, and from the nation to the federation. This principle of association is to be the keynote of the social development of the future. Under the present system the industrial chief exploits the proletariat, the members of which, though nominally free, must accept his terms under pain of starvation. The only remedy for this is the abolition of the law of inheritance, and the union of all the instruments of labour in a social fund, which shall be exploited by association. Society thus becomes sole proprietor, intrusting to social groups and social functionaries the management of the various properties. The right of succession is transferred from the family to the state. The school of Saint-Simon insists strongly on the claims of merit; they advocate a social hierarchy in which each man shall be placed according to his capacity and rewarded according to his works. This is, indeed, a most special and pronounced feature of the Saint-Simon socialism, whose theory of government is a kind of spiritual or scientific autocracy, degenerating into the fantastic sacerdotalism of Enfantin. With regard to the family and the relation of the sexes the school of Saint-Simon advocated the complete emancipation of woman and her entire equality with man. The "social individual" is man and woman, who are associated in the exercise of the triple function of religion, the state and the family. In its official declarations the school maintained the sanctity of the Christian law of marriage. Connected with these doctrines was their famous theory of the "rehabilitation of the flesh," deduced from the philosophic theory of the school, which was a species of Pantheism, though they repudiated the name. On this theory they rejected the dualism so much emphasized by Catholic Christianity in its penances and mortifications, and held that the body should be restored to its

due place of honour. It is a vague principle, of which the ethical character depends on the interpretation; and it was variously interpreted in the school of Saint-Simon. It was certainly immoral as held by Enfantin, by whom it was developed into a kind of sensual mysticism, a system of free love with a religious sanction.

An excellent edition of the works of Saint-Simon and Enfantin was published by the survivors of the sect (47 vols., Paris, 1865–1878). See, in addition to the works cited above, L. Reybaud, *Études sur les réformateurs contemporains* (7th edition, Paris, 1864); Paul Janet, *Saint-Simon et le Saint-Simonisme* (Paris, 1878); A. J. Booth, *Saint-Simon and Saint-Simonism* (London, 1871); Georges Weill, *Un Précurseur du socialisme, Saint-Simon et son œuvre* (Paris, 1894), and a history of the *École Saint-Simonienne*, by the same author (1896); G. Dumas, *Psychologie de deux messies positivistes St Simon et Comte* (1905); E. Levasseur's *Études sociales sous la Restauration*, contains a good section on Saint-Simon.

(T. K.; J. T. S.*)

SAINT-SIMON, LOUIS DE ROUVROY, DUC DE (1675–1755), French soldier, diplomatist and writer of memoirs, was born at Versailles on the 16th of January 1675. The peerage granted to his father, Claude de St Simon (*q.v.*), is the central fact in his history. The French peerage under the old régime was a very peculiar thing, difficult to comprehend at all, but quite certain to be miscomprehended if any analogy of the English peerage is imported into the consideration. No two things could be more different in France than ennobling a man and making him a peer. No one was made a peer who was not ennobled, but men of the noblest blood in France and representing their houses might not be, and in most cases were not, peers. Derived at least traditionally and imaginatively from the *douze pairs* of Charlemagne, the peers were supposed to represent the chosen of the noblesse, and gradually, in an indefinite and constantly disputed fashion, became associated with the parlement of Paris as a quasi-legislative (or at least law-registering) and directly judicial body. But the peerage was further complicated by the fact that not persons but the holders of certain fiefs were made peers. Strictly speaking, neither Saint-Simon nor any one else in the same case was made a peer, but his estate was raised to the rank of a *duché pairie* or a *comté pairie* as the case might be. Still the peers were in a way a standing committee representative of the entire body of nobles, and it was Saint-Simon's lifelong ideal, and at times his practical effort to convert them into a sort of great council of the nation.

His mother, Charlotte de l'Aubespine, belonged to a family not of the oldest nobility but one which had been distinguished in the public service at least since the time of Francis I. Her son Louis was well educated, to a great extent by herself, and he had had for godfather and godmother Louis XIV. and the queen. After some tuition by the Jesuits (especially by Sanadon, the editor of Horace), he joined the *mousquetaires gris* in 1692. He was present at the siege of Namur, and the battle of Neerwinden. But it was at this very time that he chose to begin the crusade of his life by instigating, if not bringing, an action on the part of the peers of France against Luxembourg, his victorious general, on a point of precedence. He fought, however, another campaign or two (not under Luxembourg), and in 1695 married Gabrielle de Durfort, daughter of the maréchal de Lorges, under whom he latterly served. He seems to have regarded her with a respect and affection not very usual between husband and wife at the time; and she sometimes succeeded in modifying his aristocratic ideas. But as he did not receive the promotion he desired he flung up his commission in 1702. Louis took a dislike to him, and it was with difficulty that he was able to keep a footing at court. He was, however, intensely interested in all the transactions of Versailles, and by dint of a most heterogeneous collection of instruments, ranging from dukes to servants, he managed to obtain the extraordinary secret information which he has handed down. His own part appears to have been entirely subordinate. He was appointed ambassador to Rome in 1705, but the appointment was cancelled before he started. At last he attached himself to the duke of Orleans and, though this was hardly likely to conciliate Louis's goodwill to him, it gave him at least the status of belonging to a definite party, and it eventually placed him in the position of tried friend to the acting chief of the state. He was able, moreover, to combine attachment to the duke of Burgundy with that to the duke of Orleans. Both attachments were no doubt all the more sincere because of his undying hatred to "the bastards," that is to say, the illegitimate sons of Louis XIV. It does not appear that this hatred was founded on moral reasons or on any real fear that these bastards would be intruded into the succession. The true cause of his wrath was that they had precedence of the peers.

The death of Louis seemed to give Saint-Simon a chance of realizing his hopes. The duke of Orleans was at once acknowledged regent, and Saint-Simon was of the council of regency. But no steps were taken to carry out his favourite vision of a France ruled by the nobles for its good, and he had little real influence with the regent. He was indeed gratified by the degradation of "the bastards," and in 1721 he was appointed ambassador to Spain to arrange for the marriage (not destined to take place) of Louis XV. and the infanta. His visit was splendid; he received the grandeeship, and, though he also caught the smallpox, he was quite satified with the business. After his return he had little to do with public affairs. His own account of the cessation of his intimacy with Orleans and Dubois, the latter of whom had never been his friend, is, like his own account of some other events of his life, obscure and rather suspicious. But there can be little doubt that he was practically ousted by the favourite. He survived for more than thirty years; but little is known of his life. His wife died in 1743, his eldest son a little later; he had other family troubles, and he was loaded with debt. When he died, at Paris on the 2nd of March 1755, he had almost entirely outlived his own generation (among whom he had been one of the youngest) and the prosperity of his house, though not its notoriety. This last was in strange fashion revived by a distant relative born five years after his own death, Claude Henri, comte de Saint-Simon (*q.v.*).

It will have been observed that the actual events of Saint-Simon's life, long as it was and high as was his position, are neither numerous nor noteworthy. He is, however, an almost unique example of a man who has acquired great literary fame entirely by posthumous publications. He was an indefatigable writer, and he began very early to set down in black and white all the gossip he collected, all his interminable legal disputes of precedence, and a vast mass of unclassified and almost unclassifiable matter. Most of his manuscripts came into the possession of the government, and it was long before their contents were published in anything like fulness. Partly in the form of notes on Dangeau's *Journal*, partly in that of original and independent memoirs, partly in scattered and multifarious tracts and disquisitions, he had committed to paper an immense amount of matter. But the mere mass of these productions is their least noteworthy feature, or rather it is most remarkable as contrasting with their character and style. Saint-Simon, though careless and sometimes even ungrammatical, ranks among the most striking memoir-writers of France, the country richest in memoirs of any in the world. His pettiness, his absolute injustice to his private enemies and to those who espoused public parties with which he did not agree, the bitterness which allows him to give favourable portraits of hardly any one, his omnivorous appetite for gossip, his lack of proportion and perspective, are all lost sight of in admiration of his extraordinary genius for historical narrative and character-drawing of a certain sort. He has been compared to Tacitus, and for once the comparison is just. In the midst of his enormous mass of writing phrases scarcely inferior to the Roman's occur frequently, and here and there are passages of sustained description equal, for intense concentration of light and life, to those of Tacitus or of any other historian. As may be expected from the vast extent of his work, it is in the highest degree unequal. But he is at the same time not a writer who can be "sampled" easily, inasmuch as his most characteristic phrases sometimes occur in the midst of long stretches of quite uninteresting matter. A few critical studies of him, especially those of Sainte-Beuve, are the basis of much, if not most, that has been written about him. Yet no one is so little to be taken at second-hand. Even his most famous passages, such as the account of the death of the dauphin or of the Bed of Justice where his enemy the duke of Maine was degraded, will not give a fair idea of his talent. These are his gallery pieces, his great "machines," as French art slang calls them. Much more noteworthy as well as more frequent are the sudden touches which he gives. The bishops are "cuistres violets"; M. de Caumartin "porte sous son manteau toute la fatuité que M. de Villeroy étale sur son baudrier"; another politician has a "mine de chat faché." In short, the interest of the *Memoirs*, independent of the large addition of positive knowledge which they make, is one of constant surprise at the novel and adroit use of word and phrase. Some of Macaulay's most brilliant portraits

and sketches of incident are adapted and sometimes almost literally translated from Saint-Simon.

The first edition of Saint-Simon (some scattered pieces may have been printed before) appeared in 1788. It was a mere selection in three volumes and was much cut down before it was allowed to appear. Next year four more volumes made their appearance, and in 1791 a new edition, still further increased. The whole, or rather not the whole, was printed in 1829–1830 and reprinted some ten years later. The real creator of Saint-Simon, as far as a full and exact text is concerned, was M. Chéruel, whose edition in 20 volumes dates from 1856, and was reissued again revised in 1872. So immense, however, is the mass of Saint-Simon's MSS. that still another recension was given by M. de Boislisle in 1882, with M. Chéruel's assistance, while a newer edition, yet once more revised from the MS., was begun in 1904. It must, however, be admitted that the matter other than the *Memoirs* is of altogether inferior interest and may be pretty safely neglected by any one but professed antiquarian and historical students. For criticism on Saint-Simon there is nothing better than Sainte-Beuve's two sketches in the 3rd and 15th volumes of the *Causeries du lundi*. The latter was written to accompany M. Chéruel's first edition. In English by far the most accurate treatment is in a Lothian prize essay by E. Cannan (Oxford and London, 1885). (G. Sa.)

ST THOMAS, an incorporated city and port of entry of Ontario, Canada, capital of Elgin county, on Kettle creek, 13 m. S. of London and 8 m. N. of Lake Erie. Pop. (1901) 11,485. It is an important station on the Grand Trunk, Michigan Central, Lake Erie & Detroit River, and Canadian Pacific railways. It has numerous schools, a collegiate institute, and Alma ladies' college. The Michigan Central railway shops, car-wheel foundry, flour, flax and planing mills are the principal industries.

ST THOMAS (São Thomé), a volcanic island in the Gulf of Guinea immediately north of the equator (0° 23′ N.) and in 6° 40′ E. With the island of Principe (Prince's Island), it forms the Portuguese province of St Thomas. From the Gabun, the nearest point of the mainland of Africa, St Thomas is distant 166 m., and from Cameroon 297 m. The extreme length of the island is 32 m. the breadth W. to E. 21 m.; the area is about 400 sq. m.

From the coast the land rises towards lofty verdant mountains (St Thomas over 7000 ft.). At least a hundred streams, great and small, descend the mountain-sides through deep-cut ravines, many of them forming beautiful waterfalls, such as those of Blu-blu on the Agua Grande. The island during its occupation by the Netherlands acquired the name of "The Dutchman's Churchyard," and the death-rate is still very high. Malaria is common in the lower regions, but the unhealthiness of the island is largely due to the absence of hygienic precautions. During the dry season (June to September) the temperature ranges in the lower parts between 66·2° and 80·6° F., and in the higher parts between 57·2° and 68°; in the rainy season it ranges between 69·8° and 89·6° in the lower parts, and between 64·4° and 80·6° in the higher parts. On Coffee Mount (2265 ft.) the mean of ten years was 68·9°, the maximum 90·5° and the minimum 47·3°. The heat is tempered by the equatorial ocean current. The rainfall is very heavy save on the north coast.

The soil is exceedingly fertile and a considerable area is densely forested. Among the products are oranges, lemons, figs, mangoes, and in the lower districts the vine, pineapple, guava and banana. The first object of European cultivation was sugar, and to this the island owed its prosperity in the 16th century; sugar has been displaced by coffee and, principally, cocoa, introduced in 1795 and 1822 respectively. In 1907 the export of cocoa (including that from Principe) was over 24,000 tons, about a sixth of the world's supply. The cocoa zone lies between 650 and 2000 ft. above the sea. Vanilla and cinchona bark both succeed well, the latter at altitudes of from 1800 to 3300 ft. Rubber, quinine, cinnamon, camphor and the kola-nut are also produced, but since 1890—when the production was under 3000 tons—cocoa has been almost exclusively grown. About 175 sq. m. were in 1910 under cultivation. The value of the imports was £175,000 in 1896 and £708,000 in 1908; that of the exports was £398,000 in 1896 and £1,760,000 in 1908. The shipping trade (190 vessels of 490,000 tons in 1908) is chiefly in the hands of the Portuguese. The revenue (1909–1910) was about £195,000, the expenditure £162,000.

At the census of 1900 the inhabitants were returned at 37,776, of whom 1012 were whites (mainly Portuguese). The town of St Thomas, capital and chief port of the province, residence of the governor and of the Curador (the legal guardian of the *serviçaes, i.e.* labourers), is situated on Chaves Bay on the N.E. coast. It is the starting-point of a railway 9 m. long, which connects with the Decauville railways on the cocoa estates. The inhabitants, apart from the Europeans, consist (1) of descendants of the original settlers, who were convicts from Portugal, slaves and others from Brazil and negroes from the Gabun and other parts of the Guinea coast. They number about 8000, are a brown-skinned, indolent race, and occupy rather than cultivate about one-eighth of the island. They are known as "natives" and use a Negro-Portuguese "lingua de S. Thomé." (2) On the south-west coast are Angolares—some 3000 in number—descendants of two hundred Angola slaves wrecked at Sete Pedras in 1544. They retain their Bunda speech and customs, and are expert fishermen and canoemen. (3) Contract labourers from Cape Verde, Kabinda, &c., and Angola. These form the bulk of the population. In 1891, before the great development of the cocoa industry, the population was only 22,000.[1]

St Thomas was discovered on the 21st of December 1470 by the Portuguese navigators João de Santarem and Pero de Escobar, who in the beginning of the following year discovered Annobom ("Good Year"). They found St Thomas uninhabited. The first attempts at colonization were João de Paiva's in 1485; but nothing permanent was accomplished till 1493, when a body of criminals and of young Jews taken from their parents to be baptized were sent to the island, and the present capital was founded by Alvaro de Carminha. In the middle of the 16th century there were over 80 sugar mills on the island, which then had a population of 50,000; but in 1567 the settlement was attacked by the French, and in 1574 the Angolares began raids which only ended with their subjugation in 1693. In 1595 there was a slave revolt; and from 1641 to 1644 the Dutch, who had plundered the capital in 1600, held possession of the island. The French did great damage in 1709; the sugar trade had passed to Brazil and internal anarchy reduced St Thomas to a deplorable state. It was not until the later half of the 19th century that prosperity began to return.

The greatly increased demand for cocoa which arose in the last decade of the century led to the establishment of many additional plantations, and a very profitable industry was developed. Planters, however, were handicapped by the scarcity of labour, for though a number of Cape Verde islanders, Krumen and Kabindas sought employment on short-term agreements, the "natives" would not work. The difficulty was met by the recruitment of indentured natives from Angola, as many as 6000 being brought over in one year. The mortality among these labourers was great, but they were very well treated on the plantations. No provision was, however, made for their repatriation, while the great majority were brought by force from remote parts of Central Africa and had no idea of the character of the agreement into which they were compelled to enter. From time to time governors of Angola endeavoured to remedy the abuses of the system, which both in Portugal and Great Britain was denounced as indistinguishable from slavery, notwithstanding that slavery had been legally abolished in the Portuguese dominions in 1878. In March 1909 certain firms, British and German, as the result of investigations made in Angola and St Thomas, refused any longer to import cocoa from St Thomas or Principe Islands unless the recruitment of labourers for the plantations was made voluntary. Representations to Portugal were made by the British government, and the Lisbon authorities stopped recruitment entirely from July 1909 to February 1910, when it was resumed under new regulations. British consular agents were stationed in Angola and St Thomas to watch the working of these regulations. (See statement by Sir E. Grey reported in *The Times*, July 2nd, 1910). As one means of obviating the difficulties encountered in Angola the recruitment of labourers from Mozambique was begun in 1908, the men going out on a yearly contract.

Principe Island lies 90 m. N.E. of St Thomas, has an area of 42 sq. m. and is also of volcanic origin. Pop. (1900) 4327. The tsetse fly (which is not found in St Thomas) infests the wooded part of the island, and through it sleeping sickness has been spread among the inhabitants. The principal industry is the cultivation of cocoa. The chief settlement is St Antonio.

See A. Negreiros, *Historia ethnographica da Ilha de S. Thomé* (Lisbon, 1895) and *Île de San Thomé* (Paris, 1901); C. Gravier "Mission scientifique à l'île de San Thomé" *Nouv. Arch. Miss. Scient.* t. xv. (Paris, 1907); A. Pinto de Miranda Guedes, "Viação em S. Thomé" in *B.S.G. Lisboa* (1902) pp. 299-357; E. de Campos

[1] According to Aug. Chevalier (in *O. Occidente*, May 20th, 1910) the population of St Thomas and Principe combined in Dec. 1909 was 68,221, the "natives" being given at over 23,000.

"S. Thomé" *B.S.G. Lisboa* (1908), pp. 113-134; W. A. Cadbury, *Labour in Portuguese West Africa* (2nd ed., London, 1910); *A ilha de S. Thomé* (Lisbon, 1907); *The Boa Entrada Plantations* (Edinburgh, 1907); and British Consular reports.

ST THOMAS, an island in the Danish West Indies. It belongs to the Virgin Island group, and lies 40 m. E. of Porto Rico, in 18° 20′ N. and 64° 55′ W. Pop. (1901) 11,012, mostly negroes. It is 13 m. long, varies in width from 1 m. to 4 m. and has an area of 33 m. It consists of a single mountain ridge, the peaks of a submerged range, culminating in West Mountain (1555 ft.). St Thomas stands on a prolongation of the range which supports the Greater Antilles, and is built up of much disintegrated eruptive rock (porphyry and granite). The climate is tropical, varying in temperature between 70° F. and 80° F., modified, however, by the sea breezes. The average yearly rainfall is about 45 in., earthquakes are not unknown, and hurricanes at times sweep over the island. The only town, Charlotte Amalie (pop. 8540), lies in the centre of the S. coast, at the head of one of the finest harbours in the West Indies. This consists of an almost land-locked basin, about ¾ m. across, varying in depth from 27 to 36 ft., and entered by a narrow channel only 300 yds. wide. It is equipped with a floating dock, which can accommodate ships up to 3000 tons, a patent slip for smaller vessels and a repairing yard. Danish is the official language, but English predominates, while French, Spanish and Dutch are also spoken. St Thomas was once the greatest distributing centre in the West Indies, but the introduction of steamships and cables led to its decline, and the removal of the Royal Mail Steamship Company's headquarters to Barbados in 1885 was the final blow. The production of sugar, which decayed gradually after the abolition of slavery, is practically extinct. Aloes, fibrous plants and fruit are grown. St Thomas is the seat of government for the Danish West Indies (St Thomas, St John and St Croix), a crown colony administered by a governor, who is assisted by a colonial council. The governor resides for half the year in St Thomas, and in St Croix for the rest. The chief importance of St Thomas lies in the fact that it is a coaling station for ships plying to and from the West Indies.

The island was discovered by Columbus in 1493, and first colonized by the Dutch in 1657. After their departure in 1667 the island came into the hands of the British, and it was held by them till 1671, when it passed into the hands of the Danish West India Company, which was succeeded in 1685 by the so-called Brandenburg Company, the shareholders of which were mainly Dutch. The king of Denmark having taken over the island in 1754, declared it a free port, and during the European wars of the 18th century the neutrality of Denmark gave a great impetus to the trade of St Thomas. It was during this period that the distributing trade of the island grew up. It was held by the British in 1801 and again from 1807 to 1815, during which it was the great rendezvous of British merchant vessels waiting for convoy. In 1867, when the islands were governed at a loss to the mother country, a treaty was concluded under which the United States agreed to buy them for 7½ million dollars, but, although the suggestion first emanated from the United States, its Senate refused to ratify the treaty. In 1902 another treaty of cession was signed by which the United States was to buy the islands for 5 million dollars, but the Danish parliament rejected it. The importance of the islands to the United States consists in their suitability as a West Indian naval base.

ST TROND, a town of Belgium in the province of Limburg about 18 m. N.W. of Liége. Pop. (1904) 15,116. It occupies an important strategical position with regard to the N.E. frontier of Belgium, and General Brialmont recommended its fortification. In the middle ages it was a fortified town belonging to the bishops of Liége, and Charles the Bold captured it in 1467. In 1566 the Assembly of Compromise met at St Trond.

SAINT-VICTOR, PAUL BINS, COMTE DE (1827–1881), known as Paul de Saint-Victor, French author, was born in Paris on the 11th of July 1827. His father Jacques B. M. Bins, comte de Saint-Victor (1772–1858), is remembered by his poem *L'Espérance*, and by an excellent verse translation of Anacreon. Saint-Victor, who ceased to use the title of count as being out of keeping with his democratic principles, began as a dramatic critic on the *Pays* in 1851, and in 1885 he succeeded Théophile Gautier on the *Presse*. In 1866 he migrated to the *Liberté*, and in 1869 joined the staff of the *Moniteur universel*. In 1870, during the last days of the second empire, he was made inspector-general of fine arts. Almost all Saint-Victor's work consists of articles, the best known being the collection entitled *Hommes et dieux* (1867). His death interrupted the publication of *Les Deux Masques*, in which the author intended to survey the whole dramatic literature of ancient and modern times. Saint-Victor's critical faculty was considerable, though rather one-sided. He owed a good deal to Théophile Gautier, but he carried ornateness to a pitch far beyond Gautier's. Saint-Victor died in Paris on the 9th of July 1881.

See also Deljant, *Paul de Saint-Victor* (1887).

ST VINCENT, JOHN JERVIS, EARL OF (1735–1823), British admiral, was the second son of Swynfen Jervis, solicitor to the admiralty, and treasurer of Greenwich hospital. He was born at Meaford in Staffordshire on the 9th of January 1735, and entered the navy on the 4th of January 1749. He became lieutenant on the 19th of February 1755, and served in that rank till 1759, taking part in the conquest of Quebec. He was made commander of the "Scorpion" sloop in 1759, and post-captain in 1760. During the peace he commanded the "Alarm" 32 in the Mediterranean, and when he was put on half pay he travelled widely in Europe, taking professional notes everywhere. While the war of American Independence lasted, he commanded the "Fourroyant" (80) in the Channel, taking part in the battle of Ushant on the 27th of July 1778 (see KEPPEL, VISCOUNT) and in the various reliefs of Gibraltar. His most signal service was the capture of the French "Pégase" (74) after a long chase on the 19th of April 1782, for which he was made K.B. In 1783 he entered parliament as member for Launceston, and in the general election of 1784 as member for Yarmouth. In politics he was a strong Whig. On the 24th of September 1787 he attained flag rank, and was promoted vice-admiral in 1793. From 1793 till 1795 he was in the West Indies co-operating with the army in the conquest of the French islands. On his return he was promoted admiral. In November 1795 he took command in the Mediterranean, where he maintained the blockade of Toulon, and aided the allies of Great Britain in Italy.

But in 1796 a great change was produced by the progress of the French armies on shore and the alliance of Spain with France. The occupation of Italy by the French armies closed all the ports to his ships, and Malta was not yet in the possession of Great Britain. Then the addition of the Spanish fleet to the French altered the balance of strength in the Mediterranean. The Spaniards were very inefficient, and Jervis would have held his ground, if one of his subordinates had not taken the extraordinary course of returning to England, because he thought that the dangerous state of the country required that all its forces should be concentrated at home. He was therefore obliged to act on the instructions sent to him and to retire to the Atlantic, withdrawing the garrisons from Corsica and other places. His headquarters were now on the coast of Portugal, and his chief duty was to watch the Spanish fleet at Cadiz. On the 14th of February 1797 he gained a most complete victory against heavy odds (see ST VINCENT, BATTLE OF). The determination to fight, and the admirable discipline of his squadron, which was very largely the fruit of his own care in preparation, supply the best proof that he was a commander of a high order. For this victory, which came at a very critical time, he was made an earl and was granted a pension of £3000. His qualities as a disciplinarian were soon to be put to a severe test. In 1797 the grievances of the sailors, which were of old standing, and had led to many mutinies of single ships, came to a head in the great general mutinies at Spithead and the Nore. Similar movements took place on the coast of Ireland and at the Cape of Good Hope (see the article NAVY: *History*). The spirit spread to the fleet under St Vincent, and there was an undoubted danger that some outbreak would take place in his command. The

peril was averted by his foresight and severity. He had always taken great care of the health of his men, and was as strict with the officers as with sailors. It must in justice be added that he was peculiarly fitted for the work. We have ample evidence from his contemporaries that he found a pleasure in insulting officers whom he disliked, as well as in hanging and flogging those of his men who offended him. He carried his strictness with his officers to an extent which aroused the actual hatred of many among them, and exasperated Sir John Orde (1751–1824) into challenging him to fight a duel. Yet he cannot be denied the honour of having raised the discipline of the navy to a higher level than it had reached before; he was always ready to promote good officers, and the efficiency of the squadron with which Nelson won the battle of the Nile was largely due to him. His health broke down under the strain of long cruising, and in June 1799 he resigned his command.

When the earl's health was restored in the following year he took the command of the Channel fleet, into which he introduced his own rigid system of discipline, to the bitter anger of the captains. But his method was fully justified by the fact that he was able to maintain the blockade of Brest for 121 days with his fleet. In 1801 he became first lord and held the office till Pitt returned to power in 1803. His administration is famous in the history of the navy, for he now applied himself to the very necessary task of reforming the corruptions of the dockyard. Naturally he was fiercely attacked in and out of parliament. His peremptory character led him to do the right thing with the maximum of dictation at Whitehall as on the quarter-deck of his flagship. He also gave an opening to his critics by devoting himself so wholly to the reform of the dockyards that he neglected the preparation of the fleet for war. He would not recognize the possibility that the peace of Amiens would not last. Pitt made himself the mouthpiece of St Vincent's enemies, mainly because he considered him as a dangerous member of the party which was weakening the position of England in the face of Napoleon. When Pitt's second ministry was formed in 1803, St Vincent refused to take the command of the Channel fleet at his request. After Pitt's death he resumed the duty with the temporary rank of admiral of the fleet in 1806, but held it only till the following year. After 1810 he retired to his house at Rochetts in Essex. The rank of admiral of the fleet was conferred on him in 1821 on the coronation of George IV., and he died on the 14th of March 1823. Lord St Vincent married his cousin Martha Parker, who died childless in 1816. There is a monument to the earl in St Paul's Cathedral, and portraits of him at different periods of his life are numerous. The earldom granted to Jervis became extinct on his death, but a viscounty, created for him in 1801, passed by special remainder to Edward Jervis Ricketts (1767–1857), the second son of his sister Mary who had married William Henry Ricketts, of Longwood, Hampshire. The 2nd viscount took the name of Jervis, and the title is still held by his descendants.

See *Life* by J. S. Tucker (2 vols.), whose father had been the admiral's secretary (marred by excessive eulogy). The life by Captain Brenton is rather inaccurate. The *Naval Career of Admiral John Markham* contains an account of the reforms in the navy. His administrations produced a swarm of pamphlets. Many mentions of him will be found in the correspondence of Nelson.

(D. H.)

ST VINCENT, one of the British Windward Islands in the West Indies, lying about 13° 15′ N., 61° 10′ W., west of Barbados and south of St Lucia. It is about 18 m. long by 11 in extreme width, and has an area of 140 sq. m. A range of volcanic hills forms the backbone of the island; their slopes and spurs are beautifully wooded, and the valleys between the spurs are fertile and picturesque. The culminating point is the volcano called the Soufrière (3500 ft.) in the north, the disastrous eruption of which in May 1902 devastated the most fertile portion of the island, a comparatively level tract lying to the north, called the Carib Country (see below). The climate of St Vincent is fairly healthy and in winter very pleasant; the average annual rainfall exceeds 100 in., and the temperature ranges from 88° F. in August to 66° in December and January. Hurricanes are not uncommon. The capital of the island is Kingstown, beautifully situated on the south-west coast near the foot of Mount St Andrew (2600 ft.).

The population of the island in 1891 was 41,054 (2445 white, 7554 coloured, 31,055 black); in 1906 it was estimated at 44,000. There were about 3300 East Indian coolies, a large number of whom were introduced in 1861 and following years, but on the expiry of their indentures mostly returned home; there were also a few Caribs of mixed blood, the majority of the aboriginal Caribs having been deported to British Honduras in 1797. Kingstown has a population of about 4000. The principal products of the island are sugar (but the sugar-industry has here, as elsewhere, undergone various vicissitudes), arrowroot and rum; and the cultivation of Sea Island cotton, introduced about 1903, has been successfully developed by the government, which established a ginnery at Kingstown. Other articles of export are cacao, cotton, spices, fruit, vegetables, live stock and poultry. The average annual value of exports in 1896–1906 was £63,157 (in 1903–1904, the year following that of the great eruption, it was £38,174, and in 1905–1906 it was £53,078) and of imports, £80,467. In 1905–1906 the value of imports from the United Kingdom was £25,471, and that of exports to the United Kingdom £24,405.

The present constitution dates from 1877, when the legislative council, consisting of four official and four nominated unofficial members, was formed. In 1899 an important scheme was entered upon, by means of a grant of £15,000 from the Imperial treasury, for settling the labouring population, distressed by the failures of the sugar industry, in the position of peasant proprietors. Estates were acquired from private owners for this purpose, and besides this a number of small holdings on crown lands (which are situated mainly in the high-lying central parts of the island) have been sold. Education is carried on in 27 state-aided schools, and there are at Kingstown a grammar school and an agricultural school. The Anglican, Wesleyan and Roman Catholic churches are well represented, and there are some Presbyterians.

St Vincent is generally stated to have been discovered on St Vincent's day, the 22nd of January 1498 by Columbus. Its Carib inhabitants, however, remained undisturbed for many years. In 1627 Charles I. granted the island to the earl of Carlisle; in 1672 it was re-granted to Lord Willoughby, having been previously (1660) declared neutral. In 1722 a further grant of the island was made, to the duke of Montague, and now for the first time a serious effort at colonization was made, but the French insisted on the maintenance of neutrality, and this was confirmed by the treaty of Aix-la-Chapelle (1748). In 1762, however, General Monckton captured the island; the treaty of Paris in 1763 confirmed the British possession, and settlement proceeded in spite of the refusal of the Caribs to admit British sovereignty. Recourse was had to arms, and in 1773 a treaty was concluded with them, when they were granted lands in the north of the island as a reserve. In 1779 the island was surrendered to the French, but it was restored to Britain by the treaty of Versailles (1783). In 1795 the Caribs rose, assisted by the French, and were only put down after considerable fighting by Sir Ralph Abercromby in 1796, after which the majority of them were deported. The emancipation of negro slaves in the island took place in 1838; in 1846 the first Portuguese labourers were introduced, and in 1861 the first East Indian coolies. St Vincent suffered from a terrific hurricane in 1780, and the Soufrière was in eruption in 1821. Severe distress was occasioned by the hurricane of the 11th of September 1898, from which the island had not recovered when it was visited by the eruption of the Soufrière in 1902. This eruption was synchronous with that of Mont Pelé in Martinique (*q.v.*). There had been signs of activity since February 1901, but the most serious eruption took place on the 6th/7th of May 1902. There were earthquakes in the following July, and further eruptions on the 3rd of September and the 15th of October, and on the 22nd of March 1903. Many sugar and arrowroot plantations were totally destroyed, and the loss of life was estimated at 2000. A Mansion House Fund was at once started in London for the relief of the sufferers, and subscriptions were sent from all parts of the civilized world, and notably from the United States.

ST VINCENT, BATTLE OF, fought on the 14th of February 1797, between the British and Spanish fleets, the most famous and important of many encounters which have taken place at the same spot. The battle of 1797 is of peculiar significance in British naval history, not only because it came at a vital moment,

but because it first revealed the full capacity of Nelson, which was well known in the navy, to all his countrymen. In the course of 1796 the Spanish government had made the disastrous alliance with the French republic, which reduced its country to the level of a pawn in the game against England. The Spanish fleet, which was in a complete state of neglect, was forced to sea. It consisted of 27 sail of the line under the command of Don José de Córdoba—fine ships, but manned in haste by drafts of soldiers, and of landsmen forced on board by the press. Even the flagships had only about eighty sailors each in their crews. Don José de Córdoba, who had gone out with no definite aim, was in reality drifting about with his unmanageable ships in two confused divisions separated from one another, in light winds from the W. and W.S.W., at a distance of from 25 to 30 m. S.W. of the Cape. While in this position he was sighted by Sir John Jervis, of whose nearness to himself he was ignorant, and who had sailed from Lisbon to attack him with only 15 sail of the line. Jervis knew the inefficient condition of the Spaniards, and was aware that the general condition of the war called for vigorous exertions. He did not hesitate to give battle in spite of the numerical superiority of his opponent. Six of the Spanish ships were to the south of him, separated by a long interval from the others which were to the south west. The British squadron was formed into a single line ahead, and was steered to pass between the two divisions of the Spaniards. The six vessels were thus cut off. A feeble attempt was made by them to molest the British, but being now to leeward as Jervis passed to the west of them, and being unable to face the rapid and well directed fire to which they were exposed, they sheered off. One only ran down the British line, and passing to the stern of the last ship succeeded in joining the bulk of her fleet to windward. As the British line passed through the gap between the Spanish divisions the ships were tacked in succession to meet the windward portion of the enemy. If this movement had been carried out fully, all the British ships would have gone through the gap and the Spaniards to windward would have been able to steer unimpeded to the north, and perhaps to avoid being brought to a close general action. Their chance of escape was baffled by the independence and promptitude of Nelson. His ship, the "Captain" (74), was the third from the end of the British line. Without waiting for orders he made a sweep to the west, threw himself across the bows of the Spaniards. His movement was seen and approved by Jervis, who then ordered the other ships in his rear to follow Nelson's example. The British force was thrown bodily on the enemy. As the Spanish crews were too utterly unpractised to handle their ships, and could not carry out the orders of their officers which they did not understand, their ships were soon driven into a herd, and fell on board of one another. Their incompetence as gunners enabled the "Captain" to assail their flagship, the huge "Santisima Trinidad" (130), with comparative impunity. The "San Josef" (112), and the "San Nicolas" (80), which fell aboard of one another, were both carried by boarding by the "Captain." Four Spanish ships, the "Salvador del Mundo" and "San Josef" (112), the "San Nicolas" (80), and the "San Isidro" (74), were taken. The "Santisima Trinidad" is said to have struck, but she was not taken possession of. By about half-past three the Spaniards were fairly beaten. More prizes might have been taken, but Sir John Jervis put a stop to the action to secure the four which had surrendered. The Spaniards were allowed to retreat to Cadiz. Sir John Jervis was made Earl St Vincent (*q.v.*) for his victory. The battle, which revealed the worthlessness of the Spanish navy, relieved the British government from a load of anxiety, and may be said to have marked the complete predominance of its fleet on the sea.

AUTHORITIES.—A very interesting account of the battle of Cape St Vincent, *A Narrative of the Proceedings of the British Fleet, &c.* (London, 1797), illustrated by plans, was published immediately afterwards by Colonel Drinkwater Bethune, author of the *History of the Siege of Gibraltar*, who was an eyewitness from the "Lively" frigate. See also James's *Naval History* (London, 1837); and Captain Mahan, *The Influence of Sea Power on the French Revolution and Empire* (London, 1892). (D. H.)

ST VITUS'S DANCE,[1] or CHOREA, a disorder of the nervous system occurring for the most part in children, and characterized mainly by involuntary jerking movements of the muscles throughout almost the entire body (see NEUROPATHOLOGY). Among the predisposing causes age is important, chorea being essentially an ailment of childhood and particularly during the period of the second dentition between the ages of nine and twelve. It is not often seen in very young children nor after puberty; but there are many exceptions. It is twice as frequent with girls as with boys. Hereditary predisposition to nervous troubles is apt to find expression in this malady, especially if the general health becomes lowered. Of exciting causes strong emotions, such as fright, ill-usage or hardship of any kind, insufficient feeding, overwork or anxiety, are among the most common: while, again, some distant source of irritation, such as teething or intestinal worms, appears capable of giving rise to an attack. It is an occasional but rare complication of pregnancy. The connexion of chorea with rheumatism is now universally recognized, and is shown not merely by its frequent occurrence before, after or during the course of attacks of rheumatic fever in young persons, but even independently of this by the liability of the heart to suffer in a similar way in the two diseases. Poynton and Paine have demonstrated a diplococcus, which they regard as the specific micro-organism of rheumatism, and which has been found in the lymph spaces in the cortex in chorea. An attempt has recently been made to demonstrate the infectious nature of the chorea.

The symptoms of St Vitus's dance sometimes develop suddenly as the result of fright, but much more frequently they come on insidiously. They are usually preceded by changes in disposition, the child becoming sad, irritable and emotional, while at the same time the general health is somewhat impaired. The first thing indicative of the disease is a certain awkwardness or fidgetiness of manner together with restlessness. In walking, too, slight dragging of one limb may be noticed. The convulsive muscular movements usually first show themselves in one part, such as an arm or a leg, and in some instances they may remain localized to that limited extent, while in all cases there is a tendency for the disorderly symptoms to be more marked on one side than on the other. When fully developed the phenomena of the disease are very characteristic. The child when standing or sitting is never still, but is constantly changing the position of the body or limbs or the facial expression in consequence of the sudden and incoordinate action of muscles or groups of them. These symptoms are aggravated when purposive movements are attempted or when the child is watched. Speech is affected both from the incoordinate movements of the tongue and from phonation sometimes taking place during an act of inspiration. The taking of food becomes a matter of difficulty, since much of it is lost in the attempts to convey it to the mouth, while swallowing is also interfered with owing to the irregular action of the pharyngeal muscles. When the tongue is protruded it comes out in a jerky manner and is immediately withdrawn, the jaws at the same time closing suddenly and sometimes with considerable force. In locomotion the muscles of the limbs act incoordinately and there is a marked alteration of the gait, which is now halting and now leaping, and the child may be tripped by one limb being suddenly jerked in front of the other. In short, the whole muscular system is deranged in its operations, and the term "insanity of the muscles" not inaptly expresses the condition, for they no longer act in harmony or with purpose, but seem, as Trousseau expresses it, each to have a will of its own. The muscles of organic life (involuntary muscles) appear scarcely,

[1] This name was originally employed in connexion with those remarkable epidemic outbursts of combined mental and physical excitement which for a time prevailed among the inhabitants of some parts of Germany in the middle ages. It is stated that sufferers from this dancing mania were wont to resort to the chapels of St Vitus (more than one in Swabia), the saint being believed to possess the power of curing them. The transference of the name to the disease now under consideration was a manifest error, but so closely has the association now become that the original application of the term has been comparatively obscured.

if at all, affected in this disease, as, for example, the heart, the rhythmic movements of which are not as a rule impaired. But the heart may suffer in other ways, especially from inflammatory conditions similar to those which attend upon rheumatism and which frequently lay the foundation of permanent heart-disease. In severe cases of St Vitus's dance the child comes to present a distressing appearance, and the physical health declines. Usually, however, there is a remission of the symptoms during sleep. The mental condition of the patient is more or less affected, as shown in emotional tendencies, irritability and a somewhat fatuous expression and bearing, but this change is in general of transient character and ceases with convalescence.

This disease occasionally assumes a very acute and aggravated form, in which the disorderly movements are so violent as to render the patient liable to be injured, and to necessitate forcible control of the limbs, or the employment of anaesthetics to produce unconsciousness. Such cases are of very grave character, if, as is common, they are accompanied with sleeplessness, and they may prove rapidly fatal by exhaustion. In the great majority of cases, however, complete recovery is to be anticipated sooner or later, the symptoms usually continuing for from one to two months, or even sometimes much longer.

The remedies proposed have been innumerable, but it is doubtful whether any of them has much control over the disease, which under suitable hygienic conditions tends to recover of itself. These conditions, however, are all-important, and embrace the proper feeding of the child with nutritious light diet, the absence of all sources of excitement and annoyance, and the rectification of any causes of irritation and of irregularities in the general health. For a time, and especially if the symptoms are severe, confinement to the house or even to bed may be necessary, but as soon as possible the child should be taken out into the open air and gently exercised by walking. Ruhräh, recognizing the importance of rest, recommends a modified Weir-Mitchell treatment. Of medicinal remedies the most serviceable appear to be zinc, arsenic and iron, especially the last two, which act as tonics to the system and improve the condition of the blood. In view of the connexion of chorea with rheumatism, Koplik and Dr D. B. Lees recommend salicylate of soda in large doses. Recently ergot, hot packs and monobromate of camphor have found advocates, while cessation of the movements has followed the application of an ether spray to the spine twice daily. As sedatives in cases of sleeplessness, bromide of potassium and chloral are of use. In long-continued cases of the disease much benefit will be obtained by a change of air as well as by the employment of moderate gymnastic exercises. The employment of massage and of electricity is also likely to be beneficial. After recovery the general health of the child should for a long time receive attention, and care should be taken to guard against excitement, excessive study or any exhausting condition, physical or mental, from the fact that the disease is apt to recur, and that other nervous disorders still more serious may be developed from it.

In the rare instances of the acute form of this malady, where the convulsive movements are unceasing and violent, the only measures available are the use of chloral or chloroform inhalation to produce insensibility and muscular relaxation, but the effect is only palliative.

SAINT-WANDRILLE, a village of north-western France, in the department of Seine-Inférieure, 28 m. W.N.W. of Rouen by rail. It is celebrated for the ruins of its Benedictine abbey. The abbey church belongs to the 13th and 14th centuries; portions of the nave walls supported by flying buttresses are standing, and the windows and vaulting of the side aisles are in fair preservation. The church communicates with a cloister, from which an interesting door of the Renaissance period opens into the refectory. Beside this entrance is a richly ornamented *lavabo* of the Renaissance period. The refectory is a room over 100 ft. long, lighted by graceful windows of the same period. The abbey was founded in the 7th century by St Wandrille, aided by the donations of Clovis II. It soon became renowned for learning and piety. In the 13th century it was burnt down, and the rebuilding was not completed till the beginning of the 16th century. Later in the same century it was practically destroyed by the Huguenots, and again the restoration was not finished for more than a hundred years. The demolition of the church was begun at the time of the Revolution, but proceeded slowly and in 1832 was entirely stopped.

SAINT YON, a family of Parisian butchers in the 14th and 15th century. Guillaume de Saint Yon is cited as the richest butcher of the Grande Boucherie in the 14th century. The family played an important rôle during the quarrels of the Armagnacs and Burgundians. They were among the leaders of the Cabochian revolution of 1413. Driven out by the Armagnacs, they recovered their influence after the return of the Burgundians to Paris in 1418, but had to flee again in 1436 when the constable, Arthur, earl of Richmond, took the city. Garnier de Saint Yon was *échevin* of Paris in 1413 and 1419; Jean de Saint Yon, his brother, was *valet de chambre* of the dauphin Louis, son of King Charles VI. Both were in the service of the king of England during the English domination. Richard de Saint Yon was master of the butchers of the Grande Boucherie in 1460.

See A. Langnon, *Paris pendant la domination anglaise* (Paris, 1878); A. Colville, *Les Cabochiens et l'ordonnance de 1413.*

ST YRIEIX, a town of west central France, capital of an arrondissement in the department of Haute-Vienne, on the left bank of the Loue, 26 m. S. of Limoges on the railway to Brive. Pop. (1906) town 3604, commune 7916. The town possesses a church in the early Gothic style known as Le Moûtier, dating from the 12th and 13th centuries, and a tower of the 12th century which is a relic of its fortifications. Its quarries of kaolin discovered in 1765 were the first known in France. The town owes its name to Aredius (popularly St Yrieix) who in the 6th century founded a monastery to which its origin was due.

SAIS (Egyptian *Sai*), an ancient city of the Egyptian Delta, lying westward of the Thermuthiac or Sebennytic branch of the Nile. It was capital of the 5th nome of Lower Egypt and must have been important from remote times. In the 8th century B.C. Sais held the hegemony of the Western Delta, while Bubastite families ruled in the east and the kings of Ethiopia in Upper Egypt. The Ethiopians found their most vigorous opponents in the Saite princes Tefnachthus and his son Bocchoris "the Wise" of the XXIVth Dynasty. After reigning six years the latter is said to have been burnt alive by Sabacon, the founder of the Ethiopian XXVth Dynasty. At the time when invasions by the Assyrians drove out the Ethiopian Taracus again and again, the chief of the twenty princes to whom Esarhaddon and Assur-bani-pal successively entrusted the government was Niku, king of Sais and Memphis. His son Psammetichus (*q.v.*) was the founder of the XXVIth Dynasty. Although the main seat of government was at Memphis, Sais remained the royal residence throughout this flourishing dynasty. Neith, the goddess of Sais, was identified with Athena, and Osiris was worshipped there in a great festival.

The brick enclosure wall of the temple is still plainly visible near the little village of Sa el hagar (Sa of stone) on the east bank of the Rosetta branch, but the royal tombs and other monuments of Sais, some of which were described by Herodotus, and its inscribed records, have all gone. Only crude brick ruins and rubbish heaps remain on the site, but a few relics conveyed to Alexandria and Europe in the Roman age have come down to our day, notably the inscribed statue of a priest of Neith who was high in favour with Psammetichus III., Cambyses and Darius. Bronze figures of deities are now the most interesting objects to be found at Sa el hagar.

(F. Ll. G.)

SAISSET, BERNARD (d. *c.* 1314), French bishop, was abbot of Saint Antonin de Pamiers in 1268. Boniface VIII., detaching the city of Pamiers from the diocese of Toulouse in 1295, made it the seat of a new bishopric and appointed Saisset to the see. Of a headstrong temperament, Saisset as abbot energetically sustained the struggle with the counts of Foix, begun two centuries before, for the lordship of the city of Pamiers, which had been shared between the counts and abbots by the feudal contract of *pariage*. The struggle ended in 1297 by an agreement between the two parties as to their common rights, and when the pope raised the excommunication incurred by the count, Saisset absolved him in the refectory of the Dominican monastery in Pamiers (1300). Saisset is, however, famous in French history for his opposition to King Philip IV. As an ardent Languedocian he hated the French, and spoke openly of the king in disrespectful terms. But when he tried to organize a general rising of the south, he was denounced to the king, perhaps by his old enemies the count of Foix and the bishop of Toulouse. Philip IV. charged Richard Leneveu, archdeacon of Auge in the diocese of Lisieux, and

Jean de Picquigni, vidame of Amiens, to make an investigation, which lasted several months. Saisset was on the point of escaping to Rome when the vidame of Amiens surprised him by night in his episcopal palace. He was brought to Senlis, and on the 24th of October 1301 appeared before Philip and his court. The chancellor, Pierre Flotte, charged him with high treason, and he was placed in the keeping of the archbishop of Narbonne, his metropolitan. Philip IV. tried to obtain from the pope the canonical degradation of Saisset. Boniface VIII., instead, ordered the king in December 1301 to free the bishop, in order that he might go to Rome to justify himself. At the same time, he sent the famous bulls *Salvator mundi*, a sort of repetition of *Clericis laicos*, and *Ausculta fili*, which opened a new stage of the quarrel between the pope and king. In the heat of the new struggle Saisset was forgotten. He had been turned over in February 1302 into the keeping of Jacques des Normands, the papal legate, and was ordered to leave the kingdom at once. He lived at Rome until after the incident at Anagni. In 1308 the king pardoned him, and restored him to his see. He died, still bishop of Pamiers, about 1314.

There is no proof for the legend that Bernard Saisset earned Philip IV.'s hatred in 1300–1301 by boldly sustaining the pope's demand for the liberation of the count of Flanders, and by publicly proclaiming the doctrine of papal supremacy.

See Dom Vaissete, *Histoire générale de Languedoc*, ed. Privat, t. ix. pp. 210-310; *Histoire littéraire de la France*, t. xxvi. pp. 540-547; E. de Rozière, *Le Passage de Pamiers*, in Bibliothèque de l'École des Chartes (1871); Ch. V. Langlois in Lavisse's *Histoire de France*, t. iii., pt. ii., pp. 142 146.

SAISSET, ÉMILE EDMOND (1814–1863), French philosopher, was born at Montpellier on the 16th of September 1814, and died at Paris on the 17th of December 1863. He studied philosophy in the school of Cousin, and carried on the eclectic tradition of his master along with Ravaisson and Jules Simon. He was professor of philosophy at Caen, at the École Normale in Paris and later at the Sorbonne.

His chief works are a monograph on Aenesidemus the Sceptic (1840); *Le Scepticisme : Ænésidème, Pascal, Kant* (1845); a translation of Spinoza (1843); *Précurseurs et disciples de Descartes* (1862); *Discours de la philosophie de Leibnitz* (1857) a work which had great influence on the progress of thought in France; *Essai de philosophie religieuse* (1859); *Critique et histoire de la philosophie* (1865).

SAKA, or SHAKA, the name of one or more tribes which invaded India from Central Asia. The word is used loosely, especially by Hindu authors, to designate all the tribes which from time to time invaded India from the north, much as all the tribes who invaded China are indiscriminately termed Tatars. Used more accurately, it denotes the tribe which invaded India 130–140 B.C. They are the Sacae and Sakai of classical authors and the Se of the Chinese, which may represent an original Sek or Sök. The Chinese annalists state that they were a pastoral people who lived in the neighbourhood of the modern Kashgar. About 160 B.C. they were driven southward by the advance of the Yue-Chi from the east. One portion appears to have settled in western Afghanistan, hence called Sakasthāna, in modern Persian Sejistan. The other section occupied the Punjab and possessed themselves of the territory which the Graeco-Bactrian kings had acquired in India, that is Sind, Gujarat and Malwa. The rulers of these provinces bore the title of Satrap (Kshatrapa or Chhatrapa) and were apparently subordinate to a king who ruled over the valley of Kabul and the Punjab. In 57 B.C. the Sakas were attacked simultaneously by Parthians from the west and by the Malava clans from the east and their power was destroyed. It should be added that what we know of Saka history is mostly derived from coins and inscriptions which admit of various interpretations and that scholars are by no means agreed as to names and dates. In any case their power, if it lasted so long, must have been swept away by the Kushan conquest of Northern India.

Nothing is known of the language or race of the Sakas. Like most of the invaders of India at this period they adopted Buddhism, at least partially. They can be traced to the neighbourhood of Kashgar, but not like the Yue-Chi to the frontiers of China. They may have been Turanians akin to that tribe, or they may have been Iranians akin to the Iranian element in Transoxiana and the districts south of the Pamirs. They cannot be the same as the Scythians of Europe, though the name and original nomadic life are points in common.

See Vincent Smith, *Early History of India* (1908); O. Franke, *Beitrage aus chinesischen Quellen zur Kenntnis der Türkvolker und Skythen* (1904); P. Gardner, *Coins of Greek and Scythian Kings in India* (1886); and various articles by Vincent Smith, Fleet, Cunningham, A. Stein, Sylvain Levi and others in the *Journal* of the Royal Asiatic Society, *Journal asiatique*, *Indian Antiquary*, *Zeitsch. der Deutschen Morgenlandischen Gesellschaft*, &c. (C. EL.)

SAKAI, an aboriginal people of the Malay peninsula found chiefly in south Perak, Selangor and Pahang. Representatives are widely scattered among Malayan villages, but these are so crossed with the Malays as to be no longer typical. An attempt has been made to identify the Sakai with the Mon-Annam group of races, *i.e.* the tribes which till 600 years ago possessed what is now Siam, and some of whom still occupy Pegu and Cambodia. Professor Virchow suggested that the Sakai belong to what he calls the Dravido-Australian race, the chief representatives of which he finds in the Veddahs of Ceylon, the civilized Tamils of south India and the aborigines of Australia. In essential characteristics of hair and head there is a remarkable agreement. The difficulty in accepting the theory is in the colour of the skin, which among the Sakais is often a light shade of yellowish brown, whereas among Tamils black is the prevailing colour. Virchow meets this by pointing out that Sinhalese, though admittedly Aryans, are often so dark as to be practically black. The Sakais are, however, it is now generally held, kinsmen of their Negrito neighbours, the Semangs (*q.v.*), and are, like the latter, dwarfish, seldom exceeding 4 ft. 9 in. Their skins are usually a darkish brown, but showing a reddish tinge about the breast and extremities. The head is long, and the hair a black brown, rather wavy than woolly. The face inclines to be long, and would be hatchet-shaped but for the breadth of the cheek bones. The chin is long and pointed, the forehead high and flat, the brows often beetling. The nose is small, slightly tilted or rounded off at the tip, but broad and with deep-set nostrils. The beard is usually scanty. The arm-stretch is almost always greater than their height. Their food is varied; the wilder tribes living on jungle fruits and game they hunt with the blow-pipe, while the more civilized grow yams, sweet potatoes, maize, sugar cane, rice and tapioca. The Sakai blow-pipe is a tube 6 to 8 ft. long formed of a single joint of a rare species of bamboo (*Bambusa Wrayi*). This tube is inserted into another for protection. The darts are made of fine slivers from the mid-rib of the leaf of certain palms, and are about the size of a knitting needle. The point is usually coated with poison compounded from the sap of the Upas tree (*Antiaris toxicaria*) and of a species of strychnos. Each dart is carried in a separate reed, thirty to fifty of these latter being rolled up and carried in a bamboo quiver. The Sakais can kill at thirty paces with these blow-pipes. They are nomads, building mere leaf-shelters in or under the trees. Their dress is of bark-cloth and they scar their faces, as do the Semangs. They are skilful in mat-making and basket-work, but they have no kind of weaving or pottery. They are musical, using a rough lute of bamboo and a nose-flute, and they sing well in chorus. They have in common with the Semangs curious marriage ceremonies. The dead are slung from a pole and carried to a distant spot in the jungle. Here, wrapped in new bark-cloth, the body is buried in a shallow trench, the clothes worn by the deceased being burned in a fire lighted near the grave. When filled up, rice is sown on the grave and watered, and some herbs and bananas are planted round it for the soul to feed on. Afterwards a three-cornered hutch, not unlike a doll's-house but mounted on high piles, is built at the foot, in which the soul may live. This soul-house is about 1½ ft. high, is thatched with leaves and has a ladder by which the soul can climb in.

SAKÉ, the national beverage of Japan. In character it stands midway between beer and wine. It is made chiefly from rice (see BREWING). Saké contains 12 to 15 % of alcohol and about 3 % of solid matter (extractives), 0·3 % of lactic

acid, a small quantity of volatile acid, 0·5 % of sugar and 0·8 % of glycerin. There are about 20,000 saké breweries in Japan, and the annual output is about 150 million gallons. Saké is a yellowish-white liquid, its flavour somewhat resembling that of madeira or sherry. It is warmed prior to consumption, as the flavour is thereby improved and it is rendered more digestible. The name is said to be derived from the town of Osaka which, from time immemorial, has been famous for its saké. According to Morewood it is probable that the wine called "sack" in England derived its name from the Japanese liquor, being introduced by Spanish and Portuguese traders (see WINE).

SAKHALIN, or SAGHALIEN, a large elongated island in the North Pacific, lying between 45° 57′ and 54° 24′ N., off the coast of the Russian Maritime Province in East Siberia, divided between the Russian and Japanese empires. Its proper Ainu name, *Karafuto* or *Karaftu*, has been restored to the island by the Japanese since 1905. Sakhalin is separated from the mainland by the narrow and shallow Strait of Tartary or Mamiya Strait, which often freezes in winter in its narrower part, and from Yezo (Japan) by the Strait of La Pérouse. The island is 600 m. long, and 16 to 105 broad, with an area of 24,560 sq. m.

Its orography and geological structure are imperfectly known. Two, or perhaps three, parallel ranges of mountains traverse it from north to south, reaching 2000 to 5000 ft. (Mt. Ichara, 4860 ft.) high, with two or more wide depressions, not exceeding 600 ft. above the sea. Crystalline rocks crop out at several capes; Cretaceous limestones, containing an abundant and specific fauna of gigantic ammonites, occur at Dui on the west coast, and Tertiary conglomerates, sandstones, marls and clays, folded by subsequent upheavals, in many parts of the island. The clays, which contain layers of good coal and an abundant fossil vegetation, show that during the Miocene period Sakhalin formed part of a continent which comprised north Asia, Alaska and Japan, and enjoyed a comparatively warm climate. The Phocene deposits contain a mollusc fauna more arctic than that which exists at the present time, indicating probably that the connexion between the Pacific and Arctic Oceans was broader than it is now. Only two rivers are worthy of mention. The Tym, 250 m. long and navigable by rafts and light boats for 50 m., flows north and north-east with numerous rapids and shallows, and enters the Sea of Okhotsk. The Poronai flows south-south-east to the Gulf of Patience or Shichiro Bay, on the south-east coast. Three other small streams enter the wide semicircular Gulf of Aniva or Higashifushimi Bay at the southern extremity of the island.

Owing to the influence of the raw, foggy Sea of Okhotsk, the climate is very cold. At Dui the average yearly temperature is only 33·0° Fahr. (January 3·4°; July 61·0°), 35·0° at Kusunai and 37·6° at Aniva (January, 9·5°; July, 60·2°). At Alexandrovsk near Dui the annual range is from 81° in July to −38° in January, while at Rykovsk in the interior the minimum is −49° Fahr. The rainfall averages 22½ in. Thick clouds for the most part shut out the sun; while the cold current from the Sea of Okhotsk, aided by north-east winds, brings immense ice-floes to the east coast in summer. The whole of the island is covered with dense forests, mostly coniferous. The Ayan spruce (*Abies ayanensis*), the Sakhalin fir (*Abies sachalensis*) and the Daurian larch are the chief trees; on the upper parts of the mountains are the Siberian rampant cedar (*Cembra pumila*) and the Kurilian bamboo (*Arundinaria kurilense*). Birch, both European and Kamchatkan (*Betula alba* and *B. Ermani*), elder, poplar, elm, wild cherry (*Prunus padus*), *Taxus baccata* and several willows are mixed with the conifers; while farther south the maple, mountain ash and oak, as also the Japanese *Panax ricinifolium*, the Amur cork (*Philodendron amurense*), the spindle tree (*Euonymus macropterus*) and the vine (*Vitis thunbergii*) make their appearance. The underwoods abound in berry-bearing plants (*e.g.* cloudberry, cranberry, crowberry, red whortleberry), berried elder (*Sambucus racemosa*), wild raspberry and *Spiraea*. Bears, foxes, otters and sables are numerous, as also the reindeer in the north, and the musk deer, hares, squirrels, rats and mice everywhere. The avi-fauna is the common Siberian, and the rivers swarm with fish, especially species of salmon (*Oncorhynchus*). Numerous whales visit the sea-coast. Sea-lions, seals and dolphins are a source of profit.

Sakhalin was inhabited in the Neolithic Stone Age. Flint implements, exactly like those of Siberia and Russia, have been found at Dui and Kusunai in great numbers, as well as polished stone hatchets, like the European ones, primitive pottery with decorations like those of Olonets and stone weights for nets. Afterwards a population to whom bronze was known left traces in earthen walls and kitchen-middens on the Bay of Aniva. The native inhabitants consist of some 2000 Gilyaks, 1300 Ainus, with 750 Orochons, 200 Tunguses and some Yakuts. The Gilyaks in the north support themselves by fishing and hunting. The Ainus inhabit the south part of the island. There are also 32,000 Russians, of whom over 22,150 are convicts. A little coal is mined and some rye, wheat, oats, barley and vegetables are grown, although the period during which vegetation can grow averages less than 100 days. Fishing is actively prosecuted, especially by the Japanese in the south.

History.—Sakhalin, which was under Chinese dominion until the 19th century, became known to Europeans from the travels of Martin Gerritz de Vries in the 17th century, and still better from those of La Pérouse (1787) and Krusenstern (1805). Both, however, regarded it as a peninsula, and were unaware of the existence of the Strait of Tartary, which was discovered in 1809 by a Japanese, Mamiya Rinzo. The Russian navigator Nevelskoi in 1849 definitively established the existence and navigability of this strait. The Russians made their first permanent settlement on Sakhalin in 1857; but the southern part of the island was held by the Japanese until 1875, when they ceded it to Russia. By the treaty of Portsmouth (U.S.A.) of 1905 the southern part of the island below 50° N. was re-ceded to Japan, the Russians retaining the other three-fifths of the area.

See C. H. Hawes, *In the Uttermost East* (London, 1903).

(P. A. K.; J. T. Be.)

SAKI, the native name of a group of tropical American monkeys nearly allied to those known as uakaris (see UAKARI), with which they agree in the forward inclination of the lower incisor teeth, the depth of the hinder part of the lower jaw, and the non-prehensile tail. The sakis, which form the genus *Pithecia*, are specially characterized by their long and generally bushy tails, distinct whiskers and beard, and the usually elongated hair on the crown of the head, which may either radiate from a point in the centre, or be divided by a median parting. They are very delicate animals, difficult to keep in confinement, and in that state exhibiting a gentle disposition, and being normally silent (see PRIMATES).

SAKURA-JIMA, a Japanese island, oval in shape and measuring 7 m. by 5 m., lying in the northern part of the Bay of Kagoshima (31° 40′ N., 130° 35′ E.). It has a volcano 3743 ft. high (of which an eruption was recorded in 1779), and is celebrated for its hot springs, its oranges and its giant radishes (*daikon*), which sometimes weigh as much as 70 lb.

SALA, GEORGE AUGUSTUS HENRY (1828–1895), English journalist, was born in London, on the 24th of November 1828. His father, Augustus John James Sala (1792–1828), was the son of Claudio Sebastiano Sala, an Italian, who came to London to arrange ballets at the theatres; his mother, Henrietta Simon (1789–1860), was an actress and teacher of singing. Sala was at school in Paris and studied drawing in London. In his earlier years he did odd jobs in scene-painting and book illustration. He wrote a tragedy in French, *Frédégonde*, before he was ten years old, and in 1851 attracted the attention of Charles Dickens, who published articles and stories by him in *Household Words* and *All the Year Round*, and in 1856 sent him to Russia as a special correspondent. About the same time he got to know Edmund Yates, with whom, in his earlier years, he was constantly connected in his journalistic ventures. From 1860 to 1886, over his own initials, he wrote "Echoes of the Week" for the *Illustrated London News*. Afterwards they were continued in a syndicate of weekly newspapers almost to his death. Thackeray, when editor of the *Cornhill*, published articles by him on Hogarth in 1860, which were issued in volume form in 1866. In 1860 he started *Temple Bar*, which he edited till 1866 when the magazine was taken over by Messrs Bentley. Meanwhile he had become in 1857 a contributor to the London *Daily Telegraph*, and it was in this capacity that he did his most characteristic work, whether as a foreign correspondent in all parts of the world, or as a writer of leaders or special articles. His literary style was highly coloured, bombastic, egotistic and full of turgid periphrases, but his articles were invariably full of interesting matter and helped to make the reputation of the paper. He collected a large library and had an elaborate system of commonplace-books, so that he could bring into his articles enough show or reality of special information to make

excellent reading for a not very critical public; he had an extraordinary faculty for never saying the same thing twice in the same way. He earned a large income from the *Telegraph* and other sources, but he never could keep his money. In 1863 he started on his first tour as special foreign correspondent to his paper. He spent the year 1864 in America and published a *Diary* of the war. Expeditions to Algiers, to Italy during Garibaldi's 1866 campaign, to Metz during the Franco-German war, to Spain in 1875 at the end of the Carlist war, were among this early journalistic enterprises, the long list of which closed with his journey through America and Australia in 1885. In 1892, when his reputation was at its height, he started a weekly paper called *Sala's Journal*, but it was a disastrous failure; and in 1895 he had to sell his library of 13,000 volumes. Lord Rosebery gave him a civil list pension of £100 a year, but he was a broken-down man, and he died at Brighton on the 8th of December 1895. Sala published many volumes of fiction, travels and essays, and edited various other works, but his *métier* was that of ephemeral journalism.

See *The Life and Adventures of George Augustus Sala, written by himself* (2 vols., 1895).

SALAAM (Arab. *salam*, "peace"), the Oriental term for a salutation. The word is used for any act of salutation, as of an ambassador to a monarch, and so in a secondary sense of a compliment. Properly it is the oral salutation of Mahommedans to each other; but it has acquired the special meaning of an act of obeisance.

SALAD (Med. Lat. *salata*, salted, pickled, *salare*, to sprinkle with salt), a dish, originally dressed with salt, of green uncooked herbs, such as lettuce, endive, mustard, cress, &c., usually served with a flavouring of onion, garlic or leeks, and with a dressing of vinegar, oil, mustard, pepper and salt, or with a cream, for which there are many receipts; hard-boiled eggs, radishes and cucumber are also added.

SALADE, SALLET or SALET, a head-piece introduced in the early 15th century replacing the heavy helmet. Its essential features are its smooth rounded surface, like an inverted bowl, and its long projecting neck guard. Usually there was no movable vizor, but the front fixed part covered most of the face, a slit being left for the eyes. The word is said to come through the Old Fr. from the Span. *celada*, Ital. *celata*, Lat. *caelata*, sc. *cassis*, engraved helmet, *caelare*, to engrave, chase (see HELMET).

SALADIN (Arab. *Sala-ud-din*, "Honouring the Faith") (1138–1193), first Ayyubite sultan of Egypt, was born at Tekrit in 1138. The brilliance of his career was only made possible by the condition of the East in the 12th century. Such authority as remained to the orthodox caliph of Bagdad (see CALIPHATE) or the heretical Fatimites (*q.v.*) of Cairo was exercised by their viziers. The Seljukian empire had, after 1076, been divided and subdivided among Turkish atabegs. The Latin kingdom of Jerusalem had existed since 1089 only because it was a united force in the midst of disintegration. Gradually, however, Christian enthusiasm had aroused a counter enthusiasm among the Moslems. Zengi, atabeg of Mosul, had inaugurated the sacred war by his campaigns in Syria (1137–1146). Nur-ed-din, his son, had continued his work by further conquests in Syria and Damascus, by the organization of his conquered lands, and, in 1157, by "publishing everywhere the Holy War." The opportunity of Saladin lay therefore in the fact that his lifetime covers the period when there was a conscious demand for political union in the defence of the Mahommedan faith. By race Saladin was a Kurd of Armenia. His father, Ayyub (Job), and his uncle Shirkuh, sons of a certain Shadhy of Ajdanakan near Dawin, were both generals in Zengi's army. In 1139 Ayyub received Baalbek from Zengi, in 1146 he moved, on Zengi's death, to the court of Damascus. In 1154 his influence secured Damascus to Nur-ed-din and he was made governor. Saladin was therefore educated in the most famous centre of Moslem learning, and represented the best traditions of Moslem culture.

His career falls into three parts, his conquests in Egypt 1164–1174, the annexation of Syria 1174–1187, and lastly the destruction of the Latin kingdom and subsequent campaigns against the Christians, 1187–1192. The conquest of Egypt was essential to Nur-ed-din. It was a menace to his empire on the south, the occasional ally of the Franks and the home of the unorthodox caliphs. His pretext was the plea of an exiled vizier, and Shirkuh was ordered to Egypt in 1164, taking Saladin as his lieutenant. The Christians under Count Amalric immediately intervened and the four expeditions which ensued in 1164, 1167, 1168 and 1169 were duels between Christians and Saracens. They resulted in heavy Christian losses, the death of Shirkuh and the appointment of Saladin as vizir. His relations towards the unorthodox caliph Nur-ed-din were marked by extraordinary tact. In 1171 on the death of the Fatimite caliph he was powerful enough to substitute the name of the orthodox caliph in all Egyptian mosques. The Mahommedan religion was thus united against Christianity. To Nur-ed-din he was invariably submissive, but from the vigour which he employed in adding to the fortifications of Cairo and the haste with which he retreated from an attack on Montréal (1171) and Kerak (1173) it is clear that he feared his lord's jealousy.

In 1174 Nur-ed-din died, and the period of Saladin's conquests in Syria begins. Nur-ed-din's vassals rebelled against his youthful heir, es-Salih, and Saladin came north, nominally to his assistance. In 1174 he entered Damascus, Emesa and Hamah; in 1175 Baalbek and the towns round Aleppo. The next step was political independence. He suppressed the name of es-Salih in prayers and on the coinage, and was formally declared sultan by the caliph 1175. In 1176 he conquered Saif-ud-din of Mosul beyond the Euphrates and was recognized as sovereign by the princes of northern Syria. In 1177 he returned by Damascus to Cairo, which he enriched with colleges, a citadel and an aqueduct. From 1177 to 1180 he made war on the Christians from Egypt, and in 1180 reduced the sultan of Konia to submission. From 1181–1183 he was chiefly occupied in Syria. In 1183 he induced the atabeg Imad-ud-din to exchange Aleppo for the insignificant Sinjar and in 1186 received the homage of the atabeg of Mosul. The last independent vassal was thus subdued and the Latin kingdom enclosed on every side by a hostile empire.

In 1187 a four years' truce was broken by the brilliant brigand Renaud de Châtillon and thus began Saladin's third period of conquest. In May he cut to pieces a small body of Templars and Hospitallers at Tiberias, and, on July 4th, inflicted a crushing defeat upon the united Christian army at Hittin. He then overran Palestine, on September 20th besieged Jerusalem and on October 2nd, after chivalrous clemency to the Christian inhabitants, crowned his victories by entering and purifying the Holy City. In the kingdom only Tyre was left to the Christians. Probably Saladin made his worst strategical error in neglecting to conquer it before winter. The Christians had thus a stronghold whence their remnant marched to attack Acre in June 1189. Saladin immediately surrounded the Christian army and thus began the famous two years' siege.

Saladin's lack of a fleet enabled the Christians to receive reinforcements and thus recover from their defeats by land. On the 8th of June 1191 Richard of England arrived, and on the 12th of July Acre capitulated without Saladin's permission. Richard followed up his victory by an admirably ordered march down the coast to Jaffa and a great victory at Arsuf. During 1191 and 1192 there were four small campaigns in southern Palestine when Richard circled round Beitnuba and Ascalon with Jerusalem as objective. In January 1192 he acknowledged his impotence by renouncing Jerusalem to fortify Ascalon. Negotiations for peace accompanied these demonstrations, which showed that Saladin was master of the situation. Though in July Richard secured two brilliant victories at Jaffa, the treaty made on the 2nd of September was a triumph for Saladin. Only the coast line was left to the Latin kingdom, with a free passage to Jerusalem; and Ascalon was demolished. The union of the Mahommedan East had beyond question dealt the death-blow to the Latin kingdom. Richard returned to Europe, and Saladin returned to Damascus, where on the 4th of March 1193,

after a few days' illness, he died. He was buried in Damascus and mourned by the whole East.

The character of Saladin and of his work is singularly vivid. In many ways he was a typical Mahommedan, fiercely hostile towards unbelievers. "Let us purge the air of the air they breathe" was his aim for the demons of the Cross,—intensely devout and regular in prayers and fasting. He showed the pride of race in the declaration that "God reserved this triumph for the Ayyubites before all others." His generosity and hospitality were proved in his gifts to Richard and his treatment of captives. He had the Oriental's power of endurance, alternating with violent and emotional courage. Other virtues were all his own, his extreme gentleness, his love for children, his flawless honesty, his invariable kindliness, his chivalry to women and the weak. Above all he typifies the Mahommedan's utter self-surrender to a sacred cause. His achievements were the inevitable expression of his character. He was not a statesman, for he left no constitution or code to the East; his empire was divided among his relatives on his death. As a strategist, though of great ability, he cannot be compared to Richard. As a general, he never organized an army. "My troops will do nothing," he confessed, "save when I ride at their head and review them." His fame lives in Eastern history as the conqueror who stemmed the tide of Western conquest on the East, and turned it definitely from East to West, as the hero who momentarily united the unruly East, and as the saint who realized in his personality the highest virtues and ideals of Mahommedanism.

AUTHORITIES.—The contemporary Arabian authorities are to be found in Michaud's *Recueil des historiens des Croisades* (Paris, 1876). This contains the work of Baha-ud-din (1145–1234), diplomatist, and secretary of Saladin, the general history of Ibn-Athir (1160–1233), the eulogist of the atabegs of Mosul but the unwilling admirer of Saladin, and parts of the general history of Abulfeda. The biography of the poet Osema ibn Murkidh (1095–1188), edited by Derenbourg (Paris, 1886), gives an invaluable picture of Eastern life. Later Arabian authorities are Ibn Khallikan (1211–1282) and Abu-Shama (born 1267). Of Christian authorities the following are important, the history of William of Tyre (1137–1185), the *Itinerarium peregrinorum*, probably the Latin version of the *Carmen Ambrosii* (ed. by Stubbs, "Rolls" series, London, 1864), and the *Chronique d'outremer*, or the French translation of William of Tyre's history and its continuation by Ernoul, the squire of Balian, seigneur of Ibelin, 1228. The best modern authority is Stanley Lane-Poole's *Saladin* ("Heroes of the Nations" series, London, 1903). See also the bibliography to CRUSADES. (W. F. K.)

SALAMANCA, a frontier province of eastern Spain, formed in 1833 out of the southern part of the ancient kingdom of Leon, and bounded on the N. by Zamora and Valladolid, E. by Ávila, S. by Cáceres and W. by Portugal. Pop. (1900) 320,765; area, 4829 sq. m. Salamanca belongs almost entirely to the basin of the Duero (Portuguese *Douro*, *q.v.*), its principal rivers being the Tormes, which follows the general slope of the province towards the north-west, and after a course of 135 m. flows into the Duero, which forms part of the north-west boundary; the Yeltes and the Agueda, also tributaries of the Duero; and the Alagon, an affluent of the Tagus. The northern part of the province is flat, and at its lowest point (on the Duero) is 488 ft. above sea-level. The southern border is partly defined along the crests of the Grédos and Gata ranges, but the highest point is La Alberca (5692 ft.) in the Sierra de Peña Francia, which rises a little farther north. The rainfall is irregular; but where it is plentiful the soil is productive and there are good harvests of wine, oil, hemp, and cereals of all kinds. Forests of oak, pine, beach and chestnut cover a wide area in the south and south-west; and timber is sent in large quantities to other parts of Spain. Sheep and cattle also find good pasturage, and out of the forty-nine Spanish provinces only Badajoz, Cáceres and Teruel have a larger number of live stock. Gold is found in the streams, and iron, lead, copper, zinc, coal and rock crystal in the hills, but the mines are only partially developed, and it is doubtful if the deposits would repay exploitation on a larger scale. The manufactures of the province are few and mostly of a low class, intended for home consumption, such as frieze, coarse cloth, hats and pottery. The capital, Salamanca (pop. 1900, 25,690), and the town of Ciudad Rodrigo (8930) are described in separate articles. Béjar (9488) is the only other town of more than 5000 inhabitants. The railways from Zamora, Medina, Plasencia and Peñaranda converge upon the capital, whence two lines go westward into Portugal—one via Barca d'Alva to Oporto, the other via Villar Formoso to Guarda. Few Spanish provinces lose so small a number of emigrants, and the population tends gradually to increase. See also LEON.

SALAMANCA (anc. *Salmantica* or *Elmantica*), the capital of the Spanish province of Salamanca, on the right bank of the river Tormes, 2648 ft. above sea-level and 172 m. by rail N.W. of Madrid. Pop. (1900) 25,690. Salamanca is the centre of a network of railways which radiate N. to Zamora, N.E. to Medina, E. to Peñaranda, S. to Plasencia, W.S.W. to Guarda in Portugal, and W. to Oporto in Portugal. The river is here crossed by a bridge 500 ft. long built on twenty-six arches, fifteen of which are of Roman origin, while the remainder date from the 16th century. The city is still much the same in outward appearance as when its tortuous streets were thronged with students. The university was naturally the chief source of wealth to the town, the population of which in the 16th century numbered 50,000, 10,000 of whom were students. Its decay of course reacted on the townsfolk, but it fortunately also arrested the process of modernization. The ravages of war alone have wrought serious damage, for the French in their defensive operations in 1811–1812 almost destroyed the western quarter. The ruins still remain, and give an air of desolation which is not borne out by the real condition of the inhabitants, however poverty-stricken they may appear. Side by side with the remains of a great past are the modern buildings: two theatres, a casino, bull-ring, town hall and electric light factory. The magnificent Plaza Mayor, built by Andres Garcia de Quiñones at the beginning of the 18th century, and capable of holding 20,000 people to witness a bull-fight, is one of the finest squares in Europe. It is surrounded by an arcade of ninety arches on Corinthian columns, one side of the square being occupied by the municipal buildings. The decorations of the façades are in the Renaissance style, and the plaza as a whole is a fine sample of Plateresque architecture.

The University.—Salamanca is still rich in educational establishments. It still keeps up its university, with the separate faculties of letters, philosophy, sciences, law and medicine; its university and provincial public library, with 80,000 volumes and 1000 MSS.; its Irish college, provincial institute, superior normal school, ecclesiastical seminary (founded in 1778), economic and other learned societies, and very many charitable foundations. The city has still its 25 parishes, 25 colleges, and as many more or less ruinous convents, and 10 yet flourishing religious houses. The university, the oldest in the Peninsula, was founded about 1230 by Alphonso IX. of Leon, and refounded in 1242 by St Ferdinand of Castile. Under the patronage of the learned Alphonso X. its wealth and reputation greatly increased (1252–1282), and its schools of canon law and civil law attracted students even from Paris and Bologna. In the 15th and 16th centuries it was renowned throughout Europe. Here Columbus, to whom a statue was erected in 1891, lectured on his discoveries, and here the Copernican system was taught long before it had won general acceptance. But soon after 1550 a period of decline set in. The university statutes were remodelled in 1757, but financial troubles and the incessant wars which checked almost every reform in Spain prevented any recovery up to 1857, when a fresh reorganization was effected. At the beginning of the 20th century the number of students was about 1200, and the number of professors 19—fewer than in any other Spanish university.

Principal Buildings.—The chief objects of interest in the city are the old and new cathedrals. The old cathedral is a cruciform building of the 12th century, begun by Bishop Jerónimo, the confessor of the Cid (*q.v.*). Its style of architecture is that Late Romanesque which prevailed in the south of France, but the builder showed much originality in the construction of the dome, which covers the crossing of the nave and transepts. The inner dome is made to spring, not from immediately above the arches, but from a higher stage of a double arcade pierced with windows. The thrust of the vaulting is borne by four massive pinnacles, and over the inner dome is an outer pointed one covered with tiles. The whole forms a most effective and graceful group. On the vault of the apse is a fresco of Our Lord in Judgment by the Italian painter Nicolas Florentino (15th century). The reredos, which has the peculiarity of fitting the curve of the apse, contains fifty-five panels with paintings mostly by the same artist. There are many fine monuments in the south transept and cloister chapels. An adjoining building, the Capilla de Talavera, is used as a chapel for service according to the Mozarabic rite, which

is celebrated there six times a year. On the north of and adjoining the old church stands the new cathedral, built from designs by Juan Gil de Ontañon. Though begun in 1509 the work of construction made little progress until 1513, when it was entrusted to Ontañon under Bishop Francisco de Bobadilla; though not finished till 1734, it is a notable example of the late Gothic and Plateresque styles. Its length is 340 ft. and its breadth 160 ft. The interior is fairly Gothic in character, but on the outside the Renaissance spirit shows itself more clearly, and is fully developed in the dome. Everywhere the attempt at mere novelty or richness results in feebleness. The main arch of the great portal consists of a simple trefoil, but the label above takes an ogee line, and the inner arches are elliptical. Above the doors are bas-reliefs, foliage, &c., which in exuberance of design and quality of workmanship are good examples of the latest efforts of Spanish Gothic. The church contains paintings by J. F. de Navarrete (1526–1579) and L. de Morales (*c.* 1509–1586), and some overrated statues by Juan de Juni (16th century). The treasury is very rich, and amongst other articles possesses a custodia which is a masterpiece of goldsmith's work, and a bronze crucifix of undoubted authenticity, which was borne before the Cid in battle. The great bell weighs over 23 tons. Of the university buildings the façade of the library is a peculiarly rich example of late 15th century Gothic. The cloisters are light and elegant; the grand staircase ascending from them has a fine balustrade of foliage and figures. The Colegio de Nobles Irlandeses, formerly Colegio de Santiago Apostol, was built in 1521 from designs by Pedro de Ibarra. The double arcaded cloister is a fine piece of work of the best period of the Renaissance. The Jesuit College is an immense and ugly Renaissance building begun in 1614 by Juan Gomez de Mora. The Colegio Viejo, also called San Bartolomé, was rebuilt in the 18th century, and now serves as the governor's palace. The convent of Santo Domingo, sometimes called San Esteban, shows a mixture of styles from the 13th century onwards. The church is Gothic with a Plateresque façade of great lightness and delicacy. It is of purer design than that of the cathedral; nevertheless it shows the tendency of the period. The reredos, one of the finest Renaissance works in Spain, contains statues by Salvador Carmona, and a curious bronze statuette of the Virgin and Child on a throne of champlevé enamel of the 12th century. The chapter-house, built by Juan Moreno in 1637, and the staircase and sacristy are good examples of later work. The convent of the Augustinas Recoletas, begun by Fontana in 1616, is in better taste than any other Renaissance building in the city. The church is rich in marble fittings and contains several fine pictures of the Neapolitan school, especially the Conception by J. Ribera (1588–1656) over the altar. The convent of the Espirita Santo has a good door by A. Berruguete (*c.* 1480–1561). There is also a rather effective portal to the convent of Las Dueñas. The church of S. Marcos is a curious circular building with three eastern apses; and the churches of S. Martin and S. Matteo have good early doorways. Many of the private houses are untouched examples of the domestic architecture of the prosperous times in which they were built. Such are the Casa de las Conchas, the finest example of its period in Spain; the Casa de la Sal, with a magnificent courtyard and sculptured gallery; and the palaces of Maldonado, Monterey and Espinosa.

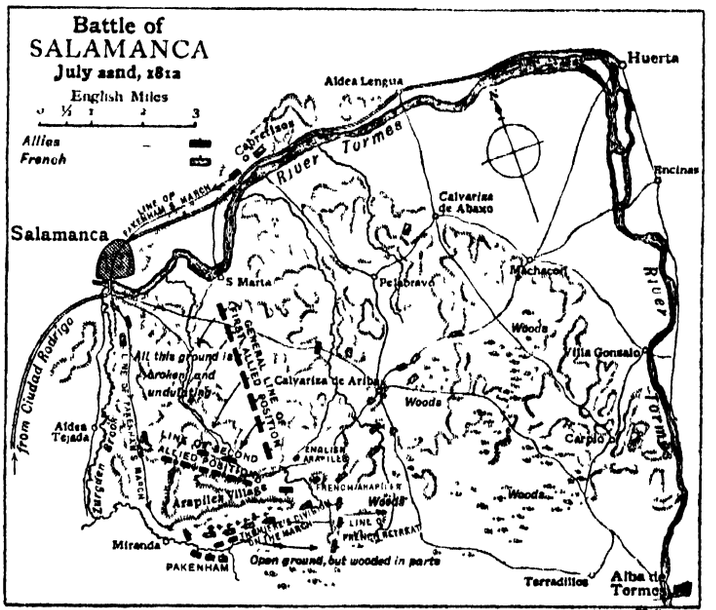
In the middle ages the trade of Salamanca was not insignificant, and the stamped leather-work produced there is still sought after. Its manufactures are now of little consequence, and consist of china, cloth and leather. The transport trade is, however, of more importance, and shows signs of increasing, as a result of the extension of railway communication between 1875 and 1900. During this period the population increased by nearly 7000.

History.—The town was of importance as early as 222 B.C., when it was captured by Hannibal from the Vettones; and it afterwards became under the Romans the ninth station on the Via Lata from Merida to Saragossa. It passed successively under the rule of the Goths and the Moors, till the latter were finally driven out about 1055. About 1100 many foreign settlers were induced by Alphonso VI. to establish themselves in the district, and the city was enlarged and adorned by Count Raymond of Burgundy and his wife, the Princess Urraca. The *Fuero de Salamanca*, a celebrated code of civil law, probably dates from about 1200. Thenceforward, until the second half of the 16th century, the prosperity of the university rendered the city one of the most important in Spain. But in 1593 the establishment of an independent bishopric at Valladolid (then the seat of the court), which had previously been subject to the see of Salamanca, dealt a serious blow to the prestige of the city; and its commerce was shattered by the expulsion of the Moriscos in 1610 and the wars of the 18th and 19th centuries.

See Villar y Macias, *Historia de Salamanca* (3 vols., Salamanca, 1887); H. Rashdall, *Universities of Europe in the Middle Ages*, vol. ii. pt. 1. (London, 1895); Lapunya, *La Universidad de Salamanca y la cultura española en el siglo XIII.* (Paris, 1900). (K. G. J.)

Battle of Salamanca, 1812. (For the operations which preceded this battle see PENINSULAR WAR.) On the 22nd of July 1812 the Allied army under Wellington (about 40,000 with 60 guns) was drawn up south of Salamanca, the left resting on the river Tormes at Santa Marta, with a division under Pakenham and some cavalry on the north bank at Cabrerizos; the right near the village of Arapiles and two hills of that name. Wellington's object was to cover Salamanca and guard his communications through Ciudad Rodrigo with Portugal. The French under Marshal Marmont (about 42,000 with 70 guns) were collecting towards Wellington's right, stretching southwards from Calvariza de Ariba. The country generally is undulating, but crossed by some marked ridges and streams.

Until the morning of the battle it had been uncertain whether Marmont wished to reach Salamanca by the right or left bank of the Tormes, or to gain the Ciudad Rodrigo road, but Wellington now felt that the latter was his real objective. At daylight there was a rush by both armies for the two commanding hills of the Arapiles; the Allies gained the northern (since termed the "English"), and the French the southern (since termed the "French") Arapiles. While Marmont was closing up his forces, a complete change of position was carried out by Wellington. Pakenham was directed to march through Salamanca, crossing the Tormes, and move under cover to a wood near Aldea Tejada, while Wellington, holding the village of Arapiles and the northern hill, took up a line with four infantry divisions, a Portuguese brigade (Bradford), a strong force of cavalry, and Don Carlos's Spanish brigade, under cover of a ridge between Arapiles and Aldea Tejada. By noon his old right had become his left, and he was nearer to the Ciudad Rodrigo road, flanking Marmont should he move towards it.



Redrawn from Maj.-Gen. C. W. Robinson's *Wellington's Campaigns*, by permission of Hugh Rees, Ltd.

It was not Wellington's wish (*Despatches*, July 21, 1812) to fight a battle "unless under very advantageous circumstances." He knew that large reinforcements were nearing the French, and, having determined to fall back towards Portugal, he began to pass his baggage along the Ciudad Rodrigo road. Marmont, about 2 P.M., seeing the dust of his baggage column, ignorant of his true position, and anxious to intercept his retreat, ordered two divisions under Maucune, the leading one of which became afterwards Thomières',[1] to push westward, while he himself attacked Arapiles. Maucune moved off, flanked by some cavalry and fifty guns, leaving a gap between him and the rest of the French. Wellington instantly took advantage of this. Directing Pakenham to attack the head of the leading French division, and a Portuguese brigade (Pack) to occupy the enemy by assaulting the south (or French) Arapiles, he prepared to bear down in strength upon Maucune's right flank. The French attack upon Arapiles was after hard fighting repulsed; and, at about 5 P.M., Maucune's force, when in confusion from the fierce attack of Pakenham and Wellington in front and flank and suffering severely, was suddenly trampled down "with a terrible clamour and disturbance" (Napier) by an irresistible charge of Le Marchant's and Anson's cavalry under Sir Stapleton Cotton. This counterstroke decided the battle, Marmont's left wing being completely broken. The French made a gallant but fruitless effort to retrieve the day, and repulsed Pack's attack upon the French Arapiles; but, as the light waned, Clausel, Marmont being wounded, drew off the French army towards Alba de Tormes and retired to Valladolid. Both armies lost heavily, the Allies about 6000, the French some 15,000 men, 12 guns, 2 eagles and several standards. The rout would have been even more thorough had not the castle and ford at Alba de

[1] Some authorities differ as to this (see *The Salamanca Campaign*, by Captain A. H. Marindin, 1906, appendix, pp. 51-59).

Tormes been evacuated by its Spanish garrison without Wellington's knowledge.

Salamanca was a brilliant victory, and followed as it was by the capture of Madrid, it severely shook the French domination in Spain. (C. W. R.)

SALAMANCA, a village in Cattaraugua county, New York, U.S.A., in the township of Salamanca, about 52 m. S. by E. of Buffalo. Pop. (1900), 4251, of whom 789 were foreign-born; (1910, census), 5792. Salamanca is served by the Erie, the Buffalo, Rochester & Pittsburg and the Pennsylvania railways, and by interurban electric lines connecting with Olean, N.Y., Bradford, Pennsylvania and Little Valley (pop. in 1905, 1225), the county seat, about 8 m. N. The village is built on both sides of the Allegany river. The agricultural and industrial development of the region has been retarded by its being within the Allegany Indian Reservation (allotted originally to the Seneca Indians by the Big Tree Treaty of 1798 and still including the valley of the Allegany river for several miles above and below Salamanca); but land is now held under a 99 year lease authorized by Congress in 1892. The village is a railway centre and division terminal, and has repair shops of the Erie and the Buffalo, Rochester & Pittsburg railways. The first settlement in the district (which was included within the "Holland Purchase" of 1792–1793) was made in 1815 near the site of West Salamanca (pop. in 1905, 558), 1½ m. W. of Salamanca, and in the same township. Salamanca (until 1873 known as East Salamanca) was incorporated in 1879, taking its name from the township, which was erected in 1854 as Buck Tooth Township and in 1862 was renamed in honour of a Spanish banker who was a large stockholder of the Atlantic & Great Western railway, built through the township this year, and later merged with the Erie railway.

See *History of Cattaraugua County, New York* (Philadelphia, Pa., 1879).

SALAMANDER. Salamanders in the restricted sense (genus *Salamandra* of N. Laurenti) are close allies of the newts, but of exclusively terrestrial habits, indicated by the shape of the tail, which is not distinctly compressed. The genus is restricted in its habitat to the western parts of the Palaearctic region and represented by four species only: the spotted salamander, *S. maculosa*, the well-known black and yellow creature inhabiting Central and Southern Europe, North-West Africa and South-Western Asia; the black salamander, *S. atra*, restricted to the Alps; *S. caucasica* from the Caucasus, and *S. luschani* from Asia Minor. Salamanders, far from being able to withstand the action of fire, as was believed by the ancients, are only found in damp places, and emerge in misty weather only or after thunderstorms, when they may appear in enormous numbers in localities where at other times their presence would not be suspected. They are usually much dreaded by country people, and although they are quite harmless to man, the large glands which are disposed very regularly on their smooth, shiny bodies, secrete a very active, milky poison which protects them from the attacks of many enemies.

The breeding habits of the two well-known European species are highly interesting. They pair on land, the male clasping the female at the arms, and the impregnation is internal. Long after pairing the female gives birth to living young. *S. maculosa*, which lives in plains or at low altitudes (up to 3000 ft.), deposits her young, ten to fifty in number, in the water, in springs or cool rivulets, and these young at birth are of small size, provided with external gills and four limbs, in every way similar to advanced newt larvae. *S. atra*, on the other hand, inhabits the Alps between 2000 and 9000 ft. altitude. Localities at such altitudes not being, as a rule, suitable for larval life in the water, the young are retained in the uterus, until the completion of the metamorphosis. Only two young, rarely three or four, are born, and they may measure as much as 50 mm. at birth, the mother measuring only 120. The uterine eggs are large and numerous, as in *S. maculosa*, but as a rule only one fully develops in each uterus, the embryo being nourished on the yolk of the other eggs, which more or less dissolve to form a large mass of nutrient matter. The embryo passes through three stages—(1) still enclosed within the egg and living on its own yolk; (2) free, within the vitelline mass, which is directly swallowed by the mouth; (3) there is no more vitelline mass, but the embryo is possessed of long external gills, which serve for an exchange of nutritive fluid through the maternal uterus, these gills functioning in the same way as the chorionic villi of the mammalian egg. Embryos in the second stage, if artificially released from the uterus, are able to live in water, in the same way as similarly developed larvae of *S. maculosa*. But the uterine gills soon wither and are shed, and are replaced by other gills differing in no respect from those of its congener.

AUTHORITIES.—Marie von Chauvin, *Zeitschr. Wiss. Zool.* xxix. (1877), p. 324; P. Kammerer, *Arch. f. Entwickel.* xvii. (1904), p. 1; Mme. Phisalix-Picot, *Recherches embryologiques, histologiques et physiologiques sur les glandes à venin de la salamandre terrestre* (Paris, 1900, 8vo.).

SALAMIS, an island of Greece in the Saronic Gulf of the Aegean Sea, extending along the coasts of Attica and Megaris, and enclosing the Bay of Eleusis between two narrow straits on the W. and S. Its area is 36 sq. m., its greatest length in any direction 10 m.; its extremely irregular shape gives rise to the modern popular name Κουλλοῦρι, *i.e.* baker's crescent. In Homer Salamis was the home of the Aeginetan prince Telamon and his sons Ajax and Teucer, and this tradition is confirmed by the position of the ancient capital of the island opposite Aegina. It subsequently passed into the hands of the Megarians, but was wrested from them about 600 B.C. by the Athenians under Solon (*q.v.*) and definitely awarded to Athens by Sparta's arbitration. Though Attic tradition claimed Salamis as an ancient possession the island was not strictly Athenian territory; a 6th-century inscription shows that it was treated either as a cleruchy or as a privileged foreign dependency. The town of Salamis was removed to an inlet of the E. coast opposite Attica. In 480 Salamis became the base of the allied Greek fleet after the retreat from Artemisium, while the Persians took their station along the Attic coast off Phalerum. Through the stratagem of the Athenian Themistocles the Greeks were enclosed in the straits by the enemy, who had wheeled by night across the entrance of the E. channel and detached a squadron to block the W. outlet. The Greeks had thus no resource but to fight, while the Persians could not utilize their superior numbers, and as they advanced into the narrow neck of the east strait were thrown into confusion. The allies, among whom the Athenians and Aeginetans were conspicuous, seized this opportunity to make a vigorous attack which probably broke the enemy's line. After waging a losing fight for several hours the Persians retreated with the loss of 200 sail and of an entire corps landed on the islet of Psyttaleia in the channel; the Greeks lost only 40 ships out of more than 300. During the Peloponnesian War Salamis served as a repository for the country stock of Attica. About 350 Salamis obtained the right of issuing copper coins. In 318 Cassander placed in it a Macedonian garrison which was finally withdrawn through the advocacy of the Achaean statesman Aratus (232). The Athenians thereupon supplanted the inhabitants by a cleruchy of their own citizens. By the 2nd century A.D. the settlement had fallen into decay. In modern times Salamis, which is chiefly peopled by Albanians, has regained importance through the transference of the naval arsenal to Ambelaki near the site of the ancient capital. Excavations in this region have revealed large numbers of late Mycenaean tombs.

AUTHORITIES.—Strabo pp. 383, 393-394; Pausanias i. 35-36; Plutarch, *Solon*, 8-10; Aeschylus, *Persae*, 337-471; Herodotus viii. 40-95; Diodorus xi. 15-19; Plutarch, *Themistocles*, 11-15; W. Goodwin, *Papers of the American School of Classical Studies at Athens*, I. p. 237 ff. (Boston, 1885); G. B. Grundy, *Great Persian War* (London, 1901), ch. ix.; B. V. Head, *Historia numorum* (Oxford, 1887), pp. 328-329; A. Wilhelm in *Athenische Mitteilungen* (1898), pp. 466-486; W. Judeich, *ibid.* (1899), pp. 321-338; C. Horner, *Quaestiones Salaminiae* (Basle, 1901); H. Raase, *Die Schlacht bei Salamis* (Rostock, 1904); R. W. Macan, Appendix to *Herodotus vii.-ix.* (London, 1908); J. Beloch in *Klio* (1908). (M. O. B. C.)

SALAMIS, the principal city of ancient Cyprus, situated on the east coast a little north of the river Pedias (Pediaeus). It had a good harbour, well situated for commerce with Phoenicia, Egypt and Cilicia, which was replaced in medieval times by Famagusta (Ammochostos), and is wholly silted now. Its trade was mainly in corn, wine and oil from the midland plain (*Mesaoria*), and in salt from the neighbouring lagoons. Traditionally, Salamis was founded after the Trojan War (*c.* 1180 B.C.) by Teucer from Salamis, the island off Attica, but there was an important Mycenaean colony somewhat earlier. The spoils of its tombs excavated in 1896 are in the British Museum.

A king Kisu of Silna (Salamis) is mentioned in a list of tributaries of Assur-bani-pal of Assyria in 668 B.C., and Assyrian influence is marked in the fine terra-cotta figures from a shrine at Toumba excavated in 1890–1891. The revolts of Greek Cyprus against Persia in 500 B.C., 386–380 B.C. and 352 B.C. were led respectively by kings Onesilaus, Evagoras (*q.v.*) and Pnytagoras, who seem to have been the principal Hellenic power in the island. In 306 Demetrius Poliorcetes won a great naval victory here over Ptolemy I. of Egypt. Under Egyptian and Roman administration Salamis flourished greatly, though under the Ptolemaic priest-kings and under Rome the seat of government was at New Paphos (see PAPHOS). But it was greatly damaged in the Jewish revolt of A.D. 116–117; it also suffered repeatedly from earthquakes, and was wholly rebuilt by Constantius II. under the name Constantia. There was a large Jewish colony in Ptolemaic and early Roman times, and a Christian community founded by Paul and Barnabas in A.D. 45–46. Barnabas was himself a Cypriote, and his reputed tomb, discovered in A.D. 477, is still shown, a little inland, near the monastery of Ai Barnâba. St Epiphanius was archbishop A.D. 367–402. The Greek city was destroyed by the Arabs under the Caliph Moawiya in 647, and does not seem to have revived. In later times the site was plundered for the building of Famagusta; it is now covered by sandhills, and its plan is imperfectly known. The market-place and a few public buildings were excavated in 1890-1891, but nothing of importance was found.

See W. H. Engel, *Kypros* (Berlin, 1841; classical allusions); J. A. R. Munro and H. A. Tubbs, *Journ. Hellenic Studies*, xii. 59 ff., 298 ff. (site and monuments); British Museum, *Excavations in Cyprus* (London, 1900; Mycenaean tombs); G. F. Hill, *Brit. Mus. Cat. Coins of Cyprus* (London, 1904; coins). (J. L. M.)

SAL AMMONIAC,[1] or AMMONIUM CHLORIDE, NH_4Cl, the earliest known salt of ammonia (*q.v.*), was formerly much used in dyeing and metallurgic operations.

The name *Hammoniacus sal* occurs in Pliny (*Nat. Hist.* xxxi. 39), who relates that it was applied to a kind of fossil salt found below the sand, in a district of Cyrenaica. The general opinion is, that the sal ammoniac of the ancients was the same as that of the moderns; but the imperfect description of Pliny is far from being conclusive. The native sal ammoniac of Bucharia, described by Model and Karsten, and analysed by M. H. Klaproth, has no resemblance to the salt described by Pliny. The same remark applies to the sal ammoniac of volcanoes. Dioscorides (v. 126), in mentioning sal ammoniac, makes use of a phrase quite irreconcilable with the description of Pliny, and rather applicable to rock-salt than to our sal ammoniac. Sal ammoniac, he says, is peculiarly prized if it can be easily split into rectangular fragments. Finally, we have no proof whatever that sal ammoniac occurs at present, either near the temple of Jupiter Ammon, or in any part of Cyrenaica. Hence we conclude that the term sal ammoniac was applied as indefinitely by the ancients as most of their other chemical terms. It may have been given to the same salt which is known to the moderns by that appellation, but was not confined to it.

In any case there can be no doubt that it was well known to the alchemists as early as the 13th century. Albertus Magnus, in his treatise *De alchymia*, informs us that there were two kinds of sal ammoniac, a natural and an artificial. The natural was sometimes white, and sometimes red; the artificial was more useful to the chemist. He does not tell us how it was prepared, but he describes the method of subliming it, which can leave no doubt that it was real sal ammoniac. In the *Opera mineralia* of Isaac Hollandus the elder, there is likewise a description of the mode of subliming sal ammoniac. Basil Valentine, in his *Currus triumphalis antimonii*, describes some of the peculiar properties of sal ammoniac in, if possible, a still less equivocal manner.

Egypt is the country where sal ammoniac was first manufactured, and from which Europe for many years was supplied with it. This commerce was first carried on by the Venetians, and afterwards by the Dutch. Nothing was known about the method employed by the Egyptians till the year 1719. In 1716 C. J. Geoffroy read a paper to the French Academy, showing that sal ammoniac must be formed by sublimation; but his opinion was opposed so violently by W. Homberg and N. Lemery, that the paper was not printed. In 1719 D. Lemaire, the French consul at Cairo, sent the Academy an account of the mode of manufacturing sal ammoniac in Egypt. The salt, it appeared, was obtained by simple sublimation from soot. In the year 1760 Linnaeus communicated to the Royal Society a correct detail of the whole process, which he had received from Dr F. Hasselquist, who had travelled in that country as a naturalist (*Phil. Trans.*, 1760, p. 504). The dung of black cattle, horses, sheep, goats, &c., which contains sal ammoniac ready formed, is collected during the first four months of the year, when the animals feed on the spring grass, a kind of clover. It is dried, and sold to the common people as fuel. The soot from this fuel is carefully collected and sold to the sal ammoniac makers, who work only during the months of March and April, for it is only at that season of the year that the dung is fit for their purpose.

The composition of this salt seems to have been first discovered by J. P. Tournefort in 1700. The experiments of C. J. Geoffroy in 1716 and 1723 were still more decisive, and those of H. L. Duhamel de Monceau, in 1735, left no doubt upon the subject. Dr Thomson first pointed out a process by synthesis, which has the advantage of being very simple, and at the same time rigidly accurate, resulting from his observation that when hydrochloric acid gas and ammonia gas are brought in contact with each other, they always combine in equal volumes.

The first attempt to manufacture sal ammoniac in Europe was made, about the beginning of the 18th century, by Mr Goodwin, a chemist of London, who appears to have used the mother ley of common salt and putrid urine as ingredients. The first successful manufacture of sal ammoniac in Great Britain was established in Edinburgh about the year 1760. It was first manufactured in France about the same time by A. Baumé. Manufactories of it were afterwards established in Germany, Holland and Flanders.

It is now obtained from the ammoniacal liquor of gas works by distilling the liquor with milk of lime and passing the ammonia so obtained into hydrochloric acid. The solution of ammonium chloride so obtained is evaporated and the crude ammonium chloride purified by sublimation. The subliming apparatus consists of two parts: (1) a hemispherical stoneware basin placed within a close-fitting iron one, or an enamelled iron basin, and (2) a hemispherical lead or stoneware lid, or dome, cemented on the top of the basin to prevent leakage. The dome has a small aperture in the top which remains open to preclude accumulation of pressure. The carefully dried crystallized salt is pressed into the basin, and, after the lid has been fitted on, is exposed to a long-lasting moderate heat. The salt volatilizes (mostly in the form of a mixed vapour of the two components, which reunite on cooling), and condenses in the dome in the form of a characteristically fibrous and tough crust.

The pure salt has a sharp saline taste and is readily soluble in water. It readily volatilizes, and if moisture be rigorously excluded, it does not dissociate, but in the presence of mere traces of water it dissociates into ammonia and hydrochloric acid (H. B. Baker, *Journ. Chem. Soc.*, 1895, 65, p. 612).

Sal ammoniac (ammonium chloride, British and United States pharmacopoeiae) as used in medicine is a white crystalline odourless powder having a saline taste. It is soluble in 1 in 3 of cold water and in 1 in 50 of 90 % alcohol. It is incompatible with carbonates of the alkalis. The dose is 5 to 20 grs. Ammonium chloride has a different action and therapeutic use from the rest of the ammonium salts. It possesses only slight influence over the heart and respiration, but it has a specific effect on mucous membranes as the elimination of the drug takes place largely through the lungs, where it aids in loosening bronchial secretions. This action renders it of the utmost value in bronchitis and pneumonia with associated bronchitis. The drug may be given in a mixture with glycerine or liquorice to cover the disagreeable taste or it may be used in a spray by means of an atomizer. The inhalation of the fumes of nascent ammonium chloride by filling the room with the gas has been recommended in foetid bronchitis. Though ammonium chloride has certain irritant properties which may disorder the stomach, yet if its mucous membrane be depressed and atonic the drug may improve its condition, and it has been used with success in gastric and intestinal catarrhs of a subacute type and is given in doses of 10 grains half an hour before meals in painful dyspepsia due to hyperacidity. It is also an intestinal and hepatic stimulant and a feeble diuretic and diaphoretic, and has been considered a specific in some forms of neuralgia.

SALARIA, VIA, an ancient highroad of Italy, which ran from Rome by Reate and Asculum to Castrum Truentinum (Porto d'Ascoli) on the Adriatic coast, a distance of 151 m. Its first portion must be of early origin, and was the route by which the Sabines came to fetch salt from the marshes at the mouth of the Tiber. Of its course through the Apennines considerable remains exist.

[1] Some derive the name sal ammoniac from Jupiter Ammon, near whose temple it is alleged to have been found; others, from a district of Cyrenaica called Ammonia. Pliny's derivation is from the sand (ἄμμος) in which it occurred.

See T. Ashby in *Papers of the British School at Rome*, iii. 3-38; N. Persichetti, *Viaggio archeologico sulla Via Salaria nel Circondario di Cittàducale* (Rome, 1893); and in *Romische Mitteilungen* (1903) 276 seq.

SALAR JUNG, SIR (1829–1883), Indian statesman of Hyderabad, born in 1829, descendant of a family which had held various appointments, first under the Adil Shahi kings of Bijapur, then under the Delhi emperors and lastly under the Nizams. While he was known to the British as Sir Salar Jung, his personal name was Mir Turab Ali, he was styled by native officials of Hyderabad the Mukhtaru 'l-Mulk, and was referred to by the general public as the Nawab Sahib. He succeeded his uncle Suraju 'l-Mulk as prime minister in 1853. The condition of the Hyderabad state was at that time a scandal to the rest of India. Salar Jung began by infusing a measure of discipline into the Arab mercenaries, the more valuable part of the Nizam's army, and employing them against the rapacious nobles and bands of robbers who had annihilated the trade of the country. He then constituted courts of justice at Hyderabad, organized the police force, constructed and repaired irrigation works, and established schools. On the outbreak of the Mutiny he supported the British, and although unable to hinder an attack on the residency, he warned the British minister that it was in contemplation. The attack was repulsed; the Hyderabad contingent remained loyal, and their loyalty served to ensure the tranquillity of the Deccan. Salar Jung took advantage of the preoccupation of the British government with the Mutiny to push his reforms more boldly, and when the Calcutta authorities were again at liberty to consider the condition of affairs his work had been carried far towards completion. During the lifetime of the Nizam Afzulu'd-dowla, Salar Jung was considerably hampered by his master's jealous supervision. When Mir Mahbub Ali, however, succeeded his father in 1869, Salar Jung, at the instance of the British government, was associated in the regency with the principal noble of the state, the Shamsu 'l-Umara or Amir Kabir, and enjoyed an increased authority. In 1876 he visited England with the object of obtaining the restoration of Berar. Although he was unsuccessful, his personal merits met with full recognition. He died of cholera at Hyderabad on the 8th of February 1883. He was created G.C.S.I. on the 28th of May 1870, and received the honorary degree of D.C.L. from the University of Oxford on the 21st of June 1876. His grandson enjoyed an estate of 1486 sq. m., yielding an income of nearly £60,000.

See *Memoirs of Sir Salar Jung*, by his private secretary, Syed Hossain Bilgrami, 1883.

SALARY, a payment for services rendered, usually a stipulated sum paid monthly, quarterly, half-yearly or yearly, and for a permanent or lengthy term of employment. It is generally contrasted with "wages," a term applied to weekly or daily payment for manual services. As laid down by Bowen, L. J., *In re Shine* (1892) 1 Q.B. 529, "Salary means a definite payment for personal services under some contract and computed by time." The Latin *salarium* meant originally salt money (Lat. *sal*, salt), *i.e.* the sum paid to soldiers for salt. In post-Augustan Latin the word was applied to any allowance, pension or stipend.

SALAS, or SAN MARTIN DE SALAS, a town of southern Spain, in the province of Oviedo; on the road from Tineo to Grado, and on a small sub-tributary of the river Narcea. Pop. (1900), 17,147. The official total of the inhabitants includes not only the actual residents in the town, but also the population of the district of Salas, a mountainous region in which coal-mining and agriculture are the principal industries. The products of this region are sent for export to Cudillero, a small harbour on the Bay of Biscay.

SALAS BARBADILLO, ALONSO JERÓNIMO DE (*c.* 1580–1635), Spanish novelist and playwright, born at Madrid about 1580, and educated at Alcalá de Henares and Valladolid. His first work, *La Patrona de Madrid restituida* (1609), is a dull devotional poem, which forms a strange prelude to *La Hija de Celestina* (1612), a malicious transcription of picaresque scenes reprinted under the title of *La Ingeniosa Elena*. This was followed by a series of similar tales and plays, the best of which are *El Cavallero puntual* (1614), *La Casa de placer honesto* (1620), *Don Diego de Noche* (1623) and a most sparkling satirical volume of character-sketches, *El Curioso y Sabio Alexandro* (1634). He died in poverty at Madrid on the 10th of July 1635. Some of his works were translated into English and French, and Scarron's *Hypocrites* is based on *La Ingeniosa Elena*; he deserved the vogue which he enjoyed till late in the 17th century, for his satirical humour, versatile invention and pointed style are an effective combination.

SALDANHA BAY, an inlet on the south-western coast of South Africa, 63 m. by sea N. by W. of Cape Town, forming a land-locked harbour. The northern part of the inlet is known as Hoetjes Bay. It has accommodation for a large fleet with deep water close inshore, but the arid nature of the country caused it to be neglected by the early navigators, and with the growth of Cape Town Saldanha Bay was rarely visited. Considerable deposits of freestone in the neighbourhood attracted attention during the later 19th century. Proposals were also made to create a port which could be supplied by water from the Berg river, 20 m. distant. From Kalabas Kraal on the Cape Town-Clanwilliam railway, a narrow gauge line runs via Hopefield to Hoetjes Bay—126 m. from Cape Town.

Saldanha Bay is so named after Antonio de Saldanha, captain of a vessel in Albuquerque's fleet which visited South Africa in 1503. The name was first given to Table Bay, where Saldanha's ship cast anchor. On Table Bay being given its present name (1601) the older appellation was transferred to the bay now called after Saldanha. In 1781 a British squadron under Commodore George Johnstone (1731–1787) seized six Dutch East Indiamen, which, fearing an attack on Cape Town, had taken refuge in Saldanha Bay. This was the only achievement, so far as South Africa was concerned, of the expedition despatched to seize Cape Town during the war of 1781–1783.

SALDERN, FRIEDRICH CHRISTOPH VON (1719–1785), Prussian soldier and military writer, entered the army in 1735, and (on account of his great stature) was transferred to the Guards in 1739. As one of Frederick's aides-de-camp he was the first to discover the approach of Neipperg's Austrians at Mollwitz. He commanded a guard battalion at Leuthen, again distinguished himself at Hochkirch and was promoted major-general. In 1760 at Liegnitz Frederick gave him four hours in which to collect, arrange and despatch the spoils of the battle, 6000 prisoners, 100 wagons, 82 guns and 5000 muskets. His complete success made him a marked man even in Frederick's army. At Torgau, Saldern and Möllendorf (*q.v.*) with their brigades converted a lost battle into a great victory by their desperate assault on the Siptitz Heights. The manœuvring skill, as well as the iron resolution, of the attack, has excited the wonder of modern critics, and after Torgau Saldern was accounted the "completest general of infantry alive" (Carlyle). In the following winter, however, being ordered by Frederick to sack Hubertusburg, Saldern refused on the ground of conscience. Nothing was left for him but to retire, but Frederick was well aware that he needed Saldern's experience and organizing ability, and after the peace the general was at once made inspector of the troops at Magdeburg. In 1766 he became lieutenant-general. The remainder of his life was spent in the study of military sciences in which he became a pedant of the most pronounced type. In one of his works he discussed at great length the question between 76 and 75 paces to the minute as the proper cadence of infantry. There can be no question that "Saldern-tactics" were the most extreme form of pedantry to which troops were ever subjected, and contributed powerfully to the disaster of Jena in 1806. His works included *Taktik der Infanterie* (Dresden, 1784) and *Taktische Grundsätze* (Dresden, 1786), and were the basis of the British "Dundas" drill book.

See Kuster, *Charakterzüge des Generalleutenants von Saldern* (Berlin, 1792).

SALE, GEORGE (*c.* 1697–1736), English orientalist, was the son of a London merchant. In 1720 he was admitted a student of the Inner Temple, but subsequently practised as a solicitor. Having studied Arabic for some time in England, he became, in 1726, one of the correctors of the Arabic version of the New Testament, begun in 1720 by the Society for Promoting Christian Knowledge, and subsequently took the principal part in the

work. He made an extremely paraphrastic, but, for his time, admirable English translation of the Koran (1734 and often reprinted), and had a European reputation as an orientalist. He died on the 13th of November 1736. His collection of oriental manuscripts is now in the Bodleian library, Oxford.

SALE, SIR ROBERT HENRY (1782–1845), British soldier, entered the 36th Foot in 1795, and went to India in 1798, as a lieutenant of the 12th Foot. His regiment formed part of Baird's brigade of Harris's army operating against Tippoo Sahib, and Sale was present at Mallavelly (Mallawalli) and Seringapatam, subsequently serving under Colonel Arthur Wellesley in the campaign against Dhundia. A little later the 12th was employed in the difficult and laborious attack on Paichi Raja. Promoted captain in 1806, Sale was engaged in 1808–1809 against the Raja of Travancore, and was at the two actions of Quilon, the storm of Travancore lines and the battle of Killianore. In 1810 he accompanied the expedition to Mauritius, and in 1813 obtained his majority. After some years he became major in the 13th, with which regiment he was for the rest of his life associated. In the Burmese War he led the 13th in all the actions up to the capture of Rangoon, in one of which he killed the enemy's leader in single combat. In the concluding operations of the war, being now lieutenant-colonel, he commanded a brigade, and at Malown (1826) he was severely wounded. For these services he received the C.B. In 1838, on the outbreak of the Afghan War, Brevet-Colonel Sale was assigned to the command of the 1st Bengal brigade of the army assembling on the Indus. His column arrived at Kandahar in April 1839, and in May it occupied the Herat plain. The Kandahar force next set out on its march to Kabul, and a month later Ghazni was stormed, Sale in person leading the storming column and distinguishing himself in single combat. The place was well provisioned, and on its supplies the army finished its march to Kabul easily. For his services Sale was made K.C.B. and received the local rank of major-general, as well as the Shah's order of the Duranee Empire. He was left, as second-in-command, with the army of occupation, and in the interval between the two wars conducted several small campaigns ending with the action of Parwan which led directly to the surrender of Dost Mahommed. By this time the army had settled down to the quiet life of cantonments, and Lady Sale and her daughter came to Kabul. But the policy of the Indian government in stopping the subsidy to the frontier tribes roused them into hostility, and Sale's brigade received orders to clear the line of communication to Peshawar. After severe fighting Sale entered Jalalabad on the 12th of November 1841. Ten days previously he had received news of the murder of Sir Alexander Burnes, along with orders to return with all speed to Kabul. These orders he, for various reasons, decided to ignore; suppressing his personal desire to return to protect his wife and family, he gave orders to push on, and on occupying Jalalabad at once set about making the old and half-ruined fortress fit to stand a siege. There followed a close and severe investment rather than a siege, and the garrison's sorties were made usually with the object of obtaining supplies. At last Pollock and the relieving army appeared, only to find that the garrison had on the 7th of April 1842 relieved itself by a brilliant and completely successful attack on Akbar's lines. Sir Robert Sale received the G.C.B.; a medal was struck for all ranks of defenders, and salutes fired at every large cantonment in India. Pollock and Sale after a time took the offensive, and after the victory of Haft Kotal, Sale's division encamped at Kabul again. At the end of the war Sale received the thanks of parliament. In 1845, as quartermaster-general to Sir H. Gough's army, Sale again took the field. At Moodkee (Mudki) he was mortally wounded, and he died on the 21st of December 1845. His wife, who shared with him the dangers and hardships of the Afghan war, was amongst Akbar's captives. Amongst the few possessions she was able to keep from Afghan plunderers was her diary (*Journal of the Disasters in Afghanistan*, London, 1843).

See Gleig, *Sale's Brigade in Afghanistan* (London, 1846); Kaye, *Lives of Indian Officers* (London, 1867); W. Sale, *Defence of Jellalabad* (London, 1846); Regimental History of the 13th Light Infantry.

SALE, a town of Tanjil county, Victoria, Australia, the principal centre in the agricultural Gippsland district, on the river Thomson, 127½ m. by rail E.S.E. of Melbourne. Pop. (1901), 3462. It is the seat of the Anglican bishop of Gippsland, and contains the cathedral of the Roman Catholic bishop of Sale. Attached to its mechanics' institute are schools of mines, art and technology, and a fine free library. The finest buildings, excluding a number of handsome churches, are the Victoria Hall and the convent of Notre Dame de Sion. The Agricultural Society has excellent show grounds, in which meetings are annually held. Sale is the head of the Gippsland lakes navigation, the shipping being brought from the lakes to the town by canal. Daily communication is maintained with Cunningham at the lakes' entrance, and ocean-going steamers ply frequently between Sale and Melbourne.

SALE, an urban district in the Altrincham parliamentary division of Cheshire, England, 5 m. S.W. of Manchester. Pop. (1901), 12,088. It is served by the Manchester, South Junction & Altrincham and the London & North-Western railways, and the Cheshire Lines, and has become a large residential suburb of Manchester. At the beginning of the 19th century the greater part of the township was still waste and unenclosed. There are numerous handsome villas. Market gardening is carried on in the neighbourhood; and there are large botanical gardens.

SALEM, a city and district of British India, in the Madras presidency. The city is on both banks of the river Tirumanimuttar, 3 m. from a station on the Madras railway, 206 m. S.W. of Madras city. Pop. (1901), 70,621. There is a considerable weaving industry and some manufacture of cutlery. Its situation in a green valley between the Shevaroy and Jarugumalai hills is picturesque.

The DISTRICT OF SALEM has an area of 7530 sq. m. Except towards the south it is hilly, with extentive plains lying between the several ranges. It consists of three distinct tracts, formerly known as the Talaghat, the Baramahal and the Balaghat. The Talaghat is situated below the Eastern Ghats on the level of the Carnatic generally; the Baramahal includes the whole face of the Ghats and a wide piece of country at their base; and the Balaghat is situated above the Ghats on the tableland of Mysore.

The western part of the district is mountainous. Amongst the chief ranges (5000-6000 ft.) are the Shevaroys, the Kalrayans, the Melagiris, the Kollimalais, the Pachamalais and the Yelagirs. The chief rivers are the Cauvery with its numerous tributaries, and the Ponniar and Palar; the last, however, only flows through a few miles of the north-western corner of the district. The forests are of considerable value. The geological structure of the district is mostly gneissic, with a few irruptive rocks in the form of trap dikes and granite veins. Magnetic iron ore is common in the hill regions, and corundum and chromate of iron are also obtainable. The qualities of the soil differ very much; in the country immediately surrounding the town of Salem a thin layer of calcareous and red loam generally prevails, through which quartz rocks appear on the surface in many places. The climate, owing to the great difference of elevation, varies considerably; on the hills it is cool and bracing, and for a great part of the year very salubrious; the annual rainfall averages about 32 in.

The population in 1901 was 2,204,974, showing an increase of 12 % in the decade. The principal crops are millets, rice, other food grains and oil-seeds, with a little cotton, indigo and tobacco. Coffee is grown on the Shevaroy hills. The chief irrigation work is the Barur tank system. Salem suffered severely from the famine of 1877–1878. The Madras railway runs through the district, with two narrow-gauge branches. The chief industry is cotton-weaving, and there is some manufacture of steel from magnetic iron ore. There are many saltpetre refineries, but no large industries. The district was acquired partly by the treaty of peace with Tippoo Sultan in 1792 and partly by the partition treaty of Mysore in 1799. By the former the Talaghat and Baramahal were ceded, and by the latter the Balaghat or what is now the Hosur *taluk*.

SALEM, a city and one of the county seats (Lawrence is the other) of Essex county, Massachusetts, about 15 m. N.E. of Boston. Pop. (1900), 35,956, of whom 10,902 were foreign-born (including 4003 French Canadians, 3476 Irish, and 1585 English

Canadians), 23,038 were of foreign parentage (one or the other parent foreign-born) and 156 were negroes; (1910), 43,697. Area, 8·2 sq. m. Salem is served by the Boston & Maine and by interurban electric railways westward to Peabody, Danvers and Lawrence, eastward to Beverly, and southward to Marblehead, Swampscott, Lynn and Boston. It occupies a peninsula projecting toward the north-east, a small island (Winter Island) connected with the neck of the peninsula (Salem Neck) by a causeway, and some land on the mainland. Salem has many historical and literary landmarks. There are three court-houses, one of granite (1839–1841) with great monolithic Corinthian pillars, another (1862), adjoining it, of brick, and a third (1908–1909) of granite, for the probate court. The City Hall was built in 1837, and enlarged in 1876. The Custom House (1818–1819) is described in the introduction to Hawthorne's *Scarlet Letter*, and in it Hawthorne worked as surveyor of the port in 1845–1849. The public library building (1888) was given to the city by the heirs of Captain John Bertram.

The Essex Institute is housed in a brick building with freestone trimmings (1851) and in old Plummer Hall (1857); its museum contains some old furniture and a collection of portraits; it has an excellent library and publishes quarterly (1859 sqq.) *Historical Collections*. The Peabody Academy of Science, founded by the gift in 1867 of $140,000 from George Peabody and incorporated in 1868, is established in the East India Marine Hall (1824), bought for this purpose from the Salem East India Marine Society. The Marine Society was organized in 1799, its membership being limited to "persons who have actually navigated the seas beyond the Cape of Good Hope or Cape Horn, as masters or supercargoes of vessels belonging to Salem"; it assists the widows and children of members. Its museum, like the ethnological and natural history collection of the Essex Institute, was bought by the Peabody Academy of Science, whose museum now includes Essex county collections (natural history, mineralogy, botany, prehistoric relics, &c.), type collections of minerals and fossils; implements, dress, &c. of primitive peoples, especially rich in objects from Malaysia, Japan and the South Seas; and portraits and relics of famous Salem merchants, with models and pictures of Salem merchant vessels. The Salem Athenaeum (1810), the successor of a Social Library (1760) and a Philosophical Library (1781) is housed in Plummer Hall (1908), a building in the southern Colonial style, named in honour of a benefactor of the Athenaeum, Caroline Plummer (d. 1855), who endowed the Plummer Professorship of Christian Morals at Harvard. Some of the old houses were built by ship-owners before the War of Independence, and more were built during the first years of the 19th century when Salem privateersmen made so many fortunes. Many of the finest old houses are of the gambrel type; and there are many beautiful doorways, doorheads and other details. Nathaniel Hawthorne's birthplace was built before 1692; another house—now reconstructed and used as a social settlement—is pointed out as the original "house of seven gables." The Corwin or "Witch" house, so called from a tradition that Jonathan Corwin, one of the judges in the witchcraft trials, held preliminary examinations of witches here, is said to have been the property of Roger Williams. The Pickering house, built before 1660, was the homestead of Timothy Pickering and of other members of that family. Among the other buildings and institutions are Hamilton Hall (1805); the Franklin Building (1861) of the Salem Marine Society; a large armoury; a state normal school (1854); an orphan asylum (1871), under the Sisters of the Grey Nuns; the Association for the Relief of Aged and Destitute Women (1860), occupying a fine old brick house formerly the home of Benjamin W. Crowninshield (1772–1851), a member of the national House of Representatives in 1824–1831 and Secretary of the Navy in 1814; the Bertram Home for Aged Men (1877) in a house built in 1806–1807; the Plummer Farm School for Boys (incorporated 1855, opened 1870), another charity of Caroline Plummer, on Winter Island; the City Almshouse (1816) and the City Insane Asylum (1884) on Salem Neck; a home for girls (1876); the Fraternity (1869), a club-house for boys; the Marine Society Bethel and the Salem Seamen's Bethel; the Seamen's Orphan and Children's Friend Society (1839); an Associated Charities (1901), and the Salem Hospital (1873).

Among the Church organizations are: the First (Unitarian; originally Trinitarian Congregational), which dates from 1629 and was the first Congregational church organized in America; the Second or East Church (Unitarian) organized in 1718; the North Church (Unitarian), which separated from the First in 1772; the Third or Tabernacle (Congregational), organized in 1735 from the First Church; the South (Congregational), which separated from the Third in 1774; several Baptist churches; a Quaker society, with a brick meeting-house (1832); St Peter's, the oldest Episcopalian church in Salem, with a building of English Gothic erected in 1833, and Grace Church (1858).

Washington Square or the Common (8 acres) is in the centre of the city. The Willows is a 30-acre park on the Neck shore, and in North Salem is Liberty Hill, another park. On a bluff projecting into South river is the old "Burying Point," set apart in 1637, and the oldest cemetery in the city; its oldest stone is dated 1673; here are buried Governor Simon Bradstreet, Chief-Justice Benjamin Lynde (1666–1745) and Judge John Hathorne (1641–1717) of the witchcraft court. The Broad Street Burial Ground was laid out in 1655. On Salem Neck is Fort Lee and on Winter Island is Fort Pickering (on the site of a fort built in 1643), near which is the Winter Island Lighthouse.

The main trade of Salem is along the coast, principally in the transhipment of coal; and the historic Crowninshield's or India wharf is now a great coal pocket. The harbour is not deep enough for ocean-going vessels, and manufacturing is the most important industry. In 1905 the total value of the factory products was $12,202,217 (13.9 % more than in 1900), and the principal manufactures were boots and shoes and leather. The largest single establishment is the Naumkeag Steam Cotton Company, which has 2800 looms and about 1500 mill-hands. Another large factory is that of the silversmiths, Daniel Low & Co.

History.—Salem was settled in 1626 by Roger Conant (1593–1679) and a company of "planters," who in 1624 (under the Sheffield patent of 1623 for a settlement on the north shore of Massachusetts Bay) had attempted a plantation at Cape Ann, whither John Lyford and others had previously come from Plymouth through "dissatisfaction with the extreme separation from the English church." Conant was not a separatist, and the Salem settlement was a commercial venture, partly agricultural and partly to provide a wintering place for Banks fishermen so that they might more quickly make their spring catch. Cape Ann was too bleak, but Naumkeag was a "pleasant and fruitful neck of land," which they named Salem in June 1629, probably in allusion to Psalm lxxvi. 2. In 1628 a patent for the territory was granted by the New England Council to the Dorchester Company, in which the Rev. John White of Dorchester, England, was conspicuous, and which in the same year sent out a small company under John Endecott as governor. Under the charter for the Colony of Massachusetts Bay (1629), which superseded the Dorchester Company patent, Endecott continued as governor until the arrival in 1630 of John Winthrop, who soon removed the seat of government from Salem first to Charlestown and then to Boston. In July or August 1629 the first Congregational Church (see CONGREGATIONALISM, § *American*) in America was organized here; its "teacher" in 1631 and 1633 and its pastor in 1634–1635 was Roger Williams, a close friend of Governor Endecott and always popular in Salem, who in 1635 fled thence to Rhode Island to escape arrest by the officials of Massachusetts Bay. In 1686, fearing that they might be dispossessed by a new charter, the people of Salem for £20 secured a deed from the Indians to the land they then held. Although not strictly Puritan the character of Salem was not essentially different from that of the other Massachusetts towns. The witchcraft delusion of 1692 centred about Salem Village, now in the township of Danvers, but then a part of Salem. Ten girls, aged nine to seventeen years, two of them house servants, met during the winter of 1691–1692 in the home of Samuel Parris, pastor of the Salem Village church, and after learning palmistry and various "magic" tricks from Parris's West Indian slave, Tituba, and influenced doubtless by current talk about witches, accused Tituba and two old women of bewitching them. The excitement spread rapidly, many more were accused, and, within four months, hundreds were arrested, and many were tried before commissioners of oyer and terminer (appointed on the 27th of May 1692, including Samuel Sewall, *q.v.*, of Boston, and three inhabitants of Salem, one being Jonathan Corwin); nineteen were hanged,[1] and one was pressed to death in September for refusing to plead when he was accused. All these trials were conducted in accordance with the English law of the time; there had been an execution for witchcraft at Charlestown in 1648; there was a case in Boston in 1655; in 1680 a woman of Newbury was condemned to death for witchcraft but was reprieved by Governor Simon Bradstreet; in England and Scotland there were many executions long after the Salem delusion died out. The reaction came suddenly in Salem, and in May 1693 Governor William Phips ordered

[1] There is nothing but tradition to identify the place of execution with what is now called Gallows Hill, between Salem and Peabody.

the release from prison of all then held on the charge of witchcraft.

Salem was an important port after 1670, especially in the India trade, and Salem privateers did great damage in the Seven Years' War, in the War of Independence (when 158 Salem privateers took 445 prizes), and in the War of 1812. On this foreign trade and these rich periods of privateering the prosperity of the place up to the middle of the 19th century was built.

The First Provincial Assembly of Massachusetts met in Salem in 1774. On the 20th of February 1775 at the North Bridge (between the present Salem and Danvers) the first armed resistance was offered to the royal troops, when Colonel Leslie with the 64th regiment, sent to find cannon hidden in the Salem "North Fields," was held in check by the townspeople. Salem was the birthplace of Nathaniel Hawthorne, W. H. Prescott, Nathaniel Bowditch, Jones Very and W. W. Story.

Marblehead was separated from Salem township in 1649; Beverly in 1668, a part of Middleton in 1728, and the district of Danvers in 1752. Salem was chartered as a city in 1836.

See Charles S. Osgood and Henry M. Batchelder, *Historical Sketch of Salem, 1626–1879* (Salem, 1879); Joseph B. Felt, *Annals of Salem* (ibid., 1827; 2nd ed., 2 vols., 1845–1849); Charles W. Upham, *Salem Witchcraft* (2 vols., Boston, 1867); H. B. Adams, *Village Communities of Cape Ann and Salem* (Baltimore, 1883); Eleanor Putnam (the pen-name of Mrs Arlo Bates), *Old Salem* (Boston, 1886); C. H. Webber and W. S. Nevins, *Old Naumkeag* (Salem, 1877); R. D. Paine, *Ships and Sailors of Old Salem* (New York 1909), and *Visitor's Guide to Salem* (Salem, 1902) published by the Essex Institute.

SALEM, a city and the county-seat of Salem county, New Jersey, U.S.A., in the S.W. part of the state, on Salem Creek, about 38 m. S.W. of Philadelphia. Pop. (1900), 5811, of whom 263 were foreign-born and 809 were negroes; (1905, state census), 6443. It is served by the West Jersey & Seashore railroad, and has steamer connexion with Philadelphia. Among its institutions is the John Tyler Library, established as Salem Library in 1804 and said to be the third oldest public library in the state. In Finn's Point National Cemetery, about 4 m. N. of Salem, there are buried some 2460 Confederate soldiers, who died during the Civil War while prisoners of war at Fort Delaware, on an island in Delaware river nearly opposite the mouth of Salem Creek. Salem lies in a rich agricultural region. Among the city's manufactures are canned fruits and vegetables, condiments, glass-ware, brass and iron-work, hosiery, linoleum and oil-cloth. Near the present site in 1643 colonists from Sweden built Fort Elfsborg; but the Swedish settlers in 1655 submitted to the Dutch at New Amsterdam, and the latter in turn surrendered to the English in 1664. In 1675 John Fenwicke, an English Quaker, entered the Delaware river and founded the first permanent English settlement on the Delaware (which he called Salem). After purchasing lands from the Indians, Fenwicke attempted to maintain an independent government, but in 1682 he submitted to the authority of the proprietors of West Jersey. During the War of Independence Salem was plundered on the 17th of March 1778 by British troops under Colonel Charles Mawhood, and on the following day a portion of these troops fought a sharp but indecisive engagement at Quinton's Bridge, 3 m. S. of the town, with American militia under Colonel Benjamin Holmes. Salem was incorporated as a town in 1695, and was chartered as a city in 1858.

SALEM, a city of Columbiana county, Ohio, U.S.A., 67 m. N.W. of Pittsburg and about the same distance S.E. of Cleveland. Pop. (1900), 7582 (667 being foreign-born and 227 negroes); (1910) 8943. Salem is served by the Pennsylvania (the Pittsburg, Fort Wayne & Chicago division) and the Youngstown & Ohio River railways, and by an interurban electric line to Canton. The city has a Carnegie library (1896), two beautiful cemeteries, a park, and a Home for Aged Women. It is situated in a fine agricultural region; coal is mined in the vicinity; natural gas is obtained in abundance; and the city has various manufactures. It was settled by Friends in 1806, incorporated as a town in 1830 and as a village in 1852, and chartered as a city in 1887. For several years preceding the Civil War it was a station on the "underground railway" and the headquarters of "the Western Anti-Slavery Society," which published here the *Anti-Slavery Bugle*.

SALEM, the capital of Oregon, U.S.A., and the county-seat of Marion county, on the east bank of the Willamette river, about 52 m. S.S.W. of Portland. Pop. (1900), 4258 (522 foreign-born); (1910), 14,094. Salem is served by the Southern Pacific railway, by the Oregon Electric line (to Portland), and by a steamship line to Portland. The city is in the centre of the Willamette Valley, a rich farming and fruit-growing country. It has wide, well-shaded streets, and two public parks. Among the public buildings and institutions are the State Capitol, the State Library, a city public library, the county court-house, the Federal building, the state penitentiary and several charitable institutions. Salem is the seat of Willamette University (Methodist Episcopal, 1844), an outgrowth of the mission work of the Methodist Episcopal church begun in 1834 about 10 m. below the site of the present city; of the Academy of the Sacred Heart (Roman Catholic, 1860) and of two business colleges. Immediately north of the city at Chemawa is the Salem (non-reservation) government school for Indians, with an excellently equipped hospital. Water power is derived (in part, by an 18 m. canal) from the Santiam, an affluent of the Willamette river. The city is a market for the produce of the Willamette Valley. The settlement here, gathering about the Methodist mission and school, began to grow in the decade 1840–1850. Salem was chartered as a city in 1853, and in 1860 was made the capital of the state. It grew rapidly after 1900, and its territory was increased in 1903.

SALEM, a town and the county-seat (since 1838) of Roanoke county, Virginia, U.S.A., on the Roanoke river, about 60 m. W. by S. of Lynchburg. Pop. (1900), 3412, of whom 798 were negroes. Salem is served by the Norfolk & Western and the Virginian railways, and has electric railway connexion with Roanoke, about 6 m. E. The town is a summer resort about 1000 ft. above the sea, surrounded by the Alleghany and Blue Ridge mountains. There are chalybeate and sulphur springs in the vicinity. Salem is the seat of a Lutheran Orphan Home (1888), of the Baptist Orphanage of Virginia (1892) and of Roanoke College (co-educational; Lutheran; chartered, 1853). The town is in a dairying, agricultural and fruit-growing region. The Roanoke river provides water-power. The water supply is obtained from a spring within the town limits, from which there flows about 576,000 gallons a day, and from an artesian well. This part of Roanoke county was granted in 1767 to General Andrew Lewis, to whom there is a monument in East Hill Cemetery, where he is buried. Salem, laid out in 1802, was incorporated as a town in 1813.

SALE OF GOODS. Sale (O.Eng. *sala, sellan, syllan,* to hand over, deliver) is commonly defined as the transfer of property from one person to another for a price. This definition requires some consideration in order to appreciate its full scope. The law of sale is usually treated as a branch of the law of contract, because sale is effected by contract. Thus Pothier entitles his classical treatise on the subject, *Traité du contrat de vente,* and the Indian Contract Act (ix. of 1872) devotes a chapter to the sale of goods. But a completed contract of sale is something more. It is a contract plus a transfer of property. An agreement to sell or buy a thing, or, as lawyers call it, an executory contract of sale, is a contract pure and simple. A purely personal bond arises thereby between seller and buyer. But a complete or executed contract of sale effects a transfer of ownership with all the advantages and risks incident thereto. By an agreement to sell a *jus in personam* is created; by a sale a *jus in rem* is transferred. The essence of sale is the transfer of property for a price. If there be no agreement for a price, express or implied, the transaction is gift, not sale, and is regulated by its own peculiar rules and considerations. So, too, if commodity be exchanged for commodity, the transaction is called barter and not sale, and the rules relating to sales do not apply in their entirety. Again, a contract of sale must contemplate an absolute transfer of the property in the thing sold or agreed to be sold. A mortgage may be in the form of a conditional sale, but English law regards the

substance and not the form of the transaction. If in substance the object of the transaction is to secure the repayment of a debt, and not to transfer the absolute property in the thing sold, the law at once annexes to the transaction the complex consequences which attach to a mortgage. So, too, it is not always easy to distinguish a contract for the sale of an article from a contract for the supply of work and materials. If a man orders a set of false teeth from a dentist the contract is one of sale, but if he employs a dentist to stop one of his teeth with gold the contract is for the supply of work and materials. The distinction is of practical importance, because very different rules of law apply to the two classes of contract. The property which may be the subject of sale may be either movable or immovable, tangible or intangible. The present article relates only to the sale of goods —that is to say, tangible movable property. By the laws of all nations the alienation of land or real property is, on grounds of public policy, subject to special regulations. It is obvious that the assignment of "things in action," such as debts, contracts and negotiable instruments, must be governed by very different principles from those which regulate the transfer of goods, when the object sold can be transferred into the physical possession of the transferee.

In 1847, when Mr Justice Story wrote his work on the sale of personal property, the law of sale was still in process of development. Many rules were still unsettled, especially the rules relating to implied conditions and warranties. But for several years the main principles have been well settled. In 1891 the subject seemed ripe for codification, and Lord Herschell introduced a codifying bill which two years later passed into law as the Sale of Goods Act 1893 (56 & 57 Vict. c. 71). Sale is a consensual contract. The parties to the contract may supplement it with any stipulations or conditions they may see fit to agree to. The code in no wise seeks to fetter this discretion. It lays down a few positive rules—such, for instance, as that which reproduces the 17th section of the Statute of Frauds. But the main object of the act is to provide clear rules for those cases where the parties have either formed no intention or have failed to express it. When parties enter into a contract they contemplate its smooth performance, and they seldom provide for contingencies which may interrupt that performance—such as the insolvency of the buyer or the destruction of the thing sold before it is delivered. It is the province of the code to provide for these contingencies, leaving the parties free to modify by express stipulation the provisions imported by law. When the code was in contemplation the case of Scotland gave rise to difficulty. Scottish law varies widely from English. To speak broadly, the Scottish law of sale differs from the English by adhering to the rules of Roman law, while the English common law has worked out rules of its own. Where two countries are so closely connected in business as Scotland and England, it is obviously inconvenient that their laws relating to commercial matters should differ. The Mercantile Law Commission of 1855 reported on this question, and recommended that on certain points the Scottish rule should be adopted in England, while on other points the English rule should be adopted in Scotland. The recommendations of the Commission were partially and rather capriciously adopted in the English and Scottish Mercantile Law Amendment Acts of 1856. Certain rules were enacted for England which resembled but did not really reproduce the Scottish law, while other rules were enacted for Scotland which resembled but did not really reproduce the English law. There the matter rested for many years. The Codifying Bill of 1891 applied only to England, but on the advice of Lord Watson it was extended to Scotland. As the English and Irish laws of sale were the same, the case of Ireland gave rise to no difficulty, and the act now applies to the whole of the United Kingdom. As regards England and Ireland very little change in the law has been effected. As regards Scotland the process of assimilation has been carried further, but has not been completed. In a few cases the Scottish rule has been saved or re-enacted, in a few other cases it has been modified, while on other points, where the laws were dissimilar, the English rules have been adopted.

The Code of 1893.

Now that the law has been codified, an analysis of the law resolves itself into an epitome of the main provisions of the statute. The act is divided into six parts, the first dealing with the formation of the contract, the second with the effects of the contract, the third with the performance of the contract, the fourth with the rights of an unpaid seller against the goods, and the fifth with remedies for breach of contract; the sixth part is supplemental. The 1st section, which may be regarded as the keystone of the act, is in the following terms: "A contract of sale of goods is a contract whereby the seller transfers or agrees to transfer the property in goods to the buyer for a money consideration called the price. A contract of sale may be absolute or conditional. When under a contract of sale the property in the goods is transferred from the seller to the buyer the contract is called a 'sale,' but when the transfer of the property in the goods is to take place at a future time or subject to some condition thereafter to be fulfilled the contract is called an 'agreement to sell.' An agreement to sell becomes a sale when the time elapses or the conditions are fulfilled subject to which the property in the goods is to be transferred." This section clearly enunciates the consensual nature of the contract, and this is confirmed by section 55, which provides that "where any right, duty or liability would arise under a contract of sale by implication of law," it may be negatived or varied by express agreement, or by the course of dealing between the parties, or by usage, if the usage be such as to bind both parties to the contract. The next question is who can sell and buy. The act is framed on the plan that if the law of contract were codified, this act would form a chapter in the code. The question of capacity is therefore referred to the general law, but a special provision is inserted (section 2) relating to the supply of necessaries to infants and other persons who are incompetent to contract. Though an infant cannot contract he must live, and he can only get goods by paying for them. The law, therefore, provides that he is liable to pay a reasonable price for necessaries supplied to him, and it defines necessaries as "goods suitable to the condition in life of such minor or other person, and to his actual requirements at the time of the sale and delivery."

The 4th section of the act reproduces the famous 17th section of the Statute of Frauds, which was an act "for the prevention of frauds and perjuries." The object of that statute was to prevent people from setting up bogus contracts of sale by requiring material evidence of the contract. The section provides that "a contract for the sale of any goods of the value of ten pounds or upwards shall not be enforceable by action unless the buyer shall accept part of the goods so sold, and actually receive the same, or give something in earnest to bind the contract, or in part payment, or unless some note or memorandum in writing of the contract be made and signed by the party to be charged, or his agent in that behalf." It is a much disputed question whether this enactment has done more good or harm. It has defeated many an honest claim, though it may have prevented many a dishonest one from being put forward. When judges and juries have been satisfied of the *bona fides* of a contract which does not appear to satisfy the statute, they have done their best to get round it. Every expression in the section has been the subject of numerous judicial decisions, which ran into almost impossible refinements, and illustrate the maxim that hard cases make bad law. It is to be noted that Scotland is excluded from the operation of section 4. The Statute of Frauds has never been applied to Scotland, and Scotsmen appear never to have felt the want of it.

As regards the subject-matter of the contract, the act provides that it may consist either of existing goods or "future goods"—that is to say, goods to be manufactured or acquired by the seller after the making of the contract (§ 5). Suppose that a man goes into a gunsmith's shop and says, "This gun suits me, and if you will make or get me another like it I will buy the pair." This is a good contract, and no question as to its validity would be likely to occur to the lay mind. But lawyers have seriously raised the question, whether there could be a valid contract of sale when the subject-matter of the contract was not in existence at the time when the contract was made. The price is an essential element in a contract of sale. It may be either fixed by the contract itself, or left to be determined in some manner thereby agreed upon, *e.g.* by the award of a third party. But there are many cases in which the parties intend to effect a sale, and yet say nothing about the price. Suppose that a man goes into a hotel and orders dinner without asking the price. How is it to be fixed? The law steps in and says that, in the absence of any agreement, a reasonable price must be paid (§ 8). This prevents extortion on the part of the seller, and unreasonableness or fraud on the part of the buyer.

The next question dealt with is the difficult one of conditions and warranties (§§ 10 and 11). The parties may insert what stipulations they like in a contract of sale, but the law has to interpret them. The term "warranty" has a peculiar and technical meaning in the law of sale. It denotes a stipulation which the law regards as collateral to the main purpose of the contract. A breach, therefore, does not entitle the buyer to reject the goods, but only to claim damages. Suppose that a man buys a particular horse, which is warranted quiet to ride and drive. If the horse turns out to be vicious, the buyer's only remedy is to claim damages, unless he has expressly reserved a right to return it. But if, instead of buying a particular horse, a man applies to a dealer to supply him with a quiet horse, and the dealer supplies him with a vicious one, the stipulation is a condition. The buyer can either return the horse, or keep it and claim damages. Of course the right of rejection must be exercised within a reasonable time. In Scotland no distinction has been drawn between conditions and warranties, and the act preserves the Scottish rule by providing that, in Scotland, "failure by the seller to perform any material part of a contract of sale" entitles the buyer either to reject the goods within a reasonable time after delivery, or to retain them and claim compensation (§ 11 (2)). In England it is a very common trick for the buyer to keep the goods, and then set up in reduction of the price that they are of inferior quality to what was ordered. To discourage this practice in Scotland the act provides that, in that country, the court may require the buyer who alleges a breach of contract to bring the agreed price into court

Warranty.

pending the decision of the case (§ 59). It seems a pity that this sensible rule was not extended to England.

In early English law *caveat emptor* was the general rule, and it was one well suited to primitive times. Men either bought their goods in the open market-place, or from their neighbours, and buyer and seller contracted on a footing of equality. Now the complexity of modern commerce, the division of labour and the increase of technical skill, have altogether altered the state of affairs. The buyer is more and more driven to rely on the honesty, skill and judgment of the seller or manufacturer. Modern law has recognized this, and protects the buyer by implying various conditions and warranties in contracts of sale, which may be summarized as follows: First, there is an implied undertaking on the part of the seller that he has a right to sell the goods (§ 12). Secondly, if goods be ordered by description, they must correspond with that description (§ 13). This, of course, is a universal rule—*Si aes pro auro veneat, non valet*. Thirdly, there is the case of manufacturers or sellers who deal in particular classes of goods. They naturally have better means of judging of their merchandise than the outside public, and the buyer is entitled within limits to rely on their skill or judgment. A tea merchant or grocer knows more about tea than his customers can, and so does a gunsmith about guns. In such cases, if the buyer makes known to the seller the particular purpose for which the goods are required, there is an implied condition that the goods are reasonably fit for it, and if no particular purpose be indicated there is an implied condition that the goods supplied are of merchantable quality (§ 14). Fourthly, in the case of a sale by sample, there is "an implied condition that the bulk shall correspond with the sample in quality," and that the buyer shall have a reasonable opportunity of comparing the bulk with the sample (§ 15).

Effects of Contract.

The main object of sale is the transfer of ownership from seller to buyer, and it is often both a difficult and an important matter to determine the precise moment at which the change of ownership is effected. According to Roman law, which is still the foundation of most European systems, the property in a thing sold did not pass until delivery to the buyer. *Traditionibus et usucapionibus dominia rerum, non nudis pactis, transferuntur.* English law has abandoned this test, and has adopted the principle that the property passes at such time as the parties intend it to pass. Express stipulations as to the time when the property is to pass are very rare. The intention of the parties has to be gathered from their conduct. A long train of judicial decisions has worked out a more or less artificial series of rules for determining the presumed intention of the parties, and these rules are embodied in sections 16 to 20 of the act. The first rule is a negative one. In the case of unascertained goods, *i.e.* goods defined by description only, and not specifically identified, "no property in the goods is transferred to the buyer unless and until the goods are ascertained." If a man orders ten tons of scrap iron from a dealer, it is obvious that the dealer can fulfil his contract by delivering any ten tons of scrap that he may select, and that until the ten tons have been set apart, no question of change of ownership can arise. But when a specific article is bought, or when goods ordered by description are appropriated to the contract, the passing of the property is a question of intention. Delivery to the buyer is strong evidence of intention to change the ownership, but it is not conclusive. Goods may be delivered to the buyer on approval, or for sale or return. Delivery to a carrier for the buyer operates in the main as a delivery to the buyer, but the seller may deliver to the carrier, and yet reserve to himself a right of disposal. On the other hand, when there is a sale of a specific article, which is in a fit state for delivery, the property in the article prima facie passes at once, even though delivery be delayed. When the contract is for the sale of unascertained goods, which are ordered by description, the property in the goods passes to the buyer, when, with the express or implied consent of the parties, goods of the required description are "unconditionally appropriated to the contract." The cases which determine what amounts to an appropriation of goods to the contract are numerous and complicated. Probably they could all be explained as cases of constructive delivery, but at the time when the law of appropriation was worked out the doctrine of constructive delivery was not known. It is perhaps to be regretted that the codifying act did not adopt the test of delivery, but it was thought better to adhere to the familiar phraseology of the cases. Section 20 deals with the transfer of risk from seller to buyer, and lays down the prima facie rule that "the goods remain at the seller's risk until the property therein is transferred to the buyer, but when the property therein is transferred to the buyer, the goods are at the buyer's risk whether delivery has been made or not." *Res perit domino* is therefore the maxim of English, as well as of Roman law.

Title.

In the vast majority of cases people only sell what they have a right to sell, but the law has to make provision for cases where a man sells goods which he is not entitled to sell. An agent may misconceive or exceed his authority. Stolen goods may be passed from buyer to buyer. Then comes the question, Which of two innocent parties is to suffer? Is the original owner to be permanently deprived of his property, or is the loss to fall on the innocent purchaser? Roman law threw the loss on the buyer, *Nemo plus juris in alium transferre potest quam ipse habet.* French law, in deference to modern commerce, protects the innocent purchaser and throws the loss on the original owner. "En fait de meubles, possession vaut titre" (*Code civil*, art. 1599). English law is a compromise between these opposing theories. It adopts the Roman rule as its guiding principle, but qualifies it with certain more or less arbitrary exceptions, which cover perhaps the majority of the actual cases which occur (§§ 21 to 26). In the first place, the provisions of the Factors Act, 1889 (52 and 53 Vict. c. 45, extended to Scotland by 53 and 54 Vict. c. 40), are preserved. That act validates sales and other dispositions of goods by mercantile agents acting within the apparent scope of their authority, and also protects innocent purchasers who obtain goods from sellers left in possession, or from intending buyers who have got possession of the goods while negotiations are pending. In most cases a contract induced by fraud is voidable only, and not void, and the act provides, accordingly, that a voidable contract of sale shall not be avoided to the prejudice of an innocent purchaser. The ancient privilege of market overt[1] is preserved intact, section 22 providing that "where goods are sold in market overt, according to the usage of the market, the buyer acquires a good title to the goods provided he buys them in good faith, and without notice of any defect or want of title on the part of the seller." The section does not apply to Scotland, nor to the law relating to the sale of horses which is contained in two old statutes, 2 & 3 Phil. and Mar. c. 7, and 31 Eliz. c. 12. The minute regulations of those statutes are never complied with, so their practical effect is to take horses out of the category of things which can be sold in market overt. The privilege of market overt applies only to markets by prescription, and does not attach to newly-created markets. The operation of the custom is therefore fitful and capricious. For example, every shop in the City of London is within the custom, but the custom does not extend to the greater London outside. If then a man buys a stolen watch in Fleet Street, he may get a good title to it, but he cannot do so if he buys it a few doors off in the Strand. There is, however, a qualification of the rights acquired by purchase even in market overt. When goods have been stolen and the thief is prosecuted to conviction, the property in the goods thereupon revests in the original owner, and he is entitled to get them back either by a summary order of the convicting court or by action. This rule dates back to the statute 21 Hen. VIII. c. 11. It was probably intended rather to encourage prosecutions in the interests of public justice than to protect people whose goods were stolen.

Performance.

Having dealt with the effects of sale, first, as between seller and buyer, and, secondly, as between the buyer and third parties, the act proceeds to determine what, in the absence of convention, are the reciprocal rights and duties of the parties in the performance of their contract (§§ 27 to 37). "It is the duty of the seller to deliver the goods and of the buyer to accept and pay for them in accordance with the terms of the contract of sale" (§ 27). In ordinary cases the seller's duty to deliver the goods is satisfied if he puts them at the disposal of the buyer at the place of sale. The normal contract of sale is represented by a cash sale in a shop. The buyer pays the price and takes away the goods: "Unless otherwise agreed, delivery of the goods and payment of the price are concurrent conditions" (§ 27). But agreement, express or implied, may create infinite variations on the normal contract. It is to be noted that when goods are sent to the buyer which he is entitled to reject, and does reject, he is not bound to send them back to the seller. It is sufficient if he intimate to the seller his refusal to accept them (§ 36).

Rights of Unpaid Sellers.

The normal theory of sale is cash against delivery, but in the great majority of actual cases, especially in commercial transactions, this theory is departed from in practice. The interests of the seller are therefore protected by two rules—namely, those as to lien and as to stoppage *in transitu*. In the absence of any different agreement, as, for instance, where there is a stipulation for sale on credit, the unpaid seller has a right to retain possession of the goods until the price is paid or tendered. The right may, of course, be waived, even when it is not negatived by the contract. It is to be noted that when the seller takes a bill of exchange or other negotiable instrument for the price, the instrument operates as conditional payment. On the dishonour of the instrument the seller's rights revive (§§ 38-43). If the buyer becomes insolvent the unpaid seller has a further right founded on ancient mercantile usage. He may have parted with both the property in and possession of the goods sold, but he can attach the goods as long as they are in the hands of a carrier or forwarding agent, and have not reached the actual possession of the seller or his immediate agent. "Subject to the provisions of this Act, when the buyer of goods becomes insolvent, the unpaid seller who has parted with the possession of the goods has the right of stopping them *in transitu*—that is to say, he may resume possession of the goods as long as they are in course of transit, and may retain them until payment or tender of the price" (§ 44). The right of stoppage, however, cannot be exercised to the prejudice of third parties to whom the bill of lading or other document of title to goods has been lawfully transferred for value (§ 47).

The ultimate sanction of a contract is the legal remedy for its

[1] That is, "open market," where the goods on sale are exposed to view.

breach. Seller and buyer have each their appropriate remedies. If the property in the goods has passed to the buyer, or if, under the contract, "the price is payable on a day certain irrespective of delivery," the seller's remedy for breach of the contract is an action for the price (§ 49). In other cases his remedy is an action for damages for non-acceptance. In the case of ordinary goods of commerce the measure of damages is the difference between the contract price and the market or current price at the time when the goods ought to have been accepted. But this test is often applicable. For instance, the buyer may have ordered some article of special manufacture for which there would be no market. The convenient market-price rule is therefore subordinate to the general principle that "the measure of damages is the estimated loss directly and naturally resulting in the ordinary course of events from the buyer's breach of contract" (§ 56). Similar considerations apply to the buyer's right of action for non-delivery of the goods (§ 51). Section 52 deals with a peculiar feature of English law. In Scotland, as a general rule, a party who complains of a breach of contract is entitled to claim that the contract shall be specifically performed. In England a court of common law could only award damages, and apart from certain recent statutes, a claim for specific performance could only be entertained by a court of equity in a very narrow class of cases when the remedy by damages was deemed inadequate. But now, under the act of 1893, "in any action for breach of contract to deliver specific or ascertained goods the court may, if it thinks fit, direct that the contract shall be performed specifically without giving the defendant the option of retaining the goods on payment of damages." The buyer who complains of a breach of warranty on the part of the seller has two remedies. He may either set up the breach of warranty in reduction of the price, or he may pay the price and sue for damages. The prima facie measure of damages is the difference between the value of the goods at the time of delivery and the value they would have had if they had answered to the warranty (§ 53).

Remedies of buyer and seller.

The sixth part of the act is supplemental, and is mainly concerned with drafting explanations, but section 58 contains some rules for regulating sales by auction. It prohibits secret bidding on behalf of the seller to enhance the price, but is silent as to combination by buyers to reduce the price. Such a combination, commonly known as a "knock out," is left to be dealt with by the ordinary law of conspiracy.

The Sale of Goods Act 1893 was the third attempt made by the English parliament to codify a branch of commercial law. It would be out of place here to discuss the policy of mercantile codification, but it may be noted that there are very few reported cases on the construction of the act, so that its interpretation does not seem to have given rise to difficulty. As has been noted above, the act preserves some curious anomalies and distinctions between English and Scottish law. But the amendments required to remove them would be few and simple, should the legislature ever think it worth while to undertake the task.

United States.—The law as to the sale of real estate agrees generally with English law. It is considerably simplified by a system of registration. The covenant of warranty, unknown in England, is the principal covenant for title in the United States. It corresponds generally to the English covenant for quiet enjoyment. The right of judicial sale of buildings under a mechanic's lien for labour and materials is given by the law of many states. The sale of public lands is regulated by Act of Congress. In the law of sale of personal property American law is also based upon English law. The principal differences are that the law of market overt is not recognized by the United States, and that an unpaid vendor is the agent of the vendee to resell on non-payment, and is entitled to recover the difference between the contract price and the price of resale. Warranty of title is not carried as far as in England. United States decisions draw a distinction between goods in the possession and goods not in the possession of the vendor at the time of sale. There is no warranty of title of the latter. The Statute of Frauds has been construed in some respects differently from the English decisions. As to unlawful sales, it has been held that a sale in a state where the sale is lawful is valid in a state where it is un-lawful by statute, even though the goods are in the latter state.

The ordinary text-books on the law of sale are constantly re-edited and brought up to date. The following among the others may be consulted: Benjamin's *Sale of Personal Property*; Blackburn's *Contract of Sale*; Campbell's *Law of Sale and Mercantile Agency*; Brown's *Sale of Goods Act (Scotland)*; Chalmers's *Sale of Goods Act*; Moyle's *Contract of Sale in the Civil Law*; E. J. Schuster's *Principles of German Civil Law*; Beddarride's *Des achats et ventes commerciales*; Story's *Sale of Personal Property* (United States).

(M. D. Ch.)

SALEP (Arab. *sahleb*, Gr. ὄρχις), a drug extensively used in Oriental countries as a nervine restorative and fattener, and also much prescribed in paralytic affections. It probably owed its original popularity to the belief in the "doctrine of signatures." It is not used in European medicine. It consists of the tuberous roots of various species of *Orchis* and *Eulophia*, which are decorticated, washed, heated until horny in appearance, and then dried. Its most important constituent is a mucilaginous substance which it yields with cold water to the extent of 48 %.

SALERNO (anc. *Salernum*), a seaport and archiepiscopal see of Campania, Italy, capital of the province of Salerno, on the west coast, 33 m. by rail S.E. of Naples. Pop. (1901), 28,936 (town); 45,313 (commune). The ruins of its old Norman castle stand on an eminence 905 ft. above the sea with a background of graceful limestone hills. The town walls were destroyed in the beginning of the 19th century; the seaward portion has given place to the Corso Garibaldi, the principal promenade. The chief buildings are the theatre, the prefecture, and the cathedral of St Matthew (whose bones were brought from Paestum to Salerno in 954), begun in 1076 by Robert Guiscard and consecrated in 1084 by Gregory VII. In front is a beautiful quadrangular court (112 by 102 ft.), surrounded by arcades formed of twenty-eight ancient pillars mostly of granite from Paestum, and containing twelve sarcophagi of various periods; the middle entrance into the church is closed by remarkable bronze doors of 11th-century Byzantine work. The nave and two aisles end in apses. Two magnificent marble ambones, the larger dating from 1175, a large 11th-century altar frontal in the south aisle, having scenes from the Bible carved on thirty ivory tablets, with 13th-century mosaics in the apse, given by Giovanni da Procida, the promotor of the Sicilian Vespers, and the tomb of Pope Gregory VII., and that of Queen Margaret of Durazzo, mother of King Ladislaus, erected in 1412, deserve to be mentioned. In the crypt is a bronze statue of St Matthew. The cathedral possesses a fine Exultet roll. S. Domenico near it has Norman cloisters, and several of the other churches contain paintings by Andrea Sabbatini da Salerno, one of the best of Raphael's scholars. A fine port constructed by Giovanni da Procida in 1260 was destroyed when Naples became the capital of the kingdom, and remained blocked with sand till after the unification of Italy, when it was cleared; but it is now unimportant. The chief industries are silk and cotton-spinning and printing. Good wine is produced in the neighbourhood. A branch railway runs N. up the Irno valley to Mercato S. Severino on the line from Naples to Avellino.

A Roman colony (Salernum) was founded in 194 B.C. to keep the Picentini in check. It was captured by the Samnites in the Social War. It was the point at which the coast road to Paestum diverged from the Via Popillia, rejoining it again E. of Buxentum. In the 4th century the *correctores* of Lucania and the territory of the Bruttii resided here, but it did not attain its full importance till after the Lombard conquest. Dismantled by order of Charlemagne, it became in the 9th century the capital of an independent principality, the rival of that of Benevento, and was surrounded by strong fortifications. The Lombard princes, who had frequently defended their city against the Saracens, succumbed before Robert Guiscard, who took the castle after an eight months' siege and made Salerno the capital of his new territory. The removal of the court to Palermo and the sack of the city by the emperor Henry VI. in 1194 put a stop to its development. The medical school of the *Civitas Hippocratica* (as it called itself on its seals) held a high position in medieval times. Salerno university, founded in 1150, and long one of the great seats of learning in Italy, was closed in 1817.

See A. Avena, *Monumenti dell' Italia Meridionale* (Naples, 1902), i. 371 sqq. (T. As.)

SALERS, a village of central France, in the department of Cantal, 30 m. N. of Aurillac by road. Pop. (1906), 659. Salers dates from the 9th or 10th century and its lords were already powerful in the 11th century. It is finely situated on a plateau overlooking the valley of the Maronne. It is a quaint old town with a church of the 13th and 15th centuries, remains of its ancient ramparts and many houses of the 15th and 16th centuries. Salers has given its name to a celebrated breed of red cattle raised in the district.

SALESBURY (or SALISBURY), **WILLIAM** (*c.* 1520–*c.* 1600), Welsh scholar, was a native of Denbighshire, being the son of Foulke Salesbury, who belonged to a family said to be descended from a certain Adam of Salzburg, a member of the ducal house of Bavaria, who came to England in the 12th century. Salesbury was educated at Oxford, where he accepted the Protestant

faith, but he passed most of his life at Llanrwst, working at his literary undertakings. The greatest Welsh scholar of his time, Salesbury was acquainted with nine languages, including Latin, Greek and Hebrew, and was learned in philology and botany. He died about 1600. About 1546 he edited a collection of Welsh proverbs (*Oll synwyr pen kembero*), probably the first book printed in Welsh, and in 1547 his *Dictionary in Englyshe and Welshe* was published (facsimile edition, 1877). In 1563 the English parliament ordered the Welsh bishops to arrange for the translation of the Scriptures and the book of common prayer into Welsh. The New Testament was assigned to Salesbury, who had previously translated parts of it. He received valuable assistance from Richard Davies, bishop of St Davids, and also from Thomas Huet, or Hewett (d. 1591), but he himself did the greater part of the work. The translation was made from the Greek, but Latin versions were consulted, and in October 1567 the New Testament was published for the first time in Welsh. This translation never became very popular, but it served as the basis for the new one made by Bishop William Morgan (*c.* 1547–1604). Salesbury and Davies continued to work together, translating various writings into Welsh, until about 1576 when the literary partnership was broken. After this event, Salesbury, although continuing his studies, produced nothing of importance.

Other noteworthy members of the family (the modern spelling is Salusbury) are: JOHN SALESBURY (*c.* 1500 1573), who held many preferments under the Tudor sovereigns and was bishop of Sodor and Man from 1571 to 1573; THOMAS SALESBURY (*c.* 1555–1586), an associate of Anthony Babington, who was executed for conspiring against Queen Elizabeth; HENRY SALESBURY (1561–*c.* 1637), the author of a Welsh grammar published in 1593; THOMAS SALESBURY (d. 1643), a poet, who probably fought for Charles I. at Edgehill; and another royalist, WILLIAM SALESBURY (*c.* 1580–*c.* 1659), governor of Denbigh Castle, which, in 1646, he gallantly defended in the interests of the king.

SALEYER (Dutch, *Saleijer*), a group of islands belonging to the government of Celebes and its dependencies in the Dutch East Indies, numbering altogether 73, the principal being Saleyer, Tambalongang, Pulasi and Bahuluwang; between 5° 36′ and 7° 25′ S. and 119° 50′ and 121° 30′ E. The main island, Saleyer, is over 50 m. long and very narrow; area, 248 sq. m. The strait separating it from Celebes is more than 100 fathoms deep and, running in a strong current, is dangerous for native ships to navigate. The strata of the island are all sedimentary rocks: coralline limestone, occasionally sandstone; everywhere, except in the north and north-west, covered by a fertile soil. The watershed is a chain running throughout the island from N. to S., reaching in Bontona Haru 5840 ft., sloping steeply to the east coast.

The population, mainly a mixed race of Macassars, Buginese, the natives of Luvu and Buton, is estimated at 57,000 on the main island and 24,000 on the dependent isles. They use the Macassar language, are for the most part nominally Mahommedans (though many heathen customs survive), and support themselves by agriculture, fishing, seafaring, trade, the preparation of salt (on the south coast) and weaving. Field work is largely performed by a servile class. Raw and prepared cotton, tobacco, trepang, tortoise-shell, coco-nuts and coco-nut oil, and salt are exported. There are frequent emigrations to Celebes and other parts of the archipelago. For that reason, and also on account of its excellent horses and numerous buffaloes, Saleyer is often compared with Madura, being of the same importance to Celebes as is Madura to Java.

SALFORD, a municipal, county and parliamentary borough of Lancashire, England, 189 m. N.W. by N. of London and 31 m. E. by N. of Liverpool. Pop. (1908 estimate), 239,234. Salford also gives its name to the hundred of south-west Lancashire in which Manchester is situated; probably because when the district was divided into hundreds Manchester was in a ruinous condition from Danish ravages. The parliamentary and municipal boundaries of Salford are identical; area, 5170 acres. The parliamentary borough has three divisions, each returning a member. The borough, composed of three townships identical with the ancient manors of Salford, Pendleton and Broughton, is for the most part separated from Manchester by the river Irwell, which is crossed by a series of bridges. The valley of the Irwell, now largely occupied by factories, separates the higher ground of Broughton from that of Pendleton, and is flattest at the south where it joins the Manchester boundary. At the other extremity of Salford it joins the borough of Eccles. The chief railway station is Exchange station, which is in Salford, but has its main approach in Manchester. The Lancashire & Yorkshire and the London & North-Western railways serve the town.

Until 1634 Salford was entirely dependent upon Manchester in its ecclesiastical arrangements. In that year Sacred Trinity Church ("Salford Chapel") was built and endowed under the will of Humphrey Booth the elder, who also founded charities which have grown greatly in value. The yearly income of more that £17,000 is disposed of in pensions and in hospital grants. His grandson, Humphrey Booth the younger, left money for the repair of the church and the residue is distributed amongst the poor. The yearly revenue is about £1400. Salford is the seat of a Roman Catholic bishopric, and its cathedral, St John's, with its spire of 240 ft., is the most noteworthy ecclesiastical building in the borough. Salford has been to a large extent overshadowed by Manchester, and the two boroughs, in spite of their separate government, are so closely connected as to be one great urban area. Many of the institutions in Manchester are intended for the service also of Salford, which, however, has resisted all attempts at municipal amalgamation.

The chief public buildings are the museum and art gallery at Peel Park, the technical school, the education offices and the Salford Hospital. The town hall, built in 1825, is no longer adequate for municipal needs. Broughton and Pendleton have each a separate town hall. The large and flourishing technical school was developed from a mechanics' institution. Peel Park, bought by public subscription in 1846, was the first public recreation ground in the borough. In the grounds are Langworthy Gallery and a museum. In the park are statues of Queen Victoria, the Prince Consort, Sir Robert Peel, Joseph Brotherton and Richard Cobden. The only other monument—a South African War memorial—is outside and almost opposite Peel Park. Other parks are at Seedley, Albert and Buile Hill; the last contains a museum, the contents of which have been transferred from Peel Park. There is also Kersal Moor, 21 acres of Moorland, crossed by a Roman road, which has been noticed for the variety of its flora, and for the capture of the *Oecophara Woodiella*, of which there is no other recorded habitat. The David Lewis recreation ground at Pendleton may also be named. Altogether Salford has thirty parks and open spaces having a total area of 217 acres. The corporation have also provided two cemeteries.

When the municipal museum was founded in 1849 a reference library formed part of the institution, and from this has developed a free library system in which there are also nine lending libraries.

The commercial and industrial history of Salford is closely bound up with that of Manchester. It is the seat of extensive cotton, iron, chemical and allied industries. It owes its development to the steam-engine and the factory system, and in recent years has shared in the increase of trade owing to the construction of the Manchester Ship Canal, which has added greatly to its prosperity. This will be seen by an examination of the rateable value of the three townships now comprised in the borough. This in 1692 was £1404; in 1841, £244,853; in 1884, £734,220; in 1901, £967,727; in 1908–1909, £1,022,172.

The municipal government is in the hands of a town council consisting of 16 aldermen and 48 councillors elected in 16 wards. The water-supply is from Manchester. The corporation have an excellent tramway service. There are also municipal baths. Salford has a separate commission of the peace.

There are no certain figures as to the population before 1773, when at the instance of Dr Thomas Percival a census was taken of Manchester and Salford. The latter had then 4755 inhabitants. Census returns show that its population in 1801 was 14,477; in 1851, 63,850; and in 1901, 220,956. The death-rate in 1906 was 18·5 per thousand.

Within the present borough area there have been found neolithic implements and British urns, as well as Roman coins. In 1851 traces of a Roman road were still visible. Domesday Book mentions Salford as held by Edward the Confessor and as having a forest three leagues long and the same broad. At the Conquest it was part of the domain granted to Roger of Poitou, but reverted to the crown in 1102. After successively belonging to the earls of Chester and of Derby it passed to Edward Crouchback, earl of Lancaster. It was erected into a duchy and county palatine in 1353, and when the house of Lancaster succeeded to the throne their Lancashire possessions were kept separate. Salford and Pendleton are still parts of the ancient duchy of Lancaster, belonging to the English crown. In 1231 Ranulf de Blundeville, earl of Chester, granted a charter constituting Salford a "free borough." But the government notwithstanding was essentially manorial and not municipal. In the Civil Wars between Charles I. and the parliament, Salford was royalist,

and the unsuccessful siege of Manchester was conducted from its side of the Irwell. Its later history is mainly identical with that of Manchester (*q.v.*). In 1844 it received a municipal charter and became a county borough in 1889.

BIBLIOGRAPHY.—There is no separate history of Salford; see publications named under MANCHESTER. The MS. records of the Portmote or Court Leet, 1597–1669, were edited by J. G. Mandley for the Chetham Society, but others still remain in manuscript in the State Paper Office. (W. E. A. A.)

SALICETI, ANTOINE CHRISTOPHE (1757–1809), French revolutionist, was born at Saliceto, in Corsica, on the 26th of August 1757, of a family of Piacenza. After studying law in Tuscany, he became an *avocat* at the upper council of Bastia, and was elected deputy of the Third Estate to the French states-general in 1789. As deputy to the Convention, Saliceti voted for the death of Louis XVI., and was sent to Corsica on mission to oppose the counter-revolutionary intrigues. But the success of his adversaries compelled him to withdraw to Provence, where he took part in repressing the revolts at Marseilles and Toulon. It was on this mission that he met and helped his compatriot Bonaparte. On account of his friendship with Robespierre, Saliceti was denounced at the revolution of 9 Thermidor, and was saved only by the amnesty of the year IV. He subsequently organized the army of Italy and the two departments into which Corsica had been divided, was deputy to the Council of the Five Hundred, and accepted various offices under the Consulate and the Empire, being minister of police and of war at Naples under Joseph Bonaparte (1806–1809). He died at Naples on the 23rd of December 1809—it has been alleged by poison.

SALICIN, SALICINUM, $C_{13}H_{18}O_7$, the bitter principle of willow-bark, discovered by Leroux in 1831. It exists in most species of *Salix* and *Populus*, and has been obtained to the extent of 3 or 4 % from the bark of *S. helix* and *S. pentandra*.

Salicin is prepared from a decoction of the bark by first precipitating the tannin by milk of lime, then evaporating the filtrate to a soft extract, and dissolving out the salicin by alcohol. As met with in commerce it is usually in the form of glossy white scales or needles. It is neutral, odourless, unaltered by exposure to the air, and has a bitter taste. It is soluble in about 30 parts of water and 80 parts of alcohol at the ordinary temperature, and in 0·7 of boiling water or in 2 parts of boiling alcohol, and more freely in alkaline liquids. It is also soluble in acetic acid without alteration, but is insoluble in chloroform and benzol. From phloridzin it is distinguished by its ammoniacal solution not becoming coloured when exposed to the air. Chemically, it is a glucoside derived from glucose and *saligenin* (o-oxy-benzyl alcohol), into which it is decomposed by the enzymes ptyaline and emulsin. Oxidation converts it into *helicin* (salicyl-aldehyde-glucose). *Populin*, a benzoyl salicin, is a glucoside found in the leaves and bark of *Populus tremula*.

Salicin is used in medicine for the same purposes as salicylic acid and the salicylates. It is also used as a bitter tonic, *i.e.* a gastric stimulant, in doses of five grains. The ordinary dose may go up to forty grains or more with perfect safety, though the British Pharmacopoeia limits it to twenty. The remote action of the drug is that of salicylic acid or the numerous compounds that contain it (see SALICYLIC ACID).

SALIC LAW, and OTHER FRANKISH LAWS. The Salic Law is one of those early medieval Frankish laws which, with other early Germanic laws (see GERMANIC LAWS), are known collectively as *leges barbarorum*. It originated with the Salian Franks, often simply called Salians, the chief of that conglomeration of Germanic peoples known as Franks.

The Salic Law has come down to us in numerous MSS. and in divers forms. The most ancient form, represented by Latin MS. No. 4404 in the Bibliothèque Nationale at Paris, consists of 65 chapters. The second form has the same 65 chapters, but contains interpolated provisions which show Christian influence. The third text consists of 99 chapters, and is divided into two groups, according as the MSS. contain or omit the "Malberg glosses."[1] The fourth version, as emended by Charlemagne, consists of 70 chapters with the Latinity corrected and without the glosses. Though he added some new provisions, Charlemagne respected the ancient ones, even those which had long fallen into disuse. The last version, published by B. J. Herold at Basel in 1557 (*Originum ac Germanicarum antiquitatum libri*) from a MS. now lost, is founded on the second recension, but contains additions of considerably later date.

The law is a compilation, the various chapters were composed at different periods, and we do not possess the original form of the compilation. Even the most ancient text, that in 65 chapters, contains passages which a comparison with the later texts shows to be interpolations. It is possible that chapter i., *De mannire*, was taken from a Merovingian capitulary and afterwards placed at the beginning of the Salic Law. This granted, internal evidence would go to show that the first compilation dates back to the time of Clovis, and doubtless to the last years of his reign, after his victory over the Visigoths (507–511). Many facts combine to preclude the assignment of an earlier date to the compilation of the law. The Germanic tribes had no need to use the Latin language until they had coalesced with the Gallo-Roman population. The scale of judicial fines is given in the *denarius* ("which makes so many *solidi*"), and it is known that the monetary system of the *solidus* did not appear until the Merovingian period. Even in its earliest form the law contains no trace of paganism—a significant fact when we consider how closely law and religion are related in their origins. As pointed out by H. Brunner in his *Deutsche Rechtsgeschichte* (i. 438), the Salic Law contains imitations of the Visigothic laws of Euric (466–485). Finally, chapter xlvii. seems to indicate that the Frankish power extended south of the Loire, since it speaks of men dwelling "trans Legerem" being summoned to the *mallus* (judicial assembly) and being allowed eighty nights for their journey. On the other hand, it is impossible to place the date of compilation later. The Romans are clearly indicated in the law as subjects, but as not yet forming part of the army, which consists solely of the *antrustions*, *i.e.* Frankish warriors of the king's bodyguard. As yet the law is not impregnated with the Christian spirit; this absence of both Christian and Pagan elements is due to the fact that many of the Franks were still heathens, although their king had been converted to Christianity. Christian enactments were introduced gradually into the later versions. Finally, we find capitularies of the kings immediately following Clovis being gradually incorporated in the text of the law *e.g.* the *Pactum pro tenore pacis* of Childebert I. and Clotaire I. (511–558), and the *Edictum Chilperici* (561–584), chapter iii. of which cites and emends the Salic Law.

The law as originally compiled underwent modifications of varying importance before it took the form known to us in Latin MS. No 4404, to which the edict of Childebert I. and Clotaire I. is already appended. The classes of MSS. distinguished above give evidence of further changes, the law being supplemented by other capitularies and sundry *extravagantia*, prologues and epilogues, which some historians have wrongly assumed to be parts of the main text. Finally, Charlemagne, who took a keen interest in the ancient documents, had the law emended, the operation consisting in eliminating the Malberg glosses, which were no longer intelligible, correcting the Latinity of the ancient text, omitting a certain number of interpolated chapters, and adding others which had obtained general sanction.

The Salic Law is a collection of ancient customs put into writing by order of the prince. In the sense that they already existed and came ready-made to the prince's hand, it is legitimate to speak of these customs as a popular law, a *Volksrecht*; but it was the prince who gave them force of law, emended them, and rejected such of the ancient usages as appeared to him antiquated. The king, moreover, had the right to add provisions to the law; and we find capitularies of Charlemagne and Louis the Pious in the form of *additamenta* to the Salic Law.

From this it will be seen that the Salic Law is not a political law; it is in no way concerned with the succession to the throne of France, and it is absolutely false to suppose that it was the Salic Law that was invoked in 1316 and 1322 to exclude the daughters of Louis X. and Philip V. from the succession to the throne. The Salic Law is pre-eminently a penal code, which shows the amount of the fines for various offences and crimes, and contains, besides, some civil law enactments, such as the famous chapter on succession to private property (*de alode*), which declares that daughters cannot inherit land. The text is filled with valuable information on the state of the family and property in the 6th century, and it is astonishing to find Montesquieu describing the Salic Law as the law of a people ignorant of landed property. The code also contains abundant information on the organization of the tribunals (tribunal of the hundred and tribunal of the king) and on procedure.

Like all the barbarian laws, the law of the Salian Franks

[1] Some of the MSS. contain words in a barbarian tongue and often preceded by the word "malb." or "malberg." These are admitted to be Frankish words, and are known as the Malberg glosses. Opinions differ as to the true import of these glosses; some scholars hold that the Salic Law was originally written in the Frankish vernacular, and that these words are remnants of the ancient text, while others regard them as legal formulae such as would be used either by a plaintiff in introducing a suit, or by the judge to denote the exact composition to be pronounced. It is more probable, however, that these words served the Franks, who were ignorant of Latin, as clues to the general sense of each paragraph of the law.

was a personal law; it applied only to the Salian Franks. As the Salians, however, were the victorious race, the law acquired an authority in excess of the other barbarian laws, and in the additions made to the Ripuarian, Lombard, and other allied laws, the Carolingians endeavoured to bring these laws into harmony with the Salic Law. Moreover, many persons, even of foreign race, declared themselves willing to live under the Salic Law. The principle of personality, however, gradually gave way to that of territoriality; and in every district, at least north of the Loire, customs were formed in which were combined in varying proportions Roman law, ecclesiastical law and the various Germanic laws. So late as the 10th and 11th centuries we find certain texts invoking the Salic Law, but only in a vague and general way; and it would be rash to conclude from this that the Salic Law was still in force.

Of the numerous editions of the Salic Law only the principal ones can be mentioned: J. M. Pardessus, *Loi salique* (Paris, 1843), 8 texts; G. Waitz, *Das alte Recht der salischen Franken* (1846), text of the first version; J. F. Behrend, *Lex Salica* (1873; 2nd ed., Weimar, 1897); J. H. Hessels, *Lex Salica: the Ten Texts with the Glosses, and the Lex Emendata*, with notes on the Frankish words in the *Lex Salica* by H. Kern (1880), the various texts shown in synoptic tables; A. Holder, *Lex Salica* (1879 seq.), reproductions of all the MSS. with all the abbreviations; H. Geficken, *Lex Salica* (Leipzig, 1898), the text in 65 chapters, with commentary paragraph by paragraph, and appendix of *additamenta*; and the edition undertaken by Mario Krammer for the *Mon. Germ. hist.* For further information see the dissertations prefixed to the editions of Pardessus, Waitz and Hessels; Jungbohn Clement, *Forschungen über das Recht der salischen Franken* (Berlin, 1876); R. Sohm, *Der Prozess der Lex Salica* (Weimar, 1867; French trans. by M. Thévenin) and *Die fränkische Reichs- und Gerichtsverfassung* (Weimar, 1870); J. J. Thonissen, *L'Organisation judiciaire, le droit pénal et la procédure de la loi salique* (2nd ed., Brussels and Paris, 1882); P. E. Fahlbeck, *La Royauté et le droit royal francs* (Lund, 1883); Mario Krammer, "Kritische Untersuchungen zur Lex Salica" in the *Neues Archiv*, xxx. 263 seq.; H. Brunner, *Deutsche Rechtsgeschichte* (2nd ed., Leipzig, 1906), i. 427 seq.

The *Lex Ripuaria* was the law of the Ripuarian Franks, who dwelt between the Meuse and the Rhine, and whose centre was Cologne. We have no ancient MSS. of the law of the Ripuarians; the 35 MSS. we possess, as well as those now lost which served as the basis of the old editions, do not go back beyond the time of Charlemagne (end of 8th century and 9th century). In all these MSS. the text is identical, but it is a revised text—in other words, we have only a *lex emendata*.

On analysis, the law of the Ripuarians, which contains 89 chapters, falls into three heterogeneous divisions. Chapters i.-xxxi. consist of a scale of compositions; but, although the fines are calculated, not on the unit of 15 *solidi*, as in the Salic Law, but on that of 18 *solidi*, it is clear that this part is already influenced by the Salic Law. Chapters xxxii.-lxiv. are taken directly from the Salic Law; the provisions follow the same arrangement; the unit of the compositions is 15 *solidi*; but capitularies are interpolated relating to the affranchisement and sale of immovable property. Chapters lxv.-lxxxix. consist of provisions of various kinds, some taken from lost capitularies and from the Salic Law, and others of unknown origin. The compilation apparently goes back to the reign of Dagobert I. (629–639), to a time when the power of the mayors of the palace was still feeble, since we read of a mayor being threatened with the death penalty for taking bribes in the course of his judicial duties. It is probable, however, that the first two parts are older than the third. Already in the Ripuarian Law the divergences from the old Germanic law are greater than in the Salic Law. In the Ripuarian Law a certain importance attaches to written deeds; the clergy are protected by a higher *wergild*—600 *solidi* for a priest, and 900 for a bishop; on the other hand, more space is given to the *cojuratores* (sworn witnesses); and we note the appearance of the judicial duel, which is not mentioned in the Salic Law.

There is an edition of the text of the Ripuarian Law in *Mon. Ger. hist. Leges* (1883), v. 185 seq. by R. Sohm, who also brought out a separate edition in 1885 for the use of schools. For further information see the prefaces to Sohm's editions; Ernst Mayer, *Zur Entstehung der Lex Ribuariorum* (Munich, 1886); Julius Ficker, "Die Heimat der Lex Ribuaria" in the *Mitteilungen für österreichische Geschichtsforschung* (supplt., vol. v.); H. Brunner, *Deutsche Rechtsgeschichte* (2nd ed., Leipzig, 1906), i., 442.

Lastly, we possess a judicial text in 48 paragraphs, which bears the title of *Notitia vel commemoratio de illa ewa (law), quae se ad Amorem habet.* This was in use in the district along the Yssel formerly called Hamalant. The name Hamalant is unquestionably derived from the Frankish tribe of the Chamavi, and the document is often called *Lex Francorum Chamavorum.* This text, however, is not a law, but rather an abstract of the special usages obtaining in those regions—what the Germans call a *Weistum.* It was compiled by the itinerant Frankish officials known as the *missi Dominici*, and the text undoubtedly goes back to the time of Charlemagne, perhaps to the years 802 and 803, when the activity of the *missi* was at its height. In certain chapters it is possible to discern the questions of the *missi* and the answers of the inhabitants.

There is an edition of this text by R. Sohm in *Mon. Germ. hist Leges*, v. 269, and another appended to the same writer's school edition of the *Lex Ribuaria.* For further information see E. T. Gaupp, *Lex Francorum Chamavorum* (Breslau, 1855; French trans. in vol. i. of the *Revue historique de droit français et étranger*); Fustel de Coulanges, *Nouvelles Recherches sur quelques problèmes d'histoire* (Paris, 1891), pp. 399-414; H. Froidevaux, *Recherches sur la lex dicta Francorum Chamavorum* (Paris, 1891). (C. Pf.)

SALICYLIC ACID (ortho-hydroxybenzoic acid), an aromatic acid, $C_6H_4(OH)(CO_2H)$, found in the free state in the buds of *Spiraea Ulmaria* and, as its methyl ester, in gaultheria oil and in the essential oil of *Andromeda Leschenaultii.* It was discovered in 1838 by Piria as a decomposition product of salicin. It may be obtained by the oxidation of saligenin and of salicylic aldehyde; by the distillation of copper benzoate; by the decomposition of anthranilic acid with nitrous acid; by fusion of ortho-chlor or ortho-brom benzoic acid with potash; by heating ortho-cyanphenol with alcoholic potash; by heating a mixture of phenol, carbon tetrachloride and alcoholic potash to 100° C. (F. Tiemann and K. Reimer, *Ber.*, 1876, 9, p. 1285); and by the action of sodium on a mixture of phenol and chlorcarbonic ester (T. Wilm and G. Wischin, *Zeit. f. Chemie*, 1868, 6).

It is manufactured by Kolbe's process or by some modification of the same. Sodium phenolate is heated in a stream of carbon dioxide in an iron retort at a temperature of 180-220° C., when half the phenol distils over and a basic sodium salicylate is left. The sodium salt is dissolved in water and the free acid precipitated by hydrochloric acid (H. Kolbe, *Ann.*, 1860, 115, p. 201). R. Schmitt (*Jour. prak. Chem.*, 1885 (2), 31, p. 407) modified the process by saturating sodium phenolate at 130° C. with carbon dioxide, in an autoclave, sodium phenyl carbonate $C_6H_5O{\cdot}CO_2Na$ being thus formed; by continuing the heating under pressure this carbonate gradually changes into mono-sodium salicylate. S. Manasse (German patent 73,279) prepared an intimate mixture of phenol and potassium carbonate, which is then heated in a closed vessel with carbon dioxide, best at 130-100° C. The Chemische Fabrik vorm. Hofmann & Schötensack decompose a mixture of phenol (3 molecules) and sodium carbonate (4 mols.) with carbonyl chloride at 140-200° C. When 90 % of the phenol has distilled over, the residue is dissolved and hydrochloric acid added, any phenol remaining is blown over in a current of steam, and the salicylic acid finally precipitated by hydrochloric acid. The acid may also be obtained by passing carbon monoxide over a mixture of sodium phenolate and sodium carbonate at 200° C.: $Na_2CO_3 + C_6H_5ONa + CO = C_7H_4O_3Na_2 + HCO_2Na$; and by heating sodium phenolate with ethyl phenyl carbonate to 200°C.: $C_6H_5O{\cdot}CO_2C_2H + C_6H_5ONa = HO{\cdot}C_6H_4CO_2Na + C_6H_5{\cdot}C_2H_5$. It is to be noted in the Kolbe method of synthesis that potassium phenolate may be used in place of the sodium salt, provided that the temperature be kept low (about 150° C.), for at the higher temperature (220° C.) the isomeric para-oxybenzoic acid is produced.

Salicylic acid crystallizes in small colourless needles which melt at 155° C. It is sparingly soluble in cold water, but readily dissolves in hot. It sublimes, but on rapid heating decomposes into carbon dioxide and phenol. It is volatile in steam. Ferric chloride colours its aqueous solution violet. Potassium bichromate and sulphuric acid oxidize it to carbon dioxide and water; and potassium chlorate and hydrochloric acid to chloranil. On boiling with concentrated nitric acid it yields picric acid. When heated with resorcin to 200° C. it gives trioxybenzophenone. Bromine water in dilute aqueous solution gives a white precipitate of tribromophenol-bromide $C_6H_2Br_3{\cdot}OBr$. Sodium reduces salicylic acid in boiling amyl alcohol solution to *n*-pimelic acid (A. Einhorn and R. Willstätter, *Ber.*, 1893, 26, pp. 2, 913; 1894, 27 p. 331). Potassium persulphate oxidizes it in alkaline solution, the product on boiling with acids giving

hydroquinone carboxylic acid (German Patent 81,297). When boiled with calcium chloride and ammonia, salicylic acid gives a precipitate of insoluble basic calcium salicylate, $C_6H_4<\begin{matrix}CO_2\\O\end{matrix}>Ca$, a reaction which serves to distinguish it from the isomeric meta- and para-hydroxybenzoic acids. It yields both esters and ethers since it is an acid and also a phenol.

Methyl Salicylate, $C_6H_4(OH)\cdot CO_2CH_3$, found in oil of wintergreen, in the oil of *Viola tricolor* and in the root of varieties of *Polygala*, is a pleasant-smelling liquid which boils at 222° C. On passing dry ammonia into the boiling ester, it gives *salicylamide* and dimethylamine. When boiled with aniline it gives methylaniline and phenol. *Ethyl salicylate*, $C_6H_4(OH)\cdot CO_2C_2H_5$, is obtained by boiling salicylic acid with alcohol and a little sulphuric acid, or by dropping an alcoholic solution of salicylic acid into β-naphthalene sulphonic acid at a temperature of 140-150° C. (German Patent 76,574). It is a pleasant-smelling liquid which boils at 233° C. It is practically unchanged when boiled with aniline. *Phenyl salicylate* $C_6H_4(OH)\cdot C\cdot O_2C_6H_5$, or salol, is obtained by heating salicylic acid, phenol and phosphorus oxychloride to 120-125° C.; by heating salicylic acid to 220° C.; or by heating salicyl metaphosphoric acid and phenol to 140-150° C. (German Patent 85,565). It crystallizes in rhombic plates which melt at 42° C. and boil at 172° C. (12 mm.). Its sodium salt is transformed into the isomeric $C_6H_4(OC_6H_5)\,CO_2Na$ when heated to 300°. When heated in air for many hours it decomposes, yielding carbon dioxide, phenol and xanthone. *Acetyl-salicylic acid* (salacetic acid), $C_6H_4(O\cdot COCH_3)\cdot CO_2H$, is obtained by the action of acetyl chloride on the acid or its sodium salt (K. Kraut, *Ann.*, 1869, 150, p. 9). It crystallizes in needles and melts at 132° C. (with decomposition). Hydrolysis with baryta water gives acetic and salicylic acids. It is used in medicine under the names aspirin, acetysal, aletodin, saletin, xaxa, &c. It has the same action as salicylic acid and salicylates, but is said to be much freer from objectionable secondary effects. *Salicylo-salicylic acid* $O\cdot(C_6H_4CO_2H)_2$ is obtained by continued heating of salicylic acid and acetyl chloride to 130-140° C. It is an amorphous yellow mass which is easily soluble in alcohol.

Applications.—The addition of a little of the acid to glue renders it more tenacious; skins to be used for making leather do not undergo decomposition if steeped in a dilute solution; butter containing a small quantity of it may be kept sweet for months even in the hottest weather. It also prevents the mouldiness of preserved fruits and has been found useful in the manufacture of vinegar. The use of salicylic acid as a food preservative, was, however, condemned in the findings of the commission appointed by the government of the United States of America, in 1904.

Medicine.—The pharmacopeial dose of the acid is 5-20 grains, but it is so unrelated to experience and practice that it may be ignored. The British Pharmacopeia contains only one preparation, an ointment containing one part of acid to 49 of white paraffin ointment. Salicylic acid is now never given internally, being replaced by its sodium salt, which is much cheaper, more soluble and less irritating to mucous membranes. The salt has a sweet, mawkish taste.

Salicylic acid and salicin (*q.v.*) share the properties common to the group of aromatic acids, which, as a group, are antiseptic without being toxic to man—a property practically unique; are unstable in the body; are antipyretic and analgesic; and diminish the excretion of urea by the kidneys. As an antiseptic salicylic acid is somewhat less powerful than carbolic acid, but its insolubility renders it unsuitable for general use. It is much more powerful than carbolic acid in its inhibitory action upon unorganized ferments such as pepsin or ptyalin. Salicyclic acid is not absorbed by the skin, but it rapidly kills the cells of the epidermis, without affecting the immediately subjacent cells of the dermis ("true skin"). It has a very useful local anhidrotic action. Salicylic acid is a powerful irritant when inhaled or swallowed in a concentrated form, and even when much diluted it causes pain, nausea and vomiting. When salicin is taken internally no irritant action occurs, nor is there any antisepsis. Whatever drug of this group be taken, the product absorbed by the blood is almost entirely sodium salicylate. When the salt is taken by the mouth, absorption is extremely rapid, the salt being present in the peripheral blood within ten minutes.

Sodium salicylate circulates in the blood unchanged, decomposition occurring in the kidney, and probably in tissues suffering from the *Diplococcus rheumaticus* of Poynton and Paine. It used to be stated that these drugs are marked cardiac depressants; and the heart being invariably implicated in rheumatic fever, it is supposed that these drugs must be given with great caution. It has now been established that, provided the kidneys be healthy, natural salicylic acid, sodium salicylate prepared from the natural acid, and salicin, are not cardiac depressants. Of the two latter, 300 grains may be given in a dose and 1½ oz. in twenty-four hours, without any toxic symptoms. The artificial acid and its salt contain ortho-, para- and meta-cresotic acids, which are cardiac depressants. The vegetable product—which is extremely expensive—must be prescribed or the synthetic product guaranteed "physiologically pure," *i.e.* tested upon animals and found to have no toxic properties. Salicylates are the next safest to quinine of all antipyretics, whilst being much more powerful in all febrile states except malaria. Sodium salicylate escapes from the blood mainly by the kidneys, in the secretion of which sodium salicylate and salicyluric acid can be detected within fifteen minutes of its administration. After large doses haematuria has been observed in a few cases. The rapid excretion by the kidneys is one of the cardinal conditions of safety, and also necessitates the very frequent administration of the drug.

Therapeutics.—Salicylic acid is used externally for the removal of corns and similar epidermic thickenings. It causes some pain, so that a sedative should be added. A common formula has 11 parts of the acid, 3 of extract of Indian hemp, and 86 of collodion. There is probably no better remedy for corns. Perspiration of the feet cannot be attacked locally with more success than by a powder consisting of salicylic acid, starch and chalk.

These drugs are specific for acute rheumatism (rheumatic fever). The drug is not a true specific, as quinine is for malaria, since it rarely, if ever, prevents the cardiac damage usually done by rheumatic fever; but it entirely removes the agonizing pain, shortly after its administration, and, an hour or two later, brings down the temperature to normal. In thirty-six hours no symptoms are left. If the drug be now discontinued, they will return in over 90 % of cases. In acute gonorrhoeal arthritis, simulating rheumatic fever, salicylates are useless. They may thus afford a means of diagnosis. In rheumatic hyperpyrexia, where the poison has attacked the central nervous system, salicylates almost always fail. The mode of their administration in rheumatic fever is of the utmost importance. At first 20 grains of sodium salicylate should be given every hour: the interval being doubled as soon as the pain disappears, and extended to three hours when the temperature becomes normal. The patient should continue to take about 100 grains a day for at least a fortnight after he is apparently convalescent, otherwise a recrudescence is very probable.

Salicylate of soda may occasionally be of use in cases of gallstone, owing to its action on the bile. It often relieves neuralgia, especially when combined with caffeine and quinine.

Salicylism, or salicylic poisoning, occurs in a good many cases of the use of these drugs. Provided the kidneys be healthy, the symptoms may be ignored. If nephritis be present, it may be seriously aggravated, and the drug must therefore be withheld. The headache, deafness, ringing in the ears and even delirium of salicylism, are practically identical with the symptoms of cinchonism. The drug must be at once withheld if haemorrhages (subcutaneous, retinal, &c.) are observed. As in the case of quinine, the administration of small doses of hydrobromic acid often relieve the milder symptoms.

SALIERI, ANTONIO (1750–1825), Italian composer, was born at Legnano, on the 19th of August 1750. His father was a merchant who died a bankrupt. Through the family of Mocenigo he obtained free admission to the choir school of St Mark's, Venice. In 1766 he was taken to Vienna by F. L. Gassmann, who introduced him to the emperor Joseph. His first opera, *Le Donne letterate*, was produced at the Burg-Theater in 1770. Others followed in rapid succession, and his *Armida* (1771) was a triumphant success.

On Gassmann's death in 1774, he became *Kapellmeister* and, on the death of Bonno in 1788, *Hofkapellmeister*. He held his offices for fifty years, though he made frequent visits to Italy and Paris, and composed music for many European theatres. His *chef d'œuvre* was *Tarare* (afterwards called *Axur, re d' Ormus*), a work which was preferred by the public of Vienna to Mozart's *Don Giovanni*. It was first produced at Vienna on the 8th of June 1787, and was revived at Leipzig in 1846, though only for a single representation. His last opera was *Die Neger*, produced in 1804. After this he devoted himself to the composition of church music, for which he had a very decided talent. Salieri lived on friendly terms with Haydn, but was a bitter enemy to Mozart, whose death he was suspected of having produced by poison; but no evidence was ever forthcoming to give colour to the accusation. He retired from office on his full salary in 1824, and died at Vienna on the 7th of May 1825. Salieri gave lessons in composition to Cherubini and to Beethoven, who dedicated to him his "Three Sonatas for Pianoforte and Violin," *Op.* 12.

See also Albert von Hermann, *Antonio Salieri, eine Studie* (1897); J. F. Edler von Mosel, *Über das Leben und die Werke des Antonio Salieri* (Vienna, 1827).

SALII, the "dancers," an old Italian priesthood, said to have been instituted by Numa for the service of Mars, although later tradition derived them from Greece. They were originally twelve in number, called Salii Palatini to distinguish them from

a second college of twelve, Salii Agonales or Collini, said to have been added by Tullus Hostilius; the Palatini were consecrated to Mars, the Collini to Quirinus. All the members were patricians, vacancies being filled by co-optation from young men whose parents were both living; membership was for life, subject to certain exceptions. The officials of the college were the magister, the praesul, and the vates (the leaders in dance and song).

Each college had the care of twelve sacred shields called ancilia. According to the story, during the reign of Numa a small oval shield fell from heaven, and Numa, in order to prevent its being stolen, had eleven others made exactly like it. They were the work of a smith named Mamurius Veturius, probably identical with the god Mamers (Mars) himself. These twelve shields (amongst which was the original one) were in charge of the Salii Palatini. The greater part of March (the birth-month of Mars), beginning from the 1st, on which day the ancile was said to have fallen from heaven and the campaigning season began, was devoted to various ceremonies connected with the Salii. On the 1st, they marched in procession through the city, dressed in an embroidered tunic, a brazen breastplate and a peaked cap; each carried a sword by his side and a short staff in his right hand, with which the shield, borne on the left arm, was struck from time to time. A halt was made at the altars and temples, where the Salii, singing a special chant, danced a war dance. Every day the procession stopped at certain stations (*mansiones*), where the shields were deposited for the night, and the Salii partook of a banquet (see Horace, *Odes*, i. 37. 2). On the next day the procession passed on to another *mansio*; this continued till the 24th, when the shields were replaced in their sacrarium. During this period the Salii took part in certain other festivities: the Equirria (Ecurria) on the 14th, a chariot race in honour of Mars on the Campus Martius (in later times called Mamuralia, in honour of Mamurius), at which a skin was beaten with staves in imitation of hammering; the Quinquatrus on the 19th, a one-day festival, at which the shields were cleansed; the Tubilustrium on the 23rd, when the trumpets of the priests were purified. On the 19th of October, at the Armilustrium or purification of arms, the ancilia were again brought out and then put away for the winter. The old chant of the Salii, called *axamenta*, was written in the old Saturnian metre, in language so archaic that even the priests themselves could hardly understand it.

See Quintilian, *Instit.* i. 6. 40; also J. Wordsworth, *Fragments and Specimens of Early Latin* (1874). The best account of the Salii generally will be found in Marquardt, *Römische Staatsverwaltung*, iii. (1885) pp. 427-438.

SALIMBENE, or more usually SALIMBENE OF PARMA (1221–*c.* 1290), the name taken by the Italian writer, Ognibene di Guido di Adamo. The son of a crusader, Gui di Adamo, and born at Parma on the 9th of October 1221, Ognibene entered the order of the Minorites in 1238, and was known as brother Salimbene. He passed some years in Pisa and other Italian towns; then in 1247 he was sent to Lyons, and from Lyons he went to Paris, returning through France to Genoa, where he became a priest in 1249. From 1249 to 1256 he resided at Ferrara, engaged in writing and in copying manuscripts, but later he found time to move from place to place. His concluding years were mainly spent in monastic retirement in Italy, and he died soon after 1288.

Salimbene was acquainted with many of the important personages of his day, including the emperor Frederick II., the French king St Louis and Pope Innocent IV.; and his *Chronicon*, written after 1281, is a work of unusual value. This covers the period 1167–1287. Salimbene is a very discursive and a very personal writer, but he gives a remarkably vivid picture of life in France and Italy during the 13th century. The manuscript of the chronicle was found during the 18th century, and passed into the Vatican library, where it now remains. The part of the *Chronicon* dealing with the period between 1212 and 1287 was edited by A. Bertani and published at Parma in 1857. This edition, however, is very defective, but an excellent and more complete one has been edited by O. Holder-Egger, and is printed in Band xxxii. of the *Monumenta Germaniae historica. Scriptores* (Hanover, 1905).

See U. Balzani, *Le Croniche italiane nel medio evo* (Milan, 1884); L. Clédat, *De fratre Salimbene et de ejus chronicae auctoritate* (Paris, 1878); E. Michael, *Salimbene und seine Chronik* (Innsbruck, 1889); A. Molinier, *Les Sources de l'histoire de France*, tome iii. (1903); D. W. Duthie, *The Case of Sir John Fastolf and other Historical Studies* (1907); G. G. Coulton, *From St Francis to Dante* (1906).

SALINA, a city and the county-seat of Saline county, Kansas, U.S.A., on the Smoky Hill river, near the mouth of the Saline river, about 100 m. W. of Topeka. Pop. (1905, state census), 7829. It is served by the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, the Missouri Pacific and the Union Pacific railways. Salina has a Carnegie library, and is the seat of Kansas Wesleyan University (Methodist Episcopal; chartered in 1885, opened in 1886) and of St John's Military School (Protestant Episcopal). The city is the see of a Protestant Episcopal bishop. Salina is the central market of a fertile farming region. Power is furnished by the river, and among the manufactures are flour, agricultural implements, foundry products and carriages. The first settlement on the site of Salina was made in 1857. Its first railway, the Union Pacific, came through in 1867. Salina was first chartered as a city in 1870.

SALINA CRUZ, a seaport of Mexico, in the state of Oaxaca, at the southern terminus of the Tehuantepec National Railway. It is situated near the mouth of the Tehuantepec river, on the open coast of the Isthmus of Tehuantepec, and has no natural harbour. There was only a small Indian village here before Salina Cruz was chosen as the Pacific terminus of the railway. Since then a modern town has been laid out and built on adjacent higher ground. The new port was opened to traffic in 1907 and in 1909 its population was largely composed of labourers. A costly artificial harbour has been built by the Mexican government to accommodate the traffic of the Tehuantepec railway. It is formed by the construction of two breakwaters, the western 3260 ft. and the eastern 1900 ft. long, which curve toward each other at their outer extremities and leave an entrance 635 ft. wide. The enclosed space is divided into an outer and inner harbour by a double line of quays wide enough to carry six great warehouses with electric cranes on both sides and a number of railway tracks. Connected with the new port works is one of the largest dry docks in the world—610 ft. long and 89 ft. wide, with a depth of 28 ft. on its sill at low water. The works were planned to handle an immense volume of transcontinental freight, and before they were finished four steamship lines had arranged regular calls at Salina Cruz; this number has since been largely increased.

SALINS, a town of eastern France, in the department of Jura, on a branch line of the Paris-Lyon railway. Pop. (1906) 4293. Salins is situated in the narrow valley of the Furieuse, between two fortified hills, while to the north rises Mont Poupet (2798 ft.). The town possesses an interesting Romanesque church (which has been well restored) and an hôtel de ville of the 18th century. A Jesuit chapel of the 17th century contains a library (established in 1593) and a museum. Salins owes its name to its saline waters, used for bathing and drinking. There are also salt workings and gypsum deposits.

The territory of Salins, which was enfeoffed in the 10th century by the abbey of Saint Maurice in Valais to the counts of Mâcon, remained in possession of their descendants till 1175. Maurette de Salins, heiress of this dynasty, left the lordship to the house of Vienne, and her granddaughter sold it in 1225 to Hugh IV., duke of Burgundy, who ceded it in 1237 to John of Chalon (d. 1267) in exchange for the countship of Chalon-sur-Saône. John's descendants—counts and dukes of Burgundy, emperors and kings of the house of Austria—bore the title of sire de Salins. In 1477 Salins was taken by the French and temporarily made the seat of the *parlement* of Franche-Comté by Louis XI. In 1668 and 1674 it was retaken by the French and thenceforward remained in their power. In 1825 the town was almost destroyed by fire. In 1871 it successfully resisted the German troops.

SALISBURY, EARLS OF. The title of earl of Salisbury was first created about 1149, when it was conferred on Patrick de Salisbury (sometimes from an early date called in error Patrick Devereux), a descendant of Edward de Salisbury, mentioned in Domesday as *vicecomes* of Wiltshire. His granddaughter Isabella became countess of Salisbury *suo jure* on the death of her father, William the 2nd earl, without male heirs, in 1196, and the title was assumed by her husband, William de Longespée (d. 1226), illegitimate son of King Henry II. possibly by Rosamond Clifford ("The fair Rosamond"). Isabella survived her husband, and outlived both her son and grandson, both called Sir William de Longespée, and on her death in 1261 her great-granddaughter Margaret (d. 1310), wife of Henry de Lacy, earl of Lincoln, probably became *suo jure* countess of Salisbury; she transmitted the title to her daughter Alice, who married Thomas Plantagenet, earl of Lancaster. Lancaster having been attainted and beheaded in 1322, the countess made a surrender of her lands

and titles to Edward II., the earldom thus lapsing to the crown.

The earldom of Salisbury was granted in 1337 by Edward III. to William de Montacute, Lord Montacute (1301–1344), in whose family it remained till 1400, when John, 3rd earl of this line, was attainted and his titles forfeited. His son Thomas (1388–1428) was restored in blood in 1421; and Thomas's daughter and heiress, Alice, married Sir Richard Neville (1400–1460), a younger son of Ralph Neville, 1st earl of Westmorland and a grandson of John of Gaunt, who sat in parliament in right of his wife as earl of Salisbury; he was succeeded by his son Richard, on whose death without male issue in 1471 the earldom fell into abeyance. George Plantagenet, duke of Clarence, brother of Edward IV., who married Richard's daughter and co-heiress, Isabel, became by a separate creation earl of Salisbury in 1472, but by his attainder in 1478 this title was forfeited, and immediately afterwards was granted to Edward Plantagenet, eldest son of Richard duke of Gloucester, afterwards Richard III., on whose death in 1484 it became extinct.

Richard III.'s queen, Anne, was a sister of the above-mentioned Isabel, duchess of Clarence, and co-heiress with her of Richard Neville, earl of Salisbury. On the death of Queen Anne in 1485 the abeyance of the older creation terminated, Edward Plantagenet, eldest son of George duke of Clarence by Isabel Neville, becoming earl of Salisbury as successor to his mother's right. He was attainted in 1504, five years after his execution, but the earldom then forfeited was restored to his sister Margaret (1474–1541), widow of Sir Richard Pole, in 1513. This lady was also attainted, with forfeiture of her titles, in 1539.

Sir Robert Cecil, second son of the 1st Lord Burghley (*q.v.*), was created earl of Salisbury (1605), having no connexion in blood with the former holders of the title. (See SALISBURY, ROBERT CECIL, 1ST EARL OF.) In his family the earldom has remained till the present day, the 7th earl of the line having been created marquess of Salisbury in 1789.

See G. E. C., *Complete Peerage*, vol. vii. (1896).

SALISBURY, ROBERT ARTHUR TALBOT GASCOYNE-CECIL, 3RD MARQUESS OF (1830–1903), British statesman, second son of James, 2nd marquess, by his first wife, Frances Mary Gascoyne, was born at Hatfield on the 3rd of February 1830, and was educated at Eton and Christ Church, Oxford, where he took his degree in 1850. At Oxford he was an active member of the Union Debating Society. The first few years after leaving the university were spent by Lord Robert Cecil (as he then was) in travel, as far afield as New Zealand; but in 1853 he was returned unopposed to the House of Commons as Conservative member for Stamford, being elected in the same year a fellow of All Souls. He made his maiden speech in Parliament on the 7th of April 1854, in opposition to Lord John Russell's Oxford University Bill. The speech was marked by scepticism as to the utility of reforms, and Lord Robert prophesied that if the wishes of founders were disregarded, nobody would in future care to found anything. In 1857 he appeared as the author of his first Bill—for establishing the voting-paper system at parliamentary elections; and in the same year he married Georgina Caroline, daughter of Sir Edward Holt Alderson, a baron of the Court of Exchequer, a large share of whose great intellectual abilities she inherited. Lord Robert Cecil continued to be active not only in politics, but, for several years, in journalism, the income he earned by his pen being then a matter of pecuniary importance to him. One of his contemporaries at Oxford had been Thomas Hamber of Oriel, who became editor of the *Standard*, and during these years Cecil was an occasional contributor of "leaders" to that paper. He also contributed to the *Saturday Review*, founded in 1855 by his brother-in-law Beresford Hope, and edited by his friend Douglas Cook; not infrequently he wrote for the *Quarterly* (where, in 1867, he was to publish his famous article on "the Conservative Surrender"); and in 1858 he contributed to *Oxford Essays* a paper on "The Theories of Parliamentary Reform," giving expression to the more intellectual and aristocratic antagonism to doctrinaire Liberal views on the subject, while admitting the existence of many anomalies in the existing electoral system. In February of the next year, when Disraeli introduced his Reform Bill with its "fancy franchises," the member for Stamford was prominent among its critics from the Tory point of view. During the seven years that followed Lord Robert was always ready to defend the Church, or the higher interests of Conservatism and property; and his speeches then, not less than later, showed a caustic quality and a tendency to what became known as "blazing indiscretions." For example, when the repeal of the paper duty was being discussed in 1861, he asked whether it "could be maintained that a person of any education could learn anything worth knowing from a penny paper"—a question the answer to which has been given by the powerful, highly organized, and admirable Conservative penny press of a subsequent day. A little later he declared the proceedings of the Government "more worthy of an attorney than of a statesman"; and on being rebuked, apologized—to the attorneys. He also charged Lord John Russell with adopting "a sort of tariff of insolence" in his dealings with foreign Powers, strong and weak.

Early years in Parliament.

It was not, however, till the death of Palmerston and the removal of Lord John Russell to the House of Lords had brought Gladstone to the front that Lord Robert Cecil—who became Lord Cranborne by the death of his elder brother on the 14th of June 1865—began to be accepted as a politician of the first rank. His emergence coincided with the opening of the new area in British politics, ushered in by the practical steps taken to extend the parliamentary franchise. On the 12th of March 1866 Gladstone brought forward his measure to establish a £7 franchise in boroughs and a £14 franchise in counties, which were calculated to add 400,000 voters to the existing lists. Lord Cranborne met the Bill with a persistent opposition, his rigorous logic and merciless hostility to clap-trap tending strongly to reinforce the impassioned eloquence of Robert Lowe. But though he attacked the Government Bill both in principle and detail, he did not absolutely commit himself to a position of hostility to Reform of every kind; and on the defeat of Gladstone's Ministry no surprise was expressed at his joining the Cabinet of Lord Derby as secretary of state for India, even when it became known that a settlement of the Reform question was part of the Tory programme. The early months of the new Government's tenure were marked by the incident of the Hyde Park riots; and if there had been members of the Cabinet and party who believed up to that time that the Reform question was not urgent the action of the Reform League and the London populace forced them to a different conclusion. On the 11th of February Disraeli informed the House of Commons that the Government intended to ask its assent to a series of thirteen resolutions; but when, on the 26th of February, the Liberal leaders demanded that the Government should produce a Bill, Disraeli at once consented to do so. The introduction of a Bill was, however, delayed by the resignation of Lord Cranborne, General Peel and Lord Carnarvon. The Cabinet had been considering two alternative measures, widely different in kind and extent, and the final decision between the two was taken in ten minutes (whence the nickname of the "Ten Minutes Bill") at an informal gathering of the Cabinet held just before Derby was engaged to address a general meeting of the party. At a Cabinet council held on the 23rd of February measure A had been agreed upon, the three doubtful ministers having been persuaded that the checks and safeguards provided were sufficient; in the interval between Saturday and Monday they had come to the conclusion that the checks were inadequate; on Monday morning they had gone to Lord Derby and told him so; at two o'clock the rest of the Cabinet, hastily summoned, had been informed of the new situation, and had there and then, before the meeting at half-past two, agreed, in order to retain their three colleagues, to throw over measure A, and to present measure B to the country as the fruit of their matured and unanimous wisdom. Derby at the meeting, and Disraeli a few hours later in the House of Commons, explained their new

Cabinet minister: the Franchise question: resignation 1867.

measure—a measure based upon a £6 franchise; but their own side did not like it, the Opposition were furious, and the moral sense of the country was revolted by the undisguised adoption of almost the very Bill which the Conservatives had refused to accept from their opponents only a year before. The result was that the Government reverted to measure A, and the three ministers again handed in their resignations. In the debate on the third reading of the Bill, when its passage through the House of Commons without a division was assured, Lord Cranborne showed with caustic rhetoric how the "precautions, guarantees, and securities" with which the Bill had bristled on its second reading had been dropped one after another at the bidding of Gladstone.

In the House of Lords.

In countries where politics are conducted on any other than the give-and-take principles in vogue in England, such a breach as that which occurred in 1867 between Lord Cranborne and his former colleagues, especially Disraeli, would have been beyond repair. But Cranborne, though an aristocrat both by birth and by conviction, was not impracticable; moreover, Disraeli, who had himself risen to eminence through invective, admired rather than resented that gift in others; and their common opposition to Gladstone was certain to reunite the two colleagues. In the session of 1868 Gladstone announced that he meant to take up the Irish question, and to deal especially with the celebrated "Upas tree," of which the first branch was the Established Church. By way of giving full notice to the electorate, he brought in a series of resolutions on this question; and though the attitude adopted by the official Conservatives towards them was not one of serious antagonism, Lord Cranborne vigorously attacked them. This was his last speech in the House of Commons, for on the 12th of April his father died, and he became 3rd marquess of Salisbury. In the House of Lords the new Lord Salisbury's style of eloquence—terse, incisive and wholly free from false ornament—found an even more appreciative audience than it had met with in the House of Commons. The questions with which he was first called upon to deal were questions in which his interest was keen—the recommendations of the Ritual Commission and, some time later, the Irish Church Suspensory Bill. Lord Salisbury's argument was that the last session of an expiring parliament was not the time in which so grave a matter as the Irish Church Establishment should be judged or prejudged; that a Suspensory Bill involved the question of disestablishment; and that such a principle could not be accepted by the Lords until the country had pronounced decisively in its favour. Even then there were those who raised the cry that the only business of the House of Lords was to register the decisions of the Commons, and that if they refused to do so it was at their peril. Lord Salisbury met this cry boldly and firmly:—

"When the opinion of your countrymen has declared itself, and you see that their convictions—their firm, deliberate, sustained convictions—are in favour of any course, I do not for a moment deny that it is your duty to yield."

In the very next session Lord Salisbury was called upon to put his view into practice, and his influence went far to persuade the peers to pass the Irish Church Disestablishment Bill. In his opinion the general election of the autumn of 1868 had been fought on this question; his friends had lost, and there was nothing for them to do but to bow to the necessities of the situation. The story of his conduct in the matter has been told in some fulness in the *Life* of Archbishop Tait, with whom Salisbury acted, and who throughout those critical weeks played a most important part as mediator between the two extreme parties—those of Lord Cairns (representing Ulster) and Gladstone. October 1869 saw the death of the old Lord Derby, who was still the titular leader of his party; and he was succeeded as leader of the House of Lords by Cairns. For the dignified post of chancellor of the university of Oxford Convocation unanimously chose as Derby's successor the marquess of Salisbury. Derby had translated the *Iliad* very well, but his successor was far more able to sympathize with the academic mind and temper. He was at heart a student, and found his best satisfaction in scientific research and in scientific speculation; while still a young man he had made useful contributions to the investigation of the flora of Hertfordshire, and at Hatfield he had his own laboratory, where he was able to satisfy his interest in chemical and electrical research. As regards his connexion with Oxford may be mentioned in particular his appointment, in 1877, of a second University Commission, and his appearance, in September 1894, in the Sheldonian Theatre as president of the British Association.

Disraeli Cabinet of 1874.

It is not necessary to dwell at any length upon the part taken by Lord Salisbury between 1869 and 1873 in respect of the other great political measures of Gladstone's Government—the Irish Land Act, the Act Abolishing Purchase in the Army, Forster's Education Act, &c. Nor does his attitude towards the Franco-German War of 1870–71 call for any remark; a British leader of Opposition is bound, even more than a minister, to preserve a discreet silence on such occasions. But early in 1874 came the dissolution, suddenly announced in Gladstone's famous Greenwich letter, with the promise of the abolition of the income-tax. For the first time since 1841 the Conservatives found themselves in office with a large majority in the House of Commons. In Disraeli's new Cabinet in 1874 Salisbury accepted his old position at the India Office. The first task with which the new secretary of state had to deal was one of those periodical famines which are the great scourge of India; he supported the action of Lord Northbrook, the viceroy, and refused to interfere with private trade by prohibiting the export of grain. This attitude was amply justified, and Lord Salisbury presently declared that the action of the Government had given so much confidence to private traders that, by their means, "grain was pouring into the distressed districts at a greater rate than that which was being carried by the public agency, the amount reaching nearly 2000 tons a day." The Public Worship Regulation Bill of 1874 was the occasion of a famous passage of arms between Salisbury and his chief. The Commons had inserted an amendment which, on consideration by the Lords, Salisbury opposed, with the remark that it was not for the peers to attend to the "bluster" of the lower House merely because a small majority there had passed the amendment. The new clause was accordingly rejected, and the Commons eventually accepted the situation; but Disraeli, banteringly criticizing Salisbury's use of the word "bluster," alluded to him as "a man who does not measure his phrases. He is one who is a great master of gibes and flouts and jeers."

The Eastern question.

From the middle of 1876 the Government was occupied with foreign affairs. In regard to the stages of Eastern fever through which the nation passed between the occurrence of the Bulgarian "atrocities" and the signature of the Treaty of Berlin, the part played by Salisbury was considerable. The excesses of the Bashi-Bazouks took place in the early summer of 1876, and were recorded in long and highly-coloured despatches to English newspapers; presently there followed Gladstone's pamphlet on *Bulgarian Horrors*, his speech on Blackheath and his enunciation of a "bag-and-baggage" policy towards Turkey. The autumn went by, Servia and Montenegro declared war upon Turkey and were in imminent danger of something like extinction. On the 31st of October Russia demanded an armistice, which Turkey granted; and Great Britain immediately proposed a conference at Constantinople, at which the powers should endeavour to make arrangements with Turkey for a general pacification of her provinces and of the inflammable communities adjoining. At this conference Great Britain was represented by Lord Salisbury. It met early in December, taking for its basis the British terms, namely, the *status quo ante* in Servia and Montenegro; a self-denying ordinance on the part of all the powers; and the independence and territorial integrity of the Ottoman empire, together with large administrative reforms assured by guarantees. General Ignatieff, the Russian ambassador, was effusively friendly with the British envoy; but though the philo-Turkish party in England professed themselves scandalized, Salisbury made no improper concessions to Russia, and departed in no way from the agreed policy of the British

Cabinet. On the 20th of January the conference broke up, Turkey having declared its recommendations inadmissible; and Europe withdrew to await the inevitable declaration of war. Very early in the course of that war the intentions of Great Britain were clearly indicated in a despatch of Lord Derby to the British representative at St Petersburg; which announced that so long as the struggle concerned Turkish interests alone Great Britain would be neutral, but that such matters as Egypt, the Suez Canal, the regulations affecting the passage of the Dardanelles, and the possession of Constantinople itself would be regarded as matters to which she could not be indifferent. For some nine months none of these British interests appeared to be threatened, nor had Lord Salisbury's own department to concern itself very directly with the progress of the belligerents. Once or twice, indeed, the Indian secretary committed himself to statements which laid him open to a good deal of attack, as when he rebuked an alarmist by bidding him study the Central Asian question "in large maps." But with the advance of Russia through Bulgaria and across the Balkans, British anxiety grew. In mid-December explanations were asked from the Russian Government as to their intentions with regard to Constantinople. On the 23rd of January the Cabinet ordered the fleet to sail to the Dardanelles. Lord Carnarvon resigned, and Lord Derby handed in his resignation, but withdrew it. The Treaty of San Stefano was signed on the 3rd of March; and three weeks later, when its full text became known, the Cabinet decided upon measures which finally induced Lord Derby, at the end of the month, to retire from the Foreign Office, his place being immediately filled by Lord Salisbury. The new foreign secretary at once issued the famous "Salisbury circular" to the British representatives abroad, which appeared in the newspapers on the 2nd of April. This elaborate and dignified State paper was at once a clear exposition of British policy, and practically an invitation to Russia to reopen the negotiations for a European congress. These negotiations, indeed, had been proceeding for several weeks past; but Russia having declared that she would only discuss such points as she pleased, the British Cabinet had withdrawn, and the matter for the time was at an end. The bulk of the document consisted of an examination of the Treaty of San Stefano and its probable effects, Lord Salisbury justifying such an examination on the ground that as the position of Turkey and the other countries affected had been settled by Europe in the Treaty of Paris in 1856, the powers which signed that treaty had the right and the duty to see that no modifications of it should be made without their consent.

Succeeds Lord Derby as Foreign Minister.

The effect of the circular was great and immediate. At home the Conservatives were encouraged, and many moderate Liberals rallied to the Eastern policy of the Government. Abroad it seemed as if the era of divided councils was over, and the Russian Government promptly recognized that the circular meant either a congress or war with Great Britain. For the latter alternative it was by no means prepared, and very soon negotiations were reopened, which led to the meeting of the congress at Berlin on the 13th of June. The history of that famous gathering and of its results is narrated under EUROPE. Lord Beaconsfield on two or three subsequent occasions referred to the important part that his colleague had played in the negotiations, and he was not using merely the language of politeness. Rumours had appeared in the London press as to a supposed Anglo-Russian agreement that had been signed between Salisbury and the Russian ambassador, Count Shuvaloff, and these rumours or statements were described by the foreign secretary in the House of Lords, just before he left for Berlin, as "wholly unauthentic." But on the 14th of June what purported to be the full text of the agreement was published by the *Globe* newspaper through a certain Charles Marvin, at that time employed in occasional transcribing work at the Foreign Office, and afterwards known by some strongly anti-Russian books on the Central Asian question. Besides the general inconvenience of the disclosure, the agreement, which stipulated that Batum and Kars might be annexed by Russia, made it impossible for the congress to insist upon Russia entirely withdrawing her claim to Batum, though at the time of the meeting of the congress it was known to some of the negotiators that she was not unwilling to do so. In one respect Salisbury's action at the congress was unsuccessful. Much as he disliked Gladstone's sentimentalism, he was not without a certain sentimentalism of his own, and at the Berlin Congress this took the form of an unexpected and, as it happened, useless pushing of the claims of Greece. But in the main Salisbury must be held to deserve, almost equally with his great colleague, the credit for the Berlin settlement. Great, however, as was the work done at Berlin, and marked the relief to all Europe which was caused by the signing of the treaty, much work, and of no pleasant kind, remained for the British Foreign Office and for the Indian Government before the Beaconsfield parliament ended and the Government had to render up its accounts to the nation. Russia, foreseeing a possible war with Great Britain, had during the spring of 1878 redoubled her activity in Central Asia, and, almost at the very time that the treaty was being signed, her mission was received at Kabul by the Amir Sher Ali. Out of the Amir's refusal to receive a counterbalancing British mission there grew the Afghan War; and though he had ceased to control the India Office, Salisbury was naturally held responsible for some of the preliminary steps which, in the judgment of the Opposition, had led to these hostilities. But the Liberals entirely failed to fix upon Salisbury the blame for a series of events which was generally seen to be inevitable. A defence of the foreign policy of the Government during the year which followed the Berlin Treaty was made by Salisbury in a speech at Manchester (October 1879), which had a great effect throughout Europe. In it he justified the occupation of Cyprus, and approved the beginnings of a league of central Europe for preserving peace.

At Berlin Congress.

In the spring of 1880 the general election overthrew Beaconsfield's Government and replaced Gladstone in power, and the country entered upon five eventful years, which were to see the consolidation of the Parnellite party, the reign of outrage in Ireland, disasters in Zululand and the Transvaal, war in Egypt, a succession of costly mistakes in the Sudan, and the final collapse of Gladstone's Government on a trifling Budget question. The defeat of 1880 greatly depressed Beaconsfield, who till then had really believed in that "hyperborean" theory upon which he had acted in 1867—the theory that beyond and below the region of democratic storm and violence was to be found a region of peaceful conservatism and of a dislike of change. After the rude awakening of April 1880 Beaconsfield seems to have lost heart and hope, and to have ceased to believe that wealth, birth and education would count for much in future in England. Salisbury, who on Beaconsfield's death a year later was chosen, after the claims of Cairns had been withdrawn, as leader of the Conservative peers (Sir Stafford Northcote continuing to lead the Opposition in the lower House), was not so disposed to counsels of despair. After the Conservative reaction had come in 1886, he was often taunted with pessimism as regards the results, and he certainly spoke on more than one occasion in a way which appeared to justify the caricatures which appeared of him in the Radical press in his character of Hamlet; but in the days of Liberal ascendancy Salisbury was confident that the tide would turn. We may pass briefly over the years of Opposition between 1880 and 1885; the only policy that could then wisely be followed by the Conservative leaders was that of giving their opponents sufficient rope. In 1884 a new Reform Bill was introduced, extending household suffrage to the counties; this was met in the Lords by a resolution, moved by Cairns, that the peers could not pass it unaccompanied by a Redistribution Bill. The Government, therefore, withdrew their measure. In the summer and autumn there was a good deal of agitation; but in November a redistribution scheme was settled between the leaders of both parties, and the Bill passed. When, in the summer of 1885, Gladstone resigned, it became necessary for the country to know whether Salisbury or Northcote was the real Conservative leader; and

Leader of Conservative Party.

the Queen settled the matter by at once sending for Lord Salisbury, who became prime minister for the first time in 1885.

Prime Minister, 1885.

The "Forwards" among the Conservatives, headed by Lord Randolph Churchill, brought so much pressure to bear that Northcote was induced to enter the House of Lords as earl of Iddesleigh, while Sir Michael Hicks Beach was made leader of the House of Commons, Lord Randolph Churchill secretary for India, and Mr Arthur Balfour president of the Local Government Board. The new Government had only to prepare for the general election in the autumn. The ministerial programme was put forward by Salisbury on the 7th of October in an important speech addressed to the Union of Conservative Associations assembled at Newport, in Monmouthshire; and in this he outlined large reforms in local government, poured scorn upon Mr Chamberlain's Radical policy of "three acres and a cow," but promised cheap land transfer, and opposed the disestablishment of the Church as a matter of life or death to the Conservative party. In this Lord Salisbury was declaring war against what seemed to be the danger should Mr Chamberlain's "unauthorized programme" succeed; while the comparative slightness of his references to Ireland showed that he had no more suspicion than anybody else of the event which was about to change the whole face of British politics, to break up the Liberal party and to change the most formidable of the advanced Radicals into an ally and a colleague. The general election took place, and there were returned to parliament 335 Liberals, 249 Conservatives and 86 Home Rulers; so that if the last two parties had combined, they would have exactly tied with the Liberals. The Conservative Government met parliament, and after a short time were put into a minority of 79 on a Radical land motion, brought in by Mr Chamberlain's henchman, Mr Jesse Collings. Mr Gladstone's return to office, and his announcement of a Bill giving a separate parliament to Ireland, were quickly followed by the secession of the Unionist Liberals; the defeat of the Bill; an appeal to the country; and the return of the Unionist party to power with a majority of 118. Salisbury at once offered to make way for Lord Hartington, but the suggestion that the latter should form a Government was declined; and the Conservatives took office alone, with an Irish policy which might be summed up, perhaps, in Salisbury's words as "twenty years of resolute government." For a few months, until just before his sudden death on the 12th of January 1887, Lord Iddesleigh was foreign secretary; but Salisbury, who meantime had held the post of lord privy seal, then returned to the Foreign Office. Meanwhile the increasing friction between him and Lord Randolph Churchill, who, amid many qualms on the part of more old-fashioned Conservatives, had become chancellor of the exchequer and leader of the House of Commons, had led to the latter's resignation, which, to his own surprise, was accepted; and from that date Salisbury's effective primacy in his own party was unchallenged.

Unionism: Prime Minister, 1886.

Only the general lines of Salisbury's later political career need here be sketched. As a consequence of the practical monopoly of political power enjoyed by the Unionist party after the Liberal disruption of 1886—for even in the years 1892–1895 the situation was dominated by the permanent Unionist majority in the House of Lords—Salisbury's position became unique. These were the long-looked-for days of Conservative reaction, of which he had never despaired. The situation was complicated, so far as Salisbury personally was concerned, by the coalition with the Liberal Unionists, which was confirmed in 1895 by the inclusion of the duke of Devonshire, Mr Chamberlain, and other Liberal Unionists in the Cabinet. But though it appeared anomalous that old antagonists like Lord Salisbury and Mr Chamberlain should be working together in the same ministry, the prime minister's position was such that he could disregard a superficial criticism which paid too little heed to his political faculty and his patriotic regard for the requirements of the situation. Moreover, the practical work of reconciling Conservative traditions with domestic reform depended rather on Salisbury's nephew, Mr Balfour, who led the House of Commons, than on Salisbury, who devoted himself almost entirely to foreign affairs. The new Conservative movement, moreover, in the country at large, was, in any case, of a more constructive type than Salisbury himself was best fitted to lead, and he was not the real source of the political inspiration even of the Conservative wing of the Unionist party during this period. He began to stand to some extent outside party and above it, a moderator with a keenly analytic and rather sceptical mind, but still the recognized representative of the British empire in the councils of the world, and the trusted adviser of his sovereign. Though himself the last man to be selected as the type of a democratic politician—for his references to extensions of popular government, even when made by his own party, were full of mild contempt—Salisbury gradually acquired a higher place in public opinion than that occupied by any contemporary statesman. His speeches—which, though carelessly composed, continued to blaze on occasion with their old fire and their somewhat mordant cynicism—were weightier in tone, and became European events. Without the genius of Disraeli or the personal magnetism of Gladstone, he yet inspired the British public with a quiet confidence that under him things would not go far wrong, and that he would not act rashly or unworthily of his country. Even political opponents came to look on his cautious and balanced conservatism, and his intellectual aloofness from interested motives or vulgar ambition, as standing between them and something more distasteful. Moreover, in the matter of foreign affairs his weight was supreme. He had lived to become, as was indeed generally recognized, the most experienced working diplomatist in Europe. His position in this respect was shown in nothing better than in his superiority to criticism. In foreign affairs many among his own party regarded him as too much inclined to "split the difference" and to make "graceful concessions"—as in the case of the cession of Heligoland to Germany—in which it was complained that Great Britain got the worst of the bargain. But though occasionally, as in the withdrawal of British ships from Port Arthur in 1898, such criticism became acute, the plain fact of the preservation of European peace, often in difficult circumstances, reconciled the public to his conduct of affairs. His patience frequently justified itself, notably in the case of British relations with the United States, which were for a moment threatened by President Cleveland's message concerning Venezuela in 1895. And though his loyalty to the European Concert in connexion with Turkey's dealings with Armenia and Crete in 1895–1898 proved irritatingly ineffectual—the pace of the concert, as Lord Salisbury explained, being rather like that of a steam-roller—no alternative policy could be contemplated as feasible in any other statesman's hands. Salisbury's personal view of the new situation created by the methods of the sultan of Turkey was indicated not only by a solemn and unusual public warning addressed to the sultan in a speech at Brighton, but also by his famous remark that in the Crimean War Great Britain had "put her money on the wrong horse." Among his most important strokes of diplomacy was the Anglo-German agreement of 1890, delimiting the British and German spheres of influence in Africa. The South African question from 1896 onwards was a matter for the Colonial Office, and Salisbury left it in Mr Chamberlain's hands.

1886-1902.

A peer premier must inevitably leave many of the real problems of democratic government to his colleagues in the House of Commons. In the Upper House Lord Salisbury was paramount. Yet while vigorously opposing the Radical agitation for the abolition of the House of Lords, he never interposed a *non possumus* to schemes of reform. He was always willing to consider plans for its improvement, and in May 1888 himself introduced a bill for reforming it and creating life peers; but he warned reformers that the only result must be to make the House stronger. To abolish it, on the other hand, would be to take away a necessary safeguard for protecting "Philip drunk" by an appeal to "Philip sober."

Lord Salisbury suffered a severe loss by the death in 1900 of his wife, whose influence with her husband had been great, as her devotion had been unswerving. Her protracted illness was

one among several causes, including his own occasional ill-health, which after 1895 made him leave as much as possible of the work of political leadership to his principal colleagues—Mr Arthur Balfour more than once acting as foreign secretary for several weeks while his uncle stayed abroad. But for some years it was felt that his attempt to be both prime minister and foreign secretary was a mistake; and after the election of 1900 Salisbury handed over the seals of the foreign office to Lord Lansdowne, remaining himself at the head of the government as lord privy seal. In 1902, upon the conclusion of peace in South Africa, he felt that the time had come to retire from office altogether; and on the 11th of July his resignation was accepted by the king, and he was succeeded as prime minister by Mr Arthur Balfour.

From this moment he remained in the political background, and his ill-health gradually increased. He died at Hatfield on the 22nd of August 1903, and was succeeded in the marquessate by his eldest son Lord Cranborne (b. 1861), who entered the house of commons for the Darwen division of Lancashire (1885–1892) and since 1893 had been member for Rochester. The new marquess had been under-secretary for foreign affairs since 1900, and in October 1903 he became lord privy seal in Mr Balfour's ministry. Of the other four sons, Lord Hugh Cecil (b. 1869) became a prominent figure in parliament as Conservative member for Greenwich (1895–1906), first as an ardent and eloquent High Churchman in connexion with the debates on education, &c., and then as one of the leaders of the Free-Trade Unionists opposing Mr Chamberlain; and his elder brother Lord Robert Cecil (b. 1864), who had at first devoted himself to the bar and become a K.C., entered parliament in 1906 for Marylebone, holding views in sympathy with those of Lord Hugh, who had been defeated through the opposition of a Tariff Reform Unionist in a triangular contest at Greenwich, which gave the victory to the Radical candidate. In the elections of January 1910 Lord Robert Cecil resigned his candidature for Marylebone, owing to the strong opposition of the Tariff Reformers, which threatened to divide the party and lose the seat; he stood for Blackburn as a Unionist Free Trader and was defeated. On the other hand Lord Hugh Cecil was returned for Oxford University in place of the Rt. Hon. J. G. Talbot. Lord Hugh's candidature, which was announced in 1909 simultaneously with the resignation of the sitting member, was opposed by many who disagreed with his fiscal views and his attitude on Church questions; but it was found that he had the support of the great majority of the electors, and he was ultimately returned unopposed. (H. Ch.)

SALISBURY, ROBERT CECIL, 1ST EARL OF (*c.* 1565–1612), English lord treasurer, the exact year of whose birth is unrecorded, was the youngest son of William Cecil, 1st Lord Burghley, and of his second wife Mildred, daughter of Sir Anthony Cooke, of Gidea Hall in Essex. He was educated in his father's house and at Cambridge University. In 1584 he was sent to France, and was returned the same year to parliament, and again in 1586, as member for Westminster. In 1588 he accompanied Lord Derby in his mission to the Netherlands to negotiate peace with Spain, and sat in the parliament of 1588, and in the assemblies of 1593, 1597 and 1601 for Hertfordshire. About 1589 he appears to have entered upon the duties of secretary of state, though he did not receive the official appointment till 1596. On the 20th of May 1591 he was knighted, and in August sworn of the privy council. In 1597 he was made chancellor of the duchy of Lancaster, and in 1598 despatched on a mission to Henry IV. of France, to prevent the impending alliance between that country and Spain. The next year he succeeded his father as master of the court of wards. On Lord Burghley's death on the 4th of August both Essex and Bacon desired to succeed him in the supreme direction of affairs, but the queen preferred the son of her last great minister. On Essex's disgrace, consequent on his sudden and unauthorized abandonment of his command in Ireland, Cecil's conduct was worthy of high praise. "By employing his credit with Her Majesty in behalf of the Earl," wrote John Petit (June 14, 1600), "he has gained great credit to himself both at home and abroad." At this period began Cecil's secret correspondence with James in Scotland. Hitherto Cecil's enemies had persuaded James that the secretary was unfavourable to his claims to the English throne. An understanding was now effected by which Cecil was able to assure James of his succession, ensure his own power and predominance in the new reign against Sir Walter Raleigh and other competitors, and secure the tranquillity of the last years of Elizabeth, the conditions demanded by him being that all attempts of James to obtain parliamentary recognition of his title should cease, that an absolute respect should be paid to the queen's feelings, and that the communications should remain a profound secret. Writing later in the reign of James, Cecil says: "If Her Majesty had known all I did, how well these (? she) should have known the innocency and constancy of my present faith, yet her age and orbity, joined to the jealousy of her sex, might have moved her to think ill of that which helped to preserve her."[1]

Such was the nature of these secret communications, which, while they aimed at securing for Cecil a fresh lease of power in the new reign, conferred undoubted advantages on the country. Owing to Cecil's action, on the death of Elizabeth on the 24th of March 1603, James was proclaimed king, and took possession of the throne without opposition. Cecil was continued in his office, was created Baron Cecil of Essendon in Rutlandshire on the 13th of May, Viscount Cranborne on the 20th of August 1604, and earl of Salisbury on the 4th of May 1605. He was elected chancellor of the University of Cambridge in February 1601, and obtained the Garter in May 1606. Meanwhile Cecil's success had completed the discontent of Raleigh, who, exasperated at his dismissal from the captaincy of the guard, became involved —whether innocently or not is uncertain—in the treasonable conspiracy known as the "Bye Plot." Cecil took a leading part in his trial in July 1603, and, though probably convinced of his guilt, endeavoured to ensure him a fair trial and rebuked the attorney-general, Sir Edward Coke, for his harshness towards the prisoner. On the 6th of May 1608 the office of lord treasurer was added to Salisbury's other appointments, and the whole conduct of public affairs was placed solely in his hands. His real policy is not always easy to distinguish, for the king constantly interfered, and Cecil, far from holding any absolute or continuous control, was often not even an adviser but merely a follower, simulating approval of schemes opposed to his real judgment. In foreign affairs his aim was to preserve the balance of power between France and Spain, and to secure the independence of the Netherlands from either state. He also hoped, like his father, to make England the head of the Protestant alliance abroad; and his last energies were expended in effecting the marriage in 1612 of the princess Elizabeth, James's daughter, with the Elector Palatine. He was in favour of peace, preoccupied with the state of the finances at home and the decreasing revenue, and, though sharing Raleigh's dislike of Spain, was instrumental in making the treaty with that power in 1604. In June 1607 he promised the support of the government to the merchants who complained of Spanish ill-usage, but declared that the commons must not meddle with questions of peace and war. In 1611 he disapproved of the proposed marriage between the prince of Wales and the Infanta. His bias against Spain and his fidelity to the national interests render, therefore, his acceptance of a pension from Spain a surprising incident in his career. At the conclusion of the peace in 1604 the sum Cecil received was £1000, which was raised the following year to £1500; while in 1609 he demanded an augmentation and to be paid for each piece of information separately. If, as has been stated,[2] he received a pension also from France, it is not improbable that, like his contemporary Bacon, who accepted presents from suitors on both sides and still gave an independent decree, Cecil may have maintained a freedom from corrupting influences, while his acceptance of money as the price of information concerning the intentions of the government may have formed

[1] *Correspondence of King James VI. of Scotland with Sir R. Cecil*, ed. by J. Bruce (Camden Soc., 1861), p. xl.

[2] Gardiner, *History of England*, i. 214.

part of a general policy of cultivating good relations with the two great rivals of England (one advantage of which was the communication of plots formed against the government), and of maintaining the balance of power between them. It is difficult, however, in the absence of complete information, to understand the exact nature and signification of these strange relations.

As lord treasurer Salisbury showed considerable financial ability. During the year preceding his acceptance of that office the expenditure had risen to £500,000, leaving, with an ordinary revenue of about £320,000 and the subsidies voted by parliament, a yearly deficit of £73,000. Lord Salisbury took advantage of the decision by the judges in the court of exchequer in Bates's case in favour of the king's right to levy impositions; and (on the 28th of July 1608) imposed new duties on articles of luxury and those of foreign manufacture which competed with English goods, while lowering the dues on currants and tobacco. By this measure, and by a more careful collection, the ordinary income was raised to £460,000, while £700,000 was paid off the debt, leaving at the beginning of 1610 the sum of £300,000. This was a substantial reform, and if, as has been stated, the "total result of Salisbury's financial administration" was "the halving of the debt at the cost of doubling the deficiency,"[1] the failure to secure a permanent improvement must be ascribed to the extravagance of James, who, disregarding his minister's entreaties and advice, continued to exceed his income by £149,000. But a want of statesmanship had been shown by Salisbury in forcing the king's legal right to levy impositions against the remonstrances of the parliament. In the "great contract," the scheme now put forward by Salisbury for settling the finances, his lack of political wisdom was still more apparent. The Commons were to guarantee a fixed annual subsidy, on condition of the abandonment of impositions and of the redress of grievances by the king. An unworthy and undignified system of higgling and haggling was initiated between the crown and the parliament. Salisbury could only attribute the miscarriage of his scheme to the fact "that God did not bless it." But Bacon regarded it with severe disapproval, and in the parliament of 1613, after the treasurer's death, he begged the king to abandon these humiliating and dangerous bargainings, "that your majesty do for this parliament put off the person of a merchant and contractor and rest upon the person of a king." In fact, the vicious principle was introduced that a redress of grievances could only be obtained by a payment of subsidies. The identity of interests between the crown and the nation which had made the reign of Elizabeth so glorious, and which she herself had consummated on the occasion of her last public appearance by a free and voluntary concession of these same impositions, was now destroyed, and a divergence of interests, made patent by vulgar bargaining, was substituted which stimulated the disastrous struggle between sovereign and people, and paralysed the national development for two generations.

This was scarcely a time to expect any favours for the Roman Catholics, but Salisbury, while fearing that the Roman Church in England would become a danger to the state, had always been averse from prosecution for religion, and he attempted to distinguish between the large body of law-abiding and loyal Roman Catholics and those connected with plots and intrigues against the throne and government, making the offer in October 1607 that if the pope would excommunicate those that rebelled against the king and oblige them to defend him against invasion, the fines for recusancy would be remitted and they would be allowed to keep priests in their houses. This was a fair measure of toleration. His want of true statesmanship was shown with regard to the Protestant Nonconformists, towards whom his attitude was identical with that afterwards maintained by Laud, and the same ideal pursued, namely that of material and outward conformity, Salisbury employing almost the same words as the archbishop later, that "unity in belief cannot be preserved unless it is to be found in worship."[2]

Bacon's disparaging estimate of his cousin and rival was probably tinged with some personal animus, and instigated by the hope of recommending himself to James as his successor; but there is little doubt that his acute and penetrating description of Salisbury to James as one "fit to prevent things from growing worse but not fit to make them better," as one "greater *in operatione* than *in opere*," is a true one.[3] Elsewhere Bacon accuses him "of an artificial animating of the negative" — in modern language, of official obstruction and "red tape." But in one instance at least, when he advised James not to press forward too hastily the union of England and Scotland, a measure which especially appealed to Bacon's imagination and was ardently desired by him, Salisbury showed a prudence and judgment superior to his illustrious critic. It can scarcely be denied that he rendered substantial services to the state in times of great difficulty and perplexity, and these services would probably have been greater and more permanent had he served a better king and in more propitious times. Both Elizabeth and James found a security in Salisbury's calm good sense, safe, orderly official mind and practical experience of business, of which there was no guarantee in the restlessness of Essex, the enterprise of Raleigh or the speculation of Bacon. On the other hand, he was neither guided nor inspired by any great principle or ideal, he contributed nothing towards the settlement of the great national problems, and he precipitated by his ill-advised action the disastrous struggle between crown and parliament.

Lord Salisbury died on the 24th of May 1612, at the parsonage house at Marlborough, while returning to London from taking the waters at Bath. During his long political career he had amassed a large fortune, besides inheriting a considerable portion of Lord Burghley's landed estate. In 1607 he exchanged, at the king's request, his estate of Theobalds in Hertfordshire for Hatfield. Here he built the magnificent house of which he himself conceived the plans and the design, but which he did not live to inhabit, its completion almost coinciding with his death. In person and figure he was in strange contrast with his rivals at court, being diminutive in stature, ill-formed and weak in health. Elizabeth styled him her pygmy; his enemies delighted in vilifying his "wry neck," "crooked back" and "splay foot," and in Bacon's essay on "Deformity," it was said, "the world takes notice that he paints out his little cousin to the life."[4] Molin, the Venetian ambassador in England, gives a similar description of his person, but adds that he had "a noble countenance and features."[5] Lord Salisbury wrote *The State and Dignitie of a Secretaire of Estate's Place* (publ. 1642, reprinted in *Harleian Miscellany*, ii. and *Somers Tracts* (1809), v.; see also *Harleian MSS.* 305 and 354), and *An Answer to Certain Scandalous Papers scattered abroad under Colour of a Catholick Admonition* (1606), justifying his attitude towards recusants after the discovery of the Gunpowder Plot (*Harl. Misc.* ii.; *Somers Tracts*, v.). He married Elizabeth, daughter of William Brooke, 5th Baron Cobham, by whom, besides one daughter, he had William (1591–1668), his successor as 2nd earl.

No complete life of Robert Cecil has been attempted, but the materials for it are very extensive, including *Hist. MSS. Comm. Series, Marquis of Salisbury's MSS.* (superseding former reports in the series), from which MSS. selections were published in 1740 by S. Haynes, by Wm. Murdin in 1759, by John Bruce, in *The Correspondence of King James VI. with Sir Robert Cecil*, in 1861 (Camden Society), and by Ed. Lodge, in *Illustrations of English History*, in 1838.

The 2nd earl of Salisbury, who sided with the parliament during the Civil War and represented his party in negotiations with the king at Uxbridge and at Newport, was succeeded by his grandson James (1648–1683) as 3rd earl. James's descendant, James, the 7th earl (1748–1823), who was lord chamberlain of the royal household from 1783 to 1804, was created marquess of Salisbury in 1789. His son and successor, James Brownlow William, the 2nd marquess (1791–1868), married Frances Mary, daughter of Bamber Gascoyne of Childwall Hall, Lancashire, and took the name of Gascoyne before that of Cecil. He was lord privy seal in 1852 and lord president of the council in 1858–1859; his son and heir was the famous prime minister.

[1] Spedding, *Life and Letters of Bacon*, iv. 276.
[2] Gardiner, *History of England*, i. 199.
[3] Spedding, *Life and Letters of Bacon*, iv. 278 note, 279.
[4] Chamberlain to Carleton, Birch's *Court of King James*, i. 214.
[5] *Cal. of State Papers: Venetian*, x. 515.

SALISBURY, THOMAS DE MONTACUTE, 4TH EARL OF (1388–1428), was son of John, the third earl, who was executed in 1400 as a supporter of Richard II. Thomas was granted part of his father's estates and summoned to parliament in 1409, though not fully restored till 1421. He was present throughout the campaign of Agincourt in 1415, and at the naval engagement before Harfleur in 1416. In the expedition of 1417–18 he served with increasing distinction, and especially at the siege of Rouen. During the spring of 1419 he held an independent command, capturing Fécamp, Honfleur and other towns, was appointed lieutenant-general of Normandy, and created earl of Perche. In 1420 he was in chief command in Maine, and defeated the Maréchal de Rieux near Le Mans. When Henry V. went home next year Salisbury remained in France as the chief lieutenant of Thomas, duke of Clarence. The duke, through his own rashness, was defeated at Baugé on the 21st of March 1421. Salisbury came up with the archers too late to retrieve the day, but recovered the bodies of the dead, and by a skilful retreat averted further disaster. He soon gathered a fresh force, and in June was able to report to the king "this part of your land stood in good plight never so well as now." (*Foedera*, x. 131). Salisbury's success in Maine marked him out as John of Bedford's chief lieutenant in the war after Henry's death. In 1423 he was appointed governor of Champagne, and by his dash and vigour secured one of the chief victories of the war at Cravant on the 30th of July. Subsequent operations completed the conquest of Champagne, and left Salisbury free to join Bedford at Verneuil. There on the 17th of August, 1424, it was his "judgment and valour" that won the day. During the next three years Salisbury was employed on the Norman border and in Maine. After a year's visit to England he returned to the chief command in the field in July, 1428. Against the judgment of Bedford he determined to make Orleans his principal objective, and began the siege on the 12th of October. Prosecuting it with his wonted vigour he stormed Tourelles, the castle which protected the southern end of the bridge across the Loire, on the 24th of October. Three days later whilst surveying the city from a window in Tourelles he was wounded by a cannon-shot, and died on the 3rd of November 1428. Salisbury was the most skilful soldier on the English side after the death of Henry V. Though employed on diplomatic missions both by Henry V. and Bedford, he took no part in politics save for a momentary support of Humphrey, duke of Gloucester, during his visit to England in 1427–1428. He was a patron of John Lydgate, who presented to him his book *The Pilgrim* (now Harley MS. 4826, with a miniature of Salisbury, engraved in Strutt's *Regal Antiquities*). By his first wife Eleanor Holand, daughter of Thomas, earl of Kent, Salisbury had an only daughter Alice, in her right earl of Salisbury, who married Richard Neville, and was mother of Warwick the King-maker. His second wife Alice was grand-daughter of Geoffrey Chaucer, and after his death married William de la Pole, duke of Suffolk.

The chief accounts of Salisbury's campaigns are to be found in the *Gesta Henrici Quinti*, edited by B. Williams for the Eng. Hist. Soc. (London, 1850) in the *Vita Henrici Quinti* (erroneously attributed to Thomas of Elmham), edited by T. Hearne (Oxford, 1727); the *Chronique* of E. de Monstrelet, edited by L. D. d'Arcq (Paris, 1857–1862); the *Chroniques* of Jehan de Waurin, edited by W. and E. L. C. P. Hardy (London, 1864–1891); and the *Chronique de la Pucelle* of G. Cousinot, edited by Vallet de Viriville (Paris, 1859). For modern accounts see Sir J. H. Ramsay, *Lancaster and York* (Oxford, 1892); and C. Oman, *Political History of England*, 1377–1485 (London, 1906). (C. L. K.)

SALISBURY, WILLIAM LONGSWORD (or LONGESPÉE), EARL OF (d. 1226), was an illegitimate son of Henry II. In 1198 he received from King Richard I. the hand of Isabella, or Ela (d. 1261), daughter and heiress of William, earl of Salisbury, and was granted this title with the lands of the earldom. He held many high offices under John, and commanded a section of the English forces at Bouvines (1214), when he was made a prisoner. He remained faithful to the royal house except for a few months in 1216, when John's cause seemed hopelessly lost. He was also a supporter of Hubert de Burgh. In 1225 he went on an expedition to Gascony, being wrecked on the Isle of Ré on the return voyage. The hardships of this adventure undermined his health, and he died at Salisbury on the 7th of March 1226, and was buried in the cathedral there. The eldest of Longsword's four sons, William (*c.* 1212–1250) did not receive his father's earldom, although he is often called earl of Salisbury. In 1247 he led the English crusaders to join the French at Damietta and was killed in battle with the Saracens in February 1250.

SALISBURY, a township of Litchfield county, in the north-western corner of Connecticut, U.S.A. Pop. (1900) 3489. Area, about 58 sq. m. Salisbury is served by the Central New England, and the New York, New Haven, & Hartford railways. In the township are several villages, including Salisbury, Lakeville, Lime Rock, Chapinville and Ore Hill. Much of the township is hilly, and Bear Mountain (2355 ft.), near the Massachusetts line, is the highest elevation in the state. The Housatonic river forms the eastern boundary. The township is a summer resort. In it are the Scoville Memorial Library (about 8000 volumes in 1910); the Hotchkiss preparatory school (opened in 1892, for boys); the Salisbury School (Protestant Episcopal, for boys), removed to Salisbury from Staten Island in 1901 and formerly St Austin's school; the Taconic School (1896, for girls); and the Connecticut School for Imbeciles (established as a private institution in 1858). Among the manufactures are charcoal, pig-iron, car wheels and general castings at Lime Rock, cutlery at Lakeville, and knife-handles and rubber brushes at Salisbury. The iron mines are among the oldest in the country; mining began probably as early as 1731.

The first settlement within the township was made in 1720 by Dutchmen and Englishmen, who in 1719 had bought from the Indians a tract of land along the Housatonic, called "Weatogue"—an Indian word said to mean "the wigwam place." In 1732 the township was surveyed with its present boundaries, and in 1738 the land (exclusive of that held under previous grants) was auctioned by the state at Hartford. In that year the present name was adopted, and in 1741 the township was incorporated.

See Malcolm D. Rudd, *An Historical Sketch of Salisbury, Connecticut* (New York, 1899); and Ellen S. Bartlett, "Salisbury," in *The Connecticut Quarterly*, vol. iv. No. 4, pp. 345 sqq. (Hartford, Conn., 1898).

SALISBURY, a city and municipal and parliamentary borough, and the county town of Wiltshire, England, 83¼ m. W. by S. of London, on the London and South-Western and Great Western railways. Pop. (1901) 17,117. Its situation is beautiful. Viewed from the hills which surround it the city is seen to lie among flat meadows mainly on the north bank of the river Avon, which is here joined by four tributaries. The magnificent cathedral stands close to the river, on the south side of the city, the streets of which are in part laid out in squares called the "Chequers." To the north rises the bare upland of Salisbury Plain.

The cathedral church of St Mary is an unsurpassed example of Early English architecture, begun and completed, save its spire and a few details, within one brief period (1220–1266). There is a tradition, supported by probability, that Elias de Derham, canon of the cathedral (d. 1245), was the principal architect. He was at Salisbury in 1220–1229, and had previously taken part in the erection of the shrine of Thomas à Becket at Canterbury. The building is 473 ft. in extreme length, the length of the nave being 229 ft. 6 in., the choir 151 ft., and the lady chapel 68 ft. 6 in. The width of the nave is 82 ft. and the height 84 ft. The spire, the highest in England, measures 404 ft. (For plan, see ARCHITECTURE: *Romanesque and Gothic in England.*) The cathedral, standing in a broad grassy close, consists of a nave of ten bays, with aisles and a lofty north porch, main transepts with eastern aisles, choir with aisles, lesser transepts, presbytery and lady chapel. The two upper storeys of the tower and the spire above are early Decorated. The west front, the last portion of the original building completed, bears in its rich ornamentation signs of the transition to the Decorated style. The perfect uniformity of the building is no less remarkable within than without. The frequent use of Purbeck marble for shafts contrasts beautifully with the delicate grey freestone which is the principal building material. In the nave is a series of monuments of much interest, which were placed here by James Wyatt, who, in an unhappy restoration of the cathedral (1782–1791), destroyed many magnificent stained-glass windows which had escaped the Reformation, and also removed two Perpendicular chapels and the detached belfry which stood to the north-west of the cathedral. One of the memorials is a

small figure of a bishop in robes. This was long connected with the ceremony of the "boy bishop," which, as practised both here and elsewhere until its suppression by Queen Elizabeth, consisted in the election of a choir-boy as "bishop" during the period between St Nicholas' and Holy Innocents' Days. The figure was supposed to represent a boy who died during his tenancy of the office. But such small figures occur elsewhere, and have been supposed to mark the separate burial-place of the heart. The lady chapel is the earliest part of the original building, as the west end is the latest. The cloisters, south of the church, were built directly after its completion. The chapter-house is of the time of Edward I., a very fine octagonal example, with a remarkable series of contemporary sculptures. The library contains many valuable MSS. and ancient printed books. The diocese covers nearly the whole of Dorsetshire, the greater part of Wiltshire and very small portions of Berkshire, Hampshire, Somersetshire and Devonshire.

There are three ancient parish churches: St Martin's, with square tower and spire, and possessing a Norman font and Early English portions in the choir; St Thomas's (of Canterbury), founded in 1240 as a chapel to the cathedral, and rebuilt in the 15th century; and St Edmund's, founded as the collegiate church of secular canons in 1268, but subsequently rebuilt in the Perpendicular period. The residence of the college of secular priests is occupied by the modern ecclesiastical college of St Edmund's, founded in 1873. St John's chapel, founded by Bishop Robert Bingham in the 13th century, is occupied by a dwelling-house. There is a beautiful chapel attached to the St Nicholas hospital. The poultry cross, or high cross, an open hexagon with six arches and a central pillar, was erected by Lord Montacute before 1335. In the market-place is Marochetti's statue to Sidney Herbert, Lord Herbert of Lea. The modern public buildings include the court-house, market, corn exchange and theatre. A park was laid out in 1887 to commemorate the jubilee of Queen Victoria, and in the same year a statue was erected to Henry Fawcett, the economist, who was born at Salisbury. Among remaining specimens of ancient domestic architecture may be mentioned the banqueting-hall of John Halle, wool merchant, built about 1470; and Audley House, belonging also to the 15th century, and repaired in 1881 as a diocesan church house. There are a large number of educational and other charities, including the bishop's grammar school, Queen Elizabeth's grammar school, the St Nicholas hospital and Trinity hospital, founded by Agnes Bottenham in 1379. Brewing, tanning, carpet-making and the manufacture of hardware and of boots and shoes are carried on, and there is a considerable agricultural trade. The city is governed by a mayor, 7 aldermen and 21 councillors. Area, 1710 acres.

History.—The neighbourhood of Salisbury is rich in antiquities. The famous megalithic remains of Stonehenge (*q.v.*) are not far distant. From Milford Hill and Fisherton many prehistoric relics have been brought to the fine Blackmore Museum in the city. But the site most intimately associated with Salisbury is that of *Old Sarum*, the history of which forms the preface to that of the modern city. This is a desolate place, lying a short distance north of Salisbury, with a huge mound guarded by a fosse and earthworks. The summit is hollowed out like a crater, its rim surmounted by a rampart so deeply cut away that its inner side rises like a sheer wall of chalk 100 ft. high.

Old Sarum.

Old Sarum was probably one of the chief fortresses of the early Britons and was known to the Romans as *Sorbiodunum*. Cerdic, founder of the West Saxon kingdom, fixed his seat there in the beginning of the 6th century. Alfred strengthened the castle, and it was selected by Edgar as a place of national assembly to devise means of checking the Danes. Under Edward the Confessor it possessed a mint. The ecclesiastical importance of Old Sarum begins with the establishment of a nunnery by Edward the Confessor. Early in the 8th century Wiltshire had been divided between the new diocese of Sherborne and that of Winchester. About 920 a bishopric had been created at Ramsbury, east of Savernake Forest; to this Sherborne was joined in 1058 and in 1075/6 Old Sarum became the seat of a bishopric, transferred hither from Sherborne. Osmund, the second bishop, revised the form of communion service in general use, compiling a missal which forms the groundwork of the celebrated "Sarum Use." The "Sarum Breviary" was printed at Venice in 1483, and upon this, the most widely prevalent of English liturgies, the prayer-books of Edward VI. were mainly based. Osmund also built a cathedral, in the form of a plain cross, and this was traceable in the very dry summer of 1834. Old Sarum could have afforded little room for a cathedral, bishop's palace, garrison and townsfolk. The priests complained of their bleak and waterless abode, and still more of its transference to the keeping of lay castellans. Soldiers and priests were at perpetual feud; and after a licence had been granted by Pope Honorius III., it was decided to move down into the fertile Avon valley. In 1102 the notorious bishop, Roger Poore, by virtue of his office of sheriff, obtained custody of the castle and the grant of a comprehensive charter from Henry I. which confirmed and extended the possessions of the ecclesiastical establishment, annexed new benefactions and granted perpetual freedom in markets and fairs from all tolls and customs. This was confirmed by Henry II., John, and Henry III. With the building of New Sarum in the 13th century and the transference to it of the see, Old Sarum lapsed to the crown. It has since changed hands several times, and under James I. formed part of the property of the earldom of Salisbury. By the 16th century it was almost entirely in ruins, and in 1608 it was ordered that the town walls should be entirely demolished. The borough returned two members to parliament from 1295 until 1832 when it was deprived of representation by the Reform Act, the privilege of election being vested in the proprietors of certain free burgage tenures. In the 14th century the town appears to have been divided into aldermanries, the will of one John atte Stone, dated 1361, including a bequest of land within the aldermanry of Newton. In 1102 Henry I. granted a yearly fair for seven days, on August 14 and for three days before and after. Henry III. granted another fair for three days from June 28, and Richard II. for eight days from September 30.

The new city, under the name of New Sarum (New Saresbury, Salisbury) immediately began to spring up round the cathedral close. A charter of Henry III. in 1227 recites the removal from Old Sarum, the king's ratification and his laying the foundation-stone of the church. It then grants and confirms to the bishops, canons and citizens, all liberties and free customs previously enjoyed, and declares New Sarum to be a free city and to constitute for ever part of the bishop's demesne. During the three following centuries periodical disputes arose between the bishop and the town, ending generally in the complete submission of the latter. One of these resulted in 1472 in the grant of a new charter by Edward IV. empowering the bishop to enforce the regular election of a mayor, and to make laws for governing the town. In 1611 the city obtained a charter of incorporation from James I. under the title of "mayor and commonalty" of the city of New Sarum, the governing body to consist of a mayor, recorder and twenty-four aldermen, with power to make by-laws. This charter was renewed by Charles I. and confirmed by Cromwell in 1656. The latter recites that since the deprivation of archbishops and bishops, by parliament, the mayor and commonalty have bought certain possessions of the late bishop of New Sarum, together with fairs and markets. These it confirms, constitutes the town a city and county, subjects the close to its jurisdiction and invests the bailiff with the powers of a sheriff. In 1659 with the restoration of the bishops, the ancient charter of the city was revived and that of 1656 cancelled. In 1684 during the friction between Charles II. and the towns, Salisbury surrendered its charter voluntarily. Four years later in 1688 James II. restored to all cities their ancient charters, and the bishop continued to hold New Sarum as his demesne until 1835. The Municipal Corporations Act of that year reported that Salisbury was still governed under the charter of 1611, as modified by later ones of Charles II., James II. and Anne.

New Sarum.

In 1221 Henry III. granted the bishop a fair for two days from August 14, which in 1227 was prolonged to eight days. Two general fairs were obtained from Cromwell in 1656, on the Tuesday before Whit-Sunday and on the Tuesday in the second week before Michaelmas. In 1792 the fairs were held on the Tuesday after January 6, on the Tuesday and Wednesday after March 25, on Whit-Monday, on the second Tuesday in September, on the second Tuesday after October 10, and on the Tuesday before Christmas Day; in 1888 on July 15 and October 18; and now on the Tuesdays after January 6 and October 10. A large pleasure-fair was held until recently on Whit-Monday and

Tuesday, but in 1888 this was reported as of bad character and it is now discontinued. A grant of a weekly market on Tuesday was obtained from Henry III. in 1227. In 1240 this privilege was being abused, a daily market being held, which was finally prohibited in 1361. In 1316 a market on Saturday was granted by Edward II. and in 1656 another on every second Tuesday by Cromwell. In 1769 a wholesale cloth market was appointed to be held yearly on August 24. In 1888 and 1891 the market days were Tuesday and Saturday. A great corn-market is now held every Tuesday, a cattle market on alternate Tuesdays, and a cheese market on the second Thursday in the month. Salisbury returned two members to parliament until 1885 when the number was reduced to one. As early as 1334 the town took part in foreign trade and was renowned for its breweries and woollen manufactories, and the latter industry continued until the 17th century, but has now entirely declined. Commercial activity gave rise to numerous confraternities amongst the various trades, such as those of the tailors, weavers and cutlers. The majority originated under Edward IV., though the most ancient—that of the tailors—was said to have been formed under Henry VI. and still existed in 1835. The manufacture of cutlery, once a flourishing industry, is now decayed.

See *Victoria County History. Wiltshire*; Sir R. C. Hoare, *History of New Sarum* (1843); and *History of Old Sarum* (1843).

SALISBURY, a town and the county-seat of Wicomico county, Maryland, U.S.A., on the Wicomico river, about 23 m. from its mouth. Pop. (1900) 4277, of whom 1006 were negroes. It is served by the Baltimore, Chesapeake & Atlantic (which has shops here), and the New York, Philadelphia & Norfolk railways, and by steamers on the Wicomico river, which has a channel 9 ft. deep; Salisbury is the head of navigation. Grain, vegetables and lumber are shipped along the coast. Salisbury was founded in 1732, organized as a town in 1812, and incorporated in 1854 and again in 1888.

SALISBURY, a city and the county-seat of Rowan county, North Carolina, U.S.A., about 120 m. W. by S. of Raleigh. Pop. (1890) 4418; (1900) 6277, of whom 2408 were negroes. Salisbury is served by the Southern railway, which has repair shops here. It is the seat of Livingstone College (African Methodist Episcopal, removed from Concord to Salisbury in 1882, chartered 1885). There is a national cemetery here, in which 12,147 Federal soldiers are buried. The city has various manufactures and is the trade centre of the surrounding farming country. Salisbury was founded about 1753, was first incorporated as a town in 1755 and first chartered as a city in 1770. During the Civil War there was a Confederate military prison here. On the 12th of April 1865 the main body of General George Stoneman's cavalry encountered near Salisbury a force of about 3000 Confederates under General William M. Gardner, and captured 1364 prisoners and 14 pieces of artillery.

SALISHAN, the name of a linguistic family of North American Indian tribes, the more important of which are the Salish (Flatheads), Bellacoola, Clallam, Colville, Kalispel, Lummi, Nisqually, Okinagan, Puyallup, Quinault, Sanpoil, Shushwap, Skokomish, Songeesh, Spokan and Tulalip. They number about 20,000, and live in the southern part of British Columbia, the coast of Oregon, and the north-west of Washington, Montana and Idaho.

SALLI (*Slā*), a seaport on the Atlantic coast of Morocco, on the north side of the Bu Ragrag opposite Rabat (*q.v.*). Pop. about 30,000. The shrine of Sidi Abd Allah Hasūn in Salli is so sacred as to close the street in which it stands to any but Moslems. Outside the town walls there is no security for life or property. A bar at the mouth of the river excludes vessels of more than two hundred tons; steamers lie outside, communicating with the port by lighters of native build manned by descendants of the pirates known as "Salli Rovers." (See BARBARY PIRATES.)

SALLO, DENIS DE, Sieur de la Coudraye [pseudonym *Sieur d'Hédonville*] (1626–1669), French writer, and founder of the first French literary and scientific journal, was born at Paris in 1626. In 1665 he published the first number of the *Journal des savants*. The *Journal*, under his direction, was suppressed after the thirteenth number, but was revived shortly afterwards. He died in Paris on the 14th of May 1669.

SALLUST [GAIUS SALLUSTIUS CRISPUS] (86–34 B.C.), Roman historian, belonging to a well-known plebeian family, was born at Amiternum in the country of the Sabines. After an ill-spent youth he entered public life, and was elected tribune of the people in 52, the year in which Clodius was killed in a street brawl by the followers of Milo. Sallust was opposed to Milo and to Pompey's party and to the old aristocracy of Rome. From the first he was a decided partisan of Caesar, to whom he owed such political advancement as he attained. In 50 he was removed from the senate by the censor Appius Claudius Pulcher on the ground of gross immorality, the real reason probably being his friendship for Caesar. In the following year, no doubt through Caesar's influence, he was reinstated and appointed quaestor. In 46 he was praetor, and accompanied Caesar in his African campaign, which ended in the decisive defeat of the remains of the Pompeian party at Thapsus. As a reward for his services, Sallust was appointed governor of the province of Numidia. In this capacity he was guilty of such oppression and extortion that only the influence of Caesar enabled him to escape condemnation. On his return to Rome he purchased and laid out in great splendour the famous gardens on the Quirinal known as the *Horti Sallustiani*. He now retired from public life and devoted himself to historical literature. His account of the Catiline conspiracy (*De conjuratione Catilinae* or *Bellum Catilinarium*) and of the Jugurthine War (*Bellum Jugurthinum*) have come down to us complete, together with fragments of his larger and most important work (*Historiae*), a history of Rome from 78–67, intended as a continuation of L. Cornelius Sisenna's work. The *Catiline Conspiracy* (his first published work) contains the history of the memorable year 63. Sallust adopts the usually accepted view of Catiline, and describes him as the deliberate foe of law, order and morality, without attempting to give any adequate explanation of his views and intentions. Catiline, it must be remembered, had supported the party of Sulla, to which Sallust was opposed. There may be truth in Mommsen's suggestion that he was particularly anxious to clear his patron Caesar of all complicity in the conspiracy. Anyhow, the subject gave him the opportunity of showing off his rhetoric at the expense of the old Roman aristocracy, whose degeneracy he delighted to paint in the blackest colours. On the whole, he is not unfair towards Cicero. His *Jugurthine War*, again, though a valuable and interesting monograph, is not a satisfactory performance. We may assume that he had collected materials and put together notes for it during his governorship of Numidia. Here, too, he dwells upon the feebleness of the senate and aristocracy, too often in a tiresome, moralizing and philosophizing vein, but as a military history the work is unsatisfactory in the matter of geographical and chronological details. The extant fragments of the *Histories* (some discovered in 1886) are enough to show the political partisan, who took a keen pleasure in describing the reaction against the dictator's policy and legislation after his death. The loss of the work is to be regretted, as it must have thrown much light on a very eventful period, embracing the war against Sertorius, the campaigns of Lucullus against Mithradates of Pontus, and the victories of the great Pompey in the East. Two letters (*Duae epistolae de republica ordinanda*), letters of political counsel and advice addressed to Caesar, and an attack upon Cicero (*Invectiva* or *Declamatio in Ciceronem*), frequently attributed to Sallust, are probably the work of a rhetorician of the first century A.D., also the author of a counter-invective by Cicero. Sallust is highly spoken of by Tacitus (*Annals*, iii. 30); and Quintilian (ii. 5, x. 1), who regards him as superior to Livy, does not hesitate to put him on a level with Thucydides. On the whole the verdict of antiquity was favourable to Sallust as an historian. He struck out for himself practically a new line in literature, his predecessors having been little better than mere dry-as-dust chroniclers, whereas he endeavoured to explain the connexion and meaning of events, and was a successful delineator of character. The contrast between his early life

and the high moral tone adopted by him in his writings was frequently made a subject of reproach against him; but there is no reason why he should not have reformed. In any case, his knowledge of his own former weaknesses may have led him to take a pessimistic view of the morality of his fellow-men, and to judge them severely. His model was Thucydides, whom he imitated in his truthfulness and impartiality, in the introduction of philosophizing reflections and speeches, and in the brevity of his style, sometimes bordering upon obscurity. His fondness for old words and phrases, in which he imitated his contemporary Cato, was ridiculed as an affectation; but it was just this affectation and his rhetorical exaggerations that made Sallust a favourite author in the 2nd century A.D. and later.

Editions and translations in various languages are numerous. Editio princeps (1470); (text) R. Dietsch (1874); H. Jordan (1887); A. Eussner (1887); (text and notes) F. D. Gerlach (1823–1831); F. Kritz (1828-1853; ed. minor, 1856); C. H. Frotscher (1830); C. Merivale (1852); F. Jacobs, H. Wirz (1894); G. Long, revised by J. G. Frazer, with chief fragments of *Histories* (1884); W. W. Capes (1884); English translation by A. W. Pollard (1882). There are many separate editions of the *Catilina* and *Jugurtha*, chiefly for school use. The fragments have been edited by F. Kritz (1853) and B. Maurenbrecher (1891–1893); and there is an Italian translation (with notes) of the supposititious letters by G. Vittori (1897). On Sallust generally J. W. Löbell's *Zur Beurtheilung des S.* (1818) should still be consulted; there are also treatises by T. Vogel (1857) and M. Jäger (1879 and 1884), T. Rambeau (1879); L. Constans, *De sermone Sallustiano* (1880); P. Bellezza, *Dei fonti e dell' autorità storica di Sallustio* (1891); and special lexicon by O. Eichert (1885). The sections in Teuffel-Schwabe's *History of Roman Literature* are full of information; see also bibliography of Sallust for 1878–1898 by B. Maurenbrecher in C. Bursian, *Jahresbericht über die Fortschritte der klassischen Altertumswissenschaft* (1900).

SALMASIUS, CLAUDIUS, the Latinized name of CLAUDE SAUMAISE (1588–1653), French classical scholar, born at Semur-en-Auxois in Burgundy on the 15th of April 1588. His father, a counsellor of the parlement of Dijon, sent him, at the age of sixteen, to Paris, where he became intimate with Casaubon. He proceeded in 1606 to the university of Heidelberg, where he devoted himself to the classics.

Here he embraced Protestantism, the religion of his mother; and his first publication (1608) was an edition of a work by Nilus Cabasilas, archbishop of Thessalonica, in the 14th century, against the primacy of the pope (*De primatu Papae*), and of a similar tract by the Calabrian monk Barlaam (d. *c.* 1348). In 1609 he brought out an edition of Florus. He then returned to Burgundy, and qualified for the succession to his father's post, which he eventually lost on account of his religion. In 1620 he published Casaubon's notes on the *Augustan History*, with copious additions of his own. In 1623 he married Anne Mercier, a Protestant lady of a distinguished family; the union was by no means a happy one, his wife being represented as a second Xanthippe. In 1629 Salmasius produced his *magnum opus* as a critic, his commentary on Solinus's *Polyhistor*, or rather on Pliny, to whom Solinus is indebted for the most important part of his work. Greatly as this commentary may have been overrated by his contemporaries, it is a monument of learning and industry. Salmasius learned Arabic to qualify himself for the botanical part of his task. After declining overtures from Oxford, Padua and Bologna, in 1631 he accepted the professorship formerly held by Joseph Scaliger at Leiden. Although the appointment in many ways suited him, he found the climate trying; and he was persistently attacked by a jealous clique, led by Daniel Heinsius, who as university librarian refused him access to the books he wished to consult. Shortly after his removal to Holland, he composed, at the request of Prince Frederick of Nassau, his treatise on the military system of the Romans (*De re militari Romanorum*), which was not published until 1657. Other works followed, mostly philological, but including a denunciation of wigs and hair-powder, and a vindication of moderate and lawful interest for money, which, although it drew down upon him many expostulations from lawyers and theologians, induced the Dutch Church to admit money-lenders to the sacrament. His treatise *De primatu Papae* (1645), accompanying a republication of the tract of Nilus Cabasilas, excited a warm controversy in France, but the government declined to suppress it.

In November 1649 appeared the work by which Salmasius is best remembered, his *Defensio regia pro Carolo I.* His advice had already been sought on English and Scottish affairs, and, inclining to Presbyterianism or a modified Episcopacy, he had written against the Independents. It does not appear by whose influence he was induced to undertake the *Defensio regia*, but Charles II. defrayed the expense of printing, and presented the author with £100. The first edition was anonymous, but the author was universally known. A French translation which speedily appeared under the name of Claude Le Gros was the work of Salmasius himself. This celebrated work, in our day principally famous for the reply it provoked from Milton, even in its own time added little to the reputation of the author. His reply to Milton, which he left unfinished at his death, and which was published by his son in 1660, is insipid as well as abusive. Until the appearance of Milton's rejoinder in March 1651 the effect of the *Defensio* was no doubt considerable; and it probably helped to procure him the flattering invitation from Queen Christina which induced him to visit Sweden in 1650. Christina loaded him with gifts and distinctions, but upon the appearance of Milton's book was unable to conceal her conviction that he had been worsted by his antagonist. Milton, addressing Christina herself, ascribes Salmasius's withdrawal from Sweden in 1651 to mortification at this affront, but this appears to be negatived by the warmth of Christina's subsequent letters and her pressing invitation to return. The claims of the university of Leiden and dread of a second Swedish winter seem fully adequate motives. Nor is there any foundation for the belief that Milton's invectives hastened his death, which took place on the 3rd of September 1653, from an injudicious use of the Spa waters.

As a commentator and verbal critic, Salmasius is entitled to very high rank. His notes on the *Augustan History* and Solinus display not only massive erudition but massive good sense as well; his perception of the meaning of his author is commonly very acute, and his corrections of the text are frequently highly felicitous. His manly independence was shown in many circumstances, and the bias of his mind was liberal and sensible. He was accused of sourness of temper; but the charge, if it had any foundation, is extenuated by the wretched condition of his health.

The life of Salmasius was written at great length by Philibert de la Mare, counsellor of the parlement of Dijon, who inherited his MSS. from his son. Papillon says that this biography left nothing to desire, but it has never been printed. It was, however, used by Papillon himself, whose account of Salmasius in his *Bibliothèque des auteurs de Bourgogne* (Dijon, 1745) is by far the best extant, and contains an exhaustive list of his works, both printed and in MS. There is an *éloge* by A. Clément prefixed to his edition of Salmasius's *Letters* (Leiden, 1656), and another by C. B. Morisot, inserted in his own *Letters* (Dijon, 1656). See also E. Haag, *La France protestante*, (ix. 149-173); and, for the *Defensio regia*, G. Masson's *Life of Milton*.

SALMERON Y ALFONSO, NICOLAS (1838–1908), Spanish statesman, was born at Alhama la Seca in the province of Almeria, on the 10th of April 1838. He was educated at Granada and became assistant professor of literature and philosophy at Madrid. The last years of the reign of Isabella II. were times of growing discontent with her bad government and with the monarchy. Salmeron joined the small party who advocated the establishment of a republic. He was director of the Opposition paper *La Discusion*, and co-operated with Don Emilio Castelar on *La Democracia*. In 1865 he was named one of the members of the directing committee of the Republican party. In 1867 he was imprisoned with other suspects. When the revolution of September 1868 broke out, he was at Almeria recovering from a serious illness. Salmeron was elected to the Cortes in 1871, and though he did not belong to the Socialist party, defended its right to toleration. When Don Amadeo of Savoy resigned the Spanish crown on the 11th of February 1873 Salmeron was naturally marked out to be a leader of the party which endeavoured to establish a republic in Spain. After serving as minister of justice in the Figueras cabinet, he was chosen president of the Cortes, and then, on the 18th of July 1873, president of the republic, in succession to Pi Margall. He became president at a time when the Federalist party had thrown all the south of Spain into anarchy. Salmeron was compelled to use the troops to restore order. When, however, he found that the generals insisted on executing rebels taken in arms, he resigned on the ground that he was opposed to capital punishment (7th September). He resumed his seat as president of the Cortes on the 8th of September. His successor, Castelar, was compelled to restore order by drastic means. Salmeron took part in the attack made on him in the Cortes on the 3rd of January 1874, which provoked the generals into closing the

chamber and establishing a provisional military government. Salmeron went into exile and remained abroad till 1881, when he was recalled by Sagasta. In 1886 he was elected to the Cortes as Progressive deputy for Madrid, and unsuccessfully endeavoured to combine the jarring republican factions into a party of practical moderate views. On the 18th of April 1907 he was shot at, but not wounded, in the streets of Barcelona by a member of the more extreme Republican party. He died at Pau on the 21st of September 1908.

SALMON, GEORGE (1819–1904), British mathematician and divine, was born in Dublin on the 25th of September 1819 and educated at Trinity College in that city. Having become senior moderator in mathematics and a fellow of Trinity, he took holy orders, and was appointed regius professor of divinity in Dublin University in 1866, a position which he retained until 1888, when he was chosen provost of Trinity College. He was provost until his death on the 22nd of January 1904. As a mathematician Salmon was a fellow of the Royal Society, and was president of the mathematical and physical section of the British Association in 1878. He was a D.C.L. of Oxford and an LL.D. of Cambridge.

His published mathematical works include: *Analytic Geometry of Three Dimensions* (1862), *Treatise on Conic Sections* (4th ed., 1863) and *Treatise on the Higher Plane Curves* (2nd ed., 1873); these books are of the highest value, and have been translated into several languages. As a theologian he wrote *Historical Introduction to the Study of the New Testament* (1885), *The Infallibilty of the Church* (1888), *Non-Miraculous Christianity* (1881) and *The Reign of Law* (1873).

SALMON and **SALMONIDAE.**[1] The Salmonidae are an important family of fishes belonging to the Malacopterygian Teleosteans, characterized as follows: Margin of the upper jaw formed by the premaxillaries and the maxillaries—supra-occipital in contact with the frontals, but frequently overlapped by the parietals, which may meet in a sagittal suture; opercular bones all well developed. Ribs sessile, parapophyses very short or absent; epineurals, sometimes also epipleurals, present. Post-temporal forked, the upper branch attached to the epiotic, the lower to the opisthotic; postclavicle, as usual, applied to the inner side of the clavicle. A small adipose dorsal fin. Air-bladder usually present, large. Oviducts rudimentary or absent, the ova falling into the cavity of the abdomen before extrusion.

The Salmonidae are very closely related to the Clupeidae, or herring family, from which they are principally distinguished by the position of the postclavicle and by the presence of a rayless fin on the back, at a considerable distance from the true or rayed dorsal fin; this so-called adipose fin is an easy recognition-mark of this family, so far as British waters are concerned, for, if it is present in several other families, these have no representatives in the area occupied by the fresh-water salmonids, with the exception of the North American Siluridae and Percopsidae, which are readily distinguished by the pungent spine or spines which precede the rays of the first dorsal fin. The imperfect condition of the oviducts, quite exceptional among fishes, owing to which the large ripe eggs may be easily squeezed out of the abdomen, is a feature of great practical importance, since it renders artificial impregnation particularly easy, and to it is due the fact that the species of *Salmo* have always occupied the first place in the annals of fish-culture.

The Salmonidae inhabit mostly the temperate and arctic zones of the northern hemisphere, and this is the case with all fresh-water forms, with one exception, *Retropinna*, a smelt-like fish from the coasts and rivers of New Zealand. A few deep-sea forms (*Argentina, Microstoma, Nansenia, Bathylagus*) are known from the Arctic ocean, the Mediterranean and the Antarctic ocean, down to 2000 fathoms. The question has been discussed whether the salmonids, so many of which live in the sea, but resort to rivers for breeding purposes, were originally marine or fresh-water. The balance of opinion is in favour of the former hypothesis, which is supported by the fact that the overwhelming majority of the members of the suborder of which the salmonids form part permanently inhabit the sea. The clupeids, for instance, which are their nearest allies, are certainly of marine origin, as proved by their abundance in Cretaceous seas, yet a few, like the shads, ascend rivers to spawn, in the same way as the salmon does, without this ever having been adduced as evidence in favour of a fresh-water origin of the genus *Clupea* to which they belong.

No remains older than Miocene (*Osmerus, Prothymallus, Thaumaturus*) are certainly referable to this family, the various Cretaceous forms originally referred to it, such as *Osmeroides* and *Pachyrhizodus*, being now placed with the *Elopidae*. There is probably no other group of fishes to which so much attention has been paid as to the Salmonidae, and the species have been unduly multiplied by some writers. Perhaps not more than 80 should be regarded as valid, but some of them fall into a number of local forms which are distinguished as varieties or subspecies by some authors, whilst others would assign them full specific rank. These differences of opinion prevail whether we deal with *Salmo* proper or with *Coregonus*.

Classification.—The recent genera may be arranged in five groups: The first, which includes *Salmo, Brachymystax, Stenodus, Coregonus, Phylogephyra* and *Thymallus*, has 8 to 20 branchiostegal rays, 9 to 13 rays in the ventral fin, the pyloric appendages more or less numerous (17 to 200) and breeding takes place in fresh water. The second group, with the single genus *Argentina*, is, like the following, marine, and is characterized by 6 branchiostegal rays, 11 to 14 ventral rays, the stomach caecal, with pyloric appendages in moderate numbers (12 to 20). The third group, genera *Osmerus, Thaleichthys, Mallotus, Plecoglossus, Hypomesus*, has 6 to 10 branchiostegal rays, 6 to 8 ventral rays, the stomach caecal, with pyloric appendages few (2 to 11) or rather numerous. The fourth group, genera *Microstoma, Nansenia, Bathylagus*, deep-sea forms with the branchiostegal rays reduced to 3 or 4, ventral rays 8 to 10, the stomach caecal and pyloric appendages absent; whilst the fifth group, with the genera *Retropinna* and *Salanx*, is distinguished from the preceding in having no air-bladder, branchiostegal rays 3 to 6, ventral rays 6 or 7, stomach siphonal and pyloric appendages absent.

The genus *Salmo*, the most important from the economical and sporting points of view, is characterized by small smooth scales, which at certain seasons may become embedded in the slimy skin, a moderately high dorsal fin with 10 to 12 well-developed rays, and a large mouth provided with strong teeth, which are present not only in the jaws and on the palate, but also on the tongue; the maxillary or posterior bone of the upper jaw extends to below or beyond the eye. Young specimens (see PARR) are marked with dark vertical bars on the sides (parr-marks), which in some trout are retained throughout life, and have the caudal fin more or less deeply forked or marginate, the form of the fin changing with the age and sexual development of the fish. Adult males have the jaws more produced in front than females, and both snout and chin may become curved and hooked. As pointed out by A. Günther, who was the first to make a profound study of the members of this genus, and especially of the British forms, there is probably no other group of fishes which offers so many difficulties to the ichthyologist with regard to the distinction of species, as well as to certain points in their life-history, the almost infinite variations which they undergo being dependent on age, sex and sexual development, food and the properties of the water. The difficulties in their study have rather been increased by the excessive multiplication of so-called specific forms. Opinions also vary as to the importance to be attached to the characters which serve to group the principal species into natural divisions. Whilst A. Günther admitted two genera, *Salmo* and *Oncorhynchus*, D. S. Jordan and B. W. Evermann go so far as to recognize five, *Oncorhynchus, Salmo, Hucho, Cristivomer* and *Salvelinus*. The latter arrangement is certainly the more logical, the difference between the first genus and the second being of rather less importance than that between the second and the third. However, considering the slightness of the distinctive characters on which these divisions are based, and the complete passage which obtains between them, the writer of this article thinks it best to maintain the genus *Salmo* in the wide sense, whilst retaining the divisions as subordinate divisions or sub-genera, with the following definitions:—

Oncorhynchus (Pacific salmon).—Vomer flat, toothed along the shaft, at least in the young; anal fin with 12 to 17 well-developed rays.

Salmo (true salmon and trout).—Vomer flat, toothed along the shaft, at least in the young; anal fin with 8 to 12 well-developed rays.

Salvelinus (char).—Vomer boat-shaped, the shaft strongly depressed behind the head, which alone is toothed, the teeth forming an isolated fascicle; anal fin with 8 to 10 well-developed rays.

Hucho (huchens).—Vomer as in the preceding, but teeth forming a single arched transverse series continuous with the palatine teeth; anal fin with 8 to 10 well-developed rays.

The salmon itself (*Salmo salar*), the type of the family, is a large fish, attaining a length of 4 or 5 ft., and living partly in the

[1] The Latin name *salmo* possibly means literally "the leaper," from *salire*, to leap, jump.

sea, partly in fresh water, breeding in the latter. Fish which thus ascend rivers to spawn are called "anadromous." It may be briefly defined as of silvery coloration, with small black spots usually confined to the side above the lateral line, with the teeth on the shaft of the vomer disappearing in the adult, with 18 to 22 gill-rakers on the first branchial arch, with 11 or 12 well-developed rays in the dorsal fin, 110 to 125 scales in the lateral line, and 11 or 12 (exceptionally 13) between the latter and the posterior border of the adipose fin. The young, called "parr" or "samlet," characterized by a smaller mouth, the maxillary bone not extending much beyond the vertical of the centre of the eye, the presence of an alternating double or zigzag series of teeth on the shaft of the vomer, the presence of dark vertical bars on the sides of the body, together with more or less numerous small red spots, is hatched in the spring, and usually remains for about two years in the rivers, descending at the third spring to the sea, where it is known as "smolt." In the sea it soon assumes a more uniform silvery coloration and from this state, or "grilse," develops its sexual organs and re-enters rivers to breed, after which operation, much emaciated and unwholesome as food, it is known as "kelt," and returns to the sea to recuperate. It has now been ascertained by the investigations instituted in Norway by K. Dahl that the smolts, immediately after leaving the rivers, make for the open sea, and do not return to the coast until they have reached the grilse stage. Thus specimens measuring between 8 and 18 in. hardly ever fall into the hands of the angler.

The salmon inhabits the North Atlantic and its tributary waters. It is known to extend as far north as Scandinavia, Lapland, Iceland, Greenland and Labrador, and as far south as the north-west of Spain and the state of Connecticut. It ascends the Rhine as far as Basel. There are land-locked forms in Scandinavia and in Canada and Maine, which are regarded by some authors as distinct species (*S. hardinii* from Lake Wener, *S. sebago* from Sebago Lake in Maine, *S. ouananiche* from Lake St John, Canada and neighbouring waters). These non-migratory forms are smaller than the typical salmon, never exceeding a weight of 25 lb, the ouananiche, the smallest of all, rarely weighing 7½ lb and averaging 3½. Although spending their whole life in fresh waters, the habits of these fish are very similar to those of the sea salmon, ascending tributary streams to spawn in their higher ranges, and then returning to the deep parts of the lakes, which are to them what the sea is to the anadromous salmonids.

The salmon breeds in the shallow running waters of the upper streams of the rivers it ascends. The female, when about to deposit her eggs, scoops out a trough in the gravel of the bed of the stream. This she effects by lying on her side and ploughing into the gravel by energetic motions of her body. She then deposits her eggs in the trough; while she is engaged in these operations she is attended by a male, who sheds milt over the eggs as the female extrudes them, fertilization being, as in the great majority of *Teleostei*, external. The parent fish then fill up the trough and heap up the gravel over the eggs until these are covered to a depth of some feet. The gravel heap thus formed is called a "redd." The period of the year at which spawning takes place in the British Isles, and in similar latitudes of the northern hemisphere, varies to a certain extent with the locality, and in a given locality may vary in different years; but, with rare exceptions, spawning is confined to the period between the beginning of September and the middle of January.

The eggs are spherical and non-adhesive; they are heavier than water, and are moderately tough and elastic. The size varies slightly with the age of the parent fish, those from full-sized females being slightly larger than those from very young fish. According to rough calculations made at salmon-breeding establishments, there are 25,000 eggs to a gallon; the diameter is about a quarter of an inch. It is usually estimated that a female salmon produces about 900 eggs for each pound of her own weight; but this average is often exceeded.

The time between fertilization and hatching, or the escape of the young fish from the egg-membrane, varies considerably with the temperature to which the eggs are exposed. It has been found that at a constant temperature of 41° F. the period is 97 days; but the period may be as short as 70 days and as long as 150 days without injury to the health of the embryo. It follows therefore that in the natural conditions eggs deposited in the autumn are hatched in the early spring. The newly hatched fish, or "alevin," is provided with a very large yolk-sac, and by the absorption of the yolk is nourished for some time; although its mouth is fully formed and open, it takes no food. The alevin stage lasts for about six weeks, and at the end of it the young fish is about 1¼ in. long.

The grilse, after spawning in autumn, return again to the sea in the winter or following spring, and reascend the rivers as mature spawning salmon in the following year. Both salmon and grilse after spawning are called "kelts." The following recorded experiment illustrates the growth of grilse into salmon: a grilse-kelt of 2 lb was marked on March 31, 1858, and recaptured on August 2 of the same year as a salmon of 8 lb.

The ascent of rivers by adult salmon is not so regular as that of grilse, and the knowledge of the subject is not complete. Although salmon scarcely ever spawn before the month of September, they do not ascend in shoals just before that season; the time of ascent extends throughout the spring and summer. A salmon newly arrived in fresh water from the sea is called a clean salmon, on account of its bright, well-fed appearance; during their stay in the rivers the fish lose the brilliancy of their scales and deteriorate in condition. The time of year at which clean salmon ascend from the sea varies greatly in different rivers; and rivers are, in relation to this subject, usually denominated early or late. The Scottish rivers flowing into the German Ocean and Pentland Firth are almost all early, while those of the Atlantic slope are late. The Thurso in Caithness and the Naver in Sutherlandshire contain fresh-run salmon in December and January; the same is the case with the Tay. In Yorkshire salmon commence their ascent in July, August or September if the season is wet, but if it is dry their migration is delayed till the autumn rains set in. In all rivers more salmon ascend immediately after a spate or flood than when the river is low, and more with the flood tide than during the ebb. In their ascent salmon are able to pass obstructions, such as waterfalls and weirs of considerable height, and the leaps they make in surmounting such impediments and the persistence of their efforts are very remarkable.

We reproduce here, with additions, Professor Noel Paton's summary (published first in the 10th edition of this *Encyclopædia*) of observations on the life-history of the salmon. Important advances in our knowledge of the life-history of the salmon have been made through the investigations of Professor F. Miescher on the Rhine at Basel, of Professor P. P. C. Hoek in Holland, of Mr Archer as lessee of the river Sands in Norway and as inspector of salmon fisheries for Scotland in conjunction with Messrs Gray and Tosh, and of a number of workers in the laboratory of the Royal College of Physicians of Edinburgh. With regard to the *food* of salmon, the enormously rapid growth of smolts to grilse and of salmon from year to year shows that they feed in the sea. In a few months a smolt will increase from a few ounces to 4 or 5 lb; while Archer's weighings of 16 salmon which had been marked and recaptured in the following year showed an average gain of 36 %, reckoned on from kelt stage to kelt stage. During the season of 1895 Tosh, at Berwick-on-Tweed, opened between March and August 514 fish, and found food in the stomachs of 76, or over 14 % of the whole. As to the nature of the food, it was found to be as follows:—

Herring	36 or 47 %
Crustacea, amphipods, &c.	14 „ 18 %
Sand eels	11 „ 14 %
Haddock and whiting	8 „ 10 %
Feathers and vegetable matter	7 „ 9 %

Excluding the feathers and vegetable matter, which are not really of the nature of food, all the material found in the stomach was of marine origin. Hoek, out of 2000 fish examined by him, found 7 with food in the stomach, and, curiously enough, 4 of these were taken on the same day. In each case marine fish constituted the food. As to where salmon go to feed in the sea, our information is still very deficient, but the prevalence of herring in the stomach would seem to indicate that they must follow the shoals of these fish which approach the coast during the summer months. While there can be no doubt that salmon feed in the sea, the question of whether they feed in fresh water has been much debated. It is difficult for the popular mind to conceive of an active fish like the salmon subsisting for several months without food, and the fact that the fish so frequently not only takes into its mouth but actually swallows worms and various lures has still further tended to confirm many people in the conviction that salmon do feed in fresh water. In discussing the question it is well clearly to understand what is meant by feeding. It is the taking, digesting and absorbing of material of use in the economy in such quantities as to be of benefit to the individual. Accepting this definition, it may at once be said that all the evidence we possess is entirely opposed to the view that salmon feed when in fresh water. Miescher examined the stomachs of about 2000 salmon captured at Basel, about 500 m. from the mouth of the Rhine, and in only two did he find any indication of feeding. These two fish were male kelts. One contained the remains of a cyprinoid fish, and the other had a dilated stomach with an acid secretion, but no food remains. Hoek, who, as already stated, examined about 2000 fish, found food of marine origin in 7, but in none food derived from fresh water. Of the 132 stomachs of salmon from the estuaries and upper waters of Scottish rivers examined in the laboratory of the College of Physicians not one contained any food remains. The stomach of salmon captured in fresh water is collapsed and shrunken. Its mucous membrane is thrown into folds, and it contains a small amount of mucus of a neutral reaction. The intestine, which usually contains numerous

tape-worms, is full of a greenish-yellow viscous material which, when examined under the microscope, is found to consist of mucus with shed epithelial and other cells and with masses of crystals of carbonate of lime. In no case does the microscope reveal any food remains such as fish-scales, plates of crustacea or bristles of worms or annelids. In the fish taken in the estuaries up to the month of August the gall-bladder is distended; in those taken later in the year it is empty. In all the fish from the upper waters the gall-bladder is empty and collapsed. According to the investigations of Hoek and of Gulland, the lining membrane of the stomach and intestine degenerates while the fish is in the river, but the correctness of these observations has been denied by F. B. Brown and J. Kingston Barton. Gillespie finds that the activity of the digestive processes is low in fish taken from the rivers, and that micro-organisms, which would be killed by the hydrochloric acid of the gastric juice were it actively secreted, flourish in the intestines of the fish from the upper waters. Those who believe that the salmon feeds in fresh water explain the fact that the stomach is always found empty by the supposition that the fish vomits any food when it is captured, and several descriptions of cases in which this has been observed might be quoted; but such observations must be accepted with caution, and the contracted state of the stomach, the absence of the hydrochloric acid of the gastric juice, and lastly the absence of any traces of digested food remains in the contents of the intestine, negative this explanation.

The question may be presented in another way. Is there any reason why the salmon should feed while in fresh water? The investigations carried on in the laboratory of the College of Physicians have definitely shown that the salmon leaves the sea with an enormous supply of nourishment stored in its muscles, and that during its sojourn in fresh water it gets its energy and builds up its rapidly growing ovaries and testes from this stored material. Briefly stated, these investigations show that the supply of albuminous material and fats stored in the muscles and used while the fish is in the river is amply sufficient for the greatest requirements of the fish. The amount of energy liberated from the fats and albuminous material is 570 times more than is required to raise the fish from the level of the estuary to that of the upper waters! These analyses further show that all the materials required for the construction of the ovaries and the testes are found in sufficient quantity in the muscles, with the exception of iron, which is, however, abundantly present in the blood.

It is a very common opinion that kelts feed voraciously while still in fresh water, and this has been used as an argument that they should be destroyed. It is not easy to bring forward such satisfactory evidence as has been adduced in the case of unspawned salmon, since it is illegal to kill kelts; but none of the 25 kelts procured by the Scottish Fishery Board, and examined in the College of Physicians' laboratory, contained any food, and Mr Anderson, formerly of Dunkeld, informs Professor Paton that in the old days, when kelts were habitually killed when captured, he has opened a large number and never found any trace of food in the stomach. Some fishers declare that they have seen kelts devouring salmon fry, but it is not easy to make accurate observations in deep water. According to Dr Gulland's investigations, the mucous membrane of the stomach and intestine is completely regenerated while the gall-bladder contains bile, and the digestive activity of the alimentary canal is greater than in salmon before spawning. Kelts thus appear at least to be capable of feeding.

The rate of growth of the genitalia has been carefully studied by Miescher, Archer and Hoek. From January till about the end of May the growth of the ovaries is slow. In Hoek's series of observations, which are the most complete, they increased from ·35 to ·85 % of the body weight. After this they enlarge more rapidly, and by the end of August are about 3 % in salmon taken at the mouth of the Tweed, about 4 % in the salmon from the mouth of the Rhine and about 8 % in the salmon from the Basel fisheries. By November they have risen to 20 % in the Tweed and in Holland, and to 23 % in the upper reaches of the Rhine. According to Archer's observations, the development of the ovaries in grilse in the earlier months somewhat lags behind that in the salmon. The growth of the testes has been chiefly investigated by Archer and Tosh in the Tweed and by Miescher at Basel. From March to the middle of July in the Tweed these organs increase from about ·19 to ·35 % of the weight of the fish. In July their rate of growth increases, and they reach their maximum development at the end of September, when they are about 6 % of the body weight. In the Rhine in March they weigh about ·1 %, and they reach their maximum development of about 5 % in October.

What leads to the migration of salmon from sea to river and river to sea? It is usually supposed that they come to the river to spawn; that it is the *nisus generativus* that drives them from the sea, where their ova will not develop, to the fresh water where development is possible. But it is found that salmon are passing from sea to river at all seasons of the year, and with their genitalia in all stages of development—some fish running in March with ovaries only 1 % of the body weight, other fish not running till October with ovaries 15 or 16 % of the body weight. It is difficult, then, to accept the theory that the sexual act is the governing factor. That it is a secondary factor seems to be indicated by the great run of fish in June, July and August, when the genitalia are most rapidly growing. There is one respect, however, in which all the fish leaving the sea for the river agree, and that is in the amount of stored material accumulated in their bodies. In the early running fish this material is largely confined to the muscles, but in the later coming fish it is more equally distributed between muscles and genitalia. The amount of stored material may be measured by the amount of solids, and if we express the results of all the fish examined in terms of fish of uniform size—100 cm. in length—the following results are obtained:—

	Nov.[1]	Feb.	Mar.	April.	May and June.	July and Aug.	Oct. and Nov.	Kelts.
Muscles	2481	2214	2355	2599	2210	2270	1750	946
Ovaries	23	24	24	33	47	72	545	9
Total	2504	2238	2379	2632	2257	2342	2295	955

It would thus appear that, when the salmon has in the sea accumulated a certain definite amount of nourishment, it ceases to feed, and returns to the river irrespective of the state of its genital organs. Nutrition, and not the *nisus generativus*, appears to be the motive power. That the fish after spawning returns to the sea in search of food is fully recognized by all.

Course of Migration.—It is well known that while salmon run all the year through in greater or lesser numbers, the run of grilse takes place in the summer months, from May to August. But it is further possible to divide the salmon into classes—the so-called winter salmon of the Rhine, large fish running from October to February, with unripe ovaries and testes; and the summer salmon, running for the most part from March to October, with genitalia more or less ripe. These summer fish are small in the early months, but increase in size as the autumn advances. The winter salmon, along with the early summer or spring fish, appear to pass directly to the upper reaches of the river, and to spawn there, while the larger late-coming fish appear to populate the lower waters. This seems to be indicated by the comparison of upper-water and estuary fish throughout the year. The period at which male and female fish enter the rivers also appears to be somewhat different. The observations of Tosh, Miescher and Hoek show that throughout the year the female fish exceed the males in number, and, secondly, that during the earlier months of the year female fish run in much larger numbers than do male fish. It is only in September that anything like an equality between the two sexes is established. But in Great Britain it is not until the end of August that the nets are removed, and one cannot but believe that the destruction of such a very large proportion of females as are captured during the early months of the season must have a most prejudicial effect upon the breeding stock.

Rate of Migration.—By a comparison of the first appearance of winter salmon and of grilse in the markets of Holland and of Basel—500 m. up the river—Miescher gives some data for the determination of the average rate at which salmon ascend an unobstructed stream. It was found that winter salmon appeared at Basel about 54 days after their appearance in Holland, which would give a rate of passage of about 10 m. per diem. From a smaller number of observations on grilse, it appears that they travel at a somewhat slower rate. It is, however, doubtful how far these figures are of value in deciding the rate at which fish pass up the lower reaches of the river.

Great difficulties have been experienced in ascertaining the age and rate of growth of salmon. The practice has long ago been resorted to of "marking" salmon, the most satisfactory mark being a small oblong silver label, oxidized or blackened, bearing distinctive letters and numbers, to the dorsal fin. But of late the structure of the scales has been studied with the object of obtaining indications of the age, growth and spawning habit. H. W. Johnston in 1905 contributed an interesting paper on the subject. The scales bear concentric lines, which vary in number and relative distance according to the growth of the fish, and during the feeding periods these lines are added with more rapidity and a greater degree of separation than at other times. Johnston has endeavoured to ascertain their meaning in Tay salmon, and he has shown that the number of lines external to their last annual ring gives some clue to the time at which they left the sea; he is thus able to distinguish among ascending salmon such as are on their first return from such as have made the journey once or oftener before.

The group of Pacific salmon, or king salmon, commonly designated as *Oncorhynchus*, contains the largest and commercially the most important of the Salmonidae. They are anadromous species inhabiting the North Pacific and entering the rivers of America as well as of Asia. The best known and most valuable is the quinnat (*S. quinnat*), ascending the large rivers in spring and summer, spawning from July to December. They die after the breeding season is over, and never return to the sea. For the important Salmonidae known as TROUT, CHAR, WHITEFISH, SMELT, GRAYLING, &c., see the separate articles. The huchen (*S. hucho*) of the Danube is an elongate, somewhat pike-like form, growing to the same size

[1] Winter fish not due to spawn till following November.

as the salmon, of silvery coloration, with numerous small black dots, extending on the dorsal fin. Allied to it are *S. fluviatilis* from Siberia and *S. perryi* or *blackistoni* from the northern island of Japan.

The genus *Stenodus* is intermediate between *Salmo* and *Coregonus* (whitefish). *S. leucichthys* is an anadromous species, inhabiting the Caspian Sea and ascending the Volga and the Ural; it is also found in the Arctic ocean, ascending the Ob, Lena, &c. It grows to a length of 5 ft. A second species occurs in Arctic North America; this is the "Inconnu," *S. mackenzii*, from the Mackenzie river and its tributaries.

The capelin (*Mallotus villosus*, so called from the villous bands formed by the scales of mature males) is a salmonid of the coasts of Arctic America and north-eastern Asia; it deposits its eggs in the sand along the shores in incredible numbers, the beach becoming a quivering mass of eggs and sand. *Plecoglossus*, a salmonid from Japan and Formosa, is highly remarkable for its lamellar, comb-like, lateral teeth. The siel-smelts, *Argentina*, are deep-sea salmonids, of which examples have occasionally been taken off the coasts of Scotland and Ireland. *Bathylagus*, another salmonid discovered by the "Challenger" expedition, is still better adapted for life at great depths (down to 1700 fathoms), the eyes being of enormous size.

AUTHORITIES.—On the systematic and life histories: A. Günther, *Catalogue of Fishes in the British Museum*, vol. vi. (1866); F. Day, *British and Irish Salmonidae* (London, 1887); F. A. Smitt, *Kritisk Forteckning öfver de i Riksmuseum befintliga Salmonider* (Stockholm, 1886); V. Fatio, *Faune des vertébrés de la Suisse*, vol. v. (1890); D. S. Jordan and B. W. Evermann, *Fishes of North America*, vol. i. (1896), and *American Food and Game Fishes* (London and New York, 1902); F. F. Kavraisky, *Die Lachse der Kaukasuslandern* (Tiflis, 1896). On growth and migrations: *Die histochemischen und physiologischen Arbeiten von Friedrich Miescher*, Band ii. pp. 116, 192, 304, 325 (Leipzig, 1897); P. P. C. Hoek, *Statische und biologische Untersuchungen an in den Niederländern gefangenen Lachsen* (Charlottenburg, 1895); *Annual Reports of the Fishery Board for Scotland*, part ii., "Report on Salmon Fisheries," Nos. 11, 12, 13, 14 (1893–1894–95–96); *Report of Investigations on the Life-History of the Salmon to the Fishery Board for Scotland*, edited by Noël Paton, presented to parliament and published 1898; K. Dahl, *Orret og unglahs samt lovgivningens forhold til dem* (Christiania, 1902); H. W. Johnston, "The Scales of Tay Salmon as indicative of Age, Growth and Spawning Habit," *Ann. Rep. Fish. Board, Scotland*, xxiii., appendix ii. (1905). Introduction in Tasmania and New Zealand: M. Allport, *Proc. Zool. Soc.* (1870), pp. 14 and 750; A. Nichol, *Acclimatization of the Salmonidae at the Antipodes* (London, 1882); W. Arthur, "History of Fish Culture in New Zealand," *Tr. N. Zeal. Inst.* xiv. (1881) p. 180; P. S. Seager, "Concise History of the Acclimatization of the Salmonids in Tasmania," *Proc. R. Soc. Tasm.* (1888) p. 1; also R. M. Johnston, *l.c.* p. 27. On the salmon disease: T. H. Huxley, *Quart. Jour. Micr. Sci.* xxii. (1882) p. 311. (G. A. B.)

SALMONEUS, in Greek mythology, son of Aeolus (king of Magnesia in Thessaly, the mythic ancestor of the Aeolian race), grandson of Hellen and brother of Sisyphus. He removed to Elis, where he built the town of Salmone, and became ruler of the country. His subjects were ordered to worship him under the name of Zeus; he built a bridge of brass, over which he drove at full speed in his chariot to imitate thunder, the effect being heightened by dried skins and caldrons trailing behind, while torches were thrown into the air to represent lightning. At last Zeus smote him with his thunderbolt, and destroyed the town (Apollodorus i. 9. 7; Hyginus, *Fab.* 60, 61; Strabo viii. p. 356; Manilius, *Astronom.* 5, 91; Virgil, *Aen.* vi. 585, with Heyne's excursus). Joseph Warton's idea that the story is introduced by Virgil as a protest against the Roman custom of deification is not supported by the general tone of the *Aeneid* itself. According to Frazer (*Early History of the Kingship*, 1905; see also *Golden Bough*, i., 1900, p. 82), the early Greek kings, who were expected to produce rain for the benefit of the crops, were in the habit of imitating thunder and lightning in the character of Zeus. At Crannon in Thessaly there was a bronze chariot, which in time of drought was shaken and prayers offered for rain (Antigonus of Carystus, *Historiae mirabiles*, 15). S. Reinach (*Revue archéologique*, 1903, i. 154) suggests that the story that Salmoneus was struck by lightning was due to the misinterpretation of a picture, in which a Thessalian magician appeared bringing down lightning and rain from heaven; hence arose the idea that he was the victim of the anger or jealousy of Zeus, and that the picture represented his punishment.

SALOME, in Jewish history the name borne by several women of the Herod dynasty. (1) Sister of Herod the Great, who became the wife successively of Joseph, Herod's uncle, Costobar, governor of Idumaea, and a certain Alexas. (2) Daughter of Herod by Elpis, his eighth wife. (3) Daughter of Herodias by her first husband Herod Philip. She was the wife successively of Philip the Tetrarch and Aristobulus, son of Herod of Chalcis. This Salome is the only one of the three who is mentioned in the New Testament (Matt. xiv. 3 sqq.; Mark vi. 17 sqq.) and only in connexion with the execution of John the Baptist. Herod Antipas, pleased by her dancing, offered her a reward "unto the half of my kingdom"; instructed by Herodias, she asked for John the Baptist's "head in a charger"[1] (see HEROD II. ANTIPAS).

Salome is also the name of one of the women who are mentioned as present at the Crucifixion (Mark xv. 40), and afterwards in the Sepulchre (xvi. 1). Comparison with Matt. xxvii. 56 suggests that she was also the wife of Zebedee (cf. Matt. xx. 20-23). It is further conjectured that she was a sister of Mary the mother of Jesus, in which case James and John would be cousins of Jesus. In the absence of specific evidence any such identification must be regarded with suspicion.

SALON, a town of south-eastern France, in the department of Boûches-du-Rhône, 40 m. N.N.W. of Marseilles by rail. Pop. (1906), town, 9927; commune, 14,050. Salon is situated on the eastern border of the plain of Crau and on the irrigation canal of Craponne, the engineer of which, Adam de Craponne (1519–1559) has a statue in the town, where he was born. The chief buildings are the church of St Laurent (14th century), which contains the tomb of Michael Nostradamus, the famous astrologer, who died at Salon in 1565, and the church of St Michel (12th century), with a fine Romanesque portal. The central and oldest part of the town preserves a gateway of the 15th century and the remains of fortifications. There are remains of Roman walls near Salon, and in the hôtel-de-ville (17th century) there is a milestone of the 4th century. The town carries on an active trade in oil and soap, which are the chief of its numerous manufactures. Olives are largely grown in the district, and there is a large trade in them and in almonds.

SALONICA, SALONIKA or SALONIKI (anc. *Thessalonica*, Turkish *Selanik*, Slav. *Solun*); the capital of the Turkish vilayet of Salonica, in western Macedonia, and one of the principal seaports of south-western Europe. Pop. (1905) about 130,000, including some 60,000 Sephardic Jews, whose ancestors fled hither in the 16th century to escape religious persecution in Spain and Portugal: their language is a corrupt form of Spanish, called Ladino (*i.e.* Latin), and spoken to some extent by other communities in the city. Salonica lies on the west side of the Chalcidic peninsula, at the head of the Gulf of Salonica (*Sinus Thermaicus*), on a fine bay whose southern edge is formed by the Calamerian heights, while its northern and western side is the broad alluvial plain produced by the discharge of the Vardar and the Bistritza, the principal rivers of western Macedonia. Built partly on the low ground along the edge of the bay and partly on the hill to the north (a compact mass of mica schist), the city with its white houses enclosed by white walls runs up along natural ravines to the castle of the Heptapyrgion, or Seven Towers, and is rendered picturesque by numerous domes and minarets and the foliage of elms, cypresses and mulberry trees. The commercial quarter of the town, lying to the north-west, towards the great valleys by which the inland traffic is conveyed, is pierced by broad and straight streets paved with lava. There are electric tramways and a good water-supply, but most of the older houses are fragile wooden structures coated with lime or mud, and the sanitation is defective. Apart from churches, mosques and synagogues, there are a few noteworthy modern buildings, such as the Ottoman Bank, the baths, quarantine station, schools and hospitals; but the chief architectural interest of Salonica is centred in its Roman and Byzantine remains.

Antiquities.—The Via Egnatia of the Romans (mod. Jassijol or Grande Rue de Vardar) traverses the city from east to west, between the Vardar Gate and the Calamerian Gate. Two Roman triumphal arches used to span the Via Egnatia. The arch near the Vardar Gate—a massive stone structure probably erected towards the end of the 1st century A.D., was destroyed in 1867

[1] Charger, a large flat plate (see CHARGE).

to furnish material for repairing the city walls; an imperfect inscription from it is preserved in the British Museum. The other arch, popularly called the arch of Constantine, but with greater probability assigned to the reign of Galerius (A.D. 305–311), is built of brick and partly faced with sculptured marble. A third example of Roman architecture—the remains of a white marble portico supposed to have formed the entrance to the hippodrome—is known by the Judaeo-Spanish designation of Las Incantadas, from the eight Caryatides in the upper part of the structure. There are also numerous fragments of Roman inscriptions and statuary. The conspicuous mosques of Salonica are nearly all of an early Christian origin; the remarkable preservation of their mural decorations makes them very important for the history of Byzantine architecture. The principal are those dedicated to St Sophia, St George and St Demetrius.

St Sophia (Aya Sofia), formerly the cathedral, and probably erected in the 6th century by Justinian's architect Anthemius, was converted into a mosque in 1589. It is cased with slabs of white marble. The whole length of the interior is 110 ft. The nave, forming a Greek cross, is surmounted by a hemispherical dome, the 600 sq. yds. of which are covered with a rich mosaic representing the Ascension. St Demetrius, which is probably older than the time of Justinian, consists of a long nave and two side aisles, each terminating eastward in an atrium the full height of the nave, in a style not known to occur in any other church. The columns of the aisles are half the height of those in the nave. The internal decoration is all produced by slabs of different-coloured marbles. St George's, conjecturally assigned to the reign of Constantine (d. 337), is circular in plan, measuring internally 80 ft. in diameter. The external wall is 18 ft. thick, and at the angles of an inscribed octagon are chapels formed in the thickness of the wall, and roofed with wagon-headed vaults visible on the exterior; the eastern chapel, however, is enlarged and developed into a bema and apse projecting beyond the circle, and the western and southern chapels constitute the two entrances of the building. The dome, 72 yds. in circumference, is covered throughout its entire surface of 800 sq. yds. with what is the largest work in ancient mosaic still extant, representing a series of fourteen saints standing in the act of adoration in front of temples and colonnades. The Eski Juma, or Old Mosque, is another interesting basilica, evidently later than Constantine, with side aisles and an apse without side chapels. The churches of the Holy Apostles and of St Elias also deserve mention. Of the secular buildings, the Caravanserai, usually attributed to Murad II. (1422–1451), probably dates from Byzantine times.

Salonica is the see of an Orthodox Greek archbishop. Each religious community has its own schools and places of worship, among the most important being the Jewish high-school, the Greek and Bulgarian gymnasia, the Jesuit college, a high-school founded in 1860 and supported by the Jewish Mission of the Established Church of Scotland, a German school, dating from 1887, and a college for boys and a secondary school for girls, both managed by the French *Mission Laïque* and subsidized since 1905 by the French government.

Railways, Harbour and Commerce.—Salonica is the principal Aegean seaport of the Balkan Peninsula, the centre of the import trade of all Macedonia and two-thirds of Albania, and the natural port of shipment for the products of an even larger area. It is the terminus of four railways. One line goes north to Nish in Servia, where it meets the main line (Paris-Vienna-Constantinople) of the Oriental railways; another, after following the same route as far as Usküb in Macedonia, branches off to Mitrovitza in Albania; the extension of this line to Serajevo in Bosnia was projected in 1908 in order to establish direct communication between Austria and Salonica. A third line, intended ultimately to reach the Adriatic, extends westward from Salonica to Monastir. A fourth, the Constantinople junction railway to Constantinople, is of great strategic importance; during the war with Greece in 1897 it facilitated the rapid concentration of Ottoman troops on the borders of Thessaly, and in 1908 it helped to secure the triumph of the Young Turks by bringing the regiments favourable to their propaganda within striking distance of Constantinople.

The new harbour, which was opened to navigation in December 1901, allows the direct transhipment of all merchandise whatever may be the direction of the wind, which was previously apt to render shipping operations difficult. The harbour works consist of a breakwater 1835 ft. long, with 28 ft. depth of water on its landward side for a width of 492 ft. Opposite the breakwater is a quay 1475 ft. long, which was widened in 1903–1907 to a breadth of 306 ft.; at each end of the quay a pier 656 ft. long projects into the sea. Between the extremities of these two piers and those of the breakwater are the two entrances to the harbour. The average number of ships, including small coasters, which entered the port in each of the three years 1905–1907 was 3400, of 930,000 tons. Salonica exports grain, flour, bran, silk cocoons, chrome, manganese, iron, hides and skins, cattle and sheep, wool, eggs, opium, tobacco and fennel. The average yearly value of the imports from 1900 to 1905 was £2,500,000, and that of the exports £1,200,000. The imports consist principally of textiles, iron goods, sugar, tobacco, flour, coffee and chemicals. The volume of the export trade tended to decrease in the first decade of the 20th century. The making of morocco leather and other leather-work, such as saddlery, harness and boots and shoes, affords employment to a large number of persons. Other industries are cotton-spinning, brewing, tanning, iron-founding, and the manufacture of bricks, tiles, soap, flour, ironmongery and ice. The spirit called mastic or raki is largely produced.

History.—Thessalonica was built on the site of the older Greek city of Therma, so called in allusion to the hot-springs of the neighbourhood. It was founded in 315 B.C. by Cassander, who gave it the name of his wife, a sister of Alexander the Great. It was a military and commercial station on a main line of communication between Rome and the East, and had reached its zenith before the seat of empire was transferred to Constantinople. It became famous in connexion with the early history of Christianity through the two epistles addressed by St Paul to the community which he founded here; and in the later defence of the ancient civilization against the barbarian inroads it played a considerable part. In 390 7000 citizens who had been guilty of insurrection were massacred in the hippodrome by command of Theodosius. Constantine repaired the port, and probably enriched the town with some of its buildings. During the iconoclastic reigns of terror it stood on the defensive, and succeeded in saving the artistic treasures of its churches: in the 9th century Joseph, one of its bishops, died in chains for his defence of image-worship. In the 7th century the Macedonian Slavs strove to capture the city, but failed even when it was thrown into confusion by a terrible earthquake. It was the attempt made to transfer the whole Bulgarian trade to Thessalonica that in the close of the 9th century caused the invasion of the empire by Simeon of Bulgaria. In 904 the Saracens from the Cyrenaica took the place by storm; the public buildings were grievously injured, and the inhabitants to the number of 22,000 were carried off and sold as slaves throughout the countries of the Mediterranean. In 1185 the Normans of Sicily took Thessalonica after a ten days' siege, and perpetrated endless barbarities, of which Eustathius, then bishop of the see, has left an account. In 1204 Baldwin, conqueror of Constantinople, conferred the kingdom of Thessalonica on Boniface, marquis of Montferrat; but in 1222 Theodore, despot of Epirus, one of the natural enemies of the new kingdom, took the city and had himself there crowned by the patriarch of Macedonian Bulgaria. On the death of Demetrius, who had been supported in his endeavour to recover his father's throne by Pope Honorius III., the empty title of king of Salonica was adopted by several claimants. In 1266 the house of Burgundy received a grant of the titular kingdom from Baldwin II. when he was titular emperor, and it was sold by Eudes IV. to Philip of Tarentum, titular emperor of Romania, in 1320. The Venetians, to whom the city was transferred by one of the Palaeologi, were in power when Murad II. appeared, and on the 1st of May 1430, in spite of the desperate resistance of the inhabitants, took the city, which had thrice previously been in the hands of the Turks. They cut to pieces the body of St Demetrius, the patron saint of Salonica, who had been the Roman proconsul of Greece, under Maximian, and was martyred in A.D. 306. In 1876 the French and German consuls at Salonica were murdered by the Turkish populace. On the 4th of September 1890 more than 2000 houses were destroyed by fire in the south-eastern quarters of the city. During the early years of the 20th century Salonica was the headquarters of the Committee of Union and Progress, the central organization of the Young Turkey Party, which carried out the constitutional revolution of 1908. Before this event the weakness of Turkey had encouraged the belief that Salonica would ultimately pass under the control of Austria-Hungary or one of the Balkan States, and this belief gave rise to many political intrigues which helped to delay the solution of the Macedonian Question.

Vilayet.—The vilayet of Salonica has an area of 13,510 sq. m. and an estimated population of 1,150,000. It is rich in minerals, including chrome, manganese, zinc, antimony, iron, argentiferous

lead, arsenic and lignite, but some of these are unworked. The chief agricultural products are grain, rice, beans, cotton, opium and poppy-seed, sesame, fennel, red pepper, and much of the finest tobacco grown in Europe; there is also some trade in timber, live-stock, skins, furs, wool and silk cocoons. The growth of commerce has been impeded by the ignorance of cultivators, the want of good roads and the unsettled political condition of Turkey. Apart from the industries carried on in the capital, there are manufactures of wine, liqueurs, sesame oil, cloth, macaroni and soap. The principal towns, Seres (pop. 30,000), Vodena (25,000) and Cavalla (24,000), are described in separate articles; Tikvesh (21,000) is the centre of an agricultural region, Caraferia (14,000) a manufacturing town, and Drama (13,000) one of the centres of tobacco cultivation.

SALOON, a large room for the reception of guests in a mansion. The French *salon* itself is formed from *salle,* Ger. *Saal,* hall, reception-room, represented in Old English by the cognate *sæl,* hall, properly "abiding-place," from the root seen in Gothic *saljan,* to dwell, cf. Russ. *selo,* village. The word in its proper sense has now a somewhat archaistic flavour, being chiefly used of the 18th century, and it has come principally to be used (1) of the large rooms on passenger steamers; (2) on English railways of carriages for the accommodation of large parties not divided into compartments, and in the United States of the so-called "drawing-room cars"; and (3) of a bar or place for the sale of intoxicants.

SALSAFY, or SALSIFY, *Tragopogon porrifolius,* a hardy biennial, with long, cylindrical, fleshy, esculent roots, which, when properly cooked, are extremely delicate and wholesome; it occurs in meadows and pastures in the Mediterranean region, and in Britain is confined to the south of England, but is not native. The salsafy requires a free, rich, deep soil, which should be trenched in autumn, the manure used being placed at two spades' depth from the surface. The first crop should be sown in March, and the main crop in April, in rows a foot from each other, the plants being afterwards thinned to 8 in. apart. In November the whitish roots should be taken up and stored in sand for immediate use, others being secured in a similar way during intervals of mild weather. The genus *Tragopogon* belongs to the natural order Compositae, and is represented in Britain by goat's beard, *T. pratensis,* found in meadows, pastures and waste places. The flowers close at noon, whence the popular name "John-go-to-bed-at-noon."

SALSETTE (="sixty-six villages"), a large island in British India, N. of Bombay city, forming part of Thana district. Area, 246 sq. m. It is connected with Bombay Island and also with the mainland by bridge and causeway. Salsette is a beautiful, well-wooded tract, its surface being diversified by hills and mountains, some of considerable height, while it is rich in rice fields. In various parts of the island are ruins of Portuguese churches, convents and villas; while the cave temples of Kanheri form a subject of interest. There are 109 Buddhist caves, which date from the end of the 2nd century A.D., but are not so interesting as those of Ajanta, Ellora and Karli. Salsette is crossed by two lines of railway, which have encouraged the building of villa residences by the wealthier merchants of Bombay. The population in 1901 was 146,933. The island was taken from the Portuguese by the Mahrattas in 1739, and from them by the British in 1774; it was formally annexed to the East India Company's dominions in 1782 by the treaty of Salbai.

There is another Salsette in the Portuguese settlement of Goa, a district with a population (1900) of 113,061.

SALSOMAGGIORE, a village of Emilia, Italy, in the province of Parma, 6 m. S.W. of Borgo San Donnino by steam tramway. Pop. (1901) 1387 (village); 7274 (commune). It is situated 525 ft. above sea-level at the foot of the Apennines, and is a popular watering-place, the baths being especially frequented. The water is strongly saline.

SALT, SIR TITUS, BART. (1803–1876), English manufacturer, was born on the 20th of September 1803, at Morley, Yorkshire. In 1820 he was apprenticed to learn wool-stapling at Bradford, and his father, having followed him there and started in that business, took him into partnership in 1824. His success in introducing the coarse Russian wool (*donskoi*) into English worsted manufacture, due to special machinery of his own devising, gave his firm a great impetus. In 1836 he solved the difficulties of working alpaca (*q.v.*) wool, created an enormous industry in the production of the staple goods for which that name was retained, and became one of the richest manufacturers in Bradford. In 1853 he opened, a few miles out of the city on the Aire, the extensive works and model manufacturing town of Saltaire. From 1859–1861 Salt was M.P. for Bradford, of which city he had been mayor in 1848, and in 1869 he was created a baronet. He died on the 20th of September 1876, and was accorded a public funeral. After his death his many benevolent institutions at Saltaire, at first continued by his widow, were transferred to a trust.

See R. Balgarnie, *Sir Titus Salt, his Life and its Lessons.*

SALT (a common Teutonic word, cf. Dutch *zout,* Ger. *Salz,* Scand. *salt*; cognate with Gr. ἅλς, Lat. *sal*). In chemistry the term salt is given to a compound formed by substituting the hydrogen of an acid by a metal or a radical acting as a metal, or, what comes to the same thing, by eliminating the elements of water between an acid and a base (see ACID; CHEMISTRY).

Common Salt.

Common salt, or simply salt, is the name given to the native and industrial forms of sodium chloride, NaCl. Pure sodium chloride, which may be obtained by passing hydrochloric acid gas into a saturated solution of the commercial salt, whereupon it is precipitated, forms colourless, crystalline cubes (see also below under *Rock salt*) which melt at 815·4°, and begins to volatilize at slightly higher temperatures. It is readily soluble in water, 100 parts of which dissolve 35·52 parts at 0° and 39·16 parts at 100°. The saturated solution at 109·7° contains 40·35 parts of salt to 100 of water. On cooling a saturated solution to − 10°, or by cooling a solution in *hot* hydrochloric acid, the hydrate $NaCl.2H_2O$ separates; on further cooling an aqueous solution to − 20° a cryohydrate containing 23·7 % of the salt is deposited. The consideration of this important substance falls under two heads, relating respectively to sea salt or "bay" salt and "rock" salt or mineral salt. The one is probably derived from the other, most rock salt deposits bearing evidence of having been formed by the evaporation of lakes or seas.

Sea Salt.—Assuming that each gallon of sea water contains 0·2547 lb of salt, and allowing an average density of 2·24 for rock-salt, it has been computed that the entire ocean if dried up would yield no less than four and a half million cubic miles of rock-salt, or about fourteen and a half times the bulk of the entire continent of Europe above high-water mark. The proportion of sodium chloride in the water of the ocean, where it is mixed with small quantities of other salts, is on the average about 3·33 %, ranging from 2·9 % for the polar seas to 3·55 % or more at the equator. Enclosed seas, such as the Mediterranean, the Red Sea, the Black Sea, the Dead Sea, the Caspian and others, are dependent of course for the proportion and quality of their saline matter on local circumstances (see OCEAN).

At one time almost the whole of the salt in commerce was produced from the evaporation of sea water, and indeed salt so made still forms a staple commodity in many countries possessing a seaboard, especially those where the climate is dry and the summer of long duration. In Portugal there are salt works at Setubal, Alcacer do Sal, Figueira and Aveiro. Spain has salt works at the Bay of Cadiz, the Balearic Islands, &c.; Italy at Sicily, Naples, Tuscany and Sardinia. France has its "marais salants du midi" and also works on the Atlantic seaboard; whilst Austria has "Salzgärten" at various places on the Adriatic (Sabbioncello, Trieste, Pirano, Capo d'Istria, &c.). In England and Scotland the industry has greatly fallen off under the competition of the rock-salt works of Cheshire.

The process of the spontaneous evaporation of sea water was studied by Usiglio on Mediterranean water at Cette. The density at first was 1·02. Primarily but a slight deposit is formed (none until the concentration arrives at specific gravity 1·0509), this deposit consisting for the most part of calcium carbonate and ferric oxide. This goes on till a density of 1·1315 is attained, when hydrated calcium sulphate begins to deposit, and continues till specific gravity 1·2046 is reached. At a density of 1·218 the deposit becomes augmented by sodium chloride, which goes down mixed with a little magnesium chloride and sulphate. At specific gravity 1·2461 a

little sodium bromide has begun also to deposit. At specific gravity 1·311 the volume of the water contained—

Magnesium sulphate	11·45 %
Magnesium chloride	19·53 %
Sodium chloride	15·98 %
Sodium bromide	2·04 %
Potassium chloride	3·30 %

Up to the time then that the water became concentrated to specific gravity 1·218 only 0·150 of deposit had formed, and that chiefly composed of lime and iron, but between specific gravity 1·218 and 1·313 there is deposited a mixture of—

Calcium sulphate	0·0283 %
Magnesium sulphate	0·0624 %
Magnesium chloride	0·0153 %
Sodium chloride	2·7107 %
Sodium bromide	0·0222 %
	2·8389 %

Of this about 95 % is sodium chloride. Up to this point the separation of the salts has taken place in a fairly regular manner, but now the temperature begins to exert an influence, and some of the salts deposited in the cold of the night dissolve again partially in the heat of the day. By night the liquor gives nearly pure magnesium sulphate; in the day the same sulphate mixed with sodium and potassium chlorides is deposited. The mother-liquor now falls to a specific gravity of 1·3082 to 1·2965, and yields a very mixed deposit of magnesium bromide and chloride, potassium chloride and magnesium sulphate, with the double magnesium and potassium sulphate, corresponding to the kainite of Stassfurt. There is also deposited a double magnesium and potassium chloride, similar to the carnallite of Stassfurt, and finally the mother-liquor, which has now again risen to specific gravity 1·3374, contains only pure magnesium chloride.

The application of these results to the production of salt from sea water is obvious. A large piece of land, barely above high-water mark, is levelled, and if necessary puddled with clay. In tidal seas a "jas" (or storage reservoir) is constructed alongside, similarly rendered impervious, in which the water is allowed to settle and concentrate to a certain extent. In non-tidal seas this storage basin is not required. The prepared land is partitioned off into large basins (*adernes* or *muants*) and others (called in France *aires*, *œuillets* or *tables salantes*) which get smaller and more shallow in proportion as they are intended to receive the water as it becomes more and more concentrated, just sufficient fall being allowed from one set of basins to the other to cause the water to flow slowly through them. The flow is often assisted by pumping. The sea salt thus made is collected into small heaps on the paths around the basins or the floors of the basins themselves, and here it undergoes a first partial purification, the more deliquescent salts (especially the magnesium chloride) being allowed to drain away. From these heaps it is collected into larger ones, where it drains further, and becomes more purified. The salt is collected from the surface by means of a sort of wooden scoop or scraper, but in spite of every precaution some of the soil on which it is produced is inevitably taken up with it, communicating a red or grey tint.

Generally speaking this salt, which may contain up to 15 % of impurities, goes into commerce just as it is, but in some cases it is taken first to the refinery, where it either is simply washed and then stove-dried before being sent out, or is dissolved in fresh water and then boiled down and crystallized like white salt from rock-salt brine. The salt of the "salines du midi" of the south-east of France is far purer, containing about 5 % of impurities. In northern Russia and in Siberia sea water is concentrated by freezing, the ice which separates containing little salt; the brine is then boiled down when an impure sea salt is deposited.

Rock-salt.—To mineralogists rock-salt is often known as *halite*—a name suggested in 1847 by E. F. Glocker from the Greek ἅλς (salt). The word halite, however, is sometimes used not only for the species rock-salt but as a group-name to include a series of haloid minerals, of which that species is the type. Halite or rock-salt crystallizes in the cubic system, usually in cubes, rarely in octahedra; the cubes being solid, unlike the skeleton-cubes obtained by rapid evaporation of brine. The mineral has perfect cubic cleavage. Percussion-figures, readily made on the cleavage-faces, have rays parallel to faces of the rhombic dodecahedron; whilst figures etched with water represent the four-faced cube. Rock-salt commonly occurs in cleavable masses, or sometimes in laminar, granular or fibrous forms, the finely fibrous variety being known as "hair-salt." The hardness is 2 to 2·5 and the spec. grav. 2·1 to 2·6. Rock-salt when pure is colourless and transparent, but is usually red or brown by mechanical admixture with ferric oxide or hydroxide. The salt is often grey, through bituminous matter or other impurity, and rarely green, blue or violet. The blue colour, which disappears on heating or dissolving the salt, has been variously ascribed to the presence of sodium subchloride, sodium, sulphur or of a certain compound of iron, or again to the existence of minute cavities with parallel walls. Halite occasionally exhibits double refraction, perhaps due to natural pressure. It is remarkably diathermanous, or capable of transmitting heat-rays, and has therefore been used in certain physical investigations. Pure halite consists only of sodium chloride, but salt usually contains certain magnesium compounds rendering it deliquescent. Minute vesicular cavities are not infrequently present, sometimes as negative cubes, and these may contain saline solutions or carbon dioxide or gaseous hydrocarbons. Some salt decrepitates on solution (*Knistersalz*), the phenomenon being due to the escape of condensed gases.

Halite may occur as a sublimate on lava, as at Vesuvius and some other volcanoes, where it is generally associated with potassium chloride; but its usual mode of occurrence is in bedded deposits, often lenticular, and sometimes of great thickness. The salt is commonly associated with gypsum, often also with anhydrite, and occasionally with sylvite, carnallite and other minerals containing potassium and magnesium. Deposits of rock-salt have evidently been formed by the evaporation of salt water, probably in areas of inland drainage or enclosed basins, like the Dead Sea and the Great Salt Lake of Utah, or perhaps in some cases in an arm of the sea partially cut off, like the Kara Bughaz, which forms a natural salt-pan on the east side of the Caspian. Such beds of salt are found in strata of very varied geological age; the Salt Range of the Punjab, for instance, is probably of Cambrian age, while the famous salt-deposits of Wieliczka, near Cracow, have been referred to the Pliocene period. In many parts of the world, including the British area, the Triassic age offered conditions especially favourable for the formation of large salt-deposits.

In England extensive deposits of rock-salt are found near the base of the Keuper marl, especially in Cheshire. The mineral occurs generally in lenticular deposits, which may reach a thickness of more than 100 ft.; but it is mined only to a limited extent, most of the salt being obtained from brine springs and wells which derive their saline character from deposits of salt. Much salt is obtained from north Lancashire, as also from the brine pits of Staffordshire, Worcestershire, Yorkshire, Durham and the Isle of Man (Point of Ayre). The salt of N.E. Yorkshire and S. Durham is regarded by some authorities as Permian, but that near Carrickfergus in Co. Antrim, Ireland, is undoubtedly of Triassic age. The Antrim salt was discovered in 1850 during a search for coal: one of the beds at Duncrue mine has a thickness of 80 ft. Important deposits of rock-salt occur in the Keuper at Berchtesgaden, in the Bavarian Alps; at Hall in Tirol and at Hallein, Hallstatt, Ischl and Aussee in the Salzkammergut in Austria. Salt occurs in the Muschelkalk at Friedrichshall and some other localities in Württemberg and Thuringia; and in the Bunter at Schöningen near Brunswick.

The Permian system (Zechstein) yields the great salt-deposits worked at Stassfurt and at Halle in Prussian Saxony. The Stassfurt deposits are of special importance for the sake of the associated salts of potassium and magnesium, such as carnallite and kainite. These deposits, in addition to having a high commercial importance, present certain problems which have received much attention, more particularly at the hands of van 't Hoff and his collaborators, whose results are embodied in his *Zur Bildung der ozeanischen Salzablagerungen*, vol. i. (1905), vol. ii. (1909). (A summary is given in A. W. Stewart, *Recent Advances in Physical and Inorganic Chemistry*, 1909; see also van't Hoff, *Lectures on Theoretical and Physical Chemistry*, vol. i.) A typical section is as follows: Beneath the surface soil of sandstone there is a layer up to 100 ft. in thickness of carnallite, $MgCl_2 \cdot KCl \cdot 6H_2O$, mixed with a little salt; this is followed by a thicker deposit of kieserite, $MgSO_4 \cdot H_2O$, containing rather more salt than the upper bed. Deeper down there are successively strata of polyhalite, $MgSO_4 \cdot K_2SO_4 \cdot 2CaSO_4 \cdot 2H_2O$, and anhydrite, $CaSO_4$, interspersed with regular layers of rock-salt; whilst below the anhydrite we have the main rock-salt deposits. A bed of rock-salt in the Zechstein at Sperenberg near Berlin has been proved by boring to have a thickness of upwards of 4000 ft. The salt of Bex in Switzerland is Jurassic, whilst Cretaceous salt occurs in Westphalia and Algiers. Important deposits of salt are developed in many parts of the Tertiary strata. At Cardona, near Barcelona, Tertiary salt forms hill-masses, while the Carpathian

sandstone in Galicia and Transylvania is rich in salt. The extensive mines at Wieliczka are in this rock-salt, as also is the salt of Kalusz in Galicia, which is associated with sylvite, KCl.

In North America salt is widely distributed at various geological horizons. In New York it occurs in the Salina beds of the Onondaga series, of Silurian age; and Silurian salt is found also in parts of Michigan and in Ontario, Canada. Some of the salt of Michigan is regarded as Carboniferous. Rock-salt is mined in several states, as New York, Kansas and Louisiana; but American salt is mostly obtained from brine. Deposits of salt, regarded as either Cretaceous or Tertiary, occur in the island of Petite Anse, west of Vermilion Bay, in Louisiana. Salt often occurs in association with petroleum and natural gas, and extensive beds were discovered in the Wyoming valley in boring for petroleum. In the dry regions of the West salt occurs as an incrustation on the surface of the soil—a mode of occurrence found in desert areas in various parts of the world.

Cubic pseudomorphs representing rock-salt are sometimes seen in strata which have been deposited in shallow water, especially on the margin of a salt-lake. The salt has been dissolved out of its original matrix, and the cavity so formed has then been filled with fine clayey or other mineral matter, forming a cubic cast. Such casts are not infrequent in the Keuper marls and sandstones, and in the Purbeck beds of England.

Manufacture.—The chief centres of manufacture in England are at Northwich, Middlewich, Winsford and Sandbach in Cheshire, Weston-on-Trent in Staffordshire, Stoke Prior and Droitwich in Worcestershire and Middlesbrough in Yorkshire.[1] The Cheshire and Worcestershire salt deposits are by far the most important. Although brine springs have been known to exist in both these counties ever since the Roman occupation, and salt had been made there from time immemorial, it was not till 1670 that rock-salt about 30 yds. thick was discovered at Marbury near Northwich by some men exploring for coal, at a depth of 34 yds. In 1779 three beds of rock-salt were discovered at Lawton, separated from one another by layers of indurated clay. The old Marston or Marston Rock mine is the largest and perhaps the oldest in England. It was worked for about a hundred years in only its upper bed, but in 1781, after traversing a layer of indurated clay intersected with small veins of salt 10½ yds. thick, a layer of rock-salt 33 to 37 yds. thick was found. Beneath it are others, but they are thin and impure. The total depth of the mine to the bottom of the lower level is 120 yds. At Winsford, where the same formation seems to recur, it is 159 yds. from the surface. The Marston mine covers an area of about 40 acres. The salt is first reached at 35-40 yds. in the Northwich district, and the upper layer is 25-50 yds. in thickness (Marston 23-26 yds.); it has above it, apparently lying in the recesses of its surface, a layer of saturated brine. This is the brine which is raised at the various pumping stations in Northwich and elsewhere around, and which serves to produce white salt. The beds are reached by sinking through the clays and variegated marls typical of this formation. The salt is blasted out with gunpowder. The Middlesbrough deposit was discovered by Bolckow and Vaughan in boring for water in 1862 at a depth of 400 yds., but was not utilized, and was again found by Messrs Bell Brothers at Port Clarence at a depth of 376 yds. In Cheshire the surface-water trickling through the overlying strata dissolves the salt, which is subsequently pumped as brine, but at Middlesbrough the great depth and impermeability of the strata precludes this, so another method has been resorted to. A bore is made into the salt, and lined with tubing, and this tube where it traverses the salt is pierced with holes. Within this is hung loosely a second tube of much smaller dimensions so as to leave an annular space between the two. Through this space the fresh surface water finds its way, and dissolving the salt below rises in the inner tube as brine, but only to such a level that the two columns bear to one another the relation of ten to twelve, this being the inverse ratio of the respective weights of saturated brine and fresh water. For the remaining distance the brine is raised by a pump. The fresh water, however, as it descends rises to the surface of the salt, tending rather to dissolve its upper layers and extend superficially, so that after a time the superincumbent soil, being without support, falls in. These interior landslips, besides choking the pipes and breaking the communication, often produce sinkings at the surface. The same inconvenience is felt in the environs of Nancy, and a similar one produces on a larger scale the sinking and subsidences at Winsford and Northwich.

In the United States extensive deposits and brine springs are worked, and also incrustations (see above). Canada also is a producer. South America possesses several salt deposits and brine springs. Asiatic Russia is very abundantly supplied with salt, as likewise is China; and Persia is perhaps one of the countries most abundantly endowed with this natural and useful product. In India there is the great salt range of the Punjab, as well as the Sambhur Lake, and salt is obtained from sea water at many places along its extensive seaboard.

[1] The termination "wich" in English place-names often points to ancient salt manufacture—the word "wich" (creek, bay; Icel. *vík*) having acquired a special sense in English usage. In Germany the various forms of the non-Teutonic words Hall, Halle occurring in place-names point in the same way to ancient salt-works.

Rock-salt is the origin of the greater part of the salt manufactured in the world. It occurs in all degrees of purity, from that of mere salty clay to that of the most transparent crystals. In the former case it is often difficult to obtain the brine at a density even approaching saturation, and chambers and galleries are sometimes excavated within the saliferous beds to increase the dissolving surface, and water let down fresh is pumped up as brine. Many brine springs also occur in a more or less saturated condition. In cases where the atmospheric conditions are suitable the brine is run into large tanks and concentrated merely by solar heat, or it may be caused to trickle over faggots arranged under large open sheds called "graduation houses" (*Gradirhäuser*), whereby a more extensive surface of evaporation is obtained and the brine becomes rapidly concentrated. After settling it is evaporated in iron pans. The use, however, of the "graduation houses" is dying out, as both their construction and their maintenance are expensive. The purer rock-salt is often simply ground for use, as at Wieliczka and elsewhere, but it is more frequently pumped as brine, produced either by artificial solution as at Middlesbrough and other places, or by natural means, as in Cheshire and Worcestershire. One great drawback to the use of even the purest rock-salt simply ground is its tendency to revert to a hard unwieldy mass, when kept any length of time in sacks. As usually made, white salt from rock-salt may be classified into two groups: (1) boiled: known as fine, table, lump, stoved lump, superfine, basket, butter and cheese salt (Fr. *sel fin-fin*, *sel à la minute*, &c.); (2) unboiled: common, chemical, fishery, Scotch fishery, extra fishery, double extra fishery and bay salt (Fr. *sel de 12, 24, 48, 60* and *72 heures*). All these names are derived from the size and appearance of the crystals, their uses and the modes of their production. The boiled salts, the crystals of which are small, are formed in a medium constantly agitated by boiling. The fine or stoved table salts are those white masses with which we are all familiar. Basket salt takes its name from the conical baskets from which it is allowed to drain when first it is "drawn" from the pan. Butter and cheese salts are not stove-dried, but left in their more or less moist condition, as being thus more easily applied to their respective uses. Of the unboiled salts the first two, corresponding to the Fr. *sel de 12 heures* and *sel de 24 heures*, show by their English names the use to which they are applied, and the others merely depend for their quality on the length of time which elapses between successive "drawings," and the temperature of the evaporation. The time varies for the unboiled salts from twelve hours to three or four weeks, the larger crystals being allowed a longer time to form, and the smaller ones being formed more quickly. The temperature varies from 55° to 180° F.

One difference between the manufacture of salt from rock-salt brine as carried on in Britain and on the Continent lies in the use in the latter case of closed or covered pans, except in the making of fine salt, whereas in Britain open ones are employed. With open pans the vapour is free to diffuse itself into the atmosphere, and the evaporation is perhaps more rapid. When covered pans are used, the loss of heat by radiation is less, and the salt made is also cleaner. It has also been proposed to concentrate the brines under diminished pressure. In S. Pick's system a triple effect is obtained by evaporating in these connected vessels, so that the steam from one heats the second into which it is led (see *Soc. of Eng.*, 1891, p. 115).

In Britain the brine is so pure that, keeping a small stream of it running into the pan to replace the losses by evaporation and the removal of the salt, it is only necessary occasionally (not often) to reject the mother-liquor when at last it becomes too impure with magnesium chloride; but in some works the mother-liquor not only contains more of this impurity but becomes quite brown from organic matter on concentration, and totally unfit for further service after yielding but two or three crops of salt crystals. Sometimes, to get rid of these impurities, the brine is treated in a large tub (*bessoir*) with lime; on settling it becomes clear and colourless, but the dissolved lime forms a skin on its surface in the pan, retards the evaporation and impedes the crystallization. At times sodium sulphate is added to the brine, producing sodium chloride and magnesium sulphate by double decomposition with the magnesium chloride. A slight degree of acidity seems more favourable to the crystallization of salt than alkalinity; thus it is a practice to add a certain amount of alum, 2 to 12 lb per pan of brine, especially when, as in fishery salt, fine crystals are required. The salt is "drawn" from the pan and placed (in the case of boiled salts) in small conical baskets hung round the pan to drain, and thence moulded in square boxes and afterwards stove-dried, or (in case of unboiled salts) "drawn" in a heap on to the "hurdles," on which it drains, and thence is carried to the store.

In most European countries a tax is laid on salt; and the coarser as well as the finer crystals are therefore often dried so as not to pay duty on more water than can be helped.

The brine used in the salt manufacture in England is very nearly saturated, containing 25 or 26 % of sodium chloride, the utmost water can take up being 27 %; and it ranges from 38 to 42 oz. of salt per gallon. In some other countries the brine has to be concentrated before use.

Saltmaking is by no means an unhealthy trade, some slight soreness of the eyes being the only affection sometimes complained of; indeed the atmosphere of steam saturated with salt in which

the workmen live seems specially preservative against colds, rheumatism, neuralgia, &c.

A parliamentary commission was appointed in 1881 to investigate the causes of the disastrous subsidences which are constantly taking place in all the salt districts, and the provision of a remedy. It led to no legislative action; but the evil is recognized as a grave one. At Northwich and Winsford scarcely a house or a chimney stack remains straight. Houses are keyed up with "shaps," "face plates" and "bolts," and only kept from falling by leaning on one another. The doors and windows have become lozenge-shaped, the walls bulged and the floors crooked. Buildings have sunk—some of them disappearing altogether. Lakes have been formed where there was solid ground before, and incalculable damage done to property in all quarters. At the same time it is difficult to see how this grievance can be remedied without inflicting serious injury, almost ruin, upon the salt trade. The workings in Great Britain represent the annual abstraction of rather more than a mass of rock equal to a foot in thickness spread over a square mile. The table gives the outputs in metric tons of the most important producers in 1900 and 1905 (from Rothwell, *Mineral Industry*, 1908).

Salt Production in Metric Tons.

	1900.	1905.
Austria	330,277	343,375
France	1,088,634	1,130,000
Germany	1,514,027	1,777,557
Hungary	189,363	195,410
India	1,021,426	1,212,600
Italy	367,255	437,699
Japan	669,694	483,506
Russia	1,768,005	1,844,678
Spain	450,041	493,451
United Kingdom	1,873,601	1,920,149
United States	2,651,278	3,297,285

See F. A. Fürer, *Salzbergbau- und Salinenkunde* (Braunschweig, 1900); J. O. Freiherr von Buschmann, *Das Salz: dessen Vorkommen und Verwertung* (Leipzig, vol. 1, 1909, vol. 2, 1906). (X.)

Ancient History and Religious Symbolism.—Salt must have been quite unattainable to primitive man in many parts of the world. Thus the *Odyssey* (xi. 122 seq.) speaks of inlanders (in Epirus?) who do not know the sea and use no salt with their food. In some parts of America, and even of India (among the Todas), salt was first introduced by Europeans; and there are still parts of central Africa where the use of it is a luxury confined to the rich. Indeed, where men live mainly on milk and flesh, consuming the latter raw or roasted, so that its salts are not lost, it is not necessary to add sodium chloride, and thus we understand how the Numidian nomads in the time of Sallust and the Bedouins of Hadramut at the present day never eat salt with their food. On the other hand, cereal or vegetable diet calls for a supplement of salt, and so does boiled meat. The important part played by the mineral in the history of commerce and religion depends on this fact; at a very early stage of progress salt became a necessary of life to most nations, and in many cases they could procure it only from abroad, from the sea-coast, or from districts like that of Palmyra where salty incrustations are found on the surface of the soil. Sometimes indeed a kind of salt was got from the ashes of saline plants (*e.g.* by the Umbrians, Aristotle, *Met.* ii. p. 459), or by pouring the water of a brackish stream over a fire of (saline) wood and collecting the ashes, as was done in ancient Germany (Tac. *Ann.* xiii. 57), in Gaul and in Spain (Plin. *H.N.* xxxi. 7. 82 seq.); but these were imperfect surrogates. Among inland peoples a salt spring was regarded as a special gift of the gods. The Chaonians in Epirus had one which flowed into a stream where there were no fish; and the legend was that Heracles had allowed their forefathers to have salt instead of fish (Arist. *ut supra*). The Germans waged war for saline streams, and believed that the presence of salt in the soil invested a district with peculiar sanctity and made it a place where prayers were most readily heard (Tac. *ut sup.*). That a religious significance was attached to a substance so highly prized and which was often obtained with difficulty is no more than natural. And it must also be remembered that the habitual use of salt is intimately connected with the advance from nomadic to agricultural life, *i.e.* with precisely that step in civilization which had most influence on the cults of almost all ancient nations. The gods were worshipped as the givers of the kindly fruits of the earth, and, as all over the world "bread and salt" go together in common use and common phrase, salt was habitually associated with offerings, at least with all offerings which consisted in whole or in part of cereal elements. This practice is found alike among the Greeks and Romans and among the Semitic peoples (Lev. ii. 13); Homer calls salt "divine," and Plato names it "a substance dear to the gods" (*Timaeus*, p. 60; cf. Plutarch, *Sympos.* v. 10). As covenants were ordinarily made over a sacrificial meal, in which salt was a necessary element, the expression "a covenant of salt" (Numb. xviii. 19) is easily understood; it is probable, however, that the preservative qualities of salt were held to make it a peculiarly fitting symbol of an enduring compact, and influenced the choice of this particular element of the covenant meal as that which was regarded as sealing an obligation to fidelity. Among the ancients, as among Orientals down to the present day, every meal that included salt had a certain sacred character and created a bond of piety and guest friendship between the participants. Hence the Greek phrase ἅλας καὶ τράπεζαν παραβαίνειν, the Arab phrase "there is salt between us," the expression "to eat the salt of the palace" (Ezra iv. 14, R.V.), the modern Persian phrase *namak harām*, "untrue to salt," *i.e.* disloyal or ungrateful, and many others. Both early in the history of the Roman army and in later times an allowance of salt was made to officers and men. In imperial times, however, this *salarium* was an allowance of money for salt (see SALARY).

It has been conjectured that some of the oldest trade routes were created for traffic in salt; at any rate salt and incense, the chief economic and religious necessaries of the ancient world, play a great part in all that we know of the ancient highways of commerce. Thus one of the oldest roads in Italy is the *Via Salaria*, by which the produce of the salt pans of Ostia was carried up into the Sabine country. Herodotus's account of the caravan route uniting the salt-oases of the Libyan desert (iv. 181 seq.) makes it plain that this was mainly a salt-road, and to the present day the caravan trade of the Sahara is largely a trade in salt. The salt of Palmyra was an important element in the vast trade between the Syrian ports and the Persian Gulf (see PALMYRA), and long after the glory of the great merchant city was past "the salt of Tadmor" retained its reputation (Mas'ūdi viii. 398). In like manner the ancient trade between the Aegean and the coasts of southern Russia was largely dependent on the salt pans at the mouth of the Dnieper and on the salt fish brought from this district (Herod. iv. 53; Dio Chrys. p. 437). In Phoenician commerce salt and salt fish—the latter a valued delicacy in the ancient world—always formed an important item. The vast salt mines of northern India were worked before the time of Alexander (Strabo v. 2, 6, xv. 1, 30) and must have been the centre of a wide-spread trade. The economic importance of salt is further indicated by the almost universal prevalence in ancient and medieval times, and indeed in most countries down to the present day, of salt taxes or of government monopolies, which have not often been directed, as they were in ancient Rome, to enable every one to procure so necessary a condiment at a moderate price. In Oriental systems of taxation high imposts on salt are seldom lacking and are often carried out in a very oppressive way, one result of this being that the article is apt to reach the consumer in a very impure state largely mixed with earth. "The salt which has lost its savour" (Matt. v. 13) is simply the earthy residuum of such an impure salt after the sodium chloride has been washed out.

Cakes of salt have been used as money in more than one part of the world—for example, in Abyssinia and elsewhere in Africa, and in Tibet and adjoining parts. See the testimony of Marco Polo (bk. ii. ch. 48) and Colonel Yule's note upon analogous customs elsewhere and on the use of salt as a medium of exchange in the Shan markets down to our own time, in his translation of Polo ii. 48 seq. In the same work interesting details are given as to the importance of salt in the financial system of the Mongol emperors (ii. 200 seq.). (W. R. S.)

SALTA, a N.W. province of Argentina, bounded N. by Bolivia and the province of Jujuy, E. by the territories of Formosa and the Chaco, S. by Santiago del Estero and Tucuman, and W. by the Los Andes territory and Bolivia. Area, 62,184 sq. m.; pop. (1904, estimated) 136,059. The western part of the province is mountainous, being traversed from N. to S. by the eastern chains of the Andes. Indenting these, however, are large valleys, or bays, of highly fertile and comparatively level land, like that in which the city of Salta is situated. The eastern part of the province is chiefly composed of extensive areas of alluvial plains belonging to the Chaco formation, whose deep, fertile soils are among the best in Argentina. This part of the province is well wooded with valuable construction timbers and furniture woods. The drainage to the Paraguay is through the Bermejo, whose tributaries cover the northern part of the province; and through the Pasage or Juramento, called Salado on its lower course, whose tributaries cover the southern part of the province and whose waters are discharged into the Paraná. The climate is hot, and the year is divided into a wet and a dry season, the latter characterized by extreme aridity. Irrigation is necessary in a great part of the province, though the rainfall is abundant in the wet season, about 21 in. Fever and ague, locally called *chucho*, is prevalent on the lowlands, but in the mountain districts the climate is healthy. There is considerable undeveloped mineral wealth, including gold, silver and copper, but its inhabitants are almost exclusively agriculturist. Its principal products are sugar, rum (*aguardiente*), wine, wheat, Indian corn, barley, tobacco, alfalfa and coffee. The Cafayate wines are excellent, but are chiefly consumed in the province.

Various tropical fruits are produced in abundance, but are not sent to market on account of the cost of transportation. Stock-raising is carried on to a limited extent for the home and Bolivian markets. The province is traversed by a government railway (the Central Northern) running northward from Tucuman to the Bolivian frontier, with a branch from General Güemes westward to the city of Salta (*q.v.*), the provincial capital. The principal towns are Oran (1904, 3000) on a small tributary (the Zenta) of the Bermejo, in the northern part of the province, formerly an important depot in the Bolivian trade, and nearly destroyed by earthquakes in 1871 and 1873; Rosario de Lerma (pop. 1904, 2500), 30 m. N.W. of Salta in the great Lerma valley; and Rosario de la Frontera (pop. 1904, 1200) near the Tucuman frontier, celebrated for its hot mineral baths and gambling establishment.

Salta was at one time a part of the great Inca empire, which extended southward into Tucuman and Rioja. It was overrun by adventurers after the Spanish conquest. The first Spanish settlement within its borders was made by Hernando de Lerma in 1582. Salta was at first governed from Tucuman, but in 1776 was made capital of the northern intendencia, which included Catamarca, Jujuy and Tucuman. After the War of Independence there was a new division, and Salta was given its present boundaries with the exception of the disputed territory on the Chilean frontier, now the territory of Los Andes.

SALTA, a city of Argentina, capital of a province of the same name, and see of a bishopric, on a small tributary (the Arias) of the Pasage, or Juramento, 976 m. by rail N.N.W. of Buenos Aires. Pop. (1904, estimated) 18,000. Salta is built on an open plain 3560 ft. above the sea, nearly enclosed with mountains. The climate is warm and changeable, malarial in summer. The city is laid out regularly, with broad, paved streets and several parks. Some of the more important public buildings face on the *plaza mayor*. There are no manufactures of importance. Salta was once largely interested in the Bolivian trade, and is still a chief distributing centre for the settlements of the Andean plateau. Near the city is the battlefield where General Belgrano won the first victory from the Spanish forces (1812) in the War of Independence. There is a large *mestizo* element in the population, and the Spanish element still retains many of the characteristics of its colonial ancestors. In Salta Spanish is still spoken with the long-drawn intonations and melodious "ll" of southern Spain.

Salta was founded in 1582 by Governor Abreu under the title of San Clemente de Nueva Sevilla, but the site was changed two years later and the new settlement was called San Felipe de Lerma. In the 17th century the name Salta came into vogue.

SALTA (Italian for "Jump!"), a table-game for two introduced at the end of the 19th century, founded on the more ancient game of Halma. It is played on a board containing 100 squares, coloured alternately black and white. Each player has a set of 15 pieces, one set being green, the other pink. These are placed upon the black squares of the first three rows nearest the player, and are classified in these rows as *stars*, *moons* and *suns*. The pawns move forward one square at a time, except when a pawn is situated in front of a hostile piece with an unoccupied space on the further side, in which case the hostile pawn must be jumped, as at draughts, but without removing the jumped pawn from the board. The object of the game is to get one's pieces on the exact squares corresponding to their own on the enemy's side, the stars in the star-line, the moons in the moon-line, &c. Salta tournaments have taken place in which chess masters of repute participated.

See *Salta*, by Schubert (Leipzig, 1900).

SALTASH, a municipal borough in the Bodmin parliamentary division of Cornwall, England, 5 m. N.W. of Plymouth, on the Great Western railway. Pop. (1901) 3357. It is beautifully situated on the wooded shore of the Tamar estuary, on the lower part of which lies the great port and naval station of Plymouth. Local communications are maintained by river steamers. At Saltash the Royal Albert bridge (1857–1859) carries the railway across the estuary. It was built by Isambard Brunel at a cost of £230,000, and is remarkable for its great height. The church of St Nicholas and St Faith has an early Norman tower, and part of the fabric is considered to date from before the Conquest; but there was much alteration in the Decorated and Perpendicular periods. The church of St Stephen, outside the town, retains its ornate Norman font. The fisheries for which Saltash was famous have suffered from the chemicals brought down by the Tamar; but there is a considerable seafaring population, and the town is a recruiting ground for the Royal Navy. The borough is under a mayor, 4 aldermen and 12 councillors. Area, 194 acres.

The Sunday market established by the count of Mortain at his castle of Trematon, which ruined the bishop of Exeter's market at St Germans, was probably held at Saltash a short distance from the castle. Saltash (Esse, 1297; Ash, 1302; Assheburgh, 1392) belonged to the manor of Trematon and the latter at the time of the Domesday Survey was held by Reginald de Valletort of the count. Reginald's descendant and namesake granted a charter (undated) to Saltash about 1190. It confirms to his free burgesses of Esse the liberties enjoyed by them under his ancestors, viz.: burgage tenure, exemption from all jurisdiction save the "hundred court of the said town," suit of court limited to three times a year, a reeve of their own election, pasturage in his demesne lands on certain terms, a limited control of trade and shipping, and a fair in the middle of the town. This charter was confirmed in the fifth year of Richard II. Roger de Valletort, the last male heir of the family, gave the honour of Trematon and with it the borough of Saltash to Richard, king of the Romans and earl of Cornwall. Thenceforth, in spite of attempts to set aside the grant, the earls and subsequently the dukes of Cornwall were the lords of Saltash. It was probably to this relation that the burgesses owed the privilege of parliamentary representation, conferred by Edward VI. In 1584 Queen Elizabeth granted a charter of incorporation to Saltash. This was superseded by another in 1683 under which the governing body was to consist of a mayor and six aldermen. In 1774, the corporation being in danger of extinction, burgesses were added, but it was not until 1886 that the ratepayers acquired the right of electing representatives to the council, the right up to that time having been exercised by the members of the corporation. The parliamentary franchise was enjoyed by the mayor, aldermen and the holders of burgage tenements. In 1814 they numbered 120. In 1832 Saltash was deprived of its two members. The count of Mortain's Sunday market had given place in 1337 to one on Saturday and this is still held. Queen Elizabeth's charter provided for one on Tuesday also, but this has disappeared. A fair on the feast of St Faith yielded 6s. 8d. in 1337. This is no longer held, but fairs at Candlemas and St James, of ancient but uncertain origin, remain. Saltash was sufficiently considerable as a port in the 16th century to furnish a frigate at the town's expense against the Armada. This probably represents the zenith of its prosperity.

SALTBURN BY THE SEA, a seaside resort in the Cleveland parliamentary division of the North Riding of Yorkshire, England, 21 m. E. of Middlesbrough by a branch of the North Eastern railway. Pop. of urban district (1901) 2578. A firm sandy beach extends westward to Redcar and the mouth of the Tees, while eastward towards Whitby the cliffs become very fine, Boulby Cliff (666 ft.) being the highest sea cliff in England. Several fishing villages occur along this coast, of which none is more picturesque than Staithes, lying in a steep gully in the cliff. There are brine baths supplied from wells near Middlesbrough, a pier, gardens and promenades. Inland the county is hilly and picturesque, though in part defaced by the Cleveland iron mines.

SALT-CELLAR, a vessel containing salt, placed upon the table at meals. The word is a combination of "salt" and "saler," assimilated in the 16th and 17th centuries to "cellar" (Lat. *cellarium*, a storehouse). "Saler" is from the Fr. (Mod. *salière*), Lat. *salarium*, that which belongs to salt, cf. "salary." Salt-cellar is, therefore, a tautological expression. There are two types of salts, the large ornamental salt which during the medieval ages and later was one of the most important pieces of household plate, and the smaller "salts," actually used and placed near the plates or trenchers of the guests at table; they were hence styled "trencher salts." The great salts, below which the inferior guests sat, were, in the earliest form which survives, shaped like an hour-glass and have a cover. New College, Oxford, possesses a magnificent specimen, dated 1493. Later salts take a square or cylindrical shape. The Elizabethan salt, kept with the regalia in the Tower of London, has a cover with numerous figures. The London Livery Companies possess many salts of a still later pattern, rather low in height and without a

cover. The " trencher salts " are either of triangular or circular shape, some are many-sided. The circular silver salt with legs came into use in the 18th century.

SALTER, JOHN WILLIAM (1820–1869), English naturalist and palaeontologist, was born on the 15th of December 1820. He was apprenticed in 1835 to James de Carle Sowerby, and was engaged in drawing and engraving the plates for Sowerby's *Mineral Conchology*, the *Supplement* to his *English Botany*, and other Natural History works. In 1842 he was employed for a short time by Sedgwick in arranging the fossils in the Woodwardian Museum at Cambridge, and he accompanied the professor on several geological expeditions (1842–1845) into Wales. In 1846 he was appointed on the staff of the Geological Survey and worked under Edward Forbes until 1854; he was then appointed palaeontologist to the survey and gave his chief attention to the palaeozoic fossils, spending much time in Wales and the border counties. He contributed the palaeontological portion to A. C. Ramsay's *Memoir on the Geology of North Wales* (1866), assisted Murchison in his work on *Siluria* (1854 and later editions), and Sedgwick by preparing *A Catalogue of the Collection of Cambrian and Silurian Fossils contained in the Geological Museum of the University of Cambridge* (1873). Salter prepared several of the Decades of the Geological Survey and became the leading authority on Trilobites, contributing to the Palaeontographical Society four parts of *A Monograph of British Trilobites* (1864–1867). He resigned his post on the Geological Survey in 1863, and died on the 2nd of August 1869.

SALTILLO, a city and the capital of the state of Coahuila, Mexico, about 615 m. by rail N. by W. of the city of Mexico. Pop. (1900) 23,996. Saltillo is on the Mexican National railway and another railway connects it with the important mining and industrial town of Torreon, on the Mexican Central. The city is on the great central plateau of Mexico, about 5200 ft. above sea-level. It has a cool and healthy climate, and is a resort in summer for the people of the tropical coast districts, and in winter for invalids from the north. The city is laid out in regular squares, with shady streets and plazas. The residences are of the Spanish colonial type, with heavy walls and large rooms to insure coolness during the heat of the day. Among its public institutions are a national college, an athenaeum, the Madero Institute with a good library, some fine churches, and the charitable institutions common to all Mexican cities. Saltillo is an active commercial and manufacturing town, and an important railway centre. Its manufactures include cotton and woollen fabrics, knitted goods and flour. The woollen " zarapes " or " ponchos " of Saltillo are among the finest produced in Mexico. There are undeveloped coal deposits in the vicinity.

Saltillo was founded in 1586 as an outpost against the Apache Indians. It became an incorporated city in 1827. In 1824 the capital of the state of Coahuila and Texas was at Saltillo. A partisan controversy removed the seat of government to Monclova in 1833, but it was returned to Saltillo in 1835. The battle of Buena Vista was fought near Saltillo on the 22nd-23rd of February 1847. After leaving San Luis Potosí, President Juarez established his capital at Saltillo for a brief period.

SALT LAKE CITY, the capital city of Utah and the county-seat of Salt Lake county, in the N.W. part of Utah, immediately E. of the Jordan river in the Salt Lake Valley, near the base of the Wasatch mountains, at an altitude of about 4350 ft., about 11 m. S.E. of the Great Salt Lake, about 710 m. W. by N. of Denver and about 930 m. E. of San Francisco. Pop. (1860) 8236; (1900) 53,531; (1910, census) 92,777. Area, 51·25 sq. m. Of the total population in 1900, 12,741 (nearly one-fourth) were foreign-born, including 5157 English,[1] 1687 Swedes, 965 Danes, 963 Germans and 912 Scotch; 35,152 were of foreign-parentage (one or the other parent foreign-born); 278 were negroes, 214 Chinese, 22 Japanese. Salt Lake City is served by the Denver & Rio Grande, the Union Pacific, the Western Pacific, the Oregon Short Line, and the San Pedro-Los Angeles & Salt Lake railways; it is also a terminus of shorter roads to Ogden, to Los Angeles and to Mercur, a mining town in the Oquirrh mountains (S. of Great Salt Lake) whose ores are reduced by the cyanide process. The Oregon Short Line and the San Pedro-Los Angeles have a union railway station (1909), and the Denver & Rio Grande and the Western Pacific also have a large union railway station (1910). The street railway system is excellent; electric cars were introduced in 1889; and the street railways were reorganized by E. H. Harriman, who bought a controlling interest in them.

[1] The early Mormon missions in England were very successful, and many of the leaders of the church and those otherwise prominent in Salt Lake City have been of English birth.

The situation of the city is striking, with views of mountains and of the Great Salt Lake, and the climate is dry and salubrious. The city is the headquarters of the Church of Jesus Christ of Latter-Day Saints (see MORMONS). The streets are laid out, according to the plan of Brigham Young, with city blocks of 10 acres each (660 ft. sq.) and streets 132 ft. wide, and well shaded with trees planted along irrigating ditches, fed by mountain streams. Brigham (or South Temple) Street is a fine boulevard running 3 m. from the Temple to Fort Douglas. Most of the streets are numbered and named " East " or " West," " North " or " South," from their direction from the centre of the city, the Temple Block. State Street is the official name of First East Street; and East Temple Street is called Main, and South Temple Street (east of the Temple block) is called Brigham. The only developed parks are Pioneer and City Hall, both small, and Liberty Park (110 acres), in which Brigham Young built a grist mill in 1852 and which was bought from his estate by the city in 1880. There are bathing parks on the shores of Great Salt Lake, 11-15 m. W. of the city—the best known being Saltair, which has a Moorish pavilion; and 5 m. S. is Wandamere (formerly Calder's) Park (64 acres). Three miles E. of the city is Fort Douglas, established as Camp Douglas in 1862 by Colonel P. Edward Connor (1820–1891), afterwards prominently connected with the development of the mineral resources of Utah; the fort overlooks the city, being more than 4900 ft. above sea-level. In the city there are medicinal and thermal springs, and water at a temperature of 98-104° F. is piped to a large bath-house (1850) in the N. part of the city.

The most prominent buildings are those of the Church of Latter-Day Saints, particularly, in Temple Square, the Temple, Tabernacle, and Assembly Hall. The great Mormon Temple (1853-1893) has grey granite walls 6 ft. thick, is 99 × 186 ft., and has six spires, the highest (220 ft.) having a copper statue of the angel Moroni. The elliptical Tabernacle (1870) has a rounded, turtle-shell shaped roof, unsupported by pillars or beams, seats nearly 10,000, and has a large pipe organ (5000 pipes). The Assembly Hall (1880), also of granite, has an auditorium which seats about 2500. In 1909 a bishopric building, with many of the business offices of the church, was built. Other buildings connected with the history of the Mormon church are three residences of Brigham Young, called the Lion House, the Beehive (the beehive is the symbol of the industry of the Mormon settlers in the desert and appears on the state seal), and the Amelia Palace or Gardo House (1877), which is now privately owned and houses an excellent private art gallery. Three blocks E. of the Temple is St Mary's, the Roman Catholic cathedral (1909, 100-200 ft.; with two towers 175 ft. high). Other large churches are: St Mark's Cathedral (1869, Protestant Episcopal) and the First Presbyterian Church (1909). There is a large city and county building (1894), built of rough grey sandstone from Utah county; it has a dome on the top of which is a statue of Columbia; over its entrances are statues of Commerce, Liberty and Justice; its balconies command views of the neighbouring country and of the Great Salt Lake; the interior is decorated with Utah onyx. Other buildings are: the Federal building; the City Public Library (1905), one block E. of Temple Block, which housed in 1910 about 40,000 volumes; the Packard Library, and several business buildings. Typical of the city is the great building of the Zion's Co-operative Mercantile Institution, a concern established by Brigham Young in 1868—there are several large factories connected with it, and its annual sales average more than $5,000,000. A monument to Brigham Young and the Utah Pioneers, crowned by a statue of Brigham Young, by C. E. Dallin, was unveiled in 1897, at the intersection of Main and Brigham Streets. The city has numerous hospitals and charities, and there is a state penitentiary here. Near the city is the Judge Miner's Home and Hospital (Roman Catholic), a memorial to John Judge, a successful Utah miner.

Salt Lake City has a good public school system. In the city is the University of Utah, chartered in 1850 as the University of the state of Deseret and opened in November 1850; it was practically discontinued from 1851 until 1867, and then was scarcely more than a business college until 1869; its charter was amended in 1884 and a new charter was issued in 1894, when the present style of the corporation was assumed; in 1894 60 acres from the Fort Douglas reservation were secured for the campus. In 1909–1910 the university consisted of a school of arts and sciences, a state school of mines (1901), a normal school, and a preparatory department. Other institutions of learning are: the Latter-Day Saints University (1887) and the Latter-Day Saints High School, St Mary's Academy (1875; under the Roman Catholic Sisters of the Holy Cross), All Hallows College (1886; Roman Catholic), Gordon Academy (1870; Congregational), Rowland Hall Academy (1880; Protestant Episcopal)

and Westminster College (1897; Presbyterian). There is a state Art Institute, which gives an annual exhibition, provides for a course of public lectures on art, and houses in its building the state art collection. The city has always been interested in music and the drama: the regular choir of 500 voices of the Mormon Tabernacle (organized in 1890) is one of the best choruses in the country, and closely connected with its development are the Symphony Orchestra and the Salt Lake Choral Society. Brigham Young was an admirer of the drama, and the Salt Lake Theatre (1862) has had a brilliant history. There is a Young Men's Christian Association (organized in 1890). The principal clubs are the Alta, University, Commercial, Country, and Women's. There are a Masonic Temple and buildings of the Elks and Odd Fellows.

Salt Lake City is the great business centre of Utah and one of the main shipping points of the West for agricultural products, live stock (especially sheep), precious metals and coal; and the excellent railway facilities contribute greatly to the commercial importance of the city. In 1905 the value of the factory products was $7,543,983, being 76·3 % more than in 1900 and being nearly one-fifth of the total value of the factory products of all Utah. There are three large steam-car repair shops in the city. Among the more valuable manufactures are: newspapers, books, &c. ($924,495 in 1905), malt liquors, confectionery, flour, foundry and machine-shop products, dairy products, salt, knit goods, mattresses, sugar, cement, &c. Electricity is largely used in the newer factories, the power being derived from Ogden river, near Ogden, about 35 m. away, and from cataracts in Cottonwood canyon and other canyons.

The city is governed under a charter of 1851. The government is in the hands of a mayor, elected for two years, and of a unicameral municipal council, consisting of 15 members, elected from the five wards of the city for two years or for four years. The municipality owns the water works. In 1909 the assessed valuation, real and personal, was $52,180,789; the tax levy was $677,411; and the city debt was $4,399,400 (exclusive of $1,528,000, the bonded indebtedness of the city schools).

The history of the city is largely that of the Mormons (*q.v.*) and in its earlier years that of Utah (*q.v.*). The Mormons first came here in 1847; an advance party led by Orson Pratt and Erastus Snow entered the Salt Lake Valley on the 22nd of July. President Brigham Young upon his arrival on the 24th approved of the site, saying that he had seen it before in a vision; on the 28th of July he chose the site for the temple. In August the city was named "the City of the Great Salt Lake," and this name was used until 1868 when the adjective was dropped by legislative act. In the autumn the major body or the pioneers arrived. The first government was purely ecclesiastical, the city being a "stake of Zion" under a president; "Father" Joseph Smith was the first president. The gold excitement of 1849 and the following years was the source of the city's first prosperity: the Mormons did not attempt to do any mining—Brigham Young counselled them not to abandon agriculture for prospecting—but they made themselves rich by outfitting those of the gold-seekers who went to California overland and who stopped at the City of the Great Salt Lake, the westernmost settlement of any importance. On the 4th of March 1849 a convention met here which appointed a committee to draft a constitution; the constitution was immediately adopted, the independent state of Deseret was organized and on the 12th of March the first general election was held. In 1850 the city had a population of 6000, more than half the total number of inhabitants of the Great Salt Lake Valley, which, as well as the rest of Utah, was largely settled from Salt Lake City. In January 1851 the general assembly of the state of Deseret chartered the city; and the first municipal election was held in April of the same year; the charter was amended in 1865. Immigration from Europe and especially from England was large in the earlier years of the city, beginning in 1848. Salt Lake City was prominently identified with the Mormon church in its struggle with the United States government; in 1858 it was entirely deserted upon the approach of the United States troops. Since the Civil War, the non-Mormon element (locally called "Gentile") has steadily increased in strength, partly because of industrial changes and partly because the city is the natural point of attack on the Mormon church of other denominations, which are comparatively stronger here than elsewhere in Utah.

See the bibliography under MORMONS and under UTAH; and particularly E. W. Tullidge, *History of Salt Lake City* (Salt Lake City, 1886), the famous descriptions in Captain Stansbury's report (1850), and in R. F. Burton's *The City of the Saints* (1861), and H. H. Bancroft, *History of Utah* (San Francisco, 1890).

SALTO, a town and river port of Uruguay and capital of a department of the same name, on the Uruguay river 60 m. above Paysandú. Pop. (1900, estimate) 12,000. It has railway connexion with Montevideo via Paysandú and Rio Negro (394 m.), and with Santa Rosa, on the Brazilian frontier (113 m.). It is also connected with Montevideo and Buenos Aires by river steamers, Salto being at the head of high water navigation for large vessels. There are reefs and rocks in the river between Paysandú and Salto that make navigation dangerous except at high water. Above Salto the river is obstructed by reefs all the way up to the Brazilian frontier, about 95 m., and is navigable for light-draft vessels only at high water. Farther up, the river is freely navigable to Santo Tomé (Argentina)—a distance of about 170 m. Travellers wishing to ascend the river above Salto usually cross to Concordia, Entre Rios, and go up by railway to Ceibo, near Monte Caseros, from which point small steamers ascend to Uruguayana, Itaqui, and other river ports. The streets of Salto are well paved and lighted with electricity, and there are some good public buildings. The town has two meat-curing establishments (*saladeros*) and is the shipping port for north-western Uruguay and, to some extent, for western Rio Grande do Sul (Brazil). Behind Salto lies a rich, undulating grazing country, whose large herds supply its chief exports.

The department of Salto—area, 4866 sq. m., pop. (1900) 40,589, (1907, estimate) 53,154—is an undulating, well-watered region occupying the north-west angle of Uruguay. Its industries are almost exclusively pastoral. About one-third of its population are foreigners, chiefly Brazilians.

SALTPETRE (from the Lat. *sal*, salt, *petra*, a rock), the commercial name given to three naturally occurring nitrates, distinguished as (1) ordinary saltpetre, nitre, or potassium nitrate, (2) Chile saltpetre, cubic nitre, or sodium nitrate, (3) wall-saltpetre or calcium nitrate. These nitrates generally occur as efflorescences caused by the oxidation of nitrogenous matter in the presence of the alkalies and alkaline earths.

1. *Ordinary Saltpetre or Potassium Nitrate*, KNO_3, occurs, mingled with other nitrates, on the surface and in the superficial layers of the soil in many countries, especially in certain parts of India, Persia, Arabia and Spain. The deposits in the great limestone caves of Kentucky, Virginia and Indiana have been probably derived from the overlying soil and accumulated by percolating water; they are of no commercial value. The actual formation of this salt is not quite clear; but it is certainly conditioned by the simultaneous contact of decaying nitrogenous matter, alkalies, air and moisture. The demand for saltpetre as an ingredient of gunpowder led to the formation of saltpetre plantations or nitriaries, which at one time were common in France, Germany, and other countries; the natural conditions were simulated by exposing heaps of decaying organic matter mixed with alkalies (lime, &c.) to atmospheric action. The salt is obtained from the soil in which it occurs naturally, or from the heaps in which it is formed artificially, by extracting with water, and adding to the solution wood-ashes or potassium carbonate. The liquid is filtered and then crystallized. Since potassium nitrate is generally more serviceable than the sodium salt, whose deliquescent properties inhibit its use for gunpowder manufacture, the latter salt, of which immense natural deposits occur (see below (2) *Chile saltpetre*), is converted into ordinary saltpetre in immense quantities. This is generally effected by adding the calculated amount of potassium chloride (of which immense quantities are obtained as a by-product in the Stassfurt salt industry) dissolved in hot water to a saturated boiling solution of sodium nitrate; the common salt, which separates on boiling down the solution, is removed from the hot solution, and on cooling the potassium nitrate crystallizes out and is separated and dried.

As found in nature, saltpetre generally forms aggregates of delicate acicular crystals, and sometimes silky tufts; distinctly developed crystals are not found in nature. When crystallized from water, crystals belonging to the orthorhombic system, and having a prism angle of 61° 10′, are obtained; they are often twinned on the prism planes, giving rise to pseudo-hexagonal groups resembling aragonite. There are perfect cleavages

parallel to the dome (011). The hardness is 2, and the specific gravity 2·1. It is fairly soluble in water; 100 parts at 0° dissolving 13·3 parts of the salt, and about 30 parts at 20°; the most saturated solution contains 327·4 parts of the salt in 100 of water; this solution boils at 114·1°. It fuses at 339° to a colourless liquid, which solidifies on cooling to a white fibrous mass, known in pharmacy as *sal prunella*. It is an energetic oxidizing agent, and on this property its most important applications depend. At a red heat it evolves oxygen with the formation of potassium nitrite, which, in turn, decomposes at a higher temperature. Heated with many metals it converts them into oxides, and with combustible substances, such as charcoal, sulphur, &c., a most intense conflagration occurs. Its chief uses are in glass-making to promote fluidity, in metallurgy to oxidize impurities, as a constituent of gunpowder and in pyrotechny; it is also used in the manufacture of nitric acid.

Potassium nitrate was used at one time in many different diseased conditions, but it is now never administered internally, as its extremely depressant action upon the heart is not compensated for by any useful properties which are not possessed by many other drugs. One most valuable use it has, however, in the treatment of asthma. All nitrites (*e.g.* sodium nitrite, ethyl nitrite, amyl nitrite) cause relaxation of involuntary muscular fibre and therefore relieve the asthmatic attacks, which depend upon spasm of the involuntary muscles in the bronchial tubes. Saltpetre may be made to act as a nitrite by dissolving it in water in the strength of about fifty grains to the ounce, soaking blotting-paper in the solution and letting the paper dry. Pieces about 2 in. square are then successively put into a jar and lighted. The patient inhales the fumes, which contain a considerable proportion of nitrogen oxides. This treatment is frequently very successful indeed in relaxing the bronchial spasm upon which the most obvious features of an attack depend.

2. *Chile saltpetre, cubic nitre* or sodium nitrate, $NaNO_3$, occurs under the same conditions as ordinary saltpetre in deposits covering immense areas in South America, which are known locally as *caliche* or *terra salitrosa*, and abound especially in the provinces of Tarapaca and Antofagasta in Chile. The nitrate fields are confined to a narrow strip of country, averaging 2½ m. in width, situated on the eastern slopes of the coast ranges and extending from north to south for 260 geographical miles, between the latitudes 25° 45′ and 19° 12′ S. The nitrate forms beds, varying in thickness from 6 in. to 12 ft., under a covering of conglomerate locally known as *lostra*, which is itself overlain by a loose sandy soil. The conglomerate consists of rock fragments, sodium chloride and various sulphates, cemented together by gypsum to form a hard compact mass 6 to 10 ft. in thickness. The caliche has often a granular structure, and is yellowish-white, bright lemon-yellow, brownish or violet in colour. It contains from 48 to 75 % of sodium nitrate and from 20 to 40 % of common salt, which are associated with various minor saline components, including sodium iodate and more or less insoluble mineral, and also some organic matter, *e.g.* guano, which suggests the idea that the nitrate was formed by the nitrification of this kind of excremental matter. The caliche is worked up *in loco* for crude nitrate by extracting the salts with hot water, allowing the suspended earth to settle, and then transferring the clarified liquor, first to a cistern where it deposits part of its sodium chloride at a high temperature, and then to another where, on cooling, it yields a crop of crystals of purified nitrate. The nitre thus refined is exported chiefly from Valparaiso, whence the name of "Chile saltpetre." The mother liquors used to be thrown away, but are now utilized for the extraction of their iodine (*q.v.*).

Chemically pure sodium nitrate can be obtained by repeated recrystallization of Chile saltpetre or by synthesis. It forms colourless, transparent rhombohedra, like those of Iceland spar; the angles are nearly equal to right angles, being 73° 30′, so that the crystals look like cubes: hence the name of "cubic saltpetre." There are perfect cleavages parallel to the rhombohedral faces, and the crystals exhibit a strong negative double refraction, like calcite. One hundred parts of water at 0° and at 100° dissolve 72·9 and 180 parts of the salt; at 120° the boiling-point of the saturated solution, 216 parts. The salt fuses at 316°; at higher temperatures it loses oxygen (more readily than the corresponding potassium salt) with the formation of nitrite which, at very high temperatures, is reduced ultimately to a mixture of peroxide, Na_2O_2, and oxide, Na_2O. The chief applications of Chile saltpetre are in the nitric acid industry, and in the manufacture of ordinary saltpetre for making gunpowder, ordinary Chile saltpetre being unsuitable by reason of its deliquescent nature, a property, however, not exhibited by the perfectly pure salt. It is also employed as a manure. For references to memoirs descriptive of the Chilian nitrate deposits, see G. P. Merrill, *The Non-Metallic Minerals* (New York, 1904).

3. *Wall-saltpetre or lime saltpetre*, calcium nitrate, $Ca(NO_3)_2$, is found as an efflorescence on the walls of stables; it is now manufactured in large quantities by fixing atmospheric nitrogen, *i.e.* by passing a powerful electric arc discharge through moist air and absorbing the nitric acid formed by lime. Its chief applications are as a manure and in the nitric acid industry.

SALT RANGE, a hill system in the Punjab and North-West Frontier Provinces of India, deriving its name from its extensive deposits of rock-salt. The range commences in Jhelum district in the lofty hill of Chel (3701 ft.), on the right bank of the river Jhelum, traverses Shahpur district, crosses the Indus in Mianwali district, thence a southern branch forms the boundary between Bannu and Dera Ismail Khan until it finally merges in the Waziristan system of mountains. The salt range contains the great mines of Mayo, Warcha and Kalabagh, which yield an inexhaustible supply of salt, and supply the wants of all Northern India. Coal of an inferior quality is also found.

SALTYKOV (STCHEDRIN), MICHAEL EVGRAFOVICH (1826–1889), Russian satirist, was born on his father's estate in the province of Tula, 15th (27th) January 1826. His early education was completely neglected, and his youth, owing to the severity and the domestic quarrels of his parents, was full of the most melancholy experiences. Left entirely to himself, he developed a love for reading; but the only book in his father's house was the Bible, which he studied with deep attention. At ten years of age he entered the Moscow Institute for the sons of the nobility, and subsequently the Lyceum at St Petersburg, where Prince Lobánov Rostofski, afterwards minister for foreign affairs, was one of his schoolfellows. While there he published poetry, and translations of some of the works of Byron and Heine; and on leaving the Lyceum he obtained employment as a clerk in the Ministry of War. In 1884 he published *Zaputennoye Dyelo* ("A Complicated Affair"), which, in view of the revolutionary movements at that time in France and Germany, was the cause of his banishment to Vyatka, where he spent eight years as a minor government official. This experience enabled him to study the life and habits of civil servants in the interior, and to give a clever picture of Russian provincial officials in his *Gubernskie Otcherki* ("Provincial Sketches"). On his return to St Petersburg he was quickly promoted to administrative posts of considerable importance. After making a report on the condition of the Russian police, he was appointed deputy governor, first of Ryazan and then of Tver. His predilection for literary work induced him to leave the government service, but pecuniary difficulties soon compelled him to re-enter it, and in 1864 he was appointed president of the local boards of taxation successively at Penza, Tula and Ryazan. In 1868 he finally quitted the civil service. Subsequently he wrote his principal works, namely, *Poshekhonskaya Starina* ("The Old Times of Poshekhona"), which possesses a certain autobiographical interest; *Istoria odnavo Goroda* ("The History of a Town"); A Satirical History of Russia; *Messieurs et Mesdames Pompadours*; and *Messieurs Golovloff*. At one time, after the death of the poet Nekrasov, he acted as editor of a leading Russian magazine, the *Contemporary*. He died in St Petersburg on the 30th of April (12th May) 1889. (G. D.)

SALUS, in Roman mythology the personification of health and prosperity. In 302 B.C. a temple was dedicated to Salus on the Quirinal (Livy x. 1); and in later times public prayers were offered to her on behalf of the emperor and the Roman people at the beginning of the year, in time of sickness, and on the emperor's birthday. In 180 B.C., on the occasion of a plague, vows were made to Apollo, Aesculapius and Salus (Livy xl. 37). Here the special attribute of the goddess appears to be health; and in later times she was identified with the Greek goddess of health, Hygieia.

SALUTATIONS, or GREETINGS, the customary forms of kindly or respectful address, especially on meeting or parting or on occasions of ceremonious approach. Etymologically the word *salutation* (Lat. *salutatio*, "wishing health") refers only to words spoken.

Forms of salutation frequent among savages and barbarians may last on almost unchanged in civilized custom. The habit of affectionate clasping or embracing is seen at the meetings of the Andaman islanders and Australian blacks, or where the Fuegians in friendly salute hug "like the grip of a bear."[1] This natural gesture appears in old Semitic and Aryan custom: "Esau ran to meet him (Jacob) and embraced him, and fell on his neck, and kissed him, and they wept" (Gen. xxxiii. 4); so, when Odysseus makes himself known, Philoetius and Eumaeus cast their arms round him with kisses on the head, hands and shoulders (*Odyss.* xxi. 223).

The idea of the kiss being an instinctive gesture is negatived by its being unknown over half the world, where the prevailing salute is that by smelling or sniffing (often called by travellers "rubbing noses"), which belongs to Polynesians, Malays, Burmese and other Indo-Chinese, Mongols, &c., extending thence eastward to the Eskimo and westward to Lapland, where Linnaeus saw relatives saluting by putting their noses together.[2] This seems the only appearance of the habit in Europe. On the other hand the kiss, the salute by tasting, appears constantly in Semitic and Aryan antiquity, as in the above cases from the book of Genesis and the *Odyssey*, or in Herodotus's description of the Persians of his time kissing one another—if equals on the mouth, if one was somewhat inferior on the cheek (Herod. i. 134). In Greece in the classic period it became customary to kiss the hand, breast or knee of a superior. In Rome the kisses of inferiors became a burdensome civility (Martial xii. 59). The early Christians made it the sign of fellowship: "greet all the brethren with an holy kiss" (1 Thess. v. 26; cf. Rom. xvi. 16, &c.). It early passed into more ceremonial form in the kiss of peace given to the newly baptized and in the celebration of the Eucharist;[3] this is retained by the Oriental Church. After a time, however, its indiscriminate use between the sexes gave rise to scandals, and it was restricted by ecclesiastical regulations —men being only allowed to kiss men, and women women, and eventually in the Roman Church the ceremonial kiss at the communion being only exchanged by the ministers, but a relic or cross called an *osculatorium* or *pax* being carried to the people to be kissed.[4] While the kiss has thus been adopted as a religious rite, its original social use has continued. Among men, however, it has become less effusive, the alteration being marked in England at the end of the 17th century by such passages as the advice to Sir Wilfull by his London-bred brother: "in the country, where great lubberly brothers slabber and kiss one another when they meet; . . . 'T is not the fashion here."[5] Court ceremonial keeps up the kiss on the cheek between sovereigns and the kissing of the hand by subjects, and the pope, like a Roman emperor, receives the kiss on his foot. A curious trace which these osculations have left behind is that when ceasing to be performed they are still talked of by way of politeness: Austrians say, "Küss d'Hand!" and Spaniards, "Beso a Vd. las manos!" "I kiss your hands!"

Strokings, pattings and other caresses have been turned to use as salutations, but have not a wide enough range to make them important. Weeping for joy, often occurring naturally at meetings, is sometimes affected as a salutation; but this seems to be different from the highly ceremonious weeping performed by several rude races when, meeting after absence, they renew the lamentations over those friends who have died in the meantime. The typical case is that of the Australian natives, where the male nearest of kin presses his breast to the new comer's, and the nearest female relative, with piteous lamentations, embraces his knees with one hand, while with the other she scratches her face till the blood drops.[6] Obviously this is no joy-weeping, but mourning, and the same is true of the New Zealand *tangi*, which is performed at the reception of a distinguished visitor, whether he has really dead friends to mourn or not.[7]

Cowering or crouching is a natural gesture of fear or inability to resist that belongs to the brutes as well as man; its extreme form is lying prostrate face to ground. In barbaric society, as soon as distinctions are marked between master and slave, chief and commoner, these tokens of submission become salutations. The sculptures of Egypt and Assyria show the lowly prostrations of the ancient East, while in Dahomey or Siam subjects crawl before the king, and even Siberian peasants grovel and kiss the dust before a noble.[8] A later stage is to suggest, but not actually perform, the prostration, as the Arab bends his hand to the ground and puts it to his lips or forehead, or the Tongan would touch the sole of a chief's foot, thus symbolically placing himself under his feet. Kneeling prevails in the middle stages of culture, as in the ceremonial of China; Hebrew custom sets it rather apart as an act of homage to a deity (1 Kings xix. 18; Isa. xlv. 23); medieval Europe distinguishes between kneeling in worship on both knees and on one knee only in homage, as in the *Boke of Curtasye* (15th century):—

> "Be curtayse to god, and knele doun
> On bothe knees with grete deuocioun;
> To mon þou shalle knele opon be toñ,
> þe toþer to þy self þou halde aloñ."

Bowing, as a salute of reverence, appears in its extreme in Oriental custom, as among the ancient Israelites: "bowed himself to the ground seven times" (Gen. xxxiii. 3).[8] The Chinese according to the degree of respect implied bow kneeling or standing.[9] The bowing salutation, varying in Europe from something less than the Eastern salaam down to the slightest inclination of the head, is interesting from being given mutually, the two saluters each making the sign of submission to the other, which would have been absurd till the sign passed into mere civility. Uncovering is a common mode of salutation, originally a sign of disarming or defencelessness or destitution in the presence of a superior. Polynesian or African chiefs require more or less stripping, such as the uncovering to the waist which Captain Cook describes in Tahiti.[10] Taking off the hat by men has for ages been the accepted mode in the Western world. Modern usage has moderated this bowing and scraping (the scrape is throwing back the right leg as the body is bent forward), as well as the curtseys (*courtoisie*) of women. Some Eastern nations are apt to see disrespect in baring the head, but insist on the feet being uncovered. Burma was agitated for years by "the great shoe question," whether Europeans should be called on to conform to native custom rather than their own, by taking off their shoes to enter the royal presence.[11] Grasping hands is a gesture which makes its appearance in antiquity as a legal act symbolic of the parties joining in compact, peace or friendship; this is well seen in marriage, where the hand grasp was part of the ancient Hindu ceremony, as was the "dextrarum junctio" in Rome, which passed on into the Christian rite. In the classic world we see it passing into a mere salutation, as where the tiresome acquaintance met by Horace on his stroll along the Via Sacra seizes his hand (Hor., *Sat.* i. 9).

Giving the right hand of fellowship (Gal. ii. 9) passed naturally into a salutation throughout Christendom, and spread, probably from Byzantium, over the Moslem world. The emphatic form of the original gesture in "striking hands" is still used to make the greeting more hearty. The variety called in English "shaking hands" (Ger. *Hände-schütteln*) only appears to have become usual in the middle ages.[12] In the Moslem legal form of joining hands the parties press their thumbs together.[13] This has been adopted as a salute by African tribes.

As to words of salutation, it is found even among the lower races that certain ordinary phrases have passed into formal greetings. Thus among the Tupis of Brazil, after the stranger's silent arrival in the hut, the master, who for a time had taken no notice of him, would say "*Ereioubé?*" that is, "Art thou come?" to which the proper reply was, "Yes, I am come"![14] Many formulas express difference of rank and consequent respect, as where the Basuto salute their chiefs with *Tama sevata! i.e.* "Greeting, wild beast!" Congo negroes returning from a journey salute their wives with an affectionate *Okowe!* but they meekly kneeling round him may not repeat the word, but must say *Ka! ka!*[15] Among cultured nations, salutations are apt to be expressions of peace and goodwill, as in the Biblical instances, "Is it well with thee?" (2 Kings iv. 26); "Peace to thee, and peace to thine house," &c. (1 Sam. xxv. 6; see Ezra iv. 17). Such formulas run on from age to age, and the latter may be traced on to the Moslem greeting, *Salām 'alaikum!* "The peace be on you," to which the reply is *Wa-'alaikum as-salām!* "And on you be the peace (*sc.* of God)!" This is an example how a greeting may become a pass-word among fellow-believers, for it is usually held that it may not be used by or to an infidel. From an epigram of Meleager (*Anth.*, ed. Jacobs vii. 119; cf. Plautus, *Poen.* v. *passim*) we learn that, while the Syrian salutation was *Shelōm* ("Peace!"), the Phoenicians greeted by wishing life (חי ארש), the

[1] W. P. Snow in *Trans. Ethnol. Soc.*, n.s., i. 263.
[2] J. E. Smith, *Linnaeus's Tour in Lapland*, i. 315.
[3] Bingham, *Antiquities of the Chr. Church*, bk. xii. c. 4, xv. c. 3.
[4] The latter term has supplied the Irish language with its term for a kiss, *póg*, Welsh *poc*; see Rhys, *Revue Celtique*, vi. 43.
[5] Congreve's *Way of the World*, act iii.
[6] Grey, *Journals*, ii. 255.
[7] A. Taylor, *New Zealand*, p. 221.
[8] See the Egyptian bow with one hand to the knee; Wilkinson, *Anc. Eg.*
[9] S. Wells Williams, *Middle Kingdom*, i. 801.
[10] See references to these customs in Tylor, *Early History of Mankind*, ch. iii.
[11] Shway Yoe, *The Burman*, ii. 158, 205.
[12] See Tylor in *Macmillan's Mag.* (May 1882), p. 76.
[13] Lane, *Mod. Eg.* i. 219.
[14] Jean de Lery, part ii. p. 204.
[15] Magyar, *Reise in Süd-Afrika.*

κιη, &c., of Neo-Punic gravestones). The cognate Babylonian form, "O king, live for ever!" (Dan. iii. 9), represents a series of phrases which continue still in the *Vivat rex!* "Long live the king!" The Greeks said χαῖρε, "Be joyful!" both at meeting and parting; the Pythagorean ὑγιαίνειν and the Platonic εὖ πράττειν, wish health; at a later time ἀσπάζομαι, "I greet!" came into fashion. The Romans applied *Salve!* "Be in health!" especially to meeting, and *Vale!* "Be well!" to parting. In the modern civilized world, everywhere, the old inquiry after health appears, the "How do you do?" becoming so formal as often to be said on both sides without either waiting for an answer. Hardly less wide in range is the set of phrases "Good day!" "Good night!" &c., varying according to the hour and translating into every language of Christendom. Among other European phrases, some correspond to our "welcome!" and "farewell!" while the religious element enters into another class, exemplified by our "Good-bye!" ("God be with you!"), and French *Adieu!* Attempts have been made to shape European greetings into expressions of orthodoxy, or even tests of belief, but they have had no great success. Examples are a Protestant German salutation "*Lobe Jesum Christum!*" answered by "*In Ewigkeit, Amen!*" and the formula which in Spain enforces the doctrine of the Immaculate Conception, "*Ave Maria purisima!*" answered by "*Sin pecado concebida!*" On the whole, though the half-meaningless forms of salutation may often seem ridiculous, society would not carry them on so universally unless it found them useful. They serve the purpose of keeping up social intercourse, and establishing relations between the parties in an interview, of which their tone may strike the keynote. (E. B. T.)

SALUZZO, a city and episcopal see of Piedmont, Italy, in the province of Cuneo, 42 m. S. of Turin by rail, 1296 ft. above sea-level. Pop. (1901) 10,306 (town), 16,208 (commune). The upper town preserves some part of the fortifications which protected it when, previous to the plague of 1630, the city had upwards of 30,000 inhabitants. The old castle of the marquises of Saluzzo now serves as a prison. Besides the Gothic cathedral (1480–1511), with the tombs of the marquises, the churches of San Giovanni (formerly San Domenico), San Bernardo and the Casa Cavazza, now the municipal museum, are noteworthy. Railways run to Cuneo and Airasca (the latter on the Turin-Pinerolo line) and steam tramways in various directions. The castle of Manta, in the vicinity, contains interesting 15th-century frescoes by a French artist (see P. d'Ancona in *L'Arte* for 1905; 94, p. 184).

The line of the marquises of Saluzzo began (1142) with Manfred, son of Boniface, marquis of Savona, and continued till 1548, when the city and territory were seized by the French. The marquises being opponents of the house of Savoy, and taking part in the struggles between France and the empire, the city often suffered severely from the fortunes of war. Henry IV. restored the marquisate to Charles Emmanuel I. of Savoy at the peace of Lyons in 1601. Among the celebrities of Saluzzo are Silvio Pellico, Bodoni, the famous printer of Parma of the late 18th and early 19th centuries, and Casalis the historian of Sardinia. The history of the marquisate was written by Delfino Muletti (5 vols., 1829–1833).

SALVADOR, or SAN SALVADOR (*República del Salvador*), the smallest but most densely peopled of the republics of Central America, bounded on the N. and E. by Honduras, S. by the Pacific Ocean, and W. by Guatemala. (For map, see CENTRAL AMERICA.) Pop. (1906) 1,116,253; area, about 7225 sq. m. Salvador has a coastline extending for about 160 m. from the mouth of the Rio de la Paz to that of the Goascoran in the Bay of Fonseca (*q.v.*). Its length from E. to W. is 140 m., and its average breadth about 60 m.

Physical Features.—With the exception of a comparatively narrow seaboard of low alluvial plains, the country consists mainly of a plateau about 2000 ft. above the sea, broken by a large number of volcanic cones. These are geologically of more recent origin than the main chain of the Cordillera which rises farther N. The principal river of the republic is the Rio Lempa, which, rising just beyond the frontier of Guatemala and crossing a corner of Honduras, enters Salvador N. of Citalá. After receiving the surplus waters of the Laguna de Guija, it flows E. through a magnificent valley between the plateau and the Cordillera, and then turning S. skirts the base of the volcano of Siguatepeque and reaches the Pacific in 88° 40′ W. Among its numerous tributaries are the Rio Santa Ana, rising near the city of that name, the Asalguate, which passes the capital San Salvador, the Sumpul, and the Torola, draining the N.E. of Salvador and part of Honduras. The Lempa is for two-thirds of its course navigable by small steamers. The Rio San Miguel drains the country between the bay of Fonseca and the basin of the Lempa. The volcanic mountains do not form a chain but a series of clusters: the Izalco group in the W.—including Izalco (formed in 1770), Marcelino, Santa Ana, Naranjos, Aguila, San Juan de Dios, Apaneca, Tamajaso and Lagunita; the San Salvador group, about 30 m. E.; Cojutepeque to the N.E. and the San Vicente group to the E. of the great volcanic lake of Ilopango; the Siguatepeque summits to the N.E. of San Vicente; and the great S.E. or San Miguel group—San Miguel, Chinameca, Buenapa, Usulatan, Tecapa, Taburete. Cacaguateque and Sociedad volcanoes in the N.E. belong to the inland Cordillera. Santa Ana (8300 ft.) and San Miguel (7120 ft.) are the loftiest volcanoes in the country.

The neighbourhood of the capital is subject to earthquakes. San Miguel is described as one of the most treacherous burning mountains in America, sometimes several years in complete repose and then all at once bursting out with terrific fury. In 1879–1880 the Lake of Ilopango was the scene of a remarkable series of phenomena. With a length of 5½ m. and a breadth of 4½, it forms a rough parallelogram with deeply indented sides, and is surrounded in all directions by steep mountains except at the points where the villages of Asino and Apulo occupy little patches of level ground. Between the 31st of December 1879 and the 11th of January 1880 the lake rose 4 ft. above its level. The Jiboa, which flows out at the S.E., became, instead of a very shallow stream 20 ft. broad, a raging torrent which soon scooped out for itself in the volcanic rocks a channel 30 to 35 ft. deep. A rapid subsidence of the lake was thus produced, and by the 6th of March the level was 34⅘ ft. below its maximum. Towards the centre of the lake a volcanic centre about 500 ft. in diameter rose 150 ft. above the water, surrounded by a number of small islands.

Climate.—The lowlands are generally hot and, on the coast, malarial; but on the tablelands and mountain slopes of the interior the climate is temperate and healthy. There are only two seasons: the wet, which Salvadorians call winter, from May to October; and the dry, or summer, season, from November to April. In July and August there are high winds, followed by torrents of rain and thunderstorms; in September and October the rain, not heavy, is continuous. For an account of the geology, fauna and flora of Salvador, see CENTRAL AMERICA.

Inhabitants.—The population in 1887 was stated to be 664,513, (1901) 1,006,848, (1906) 1,116,253. The number of Ladinos (whites and persons of mixed blood) is about 775,000 and of Indians about 230,000. The various elements were, before 1901, estimated as follows, and the proportion still holds good in the main: whites (creoles and foreigners) 10 %, half-castes 50 %, Indians 40 %, and a very small proportion of negroes. The whites of pure blood are very few, a liberal estimate putting the proportion at 2·5 %. There is no immigration into the country, and the rapid increase with which the population is credited can be due only to a large surplus of births over deaths. The chief towns, which are described in separate articles, comprise San Salvador the capital (pop. 1905, about 60,000). Santa Ana (48,000), San Miguel (25,000), San Vicente (18,000), Sonsonate (17,000), Nueva San Salvador or Santa Tecla (18,000) and the seaport of La Union (4000). For the ancient Indian civilization of Salvador, see CENTRAL AMERICA: *Archaeology*, and MEXICO: *History*.

Agriculture.—The only industry extensively carried on is agriculture, but the methods employed are still primitive. The more important products are coffee, sugar, indigo and balsam. The country is rich in medicinal plants. Peruvian balsam (*Myrospermum Salvatorense* or *Myroxylon Pereirae*) is an indigenous balm, rare except on the Balsam Coast, as the region about Cape Remedios is named. It is not cultivated in Peru, but owes its name to the fact that, during the early period of Spanish rule, it was forwarded to the Peruvian port of Callao for transhipment to Europe. Rubber is collected; tobacco is grown in small quantities; cocoa, rice, cereals and fruits are cultivated. The government seeks to encourage cotton growing, and has

established in the suburbs of the capital an agricultural college and model farm.

Mining.—In the Cordillera, which runs through Salvador, there are veins of various metals—gold, silver, copper, mercury and lead being found mostly in the E., and iron in the W. Coal has been discovered at various points in the valley of the Lempa. In the republic there are about 180 mining establishments, about half of them being in the department of Morazan; they are owned by British, United States and Salvadorian companies. Only gold and silver are worked. The output, chiefly gold, was valued at £250,000 in 1907.

Commerce.—The trade of Salvador is almost entirely confined to the import of cotton goods, woollen goods, sacks and machinery, and to the export of coffee and a few other agricultural products. In 1900 the formation of a statistical office was decreed. The average yearly value of the imports for the five years 1904–1908 was £804,000, of the exports £1,250,000. The coffee exported in 1908 was valued at £830,000. The imports, comprising foodstuffs, hardware, drugs, cottons, silk and yarn, come (in order of value) chiefly from Great Britain, the United States, France and Germany; the exports are mostly to the United States and France.

Shipping and Communications.—Until 1855 the roads of Salvador were little better than bridle-paths, and fords or ferries were the sole means of crossing the larger rivers. During the next half-century about 2000 m. of highways were built, and the rivers were bridged. The first railway, a narrow-gauge line, between the port of Acajutla and Sonsonate, was opened in 1882, and afterwards extended to Ateos on the E. and Santa Ana on the N.W. A railway from the capital to Nueva San Salvador was also constructed, and in 1900 was linked to the older system by a line from Ateos to San Salvador. In 1903, a concession was granted for an extension from Nueva San Salvador to the port of La Libertad. From 350 to 450 vessels annually entered and cleared at Salvadorian ports (chiefly Acajutla, La Libertad and La Union), during the years 1895 to 1905. The old port of Acajutla has been closed, and a new port opened in a more sheltered position about 1 m. N., where an iron pier, warehouses and custom-house have been erected. Salvador joined the postal union in 1879.

Currency and Credit.—In 1910 there were three commercial banks and an agricultural bank within the republic. In 1897 a law was passed adopting a gold standard. The currency of the country in 1910 consisted entirely of silver pesos, the fractional money under ·900 fine having, by arrangement with the government, been all exported by the banks. The peso or dollar at par is valued at four shillings; its actual value was about 1s. 8d. in 1910. The metric system of weights and measures was adopted by decree of January 1886, but the old Spanish weights and measures still continue in general use.

Finance.—The revenue is mainly derived from import and export duties, but considerable sums are also obtained from excise, and smaller amounts from stamps and other sources. The principal branches of expenditure are the public debt, defence and internal administration. The official figures showing the revenue and expenditure for the five years 1904–1908 are as follows (pesos being converted into sterling at the rate of 12 to £1):—

Years.	Revenue.	Expenditure.
1904	675,000	734,000
1905	711,000	837,000
1906	707,000	1,024,000
1907	728,000	886,000
1908	1,064,000	1,019,000

The foreign debt, amounting to £726,420 (£240,000 of a 6 % loan of 1889, and £485,720 of another of 1892) was in 1899 converted into 5 % mortgage debentures of the Salvador Railway Company Limited, to which the government has guaranteed, for eighteen years from the 1st of January 1899, a fixed annual subsidy of £24,000. In March 1908 a new foreign loan was raised, amounting to £1,000,000. The bonds were issued at 86, and bore 6 % interest, secured partly upon the special import duty of $3·60 (American gold) on every kilogramme of imported merchandise, partly upon the export duty of 40 c. (American gold) on every quintal (100 lb) of coffee up to 500,000 lb. The 4 % internal debt amounted in 1905 to £840,170.

Government.—The constitution proclaimed in 1824, and modified in 1859, 1864, 1871, 1872, 1880, 1883 and 1886, vests the legislative power in a chamber of 70 deputies, including 42 landowners (3 for each department), all chosen by the direct vote of the people. The president and vice-president are likewise chosen by direct popular vote, and they hold office for 4 years. The president is not eligible for the presidency or vice-presidency during the following presidential term. He is assisted by 4 ministers. Local government is carried on in each of the 14 departments by governors appointed by the central executive. The municipalities are administered by officers (*alcaldes, regidores*, &c.) elected by the inhabitants.

Religion and Education.—The Roman Catholic religion prevails throughout the republic, but there is complete religious freedom, so far as is compatible with public order. Civil marriage is legal, monastic institutions are prohibited, and education is in the hands of laymen. Primary education is gratuitous and obligatory. For secondary instruction there are about 20 higher schools, including 3 technical institutes, and 2 schools for teachers, one for men and the other for women—these five institutions being supported by the government. At San Salvador there is a national college for the higher education of women. Superior and professional instruction is provided at the national university in the capital.

Justice is administered by a supreme court, and in district, circuit and local courts. The active army consists of about 3000 men, and the militia, of about 18,000. In time of war all males between the ages of eighteen and sixty are liable for service. The navy consists of one customs cruiser.

History.—Salvador received its name from Pedro de Alvarado, who conquered it for Spain in 1525–26. Its independence of the Spanish Crown dates from 1822; (see CENTRAL AMERICA: *History*). Revolutions have been frequent. In July 1906 war broke out between Salvador, Honduras and Guatemala, but was terminated within the month by the arbitration of the United States president (see as above). In 1907 Salvador supported Honduras (*q.v.*) against Nicaragua; its prosperity was not, however, seriously impaired by the defeat of its ally.

See E. G. Squier, *The States of Central America* (London, 1868); D. Guzman, *Apuntamientos sobre la topografia fisica de la república del Salvador* (San Salvador, 1883); D. Gonzalez, *Datos sobre la republica de El Salvador* (San Salvador, 1901); No. 58 of the *Bulletins* of the Bureau of American Republics (Washington, 1892); annual reports of the Council of the Corporation of Foreign Bondholders (London) and of the British Foreign Office.

SALVAGE (from Lat. *salvus*, safe). There is no general rule or principle of law which entitles one who saves the life or property of another to be rewarded by him. But in certain special classes of cases the law does require the appointed courts to reward those who by their exertions have rescued lives or property from probable damage or destruction. The reward so given is called *salvage* and the same word is often used to denote the service rewarded. Apart from the application of the term by analogy to the saving of property from fire on land, the recovery of property from destruction by the aid of voluntary payments (as in the case of payments to prevent the forfeiture of an insurance policy), or a solicitor's charges for property recovered by his means, the subject of salvage divides into (1) civil salvage, (2) military salvage.

1. *Civil Salvage* in English law is defined as such a service as may become the ground of a reward in the (admiralty) court on the civil side of its jurisdiction, and consists in the preservation of life or property from some of the dangers of the sea. The jurisdiction to give it is an admiralty jurisdiction. But the right to reward was recognized in the courts of common law before the admiralty court became, as it now is, a part of the High Court of Justice, *e.g.* by enforcing a possessory lien of the salvor over the salved property. The origin of the rule has been traced

to the doctrine of Roman law that "spontaneous services" in the protection of lives and property should be rewarded. But that doctrine has not found a place in English law except, as part of the maritime law administered in the court of admiralty. Thus services on land, say in rescuing lives or houses or goods from fire, do not entitle the person rendering those services to reward, unless he has acted under some contract or employment. But at sea the right to reward springs from the service itself if it has been rendered to a ship, or her passengers, crew or cargo, or to property which has been thrown or washed out of her. And such a service entitles to salvage though the ship may be in harbour, or within a river, or even in a dock. This connexion of the lives or property with a ship seems essential. The right does not arise upon saving goods which have got adrift in river or harbour, even if they have been washed out to sea, nor upon saving property of other kinds which may be in peril on the sea or on the seashore. Thus a claim to reward for saving a gas-buoy or beacon, which had broken from its moorings in the Upper Humber, and was aground on the Lincolnshire coast, was disallowed by the House of Lords, affirming the court of appeal, in the case of the gas-float "*Whilton No. 2*," 1897, A.C. 337.

The definite right to salvage for saving lives from ships is the creation of modern statutes. Formerly the Admiralty judges treated the fact that lives had been saved as enhancing the merit of a salvage of property by the same salvors, where the two could be connected; and so indirectly gave life salvage. And this is still the position in cases where the Merchant Shipping Act of 1894 does not apply. This act (§ 544) applies to all cases in which the "services are rendered wholly or in part within British waters in saving life from any British or foreign vessel, or elsewhere in saving life from any British vessel." Also (§ 545) it can be applied, by Order in Council, to life salvage from ships of any foreign country whose government "is willing that salvage should be awarded by British courts for services rendered in saving life from ships belonging to that country where the ship is beyond the limits of British jurisdiction." By section 544 the life salvage is made payable "by the owner of the vessel, cargo or apparel saved"; and is to be paid in priority to all other claims for salvage. Where the value of the vessel, cargo and apparel saved is insufficient to pay the life salvage, the Board of Trade may in their discretion make up the deficiency, in whole or in part, out of the Mercantile Marine Fund. The effect of the act is to impose a common responsibility upon the owners of ship and cargo to the extent of their property saved. Whatever is saved becomes a fund out of which life salvors may be rewarded, and to which they are entitled in priority to other salvors. In the case of the cargo *ex* "*Schiller*" (1877, 2 P.D. 145) salvage was allowed out of specie raised by divers from the sunken wreck, to persons who had saved some of the passengers and crew.

This limitation of liability to the amount of the property salved is also true with regard to salvage of property. The ordinary remedy of the salvor is against the property itself; by proceedings *in rem*, to enforce the maritime lien given him by the law upon that property. This enables him to arrest the property, if within the jurisdiction, into whose hands soever it may have come; and, if necessary, to obtain a sale, and payment of his claim out of the proceeds. The salvor has also a remedy *in personam*, used only in exceptional cases, against the owners or others interested in the property saved (Five steel barges, 15 P.D. 142); but it seems certain that that depends upon property having been saved, and having come to the owner's hands; and that the amount which can be awarded is limited by the value of that property.

An essential condition is that the lives or property saved must have been in danger—either in immediate peril, or in a position of "difficulty and reasonable apprehension." Danger to the salvor is not essential, though it enhances his claim to reward; but to constitute a salvage service there must have been danger to the thing salved. Again, the service must have helped usefully towards saving the lives or property. Ineffectual efforts, however strenuous and meritorious, give rise to no claim. But the service need not be completely successful. If it has contributed to an ultimate rescue it will be rewarded, though that may have been accomplished by others. And as we have seen, there must have been ultimate success. Some of the property involved in the adventure must have been saved. And the value of that, or the fund realized by its sale, limits the total of the awards to all the salvors. Cases, of course, occur in which services at sea are employed by ships in danger: as where a steamer with a broken propeller shaft employs another steamer to tow her; or where a vessel which has lost her anchors employs another to procure anchors for her from shore. In such cases the conditions of reward above set out may not apply. Reward may be payable, notwithstanding entire failure of success, by the express or implied terms of the employment. But such a reward is not truly "salvage."

Services rendered in the performance of a duty owed do not entitle to salvage. The policy of the law is to stimulate voluntary effort, not to weaken obligation. Thus the crew cannot (while still the crew) be salvors of the ship or cargo; nor can the passengers, unless they have voluntarily stayed on the ship for the purpose of saving her. Nor can a pilot employed as such be salvor, unless he has boarded her in such exceptional circumstances that his doing so for pilotage fees could not reasonably be required; or unless the circumstances of the service, entered upon as pilotage, have so changed as to alter its character; and it may be doubted whether such a change of circumstances is a valid ground for a claim of salvage remuneration by the pilot where he has had no opportunity of leaving the ship. So again of the owners and crew of a tug employed to tow a ship. They cannot claim salvage for rescuing her from a danger which may arise during the towage, unless circumstances have supervened which were not contemplated, and are such as to require extraordinary aid from the tug, or to expose her to extraordinary risk. Officers and crew of a ship of the royal navy may have salvage where they have rendered services outside the protection which their ship ought to afford. But by the Merchant Shipping Act 1894, § 557, such a claim must be with consent of the Admiralty; and no claim can be made in respect of the ship herself.

The kinds and degrees of service are very various. The rewards given vary correspondingly. Regard is paid, first, to the degree of the danger to the property salved, to its value, and to the effect of the services rendered; next, to the risks run by the salvors, the length and severity of their efforts, the enterprise and skill displayed, and to the value and efficiency of the vessel or apparatus they have used, and the risks to which they have exposed her. In a modern case (the "*Glengyle*," 1898, A.C. 519) a specially large award was given to vessels kept constantly ready for salving operations in Gibraltar Bay. It was owing to that readiness that the rescue had been possible. On the other hand, any negligent or improper conduct of the salvors will be considered in diminution of the award: as where they have negligently exposed the ship to damage, or have plundered the cargo, or dealt with it contrary to the owner's interests. And where the rescue has been from a danger which was brought about by the negligent or improper conduct of those who effected the rescue, no salvage is allowed. So that where two colliding ships were both to blame for the collision, the master and crew of one of them were not allowed salvage for services in saving cargo of the other (cargo *ex* "*Capella*," L.R. 1 A. and E. 356).

In apportioning the total award given for a salvage service among the owners, master and crew of the vessel by means of which it has been rendered, the special circumstances of each case have to be considered. In nearly all cases a large portion goes to the owners, and as in recent times the value and efficiency of ships (especially of steamships) have increased, so the proportion of the whole usually awarded to the owners has also increased. In an ordinary case of salvage by a steamship towing a distressed ship into safety, the share of the owners is usually about three-fourths; of the remainder the master usually gets about one-third,

and the officers and crew divide the rest in proportion to their ratings. But where the salving ship has sustained special damage in the service, or her owners have been put to loss by it, that is taken into account. On the other hand, where special personal services have been rendered by members of the crew they are specially rewarded.

As an illustration take the case of the "*Rasche*" (L.R. 4 A. and E. 127). The brigantine "Rasche," derelict, was fallen in with by the ship "Scythia" (carrying a very valuable cargo) 220 m. N. of the Lizard. The mate and three hands of the "Scythia" were put on board, and in circumstances of much hardship and danger they brought her after eighteen days safely to Liverpool. After deducting expenses incurred by the owners of the "Scythia," the value of the property saved was £6204. Sir R. Phillimore awarded £3200; and of this he gave £600 to the mate, £510 to each of the three men who had accompanied him; £500 to the owners of the "Scythia"; and £350 to her other officers and crew.

An agreement as to the salvage to be paid is sometimes made at the time the assistance is given. When made fairly the court will act upon it, though it may turn out to be a bad bargain for one or other of the parties. But if the facts were not correctly apprehended by one or both, or if the position was one of such difficulty that those salved had no real option as to accepting the salvor's terms, the courts will set the agreement aside.

This happened, for instance, where the salving ship refused to rescue 550 wrecked pilgrims from the Parkin Rock in the Red Sea for a less sum than £4000. An agreement had in consequence been signed for their conveyance for that sum to Jedda, two or three days' sail. The Parkin Rock stands 6 ft. above the water, and had bad weather come on the lives would have been in great danger. It was held that the sum asked for was exorbitant; and that the agreement, made under practical compulsion, could not stand (the "*Medina*," 2 P.D. 5). On the other hand, an agreement to tow, for a fixed sum, a vessel which had suffered considerable damage, was set aside, and salvage awarded, on the ground that the damaged condition had not been disclosed to the tug when the contract was made (the "*Kingaloch*," 1 Spink, 265).

The award of salvage is generally made in one sum against ship, freight and cargo; and those interests contribute to the amount in proportion to the value saved. No distinction is made between the degree of service rendered to one interest and another. But, with a possible exception in the case of life salvage, there is not a joint liability of the several interests. Each is liable to the salvors for his own share, and for no more. The ship cannot be made to pay the cargo's share, nor the cargo the ship's. If, however, the shipowner pays the cargo's share, he has a lien upon it for the amount. In practice the liabilities for salvage are ordinarily adjusted as part of general average. Strictly, however, there is a difference. The liability to pay salvage is a direct liability to the salvors, arising at once, *e.g.* at the port of refuge, and proportional to the values there; whereas the liability to contribute to a general average loss or expenditure is postponed until the completion or break up of the adventure, and depends upon the values of the interests which have arrived there; which may be very different. (See AVERAGE, INSURANCE, *Marine*, and also ADMIRALTY JURISDICTION.)

AUTHORITIES.—Kennedy, *On the Law of Civil Salvage* (London, 1907); Abbott, *Law of Merchant Ships and Seamen* (14th ed., London, 1901); Carver, *Carriage by Sea* (5th ed., London, 1909).

(T. G. C.)

2. *Military Salvage* is analogous to civil salvage. It is defined as such a service as may become the ground for the demand of a reward in the court as a prize court, and consists in the rescue of property from the enemy in time of war. Such cases almost invariably relate to ships and their cargoes; and they have always been dealt with by courts having Admiralty jurisdiction, sitting as prize courts. They involve the determination of two questions: first, whether the property is to be restored to its original owner or condemned as prize to the recaptor; and second, what amount of salvage, if any, is to accompany restitution. Generally speaking, the first question depends upon the law of nations, which may be taken to be that where a ship has been carried by an enemy *infra praesidia*, and especially after a sentence of condemnation, the title of the original owner is divested, and does not revest upon recapture by third parties. In such a case, therefore, *jure gentium* restitution cannot be claimed. The municipal law of civilized countries, however, does not encourage subjects to "make reprisals upon one another" (the "*Renard*," Marr. Adm. Dec. 222), and laws are generally found, as in England, which as between subjects of that particular state provide for restitution irrespective of any change in the title to the subject matter which may have occurred. But (speaking henceforth of England) in cases which do not fall strictly within these acts, the old maritime law, which was in unison with the general law of nations, is applied by the courts. Moreover, the English Prize Acts do not apply to foreign owners of recaptured prizes, and therefore no award can be made against them unless in accordance with the law of nations. In practice the courts have acted upon the "rule of reciprocity" where recaptures have been made of the property of formal allies, dealing with them as the allied state would have dealt with English property. In the case of neutral recaptures restitution is always ordered. An exception to the rule of restitution as between British subjects is made in the case of a British ship which has been "set forth as a ship of war" by the captor, and subsequently retaken by a British ship. Such a ship is not liable to restoration, but is the prize of the recaptor. This exception, the object of which is to encourage the capture of armed ships, dates from 1793, previous acts having provided for restitution upon payment of a moiety as salvage. The condition of setting forth as a ship of war is satisfied, where under a fair semblance of authority, which is not disproved, the ship "has been used in the operations of war, and constituted a part of the naval force of the enemy" (the "*Ceylon*," 1 Dod. 105). Such a user permanently obliterates the ship's original character, and extinguishes all future claims to restitution ("*L'Actif*," Edw. 185).

As to the right to salvage and the amount which will be allowed, this is also a question of the *jus gentium*, though usually governed by municipal law. The right was recognized so long ago as the 11th century, when the "*Consolato del Mare*" (see CONSULATE OF THE SEA) laid down elaborate provisions on the subject. In England the first statutory recognition of the right occurs in 1648, when an act of the Commonwealth, which in its outline has been the model for all subsequent Prize Acts, provides that British vessels captured by an enemy and retaken by British ships shall be restored upon payment of one-eighth of the value of the property in lieu of salvage, or one-half in the case of a prize "set forth as a ship of war." From that date until 1864, the date of the act now in force, there have been thirteen Prize Acts dealing with recapture, each of which, except that of 1864, has been passed to meet a particular occasion, and has expired with the cessation of the then existing hostilities. Since the first act, and down to the act of 1805 inclusive, a distinction has always been drawn between a recapture effected by one of the royal ships of war and a recapture by a privateer or other vessel. In the former case the allowance has always been one-eighth, in the latter it varied, but was usually one-sixth. In the act of 1692 a clause taken from a Dutch law gave salvage to a privateer, rising in amount from one-eighth to one-half according to the number of hours the prize had been in the enemy's possession, but this clause has disappeared since 1756. There is no provision in the present act for the payment of salvage, except in case of recapture by one of His Majesty's ships, but it seems beyond question that recaptors are entitled at law to salvage, although they may hold no commission from the crown. "It is the duty of every subject of the king to assist his fellow-subjects in war, and to retake their property in the possession of the enemy: no commission is necessary to give a person so employed a title to the reward which the policy of the law allots to that meritorious act of duty" (the "*Helen*," 3 C. Rob. 226, *per* Sir W. Scott). Though it is improbable that privateers will figure in any future war, it may reasonably be anticipated that recaptures may be made by private vessels, and in such cases salvage would probably be awarded, the proportion lying in the discretion of the court. Similarly, salvage is awarded in the case of recapture from pirates or from a mutinous crew. In the case of royal ships the present act allows one-eighth salvage, which in cases of "special difficulty or danger" the court may increase to a quarter. The latter provision is an innovation.

It may appear that the grant of salvage to ships of war, the duty of whose commanders it is, according to the naval instructions, "if possible, to rescue any British vessel which he may find attacked or captured by the enemy," needs some justification. Objections on this ground have never been seriously treated, it being urged that it is politic to encourage the undertaking of such enterprises, even where they coincide with the path of duty. Where, however, a transport was rescued from under the guns of an enemy by a ship of war, under whose charge she sailed. salvage was refused on the ground that the salvor was only doing what he was bound to do (the "*Belle*," Edw. 66). So no salvage is due to a crew who rescue a ship from mutineers, this being only their duty under a subsisting contract (the "*Governor Raffles*," 2 Dod. 14). On the other hand, a crew who rescue their ship from the prize crew of a belligerent are entitled to salvage, since the capture discharges them from their contract with the owner, and they act as volunteers (the "*Two Friends*," 1 C. Rob. 271). In the case of a neutral captured by one belligerent and recaptured by the other, which has been already alluded to, no salvage is as a rule allowed, upon the supposition that if the vessel had been carried into the port of the enemy justice would have been done and the vessel restored. In the case of the French war at the opening of the 19th century no such supposition existed, and salvage was usually awarded on the recapture of neutral property from the French. (M. Bt.)

SALVAGE CORPS. The London Salvage Corps is maintained by the fire offices of London. The corps was first formed in 1865 and began operations in March 1866. The staff of the corps when first formed consisted of 64. Since that time, owing to the many improvements that have taken place in the system of dealing with salvage, and the increase in the work to be done, the corps has necessarily been strengthened, and the staff now numbers over 100. The various stations of the corps are well placed, and the Metropolis has been mapped out so that when a fire takes place it may be attended to at the earliest possible moment. The headquarters are situated at Watling Street, which is called the No. 1 station, and this station protects the City of London enclosed by the Euston Road, Tottenham Court Road, City Road and the river Thames; this is known as the "B" district. No. 2 station is at Commercial Road, and attends to the whole of the E. and N.E. portion of London to the N. of the Thames, and is known as the "C" district. No 3 station, opposite the headquarters of the Metropolitan Fire Brigade Station in the Southwark Bridge Road, protects the whole of S. London, and is known as the "D" district. No. 4 station, at Shaftesbury Avenue, is called the "A" district, and covers the West End and Kensington. Finally, No. 5 station, in Upper Street, Islington, guards the parish of Islington. The working staff, which is mainly recruited from the royal navy, consists of the chief officer and a superintendent, foreman and crew of men at each station. The stations of the corps are connected by telephone with the fire brigade stations from whence the "calls" are received. In addition to the home staff, there is also a staff constantly employed during the daytime in inspecting docks, wharves, Manchester goods and uptown warehouses, and reports are made weekly to the committee.

Generally speaking, the work of the Corps may be divided into two distinct classes—(1) services at fires: (2) watching and working salvage.

(1) *Services at Fires* form the most important feature of the work. Much depends upon the method of dealing with the salvage. If, for instance, a large Manchester goods warehouse was on fire in the top part, it would be very little advantage to the offices interested in the risk if the men were set to work removing the stock off the ground floor. The best method would be to cover up with tarpaulin all goods there, and prevent the water from collecting on the lower floors. It will be gathered that the most important work of the corps is to prevent damage to goods, and that water is mostly looked after. The damage from fire is left almost entirely to the fire brigade. The vans, which immediately on receipt of an alarm proceed to the scene of the fire with their crew of men, carry every kind of appliance for the saving of goods from destruction by fire or damage by water, as well as lime-light apparatus for use in working after the fire has been extinguished, thus enabling the men to note the position of dangerous walls, &c.; and a portable coal-gas apparatus, which can be employed in the interior of buildings when the ordinary means of illumination has failed; in addition to ambulance appliances for emergencies.

(2) *Working Salvage.*—When a fire takes place, a man is left behind in charge of the salvage if the property is insured; or if that fact cannot be ascertained, but it appears probable that it is, a man is left until the information is obtained later. The duty, if an important one, is divided into a day and night duty. This enables an experienced man to be sent on day duty to meet the surveyor, and to carry out his instructions regarding the working out of the salvage; and a junior man at night. The day man, if working out salvage, would employ a number of men called strangers, over whom he acts as a kind of foreman. The "working out" may take the form of dividing up damaged goods into lots ready for a sale to be held by the surveyor, or of sifting over the débris to find remains of certain articles claimed for. If, for instance, a large fire occurred at a pianoforte manufacturer's, and the débris was all in one common heap, the London Salvage Corps might have to arrange certain quantities of pegs and wires in order to give an idea of the number of pianos before the fire. The watching continues until the loss is settled, when the charge of the premises is given over to the assured.

There are also salvage corps on similar lines, but on a smaller scale, in Liverpool and Glasgow. (C J F)

SALVANDY, NARCISSE ACHILLE (1795–1856), French politician, was born at Condom (Gers) on the 11th of June 1795, of a poor family Irish by extraction. He entered the army in 1813, and next year was admitted to the household troops of Louis XVIII. A patriotic pamphlet on *La Coalition et la France* (1816) attracted the attention of Decazes, who employed him to disseminate his views in the press, and he waged war against the Villèle ministry of 1822–1828. Under the July monarchy he sat almost continuously in the Chamber of Deputies from 1830 till 1848, giving his support to the Conservative party. Minister of education in the Molé cabinet of 1837–1839, and again in 1845, he superintended the reconstitution of the Council of Education, the foundation of the French School at Athens and the restoration of the École des Chartes. For short periods in 1841 and 1843 he was ambassador at Madrid and at Turin, and became a member of the French Academy in 1835. Under the Empire he took no part in public affairs, and died at Graveron (Eure) on the 16th of December 1856.

SALVATION ARMY, a religious philanthropic organization founded by William Booth (*q.v.*), who in 1865 began to hold meetings for preaching in the streets in London and in tents, music halls, theatres and other hired buildings. Large numbers attended, many of whom had never entered a place of worship, and presently an organized society was formed called "The Christian Mission." Booth was assisted by his wife, Catherine Booth, a woman of remarkable gifts, who won for the new movement the sympathy of many among the cultured classes. In 1878 the Mission, which had spread beyond London, was reorganized on a quasi-military basis, and the title of "The Salvation Army" was definitely adopted in June 1880. The local societies became "Corps," and their evangelists "Field Officers," with Booth as "General" of the whole body. The spiritual operations of the Army at once rapidly expanded in spite of much disorderly opposition in some places. In 1878 there were 75 corps and 120 officers in the United Kingdom, the amount contributed by the outside public being £1925. Since then the number of corps and officers has greatly increased. Very large numbers who have "professed conversion" are reported annually. No figures of membership, however, are published. In doctrine, the Army is in harmony with the main principles of the evangelical bodies, "as embodied in the three creeds of the Church." Its preaching is practical and direct, asseverating the reality of Sin, "the everlasting punishment of the wicked," and Redemption. The Army proclaims the

supreme duty of self-sacrifice for the sake of the salvation of others.

The Army is under the control of the General for the time being, who issues all orders and regulations. Large powers devolve upon other officers, such as the "Chief of the Staff," the "Foreign Secretary," and the "Chancellor," who direct affairs from the "International Headquarters" in London. The system of government is autocratic, "unquestioning obedience" being required throughout all ranks. The Army is divided, usually in harmony with national boundaries, into "territories," each under a "Commissioner," with headquarters in the capital of the country. The Territories are generally divided into "Provinces" and these again into "Divisions," which include a number of corps, each supporting its own "Captain" and "Lieutenant." The "soldiers" or members are drawn from all classes of the community. The property of the Army in the United Kingdom is held by the General for the time being, for the benefit of the Army exclusively, he being constituted the sole trustee of the property, in the disposal of which and in the appointment of his successor he is placed under the government of a deed poll, executed by Booth while the body was still known as "The Christian Mission," and enrolled in the Court of Chancery in August 1878. In other countries various modifications have been necessary, but the General's ultimate control has been practically assured. A further deed poll providing for the removal of a General in the contingency of "mental incapacity" or other "unfitness," and for the election of a successor, was executed by Booth in July 1904.

Funds are raised from the voluntary offerings of the corps, from open-air and other collections, from friends interested in evangelical and charitable work, and from the profits on publications and general trading. The financial statements of the various national headquarters funds are annually published, certified by public accountants, in each country. In 1909 the general income and expenditure account of International Headquarters in London dealt with a total of £64,345. Details of the aggregate income raised in the United Kingdom by the corps are not published. The annual Self-Denial offering (Great Britain) was £12,663 in 1888, £72,562 in 1906 and £69,034 in 1910. The value of the assets of the spiritual work in the United Kingdom increased from £558,992 in 1891 to £1,357,706 in 1909, the liabilities on account of loans upon mortgage and otherwise amounting at the latter date to £662,235. The assets of the Trade Departments were valued at £110,657 in 1909.

Statistics of Spiritual Operations
(Compiled from the "S.A. Year Book, 1910").

	Corps and Outposts.	Officers and Cadets.
The British Isles	1447	3,191 [1]
The United States	871	2,983
South America and West Indies	128	188
Canada and Newfoundland	465	950
Australasia and Java	1283	1,721
India, Ceylon, Japan and Korea	2584	1,626
South Africa and St Helena	113	278
France, Belgium, Switzerland and Italy	374	499
Germany and Holland	248	772
Sweden, Norway, Finland, Denmark and Iceland	1067	1,513
Gibraltar and Malta	2	5
Total	8582	13,726

Employees (without rank), 6269.
[1] Officers and employees (British Isles), 7538.

Booth's scheme for *Social Relief*, described in *In Darkest England, and the Way Out* (1890), attracted wide-spread interest, and was started with subscriptions amounting to over £100,000. A separate deed poll, making the General sole trustee, was executed by Booth in regard to the property and funds of this branch of work. Since then, both in Great Britain and abroad, the scheme has been actively carried on. The amount received in the year ending 30th September 1909 for cheap food and lodging in the United Kingdom was returned at £42,022 for the men's work, and £6417 for the women's. Large numbers of unemployed, ex-criminal and other needy persons have been aided or dealt with. In the year ending 30th September 1909, the number of persons received into the "elevators" or factories was reported as 6425, of women and girls received into rescue homes as 2559. The farm colony at Hadleigh in Essex has a large acreage under cultivation, with fruit and market gardens and various industrial undertakings. The emigration department, although a development of the Darkest England Scheme, has no connexion with the rescue work; in 1907 the passage money received amounted to £85,014, and in 1909 to £38,179. An "anti-suicide bureau" was opened in 1907, and at Boxted, near Colchester, a scheme for Small Holdings has been initiated. In 1909 the value of the property held under the Darkest England Scheme in the United Kingdom was returned at £329,645, and the income of the central fund at £50,594.

Summary of Social Operations throughout the World
(Compiled from the "S.A. Year Book, 1910")

	Number of Institutions.			
	United Kingdom.	Abroad.	Total.	Total Accommodation.
Men's Work—				
Shelters and Food Depots	31	156	187	18,531
Labour Bureaus	8	50	58	..
Labour Homes and Factories	28	117	145	4,936
Ex-criminal Homes	..[1]	18	18	486
Farm Colonies	2	15	17	..
Women's Work—				
Rescue and Maternity Homes	32	107	139	3,469
Shelters and Food Depots	10	20	30	1,934
Children's Homes and Crèches	2	57	59	..
Slum Posts	44	103	147	..
Other Social Institutions	17	87	104	..
Total Institutions	174	730	904	29,356

Total number of officers engaged exclusively in social work, 2520.
[1] In the United Kingdom ex-criminals are now received in the ordinary labour homes and factories.

There are a number of subsidiary branches of work, such as the Young People's Legion, and the Naval and Military League for work among men in the military, naval and merchant services. In England there is a bank (the Reliance Bank, Ltd.) and a Life Assurance Society, the funds of the latter amounting to £566,309 in 1909. All officers and many of the rank and file wear a uniform. Music is universally employed. While the organization has succeeded in securing recognition and favour in high places both in England and abroad, it has been seriously criticized at times, notably by Huxley and others in 1890–1891, and more recently by J. Manson in *The Salvation Army and the Public*, a work which led to much public discussion of the Army's religious, social and financial operations and methods. In 1910 some resignations took place among the higher officials.

AUTHORITIES.—William Booth, *Orders and Regulations for Soldiers; Orders and Regulations for Field Officers; Orders and Regulations for Staff Officers; Salvation Soldiery; Interview with W. E. Gladstone; In Darkest England and the Way Out* (1890); Bramwell Booth, *Social Reparation; Servants of All* (1899); Booth-Tucker, *The Life of Catherine Booth* (1892); Railton, *Heathen England*; *Twenty-one Years' Salvation Army*; Arnold White, *Truth about the Salvation Army* (1892, 1900 and 1906); *The Great Idea* (1909; 2nd ed., 1910); T. F. G. Coates, *The Life Story of General Booth* (2nd ed., 1906); Harold Begbie, *Broken Earthenware* (1909); various reports and accounts; *The War Cry, The Social Gazette, The Salvation Army Year Book, &c.* Criticism: Thomas H. Huxley, "Social Diseases and Worse Remedies" in *Collected Essays*, vol. ix. (1895); John

Manson, *The Salvation Army and the Public* (1906; 3rd ed., 1908); Salvation Army Headquarters, *A Calumny Refuted: A Reply to the Unfounded Charges of Sweating*, &c. (1908); United Workers' Anti-Sweating Committee, *Salvation Army Sweating: A Reply to the Mis-statements of General Booth and his Officials* (1908; 2nd ed., 1910); *Reports of the Trades Union Congress* (1907 to 1910).

SALVER, a flat tray of silver or other metal used for carrying or serving glasses, cups, dishes, &c., at table or for the presenting of a letter or card by a servant. In a royal or noble household the fear of poisoning led to the custom of tasting the food or drink before it was served to the master and his guests; this was known as the "assay" of meat and drink, and in Spanish was called *salva* (*salvar*, to preserve from risk, Lat. *salvare*, to save). The term *salva* was also applied to the dish or tray on which the food or drink was presented after the tasting process. There seems no doubt that this Spanish word is the source of the English "salver"; a parallel is found in the origin of the term "credence-table," which is from the Ital. *credenza*, Lat. *credere*, to believe, trust (see CREDENCE AND CREDENCE-TABLE).

SALVIA, a large genus belonging to the natural order Labiatae (*q.v.*), containing about 500 species in the temperate and warmer regions of both hemispheres. The name is derived from the Lat. *salvo*, from the healing properties of sage, *S. officinalis* (see figure under LABIATAE). *S. verbenaea*, Clary, is a native of Britain found in dry pastures and waste places.

Some of the Salvias are among the most showy of the soft-wooded winter-flowering plants, the blossoms being of a bright glowing scarlet. The three most useful species are *S. splendens*, *S. Heerii* and *S. gesneriflora*, the first beginning to flower early in the autumn and lasting till Christmas, while the others follow immediately in succession, and continue in full beauty till April. Young plants should be propagated annually about February, and after nursing through the spring should be grown outdoors in a fully exposed situation, where they can be plunged in some non-conducting material, such as half-decomposed leaves. The young shoots should be stopped to secure bushy plants, but not later than the middle of August. The most suitable compost for them is a mixture



From Strasburger's *Lehrbuch der Botanik*, by permission of Gustav Fischer.

Pollination of *Salvia Pratensis*.

1, Flower visited by a bumble-bee, showing the projection of the curved connective from the helmet-shaped upper lip and the deposition of the pollen on the back of the bumble-bee.
2, Older flower, with connective drawn back, and elongated style.
4, The staminal apparatus at rest, with connective enclosed within the upper lip.
3, The same when disturbed by the entrance of the proboscis of the bee in the direction of the arrow.
f, Filament.
c, Connective.
s, The obstructing half of the [anther.

of mellow fibry loam enriched with a little mild thoroughly decomposed manure, made sufficiently porous by the addition of sand or grit. In spring, and during the blooming period, the temperature should be intermediate between that of a stove and greenhouse. There are other very ornamental species of easy growth, increased by cuttings in spring, and succeeding well in ordinary rich loamy soil. Of these *S. angustifolia* bears spikes of fine bright-blue flowers in May or June; *S. chamaedryoides*, a dwarfish subject, has deep-blue flowers in August; *S. fulgens* produces scarlet flowers in August; and *S. involucrata* produces fine red flowers during the autumn. *S. patens* is a lovely blue free-blooming sort, flowering in August, the colour being unique.

SALVIAN, a Christian writer of the 5th century, was born probably at Cologne (*De gub. Dei*, vi. 8, 13), some time between 400 and 405. He was educated at the school of Treves and seems to have been brought up as a Christian. His writings appear to show that he had made a special study of the law; and this is the more likely as he appears to have been of noble birth and could describe one of his relations as being "of no small account in her own district and not obscure in family" (*Ep.* i.). He was certainly a Christian when he married Palladia, the daughter of heathen parents, Hypatius and Quieta, whose displeasure he incurred by persuading his wife to retire with him to a distant monastery, which is almost certainly that founded by St Honoratus at Lerins. For seven years there was no communication between the two branches of the family, till at last, when Hypatius had become a Christian, Salvian wrote him a most touching letter in his own name, his wife's, and that of his little daughter Auspiciola, begging for the renewal of the old affection (*Ep.* iv.). This whole letter is a most curious illustration of Salvian's reproach against his age that the noblest man at once forfeited all esteem if he became a monk (*De gub.* iv. 7; cf. viii. 4).

It was presumably at Lerins that Salvian made the acquaintance of Honoratus (*ob.* 429), Hilary of Arles (*ob.* 449), and Eucherius of Lyons (*ob.* 449). That he was a friend of the former and wrote an account of his life we learn from Hilary (*Vita Hon.*, ap. Migne, l. 1260). To Eucherius's two sons, Salonius and Veranus, he acted as tutor in consort with Vincent of Lerins. As he succeeded Honoratus and Hilary in this office, this date cannot well be later than the year 426 or 427, when the former was called to Arles, whither he seems to have summoned Hilary before his death in 429 (*Eucherii Instructio ad Salonium*, ap. Migne, l. 773; Salv., *Ep.* ii.). Salvian continued his friendly intercourse with both father and sons long after the latter had left his care; it was to Salonius (then a bishop) that he wrote his explanatory letter just after the publication of his treatise *Ad ecclesiam*; and to the same prelate a few years later he dedicated his great work, the *De gubernatione Dei*. If French scholars are right in assigning Hilary's *Vita Honorati* to 430, Salvian, who is there called a priest, had probably already left Lyons for Marseilles, where he is known to have spent the last years of his life (Gennadius, ap. Migne, lviii. 1099). It was probably from Marseilles that he wrote his first letter—presumably to Lerins—begging the community there to receive his kinsman, the son of a widow of Cologne, who had been reduced to poverty by the barbarian invasions. It seems a fair inference that Salvian had divested himself of all his property in favour of that society and sent his relative to Lerins for assistance (*Ep.* i., with which compare *Ad eccles.* ii. 9, 10; iii. 5). It has been conjectured that Salvian paid a visit to Carthage; but this is a mere inference based on the minute details he gives of the state of this city just before its fall (*De gub.* vii. viii.). He seems to have been still living at Marseilles when Gennadius wrote under the papacy of Gelasius (492–496).

Of Salvian's writings there are still extant two treatises, entitled respectively *De gubernatione Dei* (more correctly *De praesenti judicio*) and *Ad ecclesiam*, and a series of nine letters. The *De gubernatione*, Salvian's greatest work, was published after the capture of Litorius at Toulouse (439), to which he plainly alludes in vii. 40, and after the Vandal conquest of Carthage in the same year (vi. 12), but before Attila's invasion (450), as Salvian speaks of the Huns, not as enemies of the empire, but as serving in the Roman armies (vii. 9). The words "proximum bellum" seem to denote a year very soon after 439. In this work, which furnishes a valuable if prejudiced description of life in 5th-century Gaul, Salvian deals with the same problem that had moved the eloquence of Augustine and Orosius. Why were these miseries falling on the empire? Could it be, as the pagans said, because the age had forsaken its old gods? or, as the semi-pagan creed of some Christians taught, that God did not constantly overrule the world he had created (i. 1)? With the former Salvian will not argue (iii. 1). To the latter he replies by asserting that, "just as the navigating steersman never looses the helm, so does God never remove his care from the world." Hence the title of the treatise. In books i. and ii. Salvian sets himself to prove God's constant guidance, first by the facts of Scripture history, and secondly by the enumeration of special texts declaring this truth. Having thus "laid the foundations" of his work, he declares in book iii. that the misery of the Roman world is all due to the neglect of God's commandments and the terrible sins of every class of society. It is not merely that the slaves are thieves and runaways, wine-bibbers and gluttons—the rich are worse (iv. 3). It is their harshness and greed that drive the poor to join the Bagaudae and fly for shelter to the barbarian invaders (v. 5 and 6). Everywhere the taxes are heaped upon the needy, while the rich, who have the apportioning of the impost, escape comparatively free (v. 7). The great towns are wholly given up to the abominations of the

circus and the theatre, where decency is wholly set at nought, and Minerva, Mars, Neptune and the old gods are still worshipped (vi. 11; cf. vi. 2 and viii. 2). Treves was almost destroyed by the barbarians; yet the first petition of its few surviving nobles was that the emperor would re-establish the circus games as a remedy for the ruined city (vi. 15). And this was the prayer of Christians, whose baptismal oath pledged them to renounce "the devil and his works . . . the pomps and shows (spectacula)" of this wicked world (vi. 6). Darker still were the iniquities of Carthage, surpassing even the unconcealed licentiousness of Gaul and Spain (iv. 5); and more fearful to Salvian than all else was it to hear men swear "by Christ" that they would commit a crime (iv. 15). It would be the atheist's strongest argument if God left such a state of society unpunished (iv. 12)—especially among Christians, whose sin, since they alone had the Scriptures, was worse than that of barbarians, even if equally wicked, would be (v. 2). But, as a matter of fact, the latter had at least some shining virtues mingled with their vices, whereas the Romans were wholly corrupt (vii. 15, iv. 14). With this iniquity of the Romans Salvian contrasts the chastity of the Vandals, the piety of the Goths, and the ruder virtues of the Franks, the Saxons, and the other tribes to whom, though heretic Arians or unbelievers, God is giving in reward the inheritance of the empire (vii. 9, 11, 21). It is curious that Salvian shows no such hatred of the heterodox barbarians as was rife in Gaul seventy years later. It is difficult to credit the universal wickedness adduced by Salvian, especially in face of the contemporary testimony of Symmachus, Ausonius and Sidonius. Salvian was a 5th-century socialist of the most extreme type, and a zealous ascetic who pitilessly scourged everything that fell short of an exalted morality, and exaggerated, albeit unconsciously, the faults that he desired to eradicate.

Ad ecclesiam is explained by its common title, *Contra avaritiam*. It strongly commends meritorious almsgiving to the church. It is quoted more than once in the *De gubernatione*. Salvian published it under the name of Timothy, and explained his motives for so doing in a letter to his old pupil, Bishop Salonius (*Ep.* ix.). This work is chiefly remarkable because in some places it seems to recommend parents not to bequeath anything to their children, on the plea that it is better for the children to suffer want in this world than that their parents should be damned in the next (iii. 4). Salvian is very clear on the duty of absolute self-denial in the case of sacred virgins, priests and monks (ii. 8-10). Several works mentioned by Gennadius, notably a poem "in morem Graecorum" on the six days of creation (hexaemeron), and certain homilies composed for bishops, are now lost (Genn. 67).

The *Ad ecclesiam* was first printed in Sichard's *Antidoton* (Basel, 1528); the *De gubernatione* by Brassican (Basel, 1530). The two appeared in one volume at Paris in 1575. Pithoeus added variae lectiones and the first seven letters (Paris, 1580); Ritterhusius made various conjectural emendations (Altorf, 1611), and Baluze many more based on MS. authority (Paris, 1663–1669). Numerous other editions appeared from the 16th to the 18th century, all of which are now superseded by the excellent ones of C. Halm (Berlin, 1877) and F. Pauly (Vienna, 1883). The two oldest MSS. of the *De gubernatione* belong to the 10th century (Cod. Paris, No. 13,385) and the 13th (Brussels, 10,628); of the *Ad ecclesiam* to the 10th (Paris, 2172) and the 11th (Paris, 2785); of *Epistle IX.* to the 9th (Paris, 2785); of *Epistle VIII.* to the 7th or 8th century (Paris, 95,559) and to the 9th or 10th century (Paris, 12,237, 12,236). Of the first seven epistles there is only one MS. extant, of which one part is now at Bern (No. 219), the other at Paris (No. 3791). See *Histoire littéraire de France*, vol. ii.; Zschimmer's *Salvianus* (Halle, 1875). Salvian's works are reprinted (after Baluze) in Migne's *Cursus patrologiae*, ser. lat. vol. liii. For bibliography, see T. G. Schoenemann's *Bibliotheca patrum* (ii. 823), and the prefaces to the editions of C. Halm (*Monum. Germ.*, 1877) and F. Pauly (Vienna, *Corp. scr. eccl. Lat.*, 1883). Gennadius, Hilary and Eucherius may be consulted in Migne, vols. lviii. and l. See also S. Dill, *Roman Society in the Last Century of the Western Empire*, pp. 115-120. (T. A. A.)

SALVINI, TOMMASO (1829–), Italian actor, was born at Milan on the 1st of January 1829. His father and mother were both actors, and Tommaso first appeared when he was barely fourteen as Pasquino in Goldoni's *Donne curiose*. In 1847 he joined the company of Adelaide Ristori, who was then at the beginning of her brilliant career. It was with her as Elettra that he won his first success in tragedy, playing the title rôle in Alfiero's *Oreste* at the Teatro Valle in Rome. He fought in the cause of Italian independence in 1849; otherwise his life was an unbroken series of successes in his art. He acted frequently in England, and made five visits to America, his first in 1873 and his last in 1889. In 1886 he played there Othello to the Iago of Edwin Booth. Apart from Othello, which he played for the first time at Vicenza in June 1856, his most famous impersonations included Conrad in Paolo Giacometti's *La Morte civile*, Egisto in Alfieri's *Merope*, Saul in Alfieri's *Saul*, Paolo in Silvio Pellico's *Francesca da Rimini*, Oedipus in Nicolini's play of that name, Macbeth and King Lear. Salvini retired from the stage in 1890, but in January 1902 took part in the celebration in Rome of Ristori's eightieth birthday (see the *Century Magazine* for June 1902, vol. lxiii.). Salvini published a volume entitled *Ricordi, anedotti ed impressioni* (Milan, 1895). Some idea of his career may be gathered from *Leaves from the Autobiography of Tommaso Salvini* (London, 1893).

His son Allessandro (1861–1896), also an actor, had several notable successes in America, particularly as D'Artagnan in *The Three Guardsmen*.

SALWEEN, a river of Burma. This river, called Nam Kŏng by the Shans, Thanlwin by the Burmese, Lu Kiang, or Nu Kiang, or Lu Tzu Kiang by the Chinese, is the longest river in Burma, and one of the wildest and most picturesque streams in the world. Its sources are still undetermined, but there seems little doubt that it rises in the Tanla mountains, S. of the Kuen Lun, somewhere in 32° or 33° N., and that perhaps it draws some of its water from the Kara Nor. It is thus a much longer river than the Irrawaddy. From the time it leaves Tibet it has a very narrow basin, and preserves the character of a gigantic ditch, or railway cutting, with for long stretches no other affluents than the mountain torrents from the hills, which rise from 3000 to 5000 or 6000 ft. above the level of the river-bed. In the dry season the banks are alternate stretches of blinding white, fine sand, and a chaos of huge boulders, masses and slabs of rock, with here and there, usually where a tributary enters, long stretches of shingle. In the rains all these disappear, and the water laps against forest trees and the abrupt slope of the hills. The average difference between high and low water level of the Salween throughout the Shan States is between 50 and 60 ft., and in some places it is as much as 90. There are many rapids, caused by reefs of rock running across the bed, or by a sudden fall of from one to several feet, which produce very rough water below the swift glide; but the most dangerous places for navigation are where a point juts out into the stream, and the current, thrown back, causes a violent double backwater. Nevertheless, long stretches of the river, extending to scores of miles, are habitually navigated by native boats. The current is extremely variable, from ½ m. an hour to ten knots. Launches ply regularly from Moulmein to the mouth of the Yŏnzalin, in Lower Burma. The worst part of the whole Salween, so far as is known, is the gorge between the mouth of the Yŏnzalin and Kyaukhnyat. It is quite certain that steam launches could ply over very long sections of the river above that, perhaps as far as the Kaw ferry, or even the Kunlong ferry. In British territory, however, there are very few settlements on the river itself, and frequently the ferry villages are built 1000 ft. above the river.

The Chinese believe the Salween valley to be deadly to all strangers, but it is in Chinese territory—particularly in the Lu Kiang, or Mŏng Hkŏ state—that there is the largest population on the river until Lower Burma is reached. A description of the Salween resolves itself into a list of the ferries at which it can be crossed, for no one marches up the river. The river is bridged by the Chinese on the main route from Tēng Yüeh (Momien) and Bhamo to Tali-fu. There are two spans; these are not in a straight line, but parallel to one another at the distance of the breadth of the central pillar. Each span is formed by twelve or fourteen massive iron chains, with planks laid across them. There was a bridge some 20 m. lower down, but this was destroyed in 1894. In British territory there are no bridges, and the ferries are the same as those maintained before annexation. There are a great number of these ferries, but only a few are used, except by the local people. From Ta Hsang Lè large trading boats ply regularly to Kyaukhnyat, whence the traders make their way by land over the hill to Papun, and so down the Yŏnzalin.

The chief tributaries of the Salween in British territory are the Nam Yu and the Nam Oi or Nam Mwe on the right bank, and the Hsipa Haw on the left. These are short but fair-sized streams. Near the Kunlong ferry the Nam Nim, on the right bank, and the Nam Ting, on the left, are considerably longer, and the Nam Ting is navigable by native craft for considerable stretches up to Mēng Ting and farther. To the S. the next tributary is the Nam Kyek, on the right bank, down the valley of which the railway will reach the Salween. Below this are two streams called Nam Ma, one entering on the right bank, the other on the left, at no great distance from one another, but of no great length. A little below is the Nam Nang, on the left bank, coming from the Wa country. The Nam Kao enters in a cascade of nearly 200 ft. in the cold weather from the right, and then there are no affluents till the Nam Hka comes in on the left.

This has a great volume of water, but is unnavigable because of its steep gradient and many gorges. After the Hwe Lōng, entering from the left at Ta Kaw, is passed, the Nam Pang comes in 22 m. lower down on the right bank. This is probably the largest tributary of the Salween; some distance above its mouth, at Kēng Hkam, it is 400 yds. wide and quite unfordable. The next important tributary is the Nam Hsim, on the left bank, rising in the latitude of Kēng Tūng. It is a large but quite unnavigable stream. Except the Mē Sili and Mē Sala, from opposite sides, and the Nam Hang, which burrows its way through a range of hills from the E., and the Nam Pan, coming from the W., there is no considerable tributary till 19° 52′ N., where the Nam Tēng comes in on the right from the central Shan States. This is a considerable river, and navigable for long stretches in its upper course, but the last few miles before it enters the Salween are little better than a cataract. Below this the only large affluent is the Nam Pawn, which drains all Karenni and a considerable portion of the Shan States, but is quite unnavigable. Below this the tributaries are again only mountain streams till the Thaung-yin comes in from the S.E. Thirty m. lower down is Kyodan, the great timber depot. Here a cable, stretched across the river, catches all the timber, which is then made up into rafts and floated down to Kado, near Moulmein, where the revenue is collected. The Yōnzalin enters the Salween from the right about 10 m. below Kyodan. Boats can ply from Kyodan S., and light draught steamers ascend as far as Shwegōn, 63 m. from Moulmein. The Salween cuts the British Shan States nearly in half, and is a very formidable natural obstacle. It seems probable, however, that long stretches of it can be opened to trade. It is certainly no less navigable than the Middle Mekong or the Yangtsze-kiang above I-chang. (J. G. Sc.)

SALWEEN, a district in the Tenasserim division of Lower Burma. Area, 2666 sq. m. Pop. (1901) 37,837, consisting largely of aboriginal tribes, Karens (33,448) and Shans (2816). Nearly the whole district is a maze of mountains intersected by deep ravines, the only level land of any considerable extent being found in the valley of the Yōnzalīn, while the country is covered with dense forest, of which 128 sq. m. are reserved. The district is drained by three principal rivers, the Salween, Yōnzalīn and Bilīn, fed by mountain torrents. The Yōnzalīn, which rises in the extreme N., is navigable with some difficulty in the dry season as far as Papun; the Bilīn is not navigable within the limits of the district except by small boats and rafts. The district is in charge of a superintendent of police, with headquarters at Papun. The total rainfall in 1905 was 114·48 in., recorded at Papun. Apart from cotton-weaving, there are no manufactures. A considerable trade is carried on with Siam by bridle paths across the mountains.

SALYANY, a town of Russian Transcaucasia, in the government of Baku, 80 m. S.S.W. from Baku, on the river Kura, and on an island of the same name. In 1897 its population was 10,168, chiefly Tatars. It is a fishing centre, where thousands of workers gather from all parts of Russia during the season. Salyany was annexed to Russia in the 18th century, but was retaken by the Persians, and only became Russian finally in 1813.

SALYES (Gr. Σάλυες: also SALLYES, SALYI, SALLUVII), in ancient geography, a people occupying the plain S. of the Druentia (Durance) between the Rhone and the Alps. According to Strabo (iv. p. 203) the older Greeks called them Ligyes, and their territory Ligystikē. By some authorities they were considered a mixed race of Galli and Ligurians (hence Celtoligyes); by others a purely Celtic people, who subjugated the Ligures in the Provincia. They are said to have been the first transalpine people subdued by the Romans (Florus iii. 2). In 154 B.C. the inhabitants of Massilia, who had been connected with the Romans by ties of friendship since the second Punic war, appealed for aid against the Oxybii and Decietes (or Deciates). These people, called by Livy (*Epit.* 47) "transalpine Ligurians," were perhaps two smaller tribes included under the general name of Salyes. They were defeated by Quintus Opimius. In 125–124 hostilities broke out between the Romans and the Salyes from the same cause. The successful operations of Marcus Fulvius Flaccus were continued by Gaius Sextius Calvinus (123–122), who definitely subdued the Salyes, destroyed their chief town, and founded near its ruins the colony of Aquae Sextiae (Aix). Part of their territory was handed over to the Massaliots. Their king, Tutomotulus (or Teutomalius), took refuge with the Allobroges. From this time the Salyes practically disappear from history. Among other important Roman towns in their territory may be mentioned Tarusco or Tarasco (Tarascon), Arelate (Arles Glanum (St Remy) and Ernaginum (St Gabriel).

For ancient authorities see A. Holder, *Altceltischer Sprachschatz* ii. (1904).

SALZA, HERMANN VON (*c.* 1170–1239), Master of the Teutonic Order, and councillor of the emperor Frederick II., was a scion of the family of Langensalza in Thuringia. He entered the Teutonic Order in early life, became very intimate with Frederick II., took part in the expedition to Damietta in 1221, and accompanied the emperor on the crusade of 1228, which was joined by many princes owing to his influence. About 1210 he was appointed master of the Teutonic Order, and was offered, in 1226 the province of Kulm by Conrad I., duke of Masovia, in return for help against the Prussians; this he accepted and obtained the investiture from Frederick. In 1230 the conquest of Prussia was begun by the Order, although not under his immediate leadership. In 1225 he reconciled Valdemar II., king of Denmark, with Henry I., count of Schwerin, and thus won again the land on the right bank of the Elbe for the Empire, and the recognition of imperial superiority over Denmark. Trusted by Pope Gregory IX. and the emperor alike, he brought about the treaty of San Germano between them in 1230, was the only witness when they met in conference at Anagni in the same year, and it was he who, in 1235, induced Frederick's son, Henry, to submit to his father. He died on the 19th of March 1239 at Barletta in Apulia, and was buried there in the chapel of his Order.

Vide: A. Koch, *Hermann von Salza, Meister des deutschen Ordens* (Leipzig, 1885).

SALZBRUNN, a watering-place of Germany, in the Prussian province of Silesia, at the foot of a well-wooded spur of the Riesengebirge, 30 m. S.W. of Breslau, by the railway to Halberstadt. Pop. (1905) 10,412. It consists of Ober-, Neu- and Nieder-Salzbrunn, has a Roman Catholic and an Evangelical church and manufactures of glass, bricks and porcelain. Its alkalo-saline springs, especially efficacious in pulmonary and urinary complaints, were known as early as 1316, but fell into disuse until rediscovered early in the 19th century. The waters are used both for drinking and bathing, and of the two chief springs, the Oberbrunnen and the Kronenquelle, nearly two million bottles are annually exported. The number of summer visitors is about 7000 a year.

See Valentiner, *Der Kurort Obersalzbrunn* (Berlin, 1877); Biefel, *Der Kurort Salzbrunn* (Salzbrunn, 1872); and Deutsch, *Schlesiens Heilquellen und Kurorte* (Breslau, 1873).

SALZBURG, a duchy and crownland of Austria, bounded E. by Upper Austria and Styria, N. by Upper Austria and Bavaria, W. by Bavaria and Tirol and S. by Carinthia and Tirol. It has an area of 2762 sq. m. Except a small portion in the extreme N., near Bavaria, the country is mountainous and belongs to the N. and central zone of the Eastern Alps. It is divided into three regions; the region of the Hohe Tauern, extending S. of the Salzach, the region of the limestone Alps and the undulating foothill region. The Hohe Tauern contains many high lying valleys, traversed by the streams which flow into the Salzach, as well as numerous depressions and passes, here called popularly Tauern. The deepest depression of the whole range is the Velber Tauern valley (8334 ft.) between the Velber and the Tauern, and the principal pass is the Niederer (Mallnitzer) Tauern (7920 ft.). This pass which leads from the Gastein valley to Carinthia is the oldest bridle-path over the Hoher Tauern. Between the passes is the ridge of Sonnblick, where a meteorological observatory was estabished in 1886 at an altitude of 10,170 ft. The region of the limestone Alps is composed of several detached groups: a portion of the Kitzbühler Alps, which contain the famous Thurn pass (4183 ft.); then the Salzburg Alps, which contain the Loferer Steinberge and the peak Birnhorn (8637 ft.); the Reitalm or the Reiteralpe with the peak Stadelhorn (7495 ft.); and the broad mass of the Schönfeldspitze (8708 ft.), from which the great glacier-covered block of the Ewiger Schnee, or Übergossene Alps projects into the Salzach valley. Farther N. are the Hagengebirge (7844 ft.); the beautiful summit of the Hoher Göll (8263 ft.); the Tennengebirge (7217 ft.); and the Untersberg, an outpost of the Berchtesgaden

group. Between the Hagengebirge and the Tennengebirge, which are situated on each side of the Salzach valley, is one of the most magnificent narrow passes of the Alps. It is below Werfen, and near its exit, just at the narrowest part, is the Lueg Pass, which was fortified as early as 1316 and offered a firm resistance to the French in the years 1800, 1805 and 1809. A portion of the Ischler Alps, as well as of the Dachstein group, also belongs to Salzburg. The principal river of Salzburg is the Salzach. The Enns and the Mur also rise in this province. The four Krimmler falls, together 2085 ft. high, are the most important falls in the Eastern Alps. The two falls at Wildbad-Gastein (196 and 296 ft.); the fall, by which the Gasteiner Ache discharges itself into the Salzach, near Lend; the Tauern fall (660 ft.), formed by the Tauern Ache on the N. side of the Radstäter Tauern; and the Gollinger fall (202 ft.) also deserve notice. Among the *Klammen, i.e.* narrow passages leading from the Salzach valley to the valleys of smaller rivers, the most celebrated are the Kitzloch Klamm and the Liechtenstein Klamm. The Kitzloch Klamm is formed by the Rauris Thal and the Liechtenstein Klamm by the Gross-Arle Thal. A path through the last Klamm leads to the magnificent fall (174 ft.) of the Gross-Arle river, which discharges itself in a series of cascades into the Salzach. The most important lake is the Zeller-see (2424 ft. above sea-level, 2 sq. m. in extent, 238 ft. deep), whose waters are carried off by the Salzach. The Walier-see or Lake of Seekirchen (1653 ft. above sea-level), the Fuschl-see (2095 ft.), the Hinter-see (2580 ft.), the Ober-Trumer-see and Nieder-Trumer-see are all situated in the Alpine foothill region. The Mond-see (1560 ft.) and Aber-see, or Lake St Wolfgang, are on the frontier between Salzburg and Upper Austria. The climate, although healthy, is very changeable, with great extremes of temperature and heavy rainfall, especially in the summer. The most settled season is the autumn. The annual mean temperature at Salzburg is 46° 4′ F. The population of the duchy in 1900 was 193,247, which is equivalent to 69 inhabitants per square mile. It is the most sparsely populated province of Austria. Between 1880 and 1900 the population increased by 17·5 %. The inhabitants are a handsome and powerfully built peasant race, very conservative in religion, manners, customs and national costume. They are almost exclusively of German stock and are Roman Catholics. Elementary education is much more advanced here than in any other Alpine province. Although 13·71 % of the soil is unproductive and 32·4 % is covered with forests, Salzburg is one of the principal pastoral regions of Austria. Of its total area, 28·9 % consists of Alpine pastures available during the summer months, 4·95 % of lowland pasturages and 8·3 % of meadows, while only 9·2 % is arable. Cattle-breeding and dairy-farming are very developed and constitute the chief resources of the province. Next in importance comes the timber trade; game is also plentiful. The mineral wealth of Salzburg includes salt at Hallein, copper at Mitterberg, iron-ore at Werfen, marble in the Untersberg region and small quantities of gold near the Goldberg in the Rauris valley and at Böckstein in the Gastein valley. The duchy contains also a great number of mineral springs, as the celebrated springs at Gastein, alkaline springs at Mauterndorf and at St Wolfgang, and saline springs at Golling and Hallein. Commerce and manufacture are poorly developed. The duchy is divided into six departments, of which the capital, Salzburg, is one and its environs the second. The other four are Hallein, St Johann, Tamsweg and Zell-am-See. The local diet, of which the archbishop is a member *ex-officio*, is composed of 28 members, and the duchy sends 7 members to the reichsrat at Vienna. At Hallein, pop. (1900) 6608, with celebrated saline springs known since the beginning of the 12th century, in October 1809, encounters between the French and the Tirolese under Joachim Johann Haspinger took place. To the N.E. lies Adnet with extensive marble quarries, and to the N. Oberalm, with manufacture of marble articles. The ascent of the Hoher Göll is made from here. Zell-am-See (2473 ft.), pop. 1561, is a favourite tourist resort. To the E. is the Schmittenhöhe (6455 ft.), which is easily accessible. On the summit is a meteorological station. Sankt Johann (pop. 1343) was one of the earliest settlements in the Salzach valley, and was a principal centre of Protestantism. Near it is the Liechtenstein Klamm.

For the history of the archbishopric and duchy see the article on the town of Salzburg (below).

SALZBURG, capital of the Austrian duchy and crownland of Salzburg and formerly of the archbishopric of the same name, 195 m. W. by S. of Vienna by rail. Pop. (1900) 32,934. The city occupies a position of singular beauty on the Salzach which passes at this point between two isolated hills, the Monchsberg (1646 ft.) on the left and the Capuzinerberg (2132 ft.) on the right. In the lovely valley so formed, and stretching into the plain beyond, lies Salzburg. The older and main part of the city lies on the left bank of the Salzach, in a narrow semicircular plain at the base of the Mönchsberg; the newer town is on the right bank at the foot of the Capuzinerberg, which is separated from the river by the narrow suburb of Stein. At the S. of the old town, below the Nonnberg, or S.E. spur of the Mönchsberg, is the suburb of Nonnthal; and at the N. end is Mülln. The steep sides of the Mönchsberg rise directly from amidst the houses of the town, some of which have cellars and rooms hewn out of the rock; and the ancient cemetery of St Peter, the oldest in Salzburg, is bounded by a row of vaults cut in the side of the hill. The narrowest part of the ridge, which has a length of above 2 m. is pierced by the Neu Thor, a tunnel 436 ft. long and 23 ft. broad, completed in 1767, to form a convenient passage from the town to the open plain. The S. end of the Mönchsberg is occupied by the imposing Hohen-Salzburg, a citadel originally founded in the 9th century, though the present buildings, the towers of which rise 400 ft. above the town, date chiefly from 1496–1519. Its chapel contains statues of the twelve apostles in red marble. The citadel is now used for barracks. The streets in the older quarters are narrow, crooked and gloomy; but the newer parts of the city, especially those laid out since the removal of the fortifications about 1861, are handsome and spacious. Owing to the frequent fires the private buildings of Salzburg are comparatively modern; and the existing houses, lavishly adorned with marble, are, like many of the public buildings, monuments of the gorgeous taste of the archbishops of the 17th and 18th centuries. From the style of the houses, the numerous open squares, and the abundant fountains which give an Italian aspect to the town, Salzburg has received the name of "the German Rome." Both sides of the river are bordered by fine promenades, planted with trees. The Salzach is spanned by four bridges, including a railway bridge.

Salzburg is full of objects and buildings of interest. The cathedral, one of the largest and most perfect specimens of the Renaissance style in Germany, was built in 1614–1668 by the Italian architect Santino Solari, in imitation of St Peter's at Rome. On three sides it is bounded by the Dom-Platz, the Kapitel-Platz and the Residenz-Platz; and opening on the N.E. and N.W. of the last are the Mozart-Platz and the Markt-Platz. In the Mozart-Platz is a statue of Mozart by Schwanthaler erected in 1842. On one side of the Residenz-Platz is the palace, an irregular though imposing building in the Italian style, begun in 1592 and finished in 1725. It contains a picture-gallery and is now occupied by the grand-duke of Tuscany. Opposite is the Neu Bau, begun in 1588, in which are the government offices and the law courts. In the middle of the Residenz-Platz is a handsome fountain, the Residenz-Brunnen, 46 ft. high, executed in marble by Antonio Dario in 1664–1680. The palace of the present archbishop is in the Kapitel-Platz. Across the river, with its French garden adjoining the public park, is the Mirabell palace, formerly the summer residence of the archbishops. Built in 1607, and restored after a fire in 1818, it was presented to the town in 1867 by the emperor Francis Joseph. The town hall of Salzburg was built in 1407 and restored in 1675. Other interesting secular buildings are the Chiemseehof, founded in 1305 and rebuilt in 1697, formerly the palace of the suffragan bishop of Chiemsee, and now the meeting-place of the Salzburg diet and the Carolino-Augusteum-Museum, containing an interesting collection of antiquities and a library of 20,000 volumes.

Of the twenty-five churches the majority are interesting from their antiquity, their architecture or their associations. Next to the cathedral, the chief is perhaps the abbey church of St Peter, a Romanesque basilica of the 12th century which was tastelessly restored in 1745, and which contains a monument to St Rupert. St Margaret's, in the midst of St Peter's churchyard, built in 1485, and restored in 1865, is situated near the cave in the side of the Mönchsberg, said to have been the hermitage of St Maximus, who

was martyred by the pagan Heruli in 477. The Franciscan church, with an elegant tower built in 1866, is an interesting example of the transition style of the 13th century, with later baroque additions. St Sebastian's, on the right bank, built in 1505–1512 and restored in 1812, contains the tomb of Paracelsus, who died here. The oldest and most important of the eight convents at Salzburg is the Benedictine abbey of St Peter founded by St Rupert as the nucleus of the city. It was completely rebuilt in 1131 and contains a library of 40,000 volumes, besides MSS. The Capuchin monastery, dating from 1599, gives name to the Capuzinerberg. The oldest nunnery is that founded on the Nonnberg by St Rupert, the Gothic church of which dates from 1423 and contains some fine stained glass and some old frescoes. The single Protestant church in Salzburg was not built until 1865. A theological seminary is the only relic now left of the university of Salzburg, founded in 1623 and suppressed in 1810. The city is the see of an archbishop with a cathedral chapter and a consistory. Salzburg, situated at an altitude of 1351 ft. above sea-level, has a healthy climate and is visited annually by over 60,000 tourists. It has a mean annual temperature of 46·4° F. and a mean annual rainfall of 45·59 in. The town carries on a variety of small manufactures, including musical instruments, iron-wares, marble ornaments. Other industries are brewing and book-binding. It was the birthplace of Mozart and of the painter Hans Makart (1840–1884). The house in which Mozart was born has been transformed into a museum, which contains many interesting relics.

Numerous places of interest and beautiful spots are to be found round Salzburg. To the E. rises the Gaisberg (4206 ft.), which is ascended by a rack-and-pinion railway, which starts from Parsch. At the foot of the Gaisberg is Aigen, a renowned castle and park. Three miles S. of Salzburg is the palace of Hellbrunn, built about 1615, which contains a famous mechanical theatre and some fine fountains. About 2 m. to the S.W. of Salzburg is the castle of Leopoldskron, and from this point the Leopoldskroner Moos stretches S. to the base of the Untersberg. A few peat-baths, as the Ludwigsbad and the Marienbad, are in the neighbourhood of Leopoldskron. Three and a half miles N. of Salzburg, at an altitude of 1720 ft., stands the pilgrimage church of Maria Plain, erected in 1674.

The origin and development of Salzburg were alike ecclesiastical, and its history is involved with that of the archbishopric to which it gave its name. The old Roman town of Juvavum was laid in ruins, and the incipient Christianity of the district overwhelmed, by the pagan Goths and Huns. The nucleus of the present city was the monastery and bishopric founded here about 700 by St Rupert of Worms, who had been invited by Duke Theodo of Bavaria to preach Christianity in his land. The modern name of the town, due like several others in the district to the abundance of salt found there, appears before the end of the 8th century. After Charlemagne had taken possession of Bavaria in the 8th century, Bishop Arno of Salzburg was made an archbishop and papal legate. Thenceforward the dignity and power of the see steadily increased and in the course of time the archbishops obtained high secular honours. In 1278 Rudolph of Habsburg made them imperial princes.

The strife between lord and people was always keen in Salzburg. Archbishop Leonhard II., who expelled the Jews from Salzburg in 1498, had to face a conspiracy of the nobles and was besieged in Hohen-Salzburg by the inhabitants in 1511. The Peasants' War also raged within the see in 1525 and 1526, and was only quelled with the aid of the Swabian League. From the beginning an orthodox stronghold of the Roman Catholic faith, Salzburg energetically opposed the Reformation. Under Archbishop Wolfgang Dietrich (d. 1611) many Protestant citizens were driven from the town and their houses demolished. In spite, however, of rigorous persecution the new faith spread, and a new and more searching edict of expulsion was issued by Archbishop Leopold Anton von Firmian (d. 1744). The Protestants invoked the aid of Frederick William I. of Prussia, who procured for them permission to sell their goods and to emigrate; and in 1731 and 1732 Salzburg parted with about 30,000 industrious and peaceful citizens, about 6000 of these coming from the capital. The last independent archbishop was Hieronymus von Colloredo (1732–1812), who ruled with energy and justice but without gaining popularity.

By the peace of Lunéville (1802) the see was secularized and given to the archduke of Austria and grand-duke of Tuscany in exchange for Tuscany, its new owner being enrolled among the electoral princes. In the redistribution following the peace of Pressburg in 1805, Salzburg fell to Austria. Four years later it passed to Bavaria, but after the peace of Paris it was restored to Austria in 1816, except a portion on the left bank of the Salzach. Under the designation of a duchy the territory formed the department of Salzach in Upper Austria until 1849, when it was made a separate crownland, and finally in 1861 the management of its affairs was entrusted to a local diet. The actual duchy does not correspond exactly with the old bishopric. Salzburg embraced at the time of the peace of Westphalia (1648) an area of 3821 sq. m. with a population of 190,000. A part of its territory was ceded to Bavaria in 1814, and when Salzburg became a separate crownland in 1849 several of its districts were added to Tirol.

For the history of the archbishopric see Meiller, *Regesta archiepiscoporum Salisburgensium, 1106–1246* (Vienna, 1866); Dümmler, *Beiträge zur Geschichte des Erzbistums von Salzburg im 9-12 Jahrhundert* (Vienna, 1859); the *Salzburger Urkundenbuch*, edited by W. Hauthaler (Salzburg, 1899); Pichler, *Salzburgs Landesgeschichte* (Salzburg, 1865); Doblhoff, *Beiträge zum Quellenstudium Salzburgischer Landeskunde* (Salzburg, 1893–1895); Greinz, *Die Erzdiözese Salzburg* (Vienna, 1898); Rieder, *Kurze Geschichte des Landes Salzburg* (Vienna, 1905); E. Richter, *Das Herzogtum Salzburg* (1881); Thym, *Das Herzogtum Salzburg* (1901), and F. von Pichl, *Kritische Abhandlungen über die älteste Geschichte Salzburgs* (Innsbruck, 1889). For the town see Widmann, *Geschichte Salzburgs* (Gotha, 1907); F. von Zillner, *Geschichte der Stadt Salzburg* (Salzburg, 1885–1890); Trautwein, *Salzburg* (12th ed., Innsbruck, 1901); J Meurer, *Führer durch Salzburg* (Vienna, 1889), and Purtscheller, *Führer durch Salzburg und Umgebung* (Salzburg, 1905). See also C. F. Arnold, *Die Ausrottung des Protestantismus in Salzburg unter Erzbischof Firmian* (1900).

SALZKAMMERGUT, a district of Austria in the S.W. angle of the duchy of Upper Austria situated between Salzburg and Styria. It forms a separate imperial domain of about 250 sq. m. and is famous for its fine scenery, which has gained for it the title of the "Austrian Switzerland"; but it owes its name (literally "salt-exchequer property") and its economic importance to its valuable salt mines. It belongs to the region of the Eastern Alps, and contains the Dachstein group with the Dachstein (9830 ft.) and the Thorstein (9657 ft.). In the Dachstein group are found the most easterly glaciers of the Alps, of which the largest is the Karls-Eisfeld, nearly 2½ m. long and 1½ m. broad; the Ischler Alps with the Gamsfeld (6640 ft.), the Höllengebirge with the great Höllenkogel (6106 ft.), and the Schafberg (5837 ft.), which is called the "Austrian Rigi." Then comes the Todtes Gebirge, with the Grosser Priel (8246 ft.) and the Traunstein (5446 ft.) on the E. shore of the Traun lake; the Pyhrgas group with the Grosser Pyhrgas (7360 ft.) and the Sengsen or Sensen group, with the Hoher Nock (6431 ft.). The chief lakes are the Traun-see or Lake of Gmunden (1383 ft. above sea-level, 9 sq. m. in extent, 623 ft. deep); the Hallstätter-see or Lake of Hallstatt (1629 ft. above sea-level, 3½ sq. m. in extent, 409 ft. deep); the Atter-see or Kammer-see (1527 ft. above sea-level, 18 sq. m. in extent, 560 ft. deep), the largest lake in Austria; the Mond-see (1560 ft. above the sea, 9 sq. m. in extent, 222 ft. deep) and the Aber-see or Lake of St Wolfgang (1742 ft. above sea-level, 5½ sq. m. in extent, 369 ft. deep). Salzkammergut had in 1900 a population of over 18,000. The capital of the district is Gmunden, and other places of importance are Ischl, Hallstatt and Ebensee (7656), which are important salt-mining centres. The salt extracted in Salzkammergut amounts to nearly 30 % of the total Austrian production. Cattle-rearing and forestry form the other principal occupations of the inhabitants.

See Kegele, *Das Salzkammergut* (Wien, 1897).

SALZWEDEL, a town in the Prussian province of Saxony, in a plain on the navigable Jeetze, a tributary of the Elbe, 32 m. N.W. of Stendal and 106 m. by rail N.W. of Berlin, on the line to Bremen. Pop. (1905) 11,122. Salzwedel is partly surrounded by medieval walls and gates. The church of St Mary is a fine Gothic structure of the 13th century with five naves and a lofty spire. The old town hall, burnt down in 1895, has been replaced by a modern edifice. The industries include linen and damask weaving, tanning, brewing and the manufacture of pins, chemicals and machinery, and a brisk river trade is carried on in agricultural produce.

Salzwedel, formerly Soltwedel, was founded by the Saxons, and was from 1070 to 1170 the capital of the old or north Mark, also for a time called the "mark of Soltwedel," the kernel of Brandenburg-Prussia. The old castle, perhaps founded by Charlemagne, was purchased in 1864 by the king of Prussia. Salzwedel was also a member of the Hanseatic League, and at the beginning of the 16th century seems to have transacted a great part of the inland commerce of North Germany.

See Pohlmann, *Geschichte der Stadt Salzwedel* (Halle, 1811), and Danneil, *Geschichte der königlichen Burg zu Salzwedel* (Salzwedel, 1865).

SAMAIN, ALBERT VICTOR (1858–1900), French poet, was born at Lille on the 4th of April 1858. He was educated at the lycée of that town, and on leaving it entered a bank as a clerk. He enjoyed no literary associations, and his talent developed slowly in solitude. About 1884 Samain went to Paris, having

obtained a clerkship in the Préfecture de la Seine, which he held for most of his life. He presently began to send poems to the *Mercure de France*, and these attracted attention. In 1893 he allowed a friend to print his earliest volume of poems, *Au Jardin de l'infante*, in a very small edition. This led to the sudden recognition of his talent, and to applause from critics of widely different schools. In 1897 this book was reprinted in a more popular form, with the addition of a section entitled *L'Urne penchée*. Samain's second volume, *Aux flancs du vase*, appeared in 1898. His health began to fail and he withdrew to the country, where he died, in the neighbourhood of the village of Magny-les-Hameaux, on the 18th of August 1900. A third volume of his poems, *Le Chariot d'or*, appeared after his death, with a lyrical drama, *Polyphème* (1901), which was produced at the Théâtre de l'Œuvre in 1904. The fame of Samain rapidly advanced when he was dead, and the general public awakened to the fact that this isolated writer was a poet of rare originality. He cultivated a delicate, languid beauty of imagery and an exquisite sense of verbal melody without attempting any revolution in prosody or identifying himself with any theory. Samain had no great range of talent, nor was he ambitious of many effects. Samain's natural life was patiently spent in squalid conditions; he escaped from them into an imaginative world of the most exquisite refinement. He has been compared to Watteau and Schumann; in his own art he bore some resemblance to Charles Baudelaire, and to the English poet Arthur O'Shaughnessy.

See also R. Doumic, "Trois Poètes," in the *Revue des deux mondes* (Oct. 1900); L. Bocquet, *Albert Samain, sa vie, son œuvre* (1905); and E. W. Gosse, *French Profiles* (1905). (E. G.)

SAMANA RANGE, a mountain ridge in Kohat district of the N.W. Frontier Province of India, commanding the S. boundary of Tirah. The ridge lies between the Khanki Valley on the N. and the Miranzai Valley on the S., and extends for some 30 m. W. from Hangu to the Samana Suk. It is some 6000 to 7000 ft. high. Beyond the Samana Suk lies the pass, known as the Chagru Kotal, across which the Tirah Expedition marched in 1897. On the opposite hill on the other side of this road is the famous position of Dargai (see TIRAH CAMPAIGN). After the Miranzai Expedition of 1891 this range was occupied by British troops and eleven posts were established along its crest, the two chief posts being Fort Lockhart and Fort Gulistan. In 1897 all the forts on the Samana were attacked by the Orakzais, and this and the Afridi attack on the Khyber Pass were the two chief causes of the Tirah Expedition. When Lord Curzon reorganized the frontier in 1900, British garrisons were withdrawn from the Samana forts, which are now held by a corps of tribal police 450 strong, called the Samana Rifles.

SĀMĀNIDS, the first great native dynasty which sprang up in the 9th century in E. Persia, and, though nominally provincial governors under the suzerainty of the caliphs of Bagdad, succeeded in a very short time in establishing an almost independent rule over Transoxiana and the greater part of Persia. Under the caliphate of Mamun, Sāmān, a Persian noble of Balkh, who was a close friend of the Arab governor of Khorasan, Asad b. Abdallah, was converted from Zoroastrianism to Islam. His son Asad, named after Asad b. Abdallah, had four sons who rendered distinguished services to Mamun. In return they all received provinces: Nūḥ obtained Samarkand; Aḥmad, Ferghana; Yahyā, Shash; Ilyās, Herat. Of these Aḥmad and his second son Ismā'īl overthrew the Saffārids (*q.v.*) and the Zaidites of Tabaristan, and thus the Sāmānids established themselves with the sanction of the caliph Motamid in their capital Bokhara.

The first ruler (874) was Naṣr I. (Naṣr or Naṣir b. Aḥmad b. Asad. b. Sāmān). He was succeeded by his brother Ismā'īl b. Aḥmad (892). His descendants and successors, all renowned for the high impulse they gave both to the patriotic feelings and the national poetry of modern Persia (see PERSIA: *Literature*), were Aḥmad b. Ismā'īl (907–913); Naṣr II. b. Aḥmad, the patron and friend of the great poet Rūdagī (913–942); Nūḥ I. b. Naṣr (942–954); Abdalmalik I. b. Nūḥ (954–961); Manṣūr I. b. Nūḥ, whose vizier Bal'amī translated Tabarī's universal history into Persian (961–976); Nūḥ II. b. Manṣūr, whose court-poet Daqiqi (Dakiki) began the *Shāhnāma* (976–997); Manṣūr II. b. Nūḥ (997–999); and Abdalmalik II. b. Nūḥ (999), under whom the Sāmānid dynasty was conquered by the Ghaznevids. The rulers of this powerful house, whose silver dirhems had an extensive currency during the 10th century all over the N. of Asia, and were brought, through Russian caravans, even so far as to Pomerania, Sweden and Norway, where Sāmānid coins have been found in great number, were in their turn overthrown by a more youthful and vigorous race, that of Sabuktagīn, which founded the illustrious Ghaznevid dynasty and the Mussulman empire of India. Under Abdalmalik I. a Turkish slave, Alptagīn, had been entrusted with the government of Bokhara, but, showing himself hostile to Manṣūr I., he was compelled to fly and to take refuge in the mountainous regions of Ghazni, where he soon established a semi-independent rule, to which, after his death in 977 (367 A.H.), his son-in-law Sabuktagīn, likewise a former Turkish slave, succeeded. Nūḥ II., in order to retain at least a nominal sway over those Afghan territories, confirmed him in his high position and even invested Sabuktagīn's son Maḥmūd with the governorship of Khorasan, in reward for the powerful help they had given him in his desperate struggles with a confederation of disaffected nobles of Bokhara under the leadership of Fā'iq and the troops of the Dailamites, a dynasty that had arisen on the shores of the Caspian Sea and wrested already from the hands of the Sāmānids all their western provinces. Unfortunately, Sabuktagīn died in the same year as Nūḥ II. (997, 387 A.H.), and Maḥmūd (*q.v.*), confronted with an internal contest against his own brother Ismā'īl, had to withdraw his attention for a short time from the affairs in Khorasan and Transoxiana. This interval sufficed for the old rebel leader Fā'iq, supported by a strong Tatar army under the Ilek Khān Abu'l Ḥosain Naṣr I., to turn Nūḥ's successor Manṣūr II. into a mere puppet, to concentrate all the power in his own hand, and to induce even his nominal master to reject Maḥmūd's application for a continuance of his governorship in Khorasan. Mahmūd refrained for the moment from vindicating his right; but, as soon as, through court intrigues, Manṣūr II. had been dethroned, he took possession of Khorasan, deposed Manṣūr's successor Abdalmalik II., and assumed as an independent monarch for the first time in Asiatic history the title of "sultān." The last prince of the house of Sāmān, Montaṣir, a bold warrior and a poet of no mean talent, carried on for some years a kind of guerilla warfare against both Maḥmūd and the Ilek Khān, who had occupied Transoxiana, till he was assassinated in 1005 (395 A.H.). Transoxiana itself was annexed to the Ghaznevid realm eleven years later, 1016 (407 A.H.).

See S. Lane Poole, *Mahommedan Dynasties* (1894), pp. 131-133; Stockvis, *Manuel d'histoire* (Leiden, 1888), vol. i. p. 113; also articles CALIPHATE and PERSIA: *History*, section B, and for the later period MAḤMŪD, SELJUKS, MONGOLS.

SAMANIEGO, FELIX MARIA DE (1745–1801), Spanish fabulist, was born at Laguardia (Álava) on the 12th of October 1745, and was educated at Valladolid. A government appointment was secured for him by his uncle the count de Peñaflorida. His *Fábulas* (1781–1784), one hundred and fifty-seven in number, were originally written for the boys educated in the school founded by the Biscayan Society. In the first instalment of his fables he admits that he had taken Iriarte for his model, a statement which proves that he had read Iriarte's fables in manuscript; he appears, however, to have resented their publication in 1782, and this led to a rancorous controversy between the former friends. Samaniego holds his own in the matters of quiet humour and careless grace, and his popularity continues. He died at Laguardia on the 11th of August 1801.

SAMARA, a government of S.E. Russia, on the W. side of the lower Volga, bounded on the N. by the governments of Kazan and Ufa, on the W. by Simbirsk and Saratov, on the E. by Ufa and Orenburg, and on the S. by Astrakhan, the Kirghiz Steppes and the territory of the Ural Cossacks. The area is 58,302 sq. m., and the population, in 1897, 2,763,478. A line drawn E. from the great bend of the Volga—the Samarskaya Luka—would divide the government into two parts, differing in orographical character. In the N. are flat hills and plateaus intersected by deep rivers. In their highest parts these elevations rise about 1000 ft. above the sea, while the level of the Volga at Samara is only 43 ft. S. of the Samarskaya Luka the country assumes the character of a low, flat steppe, recently emerged from the post-Pliocene Aral-Caspian basin. The government is built up chiefly of Carboniferous sandstones, conglomerates, clay slates and limestones, representing mostly deep-sea deposits. The Permian formation appears along the rivers Sok and Samara, and is represented by limestones, sands and marls containing gypsum, all of marine origin, and by continental deposits dating from the same period; sandstones impregnated with petroleum also occur. In the N. these deposits are covered with

"variegated marls" and with a variety of Triassic, Jurassic and Cretaceous deposits. The Tertiary formation (Eocene) appears only at Novo-uzensk; the remainder of a vast sheet of this formation, which at one time covered all the region between the Volga and the Urals, was removed during the Glacial period. Post-Tertiary Caspian deposits penetrate far into the government along the main valleys, and a thick layer of loess occurs in the N. Selenites, rock-crystal and agates are found, as also copper ores, rock-salt and sandstone extracted for building purposes. The soil is on the whole very fertile. All the N. of the government is covered with a thick sheet of black earth; this becomes thinner towards the S., clays—mostly fertile—cropping out from underneath it; salt clays appear in the S.E.

Samara is inadequately drained, especially in the S. The Volga flows for 550 m. along its W. border. Its tributaries, the Great Cheremshan (220 m.), the Sok (195 m.), the Samara (340 m.), with its tributaries, are not navigable, partly on account of their shallowness and partly because of water-mills. When the water is high, boats can penetrate up some of them 15 to 30 m. The Great Irgiz alone, which has an exceedingly winding course of 335 m., is navigated to Kushum, and rafts are floated from Nikolayevsk. The banks of both Karamans are densely peopled. The Great and Little Uzeñ drain S.E. Samara and lose themselves in the Kamysh sands before reaching the Caspian. Salt marshes occur in the S.E.

The whole of the region is rapidly drying up. The forests, which are disappearing, are extensive only in the N. Altogether they cover 8 % of the surface; prairie and grazing land occupies 32 %, and 12 % is uncultivable.

The climate is one of extremes, especially in the steppes, where the depressing heat and drought of summer are followed in winter by severe frosts, often accompanied by snowstorms. The average temperature at Samara (53° 11′ N.) is only 39°·2 (January, 9°·3; July, 70°·4).

The population, which was 1,388,500 in 1853, numbered 2,763,478 in 1897, of whom 1,398,263 were women and 159,485 lived in towns. The estimated pop. in 1906 was 3,276,500. Great and Little Russians formed 69 % of the inhabitants; Mordvinians 8·6 %, Chuvashes and Votiaks 2·3 %, Germans 8·1 %, Tatars 3·6 % and Bashkirs 2 %. The Great Russians immigrated in compact masses. A special feature of Samara is its German colonists, from Württemberg, Baden, Switzerland and partly also from Holland and the Palatinate, whose immigration dates from the time of Catherine II. in 1762. Favoured as they were by free and extensive grants of land, by exemption from military service and by self-government, they have developed into wealthy colonies of Roman Catholics, Protestants, Unitarians, Anabaptists, Moravians and Mennonites. As regards religion, the great bulk of the population are Orthodox Greeks; the Nonconformists, who are settled chiefly on both the rivers Uzeñ, number officially 100,000, but their real numbers are higher; next come Mahommedans, 12 %; various Protestant sects, 5 %; Roman Catholics, about 2 %; and some 4000 pagans.

The chief occupation is agriculture—wheat, rye, oats, millet, oil-yielding plants, potatoes and tobacco being the principal crops. Owing to its great fertility, Samara usually has a surplus of grain for export, varying from 1½ to 4 million quarters (exclusive of oats) annually. Notwithstanding this production, the government is periodically liable to famine to such an extent that men die by thousands of hunger-typhus, or are forced to go by thousands in search of employment on the Volga. The population have no store of corn, or reserve capital for years of scarcity, and some 210,000 males have each an average of only four acres of arable and pasture land. But even this soil, although all taxed as arable, is often of such quality that only 50 % to 55 % of it is under crops, while the peasants are compelled to rent from two to two and a half million acres for tillage from large proprietors. Over 8½ million acres, or not far short of one-quarter of the total area of the government, purchased from the crown or from the Bashkirs—very often at a few pence per acre—are in the hands of no more than 1704 persons. The general impoverishment may be judged from the death-rate, 46 to 48 per thousand. Out of the total area, 4,143,800 acres belong to the crown, 7,979,000 to private persons and 22,486,700 acres to the peasants, who rent, moreover, about 6½ million acres. Water melons and sunflowers are extensively cultivated, and gardening is widely engaged in; mustard and inferior qualities of tobacco are grown. Hemp-seed, linseed, and other oil-seeds and bran are exported, as well as cereals and flour. Livestock are extensively bred. Bee-keeping is another pursuit that is widely followed. The export of poultry, especially of geese, has increased greatly. The principal manufactures are flour-mills, tanneries, distilleries, candle and tallow works, breweries and sugar refineries. Petty domestic industries, especially the weaving of woollen cloth, are carried on in the S. Both the external and the internal trade are very flourishing, nearly 250 fairs being held in the government every year; the chief are those at Novo-uzensk and Bugulma. Owing to the efforts of the local *zemstvos* there are more than the average number of primary schools, namely, one for every 1810 inhabitants. The government is divided into seven districts, the chief towns of which are Samara, Bugulma, Buguruslan, Buzuluk, Nikolayevsk, Novo-Uzen and Stavropol. The Sergiyevsk sulphurous mineral springs, 57 m. from Buguruslan, are visited by numbers of patients.

The territory now occupied by Samara was until the 18th century the abode of nomads. The Bulgarians who occupied it until the 13th century were followed by Mongols of the Golden Horde. The Russians penetrated thus far in the 16th century, after the conquest of the principalities of Kazan and Astrakhan. To secure communication between these two cities, the fort of Samara was erected in 1586, as well as Saratov, Tsaritsyn and the first line of Russian forts, which extended from Byelyi-yar on the Volga to the neighbourhood of Menzelinsk near the Kama. In 1670 Samara was taken by the insurgent leader Stenka Razin. In 1732 the line of forts was removed a little farther E., and the Russian colonists advanced E. as the forts were pushed forwards. In 1762, on the invitation of Catherine II., emigrants from various parts of Germany settled in this region, as also did the Raskolniks, whose communities on the Irgiz became the centre of a formidable insurrection in 1775 under Pugachev. At the end of the 18th century Samara became an important centre for trade. In the first half of the 19th century the region was rapidly colonized by Great and Little Russians. In 1847–1850 the government introduced about 120 Polish families; in 1857–1859 Mennonites from Danzig founded settlements; and in 1859 a few Circassians were brought hither by government; while the influx of Great Russian peasants still goes on.

(P. A. K.; J. T. Be.)

SAMARA, a town of E. Russia, capital of the government of the same name, 305 m. by river S.S.E. of Kazan and 261 m. by rail W.N.W. of Orenburg. Its population, which was 63,479 in 1883, numbered 91,672 in 1897. Owing to its situation on the left bank of the Volga, at the convergence of the Siberian and Central Asian railways, it has great commercial importance, especially as a depôt for cereals and a centre for flour-milling. A considerable trade is also carried on in animal products, particularly hides. The other industries include iron-foundries, soap, candles, vehicles and glue factories, cooperages, tanneries, breweries and brick-works. The port is the best on the Volga. Three great fairs are held every year. The city, which gives title to a bishop of the Orthodox Greek Church, has three cathedrals, built in 1685, 1730–1735 and 1894 respectively, three public libraries, and a natural history and archaeological museum. It is famous for its kumis (mare's milk) cures. Its foundation took place in 1586–1591 for the purpose of protecting the Russian frontier against the Bashkirs, the Kalmucks and the Nogai Tatars.

SAMARIA, an ancient city of Palestine. The name Samaria is derived through the Gr. Σαμάρεια from the Hebrew שֹׁמְרוֹן, "an outlook hill," or rather from the Aramaic form שֶׁמְרִין, whence also comes the Assyrian form *Samirina*. According to 1 Kings xvi. 24, Omri, king of Israel, bought Samaria from a

certain Shemer (whose name is said to be the origin of that of the city), and transferred thither his capital from Tirzah. But the city, as a superficial inspection of the site shows, must have existed as a settlement long before Omri, as potsherds of earlier date lie scattered on the surface. The city was occupied by Ahab, who here built a temple to "Baal" (1 Kings xvi. 32) and a palace of ivory (1 Kings xxii. 39). It sustained frequent sieges during the troubled history of the Israelite kingdom. Ben-Hadad II. of Syria assaulted it in the reign of Ahab, but was repulsed and obliged to allow the Israelite traders to establish a quarter in Damascus, as his predecessor Ben-Hadad I. had done in Samaria (1 Kings xx. 34). Ben-Hadad II. in the time of Jehoahaz again besieged Samaria, and caused a famine in the city; but some panic led them to raise the siege (2 Kings vi., vii.). The history of the city for the following 120 years is that of Israel (see JEWS).

In 727 died Tiglath-Pileser, to whom the small kingdoms of W. Asia had been in vassalage; in the case of Israel at least since Menahem (2 Kings xv. 19). He was succeeded by Shalmaneser IV., and the king of Israel, with the rest, attempted to revolt. Shalmaneser accordingly invaded Syria, and in 724 began a three-years' siege of Samaria (2 Kings xvii. 5). He died before it was completed, but it was finished by Sargon, who reduced the city, deported its inhabitants, and established within it a mixed multitude of settlers (who were the ancestors of the modern Samaritans). These people themselves seem to have joined a revolt against the Assyrians, which was soon quelled. The next event we hear of in the history of the city is its conquest by Alexander the Great (331 B.C.), and later by Ptolemy Lagi and Demetrius Poliorcetes. It quickly recovered from these injuries: when John Hyrcanus besieged it in 120 B.C. it was "a very strong city" which offered a vigorous resistance (Jos. *Ant.* xiii. x. 2). It was rebuilt by Pompey, and restored by Aulus Gabinius: but it was to Herod that it owed much of its later glory. He built a great temple, a hippodrome and a street of columns surrounding the city, the remains of which still arrest the attention. It was renamed by him *Sebaste*, in honour of Augustus: this name still survives in the modern name *Sebusteh*.[1] Philip here preached the gospel (Acts viii. 5). The rise of Neapolis (Shechem) in the neighbourhood caused the decay of Sebaste. It was quite small by the time of Eusebius. The crusaders did something to develop it by establishing a bishopric with a large church, which still exists (as a mosque); here were shown the tombs of Elisha, Obadiah and St John the Baptist. From this time onward the village dwindled to the poor dirty place it is to-day.

The site of Samaria is an enormous mound of accumulation, one of the largest in Palestine. In some places it is estimated the débris is at least 40 ft. deep. The crusaders' church remains almost intact, and numerous fragments of carved stone are built into the village houses, beneath which in some places are some interesting tombs. The hippodrome remains in the valley below, and the columns of the street of columns are in very good order. The walls can be traced almost all round the town: at the end of the mound opposite the modern village are the dilapidated ruins of a large gate. The site stands in the very centre of Palestine, and, built on a steep and almost isolated hill, with a long and spacious plateau for its summit, is naturally a position of much strength, commanding two of the most important roads—the great N. and S. road which passes immediately under the E. wall, and the road from Shechem to the maritime plain which runs a little to the W. of the city. The hill of Samaria is separated from the surrounding mountains (Amos iii. 9) by a rich and well-watered plain, from which it rises in successive terraces of fertile soil to a height of 400 or 500 ft. Only on the E. a narrow saddle, some 200 ft. beneath the plateau, runs across the plain towards the mountains; it is at this point that the traveller coming from Shechem now ascends the hill to the village of Sebusteh, which occupies only the extreme E. of a terrace beneath the hill-top, behind the crusaders' church, which is the first thing that attracts the eye as one approaches the town. The hill-top, the longer axis of which runs W. from the village, rises 1450 ft. above the sea, and commands a superb view towards the Mediterranean, the mountains of Shechem and Mount Hermon. Excavations under the auspices of Harvard University began here in 1908. (R. A. S. M.)

[1] Accentuated on the second syllable. Guide- and travel-books generally spell the name *Sebastīyeh*, which is not a correct rendering of the local pronunciation.

SAMARITANS. This term, which primarily means "inhabitants of Samaritis, or the region of Samaria," is specially used, in the New Testament and by Josephus, as the name of a peculiar religious community which had its headquarters in the Samaritan country, and is still represented by a few families at Nâblus, the ancient Shechem. By the Jews they are called Shomronim, a gentilic form from Shomron = Samaria; among themselves they sometimes use the name Shemêrem (= Heb. Shomerim) which is explained to mean "Keepers," sc. of the Law, but they usually style themselves "Israel" or "Children of Israel." They claim to be descendants of the ten tribes, and to possess the orthodox religion of Moses, accepting the Pentateuch and transmitting it in a Hebrew text which for the most part has only slight variations from that of the Jews. But they regard the Jewish temple and priesthood as schismatical, and declare that the true sanctuary chosen by God is not Zion but Mount Gerizim, over against Shechem (St John iv. 20). The sanctity of this site they prove from the Pentateuch, reading Gerizim for Ebal in Deut. xxvii. 4. With this change the chapter is interpreted as a command to select Gerizim as the legitimate sanctuary (cf. verse 7). Moreover, in Exod. xx. 17 and Deut. v. 21 a commandment (taken from Deut. xxvii.) is found in the Samaritan text, at the close of the decalogue, giving directions to build an altar and do sacrifice on Gerizim, from which of course it follows that not only the temple of Zion but the earlier shrine at Shiloh and the priesthood of Eli were schismatical. Such at least is the express statement of the later Samaritans: in earlier times, as they had no sacred books except the Pentateuch, they probably ignored the whole history between Joshua and the captivity, thus escaping many difficulties.

According to modern views the books of Moses were not reduced to their present form till after the exile, when their regulations were clearly intended to apply to the rebuilt temple of Zion. The Samaritans must in that case have derived their Pentateuch from the Jews after Ezra's reforms of 444 B.C. Before that time Samaritanism cannot have existed in the form in which we know it, but there must have been a community ready to accept the Pentateuch. The city of Samaria had been taken by Assyria (2 Kings xvii. 6 sqq. and xviii. 9-11) in 722 B.C., and the inhabitants deported, but in point of fact the district of Mount Ephraim was not entirely stripped of its old Hebrew population by this means. In the Annals of Sargon the number of the exiles is put at 27,290, representing no doubt the more prominent of the inhabitants, for this number cannot include the whole of N. Israel. The poorer sort must have remained on the land, and among them the worship of Jehovah went on as before at the old shrines of N. Israel, but probably corrupted by the religious rites of the new settlers. The account of the country given in 2 Kings xvii. 24 seq. dwells only on the partial adoption of Jehovah-worship by the foreigners settled in the land, and by no means implies that these constituted the whole population. Josiah extended his reforms to Bethel and other Samaritan cities (2 Kings xxiii. 19), and the narrative shows that at that date things were going on at the N. sanctuaries much as they had done in the time of Amos and Hosea. To a considerable extent his efforts to make Jerusalem the sanctuary of Samaria as well as of Judah must have been successful, for in Jer. xli. 5 we find fourscore men from Shechem, Shiloh and Samaria making a pilgrimage to "the house of Jehovah," after the catastrophe of Zedekiah. It is therefore not surprising that the people of this district came to Zerubbabel and Jeshua after the restoration, claiming to be of the same religion with the Jews and asking to be associated in the rebuilding of the Temple. They were rejected by the leaders of the new theocracy, who feared the result of admitting men of possibly mixed blood and of certainly questionable orthodoxy; and so the Jehovah-worshippers of Samaria were driven to the ranks of "the adversaries of Judah and Benjamin" (Ezra iv.). Nevertheless, down to the time of Nehemiah, the breach was not absolute; but the expulsion from Jerusalem in 432 B.C. of a man of high-priestly family (Neh. xiii. 28), who had married a daughter of Sanballat, made it so. It can hardly be doubted that this priest is the Manasseh of Josephus

(*Ant.* xi. 8), who carried the Pentateuch to Shechem, and for whom the temple of Gerizim was perhaps built. For, though the story in Josephus is put a century too late and is evidently based on a confusion, it agrees with Neh. xiii. in essentials too closely to be altogether rejected,[1] and supplies exactly what is wanted to explain the existence in Shechem of a community bitterly hostile to the Jews, yet constituted in obedience to Ezra's Pentateuch.

It is remarkable that, having got the Pentateuch, they followed it with a fidelity as exact as that of the Jews, except in regard to the sanctuary on Mt Gerizim. The text of the sacred book was transmitted with as much conscientiousness as was observed by Jewish scribes;[2] and even from the unwilling witness of the Jews[3] we gather that they fulfilled all righteousness with scrupulous punctiliousness so far as the letter of the law was concerned. They did not however, receive the writings even of the prophets of N. Israel (all of which are preserved to us only by the Jews) nor the later oral law[4] as developed by the Pharisees.

But although these differences separated the two communities, their internal development and external history ran parallel courses till the Jewish state took a new departure under the Maccabees. The religious resemblance between the two bodies was increased by the institution of the synagogue, from which there grew up a Samaritan theology and an exegetical tradition. The latter is embodied in the Samaritan Targum, or Aramaic version of the Pentateuch, which in its present form is probably not much earlier than the 4th century A.D., but in general is said to agree with the readings of Origen's τὸ Σαμαρειτικόν. Whether the latter represents a complete translation of the Law into Greek may be doubted, but at any rate the Samaritans began already in the time of Alexander to be influenced by Hellenism. They as well as Jews were carried to Egypt by Ptolemy Lagi, and the rivalry of the two parties was continued in Alexandria (Jos. *Ant.* xii. 1. 1), where such a translation may have been produced. Of the Samaritan contributions to Hellenistic literature some fragments have been preserved in the remains of Alexander Polyhistor.[5]

[1] There are, however, many difficulties in the story, which is not rendered clearer by references to Sanballat in the documents from Elephantine (dated in 408/407 B.C.) published by Sachau in the *Abhandlungen d. Kgl. preuss. Akad. d. Wiss.* for 1907.

[2] This appears by the frequent agreement of the Samaritan Pentateuch with the Septuagint. The Samaritan character is an independent development of the old Hebrew writing, as it was about the time when they first got the Pentateuch, and this in itself is an indication that from the first their text ran a separate course. Differences between MSS. existed down to the time of the Massoretes (see art. HEBREW), and it was from one of these divergent texts that the Samaritan was derived, the Septuagint from another. But while the Jews constantly revised their text with skill and success, the rigid conservatism of the Samaritans prevented any changes except the corruptions naturally due to human infirmity. The story that they possess a copy of the Law written by Abisha, the great-grandson of Aaron, seems to have aroused a strangely widespread interest, so that tourists invariably ask to see it and usually claim to have succeeded in doing so. Considering the extreme reverence with which it is regarded, it may safely be said that *this* manuscript is never shown to them. The origin of the legend is no doubt due to a pious fraud. It is first mentioned by Abu'l-fath in 1355, from which year its "invention" dates. Obviously an old copy would be chosen for the purpose of such a discovery, but it is unlikely to be earlier than the 10th or 11th century A.D.

[3] Not, indeed, without exceptions, nor at all periods, but such is the general intention of the Masseḳheth Kuthim; see Montgomery, *Samaritans*, cap. x.

[4] For details see Nutt, *Fragments*, p. 37, and more fully, Montgomery, *l.c.* No doubt, in addition to the legal ordinances, the Samaritans retained some ancient traditional practices (cf. Gaster in *Transactions of the 3rd Internat. Congr. for the History of Religions*, i. p. 299, Oxford, 1908), or introduced some new observances. Their Passover, for instance, has some peculiar features, one of which, the application of the sacrificial blood to the faces of the children, has a parallel in the old Arabic *'aqiqah*. See the account of an eye-witness (Professor Socin) in Baedeker's *Palestine*; Mills, *Three Months' Residence at Nablus* (London, 1864), p. 248; Stanley, *The Jewish Church*, i. app. iii.

[5] Chiefly in quotations by Eusebius (*Praep. Ev.*, ed. Gifford, Oxon., 1903, bk. ix. 17). See Freudenthal, *Hellenistische Studien*, i., ii. (Breslau, 1875); Schürer, *History of the Jewish People in the Time of Jesus Christ* (Eng. ed., 1891), ii. 3. p. 197.

The troubles that fell upon the Jews under Antiochus Epiphanes were not escaped by the Samaritans (2 Macc. v. 23; vi. 2), for the account in Josephus (*Ant.* xii. 5. 5), which makes them voluntarily exchange their religion for the worship of the Grecian Zeus, is evidently coloured to suit the author's hostility. Under the Maccabees their relations with Judaea became very bitter. They suffered severely at the hands of Hyrcanus, and the temple on Mt Gerizim was destroyed. Although this treatment established an unalterable enmity to the Jews, as we see in the New Testament, in Josephus and in Jewish tradition, the two sects had too much in common not to unite occasionally against a common enemy, and in the struggles of the Jews with Vespasian the Samaritans took part against the Romans. They were not, however, consistent, for under Hadrian they helped the Romans against the Jews and were allowed to rebuild their temple on Mt Gerizim. They seem to have shared in the Jewish dispersion, since in later times we hear of Samaritans and their synagogues in Egypt, in Rome and in other parts of the empire. In the 4th century they enjoyed a certain degree of prosperity, according to their own chronicles, under Baba the Great, who (re-)established their religious and social organization. In 484, in consequence of attacks on the Christians, the Gerizim temple was finally destroyed by the Romans, and an insurrection in 529 was suppressed by Justinian so effectively that, while retaining their distinctive religion, they became henceforth politically merged in the surrounding population, with a merely domestic history. They are mentioned in later times by the Jewish travellers Benjamin of Tudela (1173) and Obadiah Bertinoro (1488 in Egypt), by Sir John Maundeville and others, but little was known of them in Europe till Scaliger opened communications with them in 1583.[6] In consequence of the interest thus aroused, the traveller Pietro della Valle visited them in 1616 and succeeded in obtaining a copy of their Pentateuch and of their Targum. Towards the end of the same century Robert Huntington (afterwards bishop of Raphoe), who was chaplain to the Turkey merchants at Aleppo, interested himself in them[7] and acquired some interesting manuscripts now in the Bodleian Library at Oxford. Since his time there has been intermittently a good deal of correspondence with them,[8] and in recent years owing to the increased facilities for travelling they have been much visited by tourists, not altogether for their good, as well as by scholars. At the present day they live only at Nâblus (Shechem), about 150 in number, the congregations formerly existing in Gaza, Cairo, Damascus and elsewhere having long since died out. Politically they are under the Turkish governor of Nâblus: their ecclesiastical head is the "Priest-levite" (in 1909 Jacob b. Aaron), who claims descent from Uzziel the younger son of Kohath (Exod. vi. 18). The line of the high-priests, so called as being descended from Aaron, became extinct in 1623.

In religion, since they recognize no sacred book but the Pentateuch, they agree with the Jews in such doctrines and observances only as are enjoined in the law of Moses. They do not therefore observe the feast of Purim, nor the fast of the 9th of Ab, nor any of the later rabbinical extensions or modifications of the law. It is this conservatism which has caused them to be confused with the Sadducees, who likewise rejected the later traditional teaching; but it is not correct to say that they deny the resurrection (as Epiphanius, *Haeres.* ix., and others) and the existence of angels (Leontius, *de Sectis*, ii. 8), or that they are entirely free from later religious developments. Briefly summarized, their creed is as follows: (*a*) God is one, and in speaking of Him all anthropomorphic expressions are to be avoided: creation was effected by his word: divine appearances in the Pentateuch are to be explained as vicarious, by means of angels (so as early as the 4th century A.D.); (*b*) Moses is the only prophet: all who have since claimed to be so are deceivers; (*c*) the Law, which was created with the world, is the only divine revelation; (*d*) Mt Gerizim is the house of God, the only centre of worship; (*e*) there will be a day of judgment. Closely connected with this are the doctrines (also found in the 4th century) of a future life and of a messiah (Ta'eb), who shall end the period of God's displeasure (Fanuta) under which his people have suffered since the schism of Eli and the disappearance of the Ark, and shall restore Israel to favour (Re'uta, Riḍwân).

[6] See Eichhorn's *Repertorium*, xiii. p. 257.

[7] See his letters ed. by T. Smith (London, 1704).

[8] See especially de Sacy in *Notices et extraits*, xii. The later letters are of less interest.

The Samaritan language properly so called is a dialect of Palestinian Aramaic, of which the best examples are found in the literature of the 4th century A.D. An archaic alphabet, derived from the old Hebrew, was retained, and is still used by them for writing Aramaic, Hebrew and sometimes even Arabic. After the Moslem conquest of Syria in 632 the native dialect of Aramaic gradually died out, and by the 11th century Arabic had become the literary as well as the popular language. In the Liturgy Hebrew was no doubt used from the earliest times side by side with Aramaic, and after the 11th century it became, in a debased form, the only language for new liturgical compositions.

The literature of the Samaritans is, like that of the Jews, almost entirely of a religious character. Reference has been made above to Samaritan Hellenistic works which have perished except for a few fragments. According to Samaritan tradition, their books were destroyed under Hadrian and Commodus, but of the language and contents of them nothing is recorded. There can be no doubt that some, perhaps much, of the literature has been lost, for nothing [1] is extant which can be dated before the 4th century A.D. The Targum, or Samaritan-Aramaic version of the Pentateuch was most probably written down about that time, though it was clearly based on a much older tradition and must have undergone various recensions. To the same period belong the liturgical compositions of Amram Darah and Marjah, and the latter's midrashic commentary (called the "Book of Wonders") on parts of the Pentateuch, all in Aramaic. With the possible exception of one or two hymns there is nothing further till the 11th century when there appears the Arabic version of the Pentateuch, usually ascribed to Abu Sa'id, but perhaps really by Abu'l-hasan [2] of Tyre, who also wrote three Arabic treatises, still extant, on theological subjects, besides some hymns. Of the same date (1053) is an anonymous commentary [3] on Genesis, preserved in the Bodleian Library at Oxford (MS. Opp. add. 4°, 99), interesting because it quotes from books of the Bible other than the Pentateuch. In the 12th century, Munajja [4] and his son Ṣadaqah wrote on theology; the earlier part of the chronicle called al-Ṭaulidah [5] was compiled, in Hebrew (1149); and about the same time treatises on Grammar [6] by Abu Sa'id and Abu Ishaq Ibrahim ibn Faraj. The next 100 years were rather barren. Ghazal ibn-al-Duwaik, who wrote on the story of Balak and on the restoration of the kingdom to Israel, is said to have lived in the 13th century, and another chronicle (in Arabic), called the Book of Joshua, is dated about the same time by T. W. J. Juynboll.[7] In the second half of the 14th century lived three important liturgical writers, Abisha b. Phinehas (ob. 1376), Abdallah b. Solomon and Sa'd-allah (or Sa'd-ed-din) b. Ṣadaqah: Abu'l-fath, who composed his chronicle [8] in 1355: a high priest Phinehas, author of a lexicon: and the anonymous writer of the commentary on the Kitab al-asaṭir,[9] a work, ascribed to Moses, containing legends of the Patriarchs. Another famous liturgist Abraham Qabazi lived in the early part of the 16th century, and his pupil Isma'il Rumaihi in 1537 wrote a work on the praise of Moses. Probably about the same time, or a little later, is another anonymous commentary on Genesis in the Huntington Collection in the Bodleian Library (MS. Hunt. 301). Several members of the Danfi family were prominent in the 18th century as liturgists, among them Abraham b. Jacob, who also wrote a commentary [10] on Gen.-Num., and of the levitical family Ghazal ibn Abi Sarur, who commented on Gen.-Exod. Another Ghazal (=Ṭabiah b. Isaac), priest-levite, who died in 1786, was a considerable writer of liturgy. Subsequent authors are few and of little interest. Mention need only be made of the chronicle [11] written (*i.e.* compiled) in Hebrew by Ab Sakhwah (=Murjan [12]) b. As'ad, of the Danfi family, in 1900, chiefly on the basis of al-Ṭaulidah and Abu'l-fath; an Arabic chronicle [13] by Phinehas b. Isaac (ob. 1898) of the levitical family; and a theological work,[14] also in Arabic by the present priest-levite, Jacob b Aaron.

Bibliography.—General: Nutt, *Fragments of a Samaritan Targum . . . with . . . a Sketch of Sam. History*, &c. (London, 1874); Montgomery, *The Samaritans* (Philadelphia, 1907), an excellent account with full bibliography; Petermann, *Brevis ling. sam. grammatica* (Porta Lingg. Orient.), Leipzig, 1873; Steinschneider, *Die arabische Literatur d. Juden*, p. 319 sqq. (Frankfurt, 1902).

Texts: the Pentateuch in the Paris and London Polyglotts; separately by Blayney (Oxford, 1790). A critical edition is in preparation by the Freiherr von Gall. Targum in the Polyglotts; reprinted in square character by Brüll (Frankfurt, 1874–1879); with critical apparatus by Petermann and Vollers (Berolini, 1872–1891); cf. also Nutt, *op. cit.*; Kohn, "Zur Sprache . . . der Samaritaner," pt. ii. (Leipzig, 1876) (in *Abhandlungen f. d. Kunde d. Morgenlandes*, v. 4); Kahle, *Textkritische . . . Bemerkungen . . .* (Leipzig, 1898) and *Zeitsch. f. Assyr.* xvi., xvii. Arabic version, ed. by Kuenen (Gen.-Lev.), Lugd. Bat. (1851); cf. Bloch, *Die Sam.-arab. Pent.-übersetzung*, Deut. i.-xi. (Berlin, 1901); Kahle, *Die arab. Bibelübersetzungen* (Leipzig, 1904); Heidenheim, *Der Commentar Marqahs* (Weimar, 1896). Parts also in dissertations by Baneth (1888), Munk (1890), Emmerich (1897), Hildesheimer (1898). Various texts and translations, mostly liturgical, in Heidenheim's *Deutsche Vierteljahrsschrift* (Gotha, 1864–1865, Zurich 1867–?) often incorrect, cf. Geiger in *ZDMG*, xvi.-xxii. Cowley, *The Samaritan Liturgy* (Oxford, 1909), text and introduction. For editions of other works see the foregoing footnotes. (A. Cy.)

SAMARIUM [symbol Sm, atomic weight 150·4 (O=16)], a rare earth metal (see Rare Earths). The separation has been worked at by A. v. Welsbach, L. de Boisbaudran, Urbain and Lacombe (*Comptes rendus*, 1903, 137, pp. 568, 792); Demarçay (*ibid.* 1900, 130, p. 1019); Benedicks; Feit and Przibylla (*Zeit. anorg. Chem.*, 1905, 43, p. 202) and others. The metal may be obtained by reduction of its oxide with magnesium. It combines with hydrogen to form a hydride. The salts are mostly of a yellowish colour. The *chloride*, $SmCl_3.6H_2O$, is a deliquescent solid which when heated in hydrochloric acid gas to 180° C. yields the anhydrous chloride. This anhydrous chloride is reduced to a lower chloride, of composition $SmCl_2$, when heated to high temperature in a current of hydrogen or ammonia (Matignon and Cazes, *Comptes rendus*, 1906, 142, p. 183). The chloride, $SmCl_2$, is a brown crystalline powder which is decomposed by water with liberation of hydrogen and the formation of the oxide, Sm_2O_3, and an oxychloride, SmOCl. The *fluoride*, $SmF_3.H_2O$, was prepared by H. Moissan by acting with fluorine on the carbide. The *sulphate*, $Sm_2(SO_4)_3.8H_2O$, is obtained by the action of sulphuric acid on the nitrate. It forms double salts with the alkaline sulphates. The *carbide*, SmC_2, is formed when the oxide is heated with carbon in the electric furnace.

SAMARKAND, a province of Russian Turkestan, formerly Zarafshan or Zerafshan. It is the ancient Sogdiana and was known as Sughd to the Moslems of the middle ages. It has on the N. and N.E. the province of Syr-darya, on the E. Ferghana, on the W. Bokhara and on the S. the khanates of Hissar, Karateghin and Darvaz. Its area is 26,627 sq. m. It is very hilly in the S., where it is intersected by ranges belonging to the Alai system. The Hissar range is the water-parting between the Zarafshan and the upper tributaries of the Amu-darya; another high range, the Zarafshan, runs between the two parallel rivers, the Zarafshan and its tributary, the Yagnob; while a third range, often called the Turkestan chain, stretches W. to E. parallel to the Zarafshan, on its N. bank. It is very probable that the three ranges referred to really possess a much more complicated character than is supposed. All three ranges are snow-clad, and their highest peaks reach altitudes of 18,500 ft. in the W. and 22,000 ft. in the E., while the passes over them, which are difficult as a rule, lie at altitudes of 12,000 ft. Several Alpine lakes, such as Iskander-kul, 7000 ft. high, have been found under the precipitous peaks.

The Alpine zone extends as far N. as the 40th parallel, beyond which the province is steppe-land, broken by only one range of mountains, the Nuratyn-tau, also known as Sanzar and Malguzar in the S.E. and as Kara-tau in the N.W. This treeless range stretches 160 m. N.W., has a width of about 35 m. and reaches altitudes of 7000 ft. It is pierced, in the Sanzar gorge, or Tamerlane's Gate, by the railway leading from Samarkand to Tashkent.

[1] Except, of course, the Pentateuch itself (see Bible) which cannot be properly regarded as a Samaritan work.

[2] So Kahle, see the bibliography.

[3] See Neubauer in *Journ. asiat.* (1873), p. 341.

[4] See Wreschner, *Samaritanische Traditionen* (Berlin, 1888).

[5] Ed. by Neubauer in *Journ. asiat.* (1869). The chronicle was continued in 1346, and was subsequently brought down to 1856–1857 by the present priest.

[6] See Nöldeke, *Gött. Gel. Nachr.* (1862), Nos. 17, 20.

[7] *Chronicon Sam. . . . Liber Josuae* (Lugd. Bat., 1848). It narrates the history from the death of Moses to the 4th century A.D. and is derived from sources of various dates. A Hebrew book of Joshua announced by Gaster in *The Times* of June 9, 1908, and published in *ZDMG*, vol. 62 (1908) pt. ii., is a modern compilation; see Yahuda in *Sitzgsber. d. Kgl. Preuss. Akad.* (1908), p. 887, and Gaster's reply in *ZDMG*, 62, pt. iii.

[8] Ed. by Vilmar (Gotha, 1865). Partly translated by Payne Smith in Heidenheim's *Vierteljahrsschrift*, vol. ii.

[9] Translated by Leitner in Heid. *Vierl.* iv. 184, &c.

[10] An account of the work (of which the only MS. is in Berlin) was given by Geiger in *ZDMG*, xx. p. 143 and later. Parts of it were published as dissertations by Klumel in 1902 and Hanover 1904.

[11] Ed. by E. N. Adler and M. Seligsohn in the *Revue des études juives*, vols. 44-46.

[12] The same who compiled Gaster's book of Joshua.

[13] Mentioned by Yahuda, *op. cit.* p. 895, as existing in a Berlin MS.

[14] Translated in *Bibliotheca sacra* (1906), p. 385, &c.

The other mountains in the province are well wooded, and it is estimated that nearly 4,500,000 acres are under forests. The N.W. portion is occupied by the Famine Steppe—which probably might be irrigated—and by the desert of Kyzyl-kum. The Famine or Hungry Steppe (not to be confounded with another desert of the same name, the Bek-pak-dala, to the W. of Lake Balkash) occupies nearly 5,000,000 acres, covered with loess-like clay. In the spring the steppe offers good pasture-grounds for the Kirghiz, but the grass withers as summer advances. Nearly 1,500,000 acres might, however, be irrigated and rendered available for the cultivation of cotton; indeed a beginning has been made in that direction. The Kyzyl-kum Steppe, 88,000 sq. m., is crossed by rocky hills, reaching an altitude of 3500 ft., and consists in part of saline clays, patches of prairie land and sand. The sand is especially prevalent on the margin, where the moving *barkhans* (crescent-shaped sandhills) invade the Kara-kul oasis of Bokhara. The vegetation is very poor, as a rule; grass and flowers (tulips, *Rheum*, various *Umbelliferae*) only appear for a short time in the spring. The *barkhans* produce nothing except *Haloxylon ammodendron*, *Poligonum*, *Halimodendron*, *Atraphaxis* and other steppe bushes; occasionally *Stipa* grass is seen on the slopes of the sandhills, while *Artemisia* and *Tamarix* bushes grow on the more compact sands. Water can only be obtained from wells, sometimes 140 ft. deep. A few Kirghiz are the sole inhabitants, and they are only found in the more hilly parts.

The chief river is the Zarafshan, which, under the name of Mach, rises in the Zarav glacier in the Kok-su mountain group. Navigation is only possible by rafts, from Penjikent downwards. The river is heavily drawn upon for irrigation; and to this it probably owes its name ("gold-spreading") rather than to the gold which is found in small quantities in its sands. Over 80 main canals (*ariks*) water 1200 sq. m. in Samarkand, while 1640 sq. m. are watered in Bokhara by means of over 40 main canals. Beyond Lake Kara-kul it is lost in the sands, before reaching the Amu-darya to which it was formerly tributary. The N.E. of the province is watered by the Syr-darya. One of the lakes, the Tuz-kaneh (40 m. from Jizakh) yields about 1300 tons of salt annually.

The average temperature for the year is 55·4° F. at Samarkand, and 58° at Khojent and Jizakh; but the average temperature for the winter is only 34°, and frosts of 4° and 11° have been experienced at Samarkand and Khojent respectively; on the other hand, the average temperature for July is 79° at Samarkand and 85° at Khojent and Jizakh. The total precipitation (including snow in winter) is only 6·4 in. at Khojent, 12 in. at Samarkand and 24 in. at Jizakh. The hilly tracts have a healthy climate, but malaria and mosquitoes prevail in the lower regions.

The estimated population in 1906 was 1,090,400. The Uxbegs form two-thirds of the population, and after them the Kirghiz and Tajiks (27 %) are the most numerous; Jews, Tatars, Afghans and Hindus are also met with.

In 1898 nearly 1,000,000 acres were irrigated, and about 800,000 acres partly irrigated. The chief crops are wheat, rice and barley. Sorghum, millet, Indian corn, peas, lentils, haricots, flax, hemp, poppy, lucerne, madder, tobacco, melons and mushrooms are also grown. Two crops are often taken from the same piece of land in one season. Cotton is extensively grown, and 21,000 acres are under vineyards. Sericulture prospers, especially in the Khojent district. Live-stock breeding is the chief occupation of the Kirghiz. Weaving, saddlery, boot-making, tanneries, oil works and metal works exist in many villages and towns, while the nomad Kirghiz excel in making felt goods and carpets. There are glass works, cotton-cleaning works, steam flour mills and distilleries. Some coal, sulphur, ammonia and gypsum are obtained. Trade is considerable, the chief exports being rice, raw cotton, raisins, dried fruit, nuts, wine and silk. The Central Asian railway crosses the province from Bokhara to Samarkand and Tashkent. The province is divided into four districts, the chief towns of which, with their populations in 1897, are: Samarkand (*q.v.*), Jizakh (16,041), Kati-kurgan (10,083) and Khojent (30,076).

SAMARKAND, a city of Russian Central Asia, anciently *Maracanda*, the capital of Sogdiana, then the residence of the Moslem Sāmānid dynasty, and subsequently the capital of the Mongol prince Tamerlane, is now chief town of the province of the same name. It lies 220 m. by rail S.W. of Tashkent, and 156 m. E. of Bokhara, in 39° 39′ N. and 66° 45′ E., 2260 ft. above the sea, in the fertile valley of the Zarafshan, at the point where it issues from the W. spurs of the Tian-shan before entering the steppes of Bokhara. The Zarafshan now flows 5 m. N. of the city. In 1897 the population numbered 40,000 in the native city, and 15,000 in the new Russian town, inclusive of the military (80 % Russians). The total population was 58,194 in 1900, and of these only 23,194 were women.

Maracanda, a great city, was destroyed by Alexander the Great in 329 B.C. It reappears as Samarkand at the time of the conquest by the Arabs, when it was finally reduced by Kotaiba ibn Moslim in A.D. 711–712. Under the Samanids it became a brilliant seat of Arabic civilization, and was so populous that, when besieged by Jenghiz Khan in 1221, it is reported to have been defended by 110,000 men. Destroyed and pillaged by that chieftain, its population was reduced to one-quarter of what it had been. When Timur made it his residence (in 1369) the inhabitants numbered 150,000. The magnificent buildings of the successors of Timur, which still remain, testify to its former wealth. But at the beginning of the 18th century it is reported to have been almost without inhabitants. It fell under Chinese dominion, and subsequently under that of the amir of Bokhara. But no follower of Islam enters it without feeling that he is on holy ground; although the venerated mosques and beautiful colleges are falling into ruins, its influence as a seat of learning has vanished, and its very soil is profaned by infidels. It was not without a desperate struggle that the Mahommedans permitted the Russians to take their holy city.

The present city is quadrangular and is enclosed by a low wall 9 m. long. The citadel is in the W., and to the W. of this the Russians have laid out since 1871 a new town, with broad streets and boulevards radiating from the citadel.

The central part of Samarkand is the Righistan—a square fenced in by the three *madrasahs* (colleges) of Ulug-beg, Shir-dar and Tilla-kari; in its architectural symmetry and beauty this is rivalled only by some of the squares of certain Italian cities. An immense doorway decorates the front of each of these large quadrilateral buildings. A high and deep-pointed porch, reaching almost to the top of the lofty façade, is flanked on each side by a broad quadrilateral pillar of the same height. Two fine columns, profusely decorated, in turn flank these broad pillars. On each side of the high doorway are two lower archways connecting it with two elegant towers, narrowing towards the top and slightly inclined. The whole of the façade and also the interior courts are profusely decorated with enamelled tiles, whose colours—blue, green, pink and golden, but chiefly turquoise-blue—are wrought into the most fascinating designs, in striking harmony with the whole and with each part of the building. Over the interior are bulbed or melon-like domes, perhaps too heavy for the façade. The most renowned of these three madrasahs is that of Ulug-beg, built in 1434 by a grandson of Timur. It is smaller than the others, but it was to its school of mathematics and astronomy that Samarkand owed its renown in the 15th century.

A winding street, running N.E. from the Righistan, leads to a much larger square in which are the college of Bibikhanum on the W., the graves of Timur's wives on the S. and a bazaar on the E. The college was erected in 1388 by a Chinese wife of Timur. To the N., outside the walls of Samarkand, but close at hand, is the Hazret Shah-Zindeh, the summer-palace of Timur, and near this is the grave of Shah-Zindeh, or, more precisely, Kasim ibn Abbas, a companion of Timur. This was a famous shrine in the 14th century (Ibn Batuta's *Travels*, iii. 52); it is believed that the saint will one day rise for the defence of his religion. The Hazret Shah-Zindeh stands on a terrace reached by forty marble steps. The decoration of the interior halls is marvellous. Another street running S.W. from the Righistan leads to the

Gur-Amir, the tomb of Timur. This consists of a chapel crowned with a dome, enclosed by a wall and fronted by an archway. Time and earthquakes have greatly injured this fine building. The interior walls are covered with elegant turquoise arabesques and inscriptions in gold. The citadel (reconstructed in 1882 and preceding years) is situated on a hill whose steep slopes render it one of the strongest in Central Asia. Its walls, 3000 yds. in circuit and about 10 ft. high, enclose a space of about 90 acres. Within it are the palace of the amir of Bokhara—a vulgar modern building now a hospital—and the audience hall of Timur—a long narrow court, surrounded by a colonnade, and containing the *kok-tash*, or stone of justice. Ruins of former buildings—heaps of plain and enamelled bricks, among which Graeco-Bactrian coins have been found—occur over a wide area round the present city, especially on the W. and N. The name of Aphrosiab is usually given to these ruins. Five m. S.W. of Samarkand is the college Khoja Akrar; its floral ornamentation in enamelled brick is one of the most beautiful in Samarkand. Nothing but the ruins of a palace now mark the site of a once famous garden, Baghchi-sarai. Of the Graeco-Armenian library said to have been brought to Samarkand by Timur no traces have been discovered, and Vambéry regards the legend as invented by the Armenians. Every trace of the renowned high school Kalinder-khaneh has also disappeared.

The present Moslem city is an intricate labyrinth of narrow, winding streets, bordered by dirty courtyards and miserable houses. The chief occupation of the inhabitants is gardening. There is a certain amount of industry in metallic wares, tallow and soap, tanneries, potteries, various tissues, dyeing, harness, boots and silver and gold wares. The best harness, ornamented with turquoises, and the finer products of the goldsmith's art, are imported from Bokhara and Afghanistan. The products of the local potteries are very fine. The bazaars of Samarkand are more animated and kept with much greater cleanliness than those of Tashkent and Namangan. The trade is very brisk, the chief items being cotton, silk, wheat and rice, horses, asses, fruits and cutlery. Wheat, rice and silk are exported chiefly to Bokhara; cotton to Russia, via Tashkent. Silk wares and excellent fruits are imported from Bokhara, and rock-salt from Hissar. (P. A. K.; J. T. Be.)

SAMBALPUR, a town and district of British India, in the Orissa division of Bengal. The town is on the left bank of the river Mahanadi, 495 ft. above sea-level, the terminus of a branch of the Bengal-Nagpur railway. Pop. (1901) 12,870. It contains a ruined fort with old temples. The garrison of native infantry was withdrawn in 1902. There is considerable trade, and hand-weaving of tussore silk and cotton cloth are carried on.

The District of Sambalpur has an area of 3773 sq. m. The Mahanadi, which is the only important river, divides it into unequal parts. The greater portion is an undulating plain, with ranges of rugged hills running in every direction, the largest of which is the Bara Pahar, covering an area of 350 sq. m., and attaining at Debrigarh a height of 2267 ft. above the plain. The Mahanadi affords means of water communication for 90 m.; its principal tributaries in Sambalpur are the Ib, Kelo and Jhira. To the W. of the Mahanadi the district is well cultivated. The soil is generally light and sandy. It is occupied for the greater part by crystalline metamorphic rocks; but part of the N.W. corner is composed of sandstone, limestone and shale. Gold dust and diamonds have been found near Hirakhuda or Diamond Island, at the junction of the Ib and Mahanadi. The climate of Sambalpur is considered very unhealthy; the annual rainfall averages 59 in. The population in 1901 was 640,243, showing an increase of 3·2 % in the decade. The registered death-rate for 1897 was only 30 per thousand, as against 68 for the province generally. This figure shows that Sambalpur entirely escaped the famine of 1896–1897, which indeed can be said to have brought prosperity to the district by causing high prices for a good rice crop, rice being the staple of cultivation. It was almost equally fortunate in 1900. The main line of the Bengal-Nagpur railway runs along the N. border of the district, with a branch S. to Sambalpur town.

Sambalpur lapsed to the British in 1849, and was attached to Bengal until 1862, when it was transferred to the Central Provinces. The early revenue administration was not successful. On the outbreak of the Mutiny in 1857 a general rising of the chiefs took place, and it was not until the final arrest of Surandra Sa, in 1864, that tranquillity was restored. In October 1905 Sambalpur was transferred back again to Bengal, without the subdivisions of Phuljhar and Chandarpur-Padampur.

See *Sambalpur District Gazetteer* (Calcutta, 1909).

SAMBHAR LAKE, a salt lake in Rajputana, India, on the borders of the two states of Jodhpur and Jaipur. The town of the same name has a railway station 53 m. N.E. from Ajmer: pop. (1901) 10,873. The area of the lake when full is about 90 sq. m., but it usually dries up altogether in the hot season. Since 1870 the British government has worked the salt under a lease from the two states interested, supplying great part of N. and Central India. The annual output averages about 126,000 tons, yielding a profit of more than half a million sterling.

SAMBLANÇAY, or Semblançay, a French noble family of Touraine, sprung from the merchant class. The founder of the family was Jean de Beaune (d. *c.* 1489), treasurer of Louis XI., who narrowly escaped death for conspiracy under Charles VIII. His son, Jacques de Beaune, baron de Samblançay, vicomte de Tours, became general of finances before 1497, and from 1518 was superintendent of finances. Convicted of peculation in connexion with the supplies for the army in Italy, he was executed at Montfaucon on the 9th of August 1527. His eldest son, Martin de Beaune, who became archbishop of Tours in 1520, died in the same year as his father. Another son, Guillaume de Beaune, general of finances under his father, and banished from 1527 to 1535, was the father of the famous prelate, Renaud de Beaune (1527–1606), archbishop of Bourges (1581) and of Sens (1595). His efforts at pacification during the wars of religion culminated in the conversion of Henry IV., and it was he who presided at the ceremony of the king's abjuration of Protestantism on the 25th of July 1593. Renaud was one of the most famous orators of his time, and some of his productions have come down to us, as well as his *Réformation de l'université de Paris* (1605 and 1667). A less honourable descendant of Jacques de Beaune was Charlotte de Beaune-Samblançay (*c.* 1550–1617), a courtesan whom Catherine de Medici employed to discover the secrets of her courtly enemies. She counted among her lovers and dupes the king of Navarre (Henry IV.), the duc d'Alençon (Henry III.), Henry I., duc de Guise and others. The duc de Guise was killed when leaving her apartments in the early morning of Christmas Day 1588. She was married early in life to Simon de Fizes, baron de Sauves, a secretary of state, and again in 1584 to François de la Trémoille, marquis de Noirmoutiers, by whom she had a son, Louis, 1st duc de Noirmoutiers, a ducal line which became extinct in 1733. Charlotte died on the 30th of September 1617.

SAMBOURNE, EDWARD LINLEY (1844–1910), English draughtsman, illustrator and designer, was born in London, on the 4th of January 1844. He was educated at the City of London School, and also received a few months' education at the South Kensington School of Art. After a six years' "gentleman apprenticeship" with John Penn & Son, marine engineers, Greenwich, his humorous and fanciful sketches made surreptitiously in the drawing-office of that firm were shown to Mark Lemon, editor of *Punch*, and at once secured him an invitation to draw for that journal. In April 1867 appeared his first sketch, "Pros and Cons," and from that time his work was regularly seen, with rare exceptions, in the weekly pages of *Punch*. In 1871 he was called to the *Punch* "table." At the beginning he made his name by his "social" drawings and especially by his highly elaborated initial letters. He drew his first political cartoon, properly so-called, in 1884, and ten years later began regularly to design the weekly second cartoon, following Sir John Tenniel as chief cartoonist in 1901. Examples of his best work in book illustration are in Sir F. C. Burnand's *New Sandford and Merton* (1872), and in Charles Kingsley's *Water Babies* (1885), which contains some of his most delicate

and delightful drawings. The design for the Diploma for the Fisheries Exhibition (1883) is of its kind one of the most extraordinary things in English art. As a political designer, while distinguished for wit and force, he was invariably refined and good-humoured to the uttermost; yet it is essentially as an artist that he takes his highest place. He died on the 3rd of August 1910.

See M. H. Spielmann, *The History of Punch* (London, 1895).

SAMBUCA, SAMBUTE, SAMBIUT, SAMBUE, SAMBUQUE, an ancient stringed instrument of Asiatic origin generally supposed to be a small triangular harp of shrill tone (Arist. Quint. Meib. ii. p. 101). The sambuca was probably identical with the Phoenician *sabecha* and the Aramaic *sabka*, the Greek form being σαμβύχη. The sabka is mentioned in Dan. iii. 5, 10, 15, where it is erroneously translated sackbut. The sambuca has been compared to the military engine of the same name by some classical writers; Polybius likens it to a rope ladder; others describe it as boat-shaped. Among the musical instruments known, the Egyptian *nanga* best answers to these descriptions. These definitions are doubtless responsible for the medieval drawings representing the sambuca as a kind of tambourine,[1] for Isidor elsewhere defines the symphonia as a tambourine. During the middle ages the word sambuca was applied (1) to a stringed instrument about which little can be discovered, (2) to a wind instrument made from the wood of the elder tree (*sambūcus*). In an old glossary (*Fundgruben*, i. 368), article *vloyt* (flute), the sambuca is said to be a kind of flute. "Sambuca vel sambucus est quaedam arbor parva et mollis, unde haec sambuca est quaedam species symphoniae qui fit de illa arbore." Isidor of Seville (*Etym.* 2. 20) describes it as "Sambuca in musicis species est symphoniarum. Est enim genus ligni fragilis unde et tibiae componuntur." In a glossary by Papias of Lombardy (*c.* 1053), first printed at Milan in 1476, the sambuca is described as a cithara, which in that century was generally glossed "harp," *i.e.* "Sambuca, genus cytherae rusticae."

In *Tristan* (7563-72) the knight is enumerating to King Marke all the instruments upon which he can play, the *sambiut* being the last mentioned:

"Waz ist daz, lieber mann?
—Daz veste Seitspiel daz ich kann."

In a Latin-French glossary (M.S. at Montpelier, H. 110, fol. 212 *v.*) Psalterium = sambue. During the later middle ages sambuca was often translated sackbut in the vocabularies, whether merely from the phonetic similarity of the two words has not yet been established. The great Boulogne Psalter (xi. c.) contains, among other fanciful instruments which are evidently intended to illustrate the equally vague and fanciful descriptions of instruments in the apocryphal letter of S. Jerome, *ad Dardanum*, a *Sambuca*, which resembles a somewhat primitive sackbut (*q.v.*) without the bell joint. It is reproduced by Coussemaker, Lacroix and Viollet-le-Duc, and has given rise to endless discussions without leading to any satisfactory solution. (K. S.)

SAMLAND, a peninsula of Germany, in the province of East Prussia, on the Baltic. It separates the Frisches Haff on the W. from the Kurisches Haff on the N.E., and is bounded on the S. by the river Pregel and on the E. by the Deime. Its shape is oblong; it is 43 m. long, and 18 broad, and has an area of 900 sq. m. The surface is mostly flat, but on the W. sand-hills rise to a height of 300 ft. The chief product is amber. The former episcopal see of Samland was founded by Pope Innocent IV. in 1249 and subordinated to the archbishop of Riga. Bishop Georg von Polentz embraced the Reformation in 1523, and in 1525 the district was incorporated with the duchy of Prussia.

See Reusch, *Sagen des preussischen Samlandes* (2nd ed., Konigsberg, 1863); Jankowsky, *Das Samland und seine Bevölkerung* (Konigsberg, 1902); Hensel, *Samland Wegweiser* (4th ed., Königsberg, 1905); and the *Urkundenbuch des Bistums Samland*, edited by Wölky and Mendthal (Leipzig, 1891–1904).

[1] See Michael Praetorius, *Synt. Mus.* (Wolfenbüttel, 1618), p. 248 and pl. 42, where the illustration resembles a tambourine, but the description mentions strings, showing that the author himself was puzzled.

SAMNAN, SIMNAN, or SEMNAN, a small province of Persia, which, including the city and district of Damghan, is generally known as "Samnan va Damghan." It is bounded on the W. by the districts of Khar (the ancient Choara) and Firuzkuh, on the N. by Mazandaran, and on the E. by Shahrud and Bostam. In the S. it extends beyond the oasis of Jendek in the desert N. of Yezd. Its northern part is still known as Komush or Komish, the ancient Commisene. The revenue amounts to about £7000 per annum.

SAMNAN, the capital of the province, is situated 145 m. E. of Teheran, on the high road thence to Meshed, at an altitude of 3740 ft. in 35° 34′ N., 53° 22′ E. It has a population of about 10,000, post and telegraph offices, and a fine minaret, built in the 12th century. It exports pistachios, almonds and coarse tobacco. A dialect with many old Persian forms and resembling the Mazandaran dialect is spoken.

A. Houtum-Schindler, "Bericht über d. Samnán Dialect," *Zeitsch. d. morgenl. Gesellschaft*, vol. xxxii. (1878).

SAMNITES, the name given by the Romans to the warlike tribes inhabiting the mountainous centre of the S. half of Italy. The word *Samnites* was not the name, so far as we know, used by the Samnites themselves, which would seem rather to have been (the Oscan form of) the word which in Latin appears as Sabini (see below). The ending of *Samnites* seems to be connected with the name by which they were known to the Greeks of the Campanian coast, which by the time of Polybius had become Σαυνῖται; and it is in connexion with the Greeks of Cumae and Naples that we first hear of the collision between Rome and the Samnites.[2] We know both from tradition and from surviving inscriptions (see OSCA LINGUA and R. S. Conway, *The Italic Dialects*, pp. 169 to 206) that they spoke Oscan; and tradition records that the Samnites were an offshoot of the Sabines (see *e.g.* Festus, p. 326 Mueller). On two inscriptions, of which one is unfortunately incomplete, and the other is the legend on a coin of the Social War, we have the form *Safinim*, which would be in Latin **Sabinium*, and is best regarded as the nominative or accusative singular, neuter or masculine, agreeing with some substantive understood, such as *nummum* (see R. S. Conway, *ibid.* pp. 188 and 216).

The abundance of the ethnica ending in the suffix *-no-* in all the Samnite districts classes them unmistakably with the great Safine stock, so that linguistic evidence confirms tradition (see further SABINI). The Samnites are thus shown to be intimately related to the patrician class at Rome (see ROME: *History, ad init.*); so that it was against their own stock that the Romans had to fight their hardest struggle for the lordship of Italy, a struggle which might never have arisen but for the geographical accident by which the Etruscan and Greek settlements of Campania divided into two halves the Safine settlements in central Italy.

The longest and most important monument of the Oscan language, as it was spoken by the Samnites (in, probably, the 3rd century B.C.) is the small bronze tablet, engraved on both sides, known as the *Tabula Agnonensis*, found in 1848 at the modern village Agnone, in the heart of the Samnite district, not very far from the site of Bovianum, which was the centre of the N. group of Samnites called Pentri (see below). This inscription, now preserved in the British Museum, is carefully engraved in full Oscan alphabet, and perfectly legible (facsimile given by Mommsen, *Unteritalische Dialekte*, Taf. 7, and by I. Zvetaieff, *Sylloge inscriptionum Oscarum*). The text and commentary will be found in Conway, *op. cit.* p. 191: it contains a list of deities to whom statues were erected in the precinct sacred to Ceres, or some allied divinity, and on the back a list of deities to whom altars were erected in the same place. Among those whose names are immediately intelligible may be mentioned those of "Jove the Ruler" and of "Hercules Cerealis." The other names are full of interest for the student of both the languages

[2] For the difficult questions involved in the obscure and fragmentary accounts of the so-called First Samnite War, which ended in 341 B.C., the reader is referred to J. Beloch, *Campanien*, 2nd ed., pp. 442 ff., and to the commentators on Livy vii. 29 ff.

and the religions of ancient Italy. The latest attempts at interpretation will be found in R. S. Conway, *Dialectorum Italicarum exempla selecta* (*s.v.*) and C. D. Buck, *Oscan and Umbrian Grammar*, p. 254.

The Samnite towns in or near the upper valley of the Volturnus, namely, Telesia, Allifae, Aesernia, and the problematic Phistelia, learnt the art of striking coins from their neighbours in Campania, on the other side of the valley, Compulteria and Venafrum, in the 4th century B.C. (see Conway, *op. cit.* p. 196).

The Samnite alliance when it first appears in history, in the 4th century B.C., included those tribes which lay between the Paeligni to the N., the Lucani to the S., the Campani to the W., the Frentani and Apuli to the E.: that is to say, the Hirpini, Pentri and Caraceni, and perhaps also the Caudini (J. Beloch, *Italischer Bund*, p. 167, and R. S. Conway, *The Italic Dialects*, pp. 169 and 183); but with these are sometimes classed other friendly and kindred communities in neighbouring territory, like the Frentani and Atina (Liv. x. 39). But after the war with Pyrrhus the Romans for ever weakened the power of the Italic tribes by dividing this central mountainous tract into two halves. The territories of the Latin colony Beneventum (268 B.C.) and the Ager Taurasinus (Livy xl. 38, *C.I.L.*, 1st ed., i. 30) united that of Saticula on the W. (313 B.C.) to that of Luceria on the E., and cut off the Hirpini from their kinsmen by a broad belt of land under Latin occupation (Velleius Pat. i. 14; Liv. lx. 26). At the same time Allifae and Venafrum became praefectures (Fest. p. 233 M), and the Latin colony of Aesernia was founded in 263 B.C. in purely Samnite territory to command the upper Volturnus valley. We hear of no further resistance in the N. of Samnium till the general rising of Italy in 90 B.C.; but the more southerly Hirpini (*q.v.*) henceforth acted independently. (R. S. C.)

SAMOA, an archipelago in the Pacific Ocean, about 150 m. N. of Tonga and nearly midway between the New Hebrides and Tahiti, 1600 m. from Auckland (New Zealand), 2410 from Sydney and 4200 from San Francisco. (For Map, see PACIFIC OCEAN.) It consists of 14 islands forming a slightly curved chain from W. by N. to E. by S., between 13° 30′ and 14° 30′ S., 168° and 173° W. as follows: Savaii, Manono, Apolima, Upolu, Fanuatapu, Manua, Nuutele and Nuulua, belonging to Germany, and Tutuila, Anua, Ofu, Olosenga, Tau and Rose, belonging to the United States of America. The principal of these are Savaii (area, 660 sq. m., pop. 13,200), Upolu (340 sq. m., pop. 18,400), Tutuila (54 sq. m., pop. 3800), and the Manua group, which includes Tau with Ofu and Olosenga (25 sq. m., pop. 2000). Some of the smaller islands are also thickly populated, so that the total population is about 39,000, whites numbering about 500. With the exception of Rose Island, which is an uninhabited coral islet 70 m. E. of its nearest neighbour, and therefore scarcely belongs geographically to the group, all the islands are considerably elevated, with several extinct or quiescent craters rising from 2000 ft. in Upolu to 4000 (Mua) in Savaii. Although there are no active cones, Upolu has in comparatively recent times been subject to volcanic disturbances, and according to a local tradition, outbreaks must have occurred in the 17th or 18th century. In 1866 a submarine volcano near the islet of Olosenga was the scene of a violent commotion, discharging rocks and mud to a height of 2000 ft. Earthquakes are not uncommon and sometimes severe. Coral reefs protect the coasts in many parts; they are frequently interrupted, but the passages through them are often difficult of navigation. The whole group is abundantly watered, and the igneous soil is marvellously fertile. The scenery of the islands is extremely beautiful. Upolu is long and narrow; it has a backbone of mountains whose flanks are scored with lovely valleys, at the foot of which are flat cultivable tracts. Of its harbours Apia and Saluafata, both on the N. coast, are most important. Mount Vaea, which overlooks Apia and Vailima, the home of Robert Louis Stevenson, is his burial-place and bears a monument to his memory. Tutuila, the principal island belonging to the United States, resembles Upolu, and has on its S. side the harbour of Pago Pago or Pango Pango, the finest in the group.

Climate, Flora, Fauna.—The climate is moist and sometimes oppressively hot, though pleasant on the whole. A fine season extends from April to September; a wet season from October to March. The temperature is equable—at Apia the mean annual temperature is 78° F., the warmest month being December (80°) and the coldest July (75°-76°). The prevalent winds, which temper the heat, are the S.E. trades, but W. winds supervene from January to March. The archipelago lies in the track of the fierce hurricanes which occur usually in this period. On the 16th of March 1889 the heavy tidal waves created havoc in the harbour of Apia. The American warship "Nipsic" was cast upon the beach, but was afterwards floated and saved. Two other United States warships, "Trenton" and "Vandalia," were beaten to pieces on the coral reef; and the German warships "Olga" and "Eber" were wrecked with great loss of life. The British warship "Calliope" (Captain Kane) was in the harbour, but succeeded in getting up steam and, standing out to sea, escaped destruction. In *A Footnote to History* R. L. Stevenson vividly describes the heroism of the captain and crew.

The Samoan forests are remarkable for the size and variety of their trees, and the luxuriance and beauty of tree-ferns, creepers and parasites. The coco-nut palm and bread-fruit are of peculiar value to the inhabitants; there are sixteen varieties of the one, and twenty of the other. Hard timber trees, of use in boat-building, &c., are especially characteristic of Savaii.

Of the extremely limited Samoan fauna, consisting mainly of an indigenous rat, four species of snakes and a few birds, the most interesting member is the *Didunculus strigirostris*, a ground pigeon of iridescent greenish-black and bright chestnut plumage, which forms a link between the extinct dodo and the living African *Treroninae*.

Natives.—The Samoans are pure Polynesians, and according to the traditions of many Polynesian peoples Savaii was the centre of dispersion of the race over the Pacific Ocean from Hawaii to New Zealand. Apart from tradition, Samoan is the most archaic of all the Polynesian tongues, and still preserves the organic letter *s*, which becomes *h* or disappears in nearly all the other archipelagos. Thus the term *Savaii* itself, originally *Savaiki*, is supposed to have been carried by the Samoan wanderers over the ocean to Tahiti, New Zealand, the Marquesas and Sandwich groups, where it still survives in such variant forms as *Havaii*, *Hawaiki*, *Havaiki* and *Hawaii*. In any case, the Samoans are the most perfect type of Polynesians, of a light brown colour, splendid physique, and handsome regular features, with an average height of 5 ft. 10 in. Their mental and social standard is high among Pacific peoples; they are simple, honourable, generous and hospitable, but brave fighters. Their idolatry (polytheistic) was unaccompanied by human sacrifice. The dead were buried, and their spirits believed to travel to a world entered by a pool at the western extremity of Savaii. They have become mainly Protestants, Catholics or Mormons, but retain many superstitions connected with their native religion. The women and children are well treated. A youth is not regarded as eligible to marry till tattooed from the hips to the knees. The principal foods of the Samoans are vegetables, coco-nut, bread-fruit, fish and pork. They are famous as sailors and boat-builders. The Samoan language is soft and liquid in pronunciation, and has been called "the Italian of the Pacific." It is difficult to learn thoroughly, owing to its many inflexions and accents, and its being largely a language of idioms. (See also POLYNESIA.)

Administration and Trade.—The German islands form a crown colony. There is an imperial governor, having under him a native high chief assisted by a native council; and there are both German and native judges and magistrates. The United States, on assuming sovereignty over Tutuila and the islands E. of it in 1900, with the written consent of the native chiefs, appointed a naval governor. Cultivation has been extended under European and American rule, and in 1904 the exports from the German islands had reached a value of £83,750, and those from the American islands of £4200. Copra and cocoa beans are the chief articles of export.

History.—It is generally considered that the Manua group was sighted by the Dutch navigator Jacob Roggeveen in 1722, and named by him the Baaumann islands after the captain of one of his ships. Louis de Bougainville obtained a fuller acquaintance with the archipelago in 1768, and called them the Navigators' Islands (*Îles des Navigateurs*). This name is still used. La Pérouse was among the islands in 1787, and on Tutuila lost some of his crew in a conflict with some natives of Upolu visiting the island. Subsequent explorers were Captain Edwards of the "Pandora" in 1791, and Otto von Kotzebue in 1824. In 1830 the respected missionary John Williams paid his first visit to Samoa. Surveys of the archipelago were made by the American explorer Charles Wilkes. The islands, especially Upolu, now began to attract American and European (mostly German) capitalists, and the Hamburg firm of J. C. Godefroy & Son developed the trade of the island. Meanwhile a series of petty

civil wars greatly interfered with the prosperity of the native population, who grouped themselves into two opposing political parties. Americans and Europeans began to discuss the question of annexation, recognizing the importance of the geographical position of the islands. In 1877 the American consul hoisted his country's flag, but the action was repudiated by his government, which, however, in 1878 obtained Pago Pago as a coaling station and made a trading treaty with the natives. In 1879 Germany obtained the harbour of Saluafata. Great Britain followed suit, but under a political arrangement between the powers no single power was to appropriate the islands. But in 1887 and 1888 civil war prevailed on the question of the succession to the native kingship, the Germans supporting Tamasese, and the British and American residents supporting Malietoa. After the latter had been deported by the Germans, the British and American support was transferred to his successor, Mataafa. In the course of the fighting which ensued some fifty German sailors and marines were killed or wounded by the adherents of Mataafa. A conference between the three powers was thereupon held at Berlin, and a treaty was executed by those powers and by Samoa, on the 14th of June 1889, by virtue of which the independence and autonomy of the islands were guaranteed, Malietoa was restored as king, and the three powers constituted themselves practically a protectorate over Samoa, and provided a chief justice and a president of the municipality of Apia, to be appointed by them, to aid in carrying out the provisions of the treaty. The government was administered under this treaty, but with considerable friction, until the end of 1898, when, upon the death of Malietoa, two rival candidates for the throne again appeared, and the chief justice selected by the three powers decided against the claims of Mataafa, and in favour of a boy, Malietoa Tanu, a relative of the deceased Malietoa. Civil war immediately ensued, in which several American and British officers and sailors were killed by the natives, the Germans upholding the claims of Mataafa, and the British and Americans supporting the rival candidate. The three powers thereupon sent a commission to Samoa to investigate and adjust the difficulties. The situation, however, was found to be so complicated and embarrassing that, early in 1900, the so-called Berlin treaty was abrogated, Great Britain withdrew her claims to any portion of the islands and received compensation from Germany by concessions in other parts of the world, and the United States withdrew from all the islands W. of Tutuila. In 1902 the king of Sweden, as arbitrator under a convention signed at Washington in 1899, decided that Great Britain and the United States were liable for injuries due to action taken by their representatives during the military operations of 1899.

See Robert Louis Stevenson, *A Footnote to History* (London, 1892), and *Vailima Letters* (London, 1895); G. Turner, *Samoa a Hundred Years Ago and Long Before* (London, 1884); W. B. Churchward, *My Consulate in Samoa* (London, 1887); J. B. Stair, *Old Samoa* (London, 1897); Mary S. Boyd, *Our Stolen Summer* (London, 1900); L. P. Churchill, *Samoa 'Uma* (London, 1902); *Journal des museums Godeffroy* (Hamburg, 1871-1874); G. Kurze, *Samoa, das Land, die Leute und die Mission* (Berlin, 1899); O. Ehlers, *Samoa, die Perle der Südsee* (Berlin, 1900); F. Reinecke, *Samoa* (Berlin, 1901); A. Kramer, *Die Samoa Inseln* (Stuttgart, 1902 seq.); parliamentary papers, *Correspondence respecting the Affairs of Samoa* (London, 1899, &c.), and 1902 (*Samoa*, Cd. 1083) for the arbitration of the king of Sweden.

SAMOS, one of the principal and most fertile of the islands in the Aegean Sea that closely adjoin the mainland of Asia Minor, from which it is separated by a strait of only about a mile in width. It is about 27 m. in length, by about 14 in its greatest breadth, and is occupied throughout the greater part of its extent by a range of mountains, of which the highest summit, near its western extremity, called Mount Kerkis, is 4725 ft. high. This range is in fact a continuation of that of Mount Mycale on the mainland, of which the promontory of Trogilium, immediately opposite to the city of Samos, formed the extreme point. Samos is tributary to Turkey in the sum of £2700 annually, but otherwise is practically an independent principality, governed by a prince of Greek nationality nominated by the Porte. As chief of the executive power the prince is assisted by a senate of four members, chosen by him out of eight candidates nominated by the four districts of the island—Vathy, Chora, Marathocumbo and Carlovasi. The legislative power belongs to a chamber of 36 deputies, presided over by the metropolitan. The seat of the government is Vathy (6000). There is a telephone service. The island is remarkably fertile, and a great portion of it is covered with vineyards, the wine from the Vathy grapes enjoying a specially high reputation. There are three ports: Vathy, Tegani and Carlovasi. The population in 1900 was about 54,830, not comprising 15,000 natives of Samos inhabiting the adjoining coasts. The predominant religion is the Orthodox Greek, the metropolitan district including Samos and Icaria. In 1900 there were 634 foreigners on the island (523 Hellenes, 13 Germans, 29 French, 28 Austrians and 24 of other nationalities).

History.—Concerning the earliest history of Samos literary tradition is singularly defective. At the time of the great migrations it received an Ionian population which traced its origin to Epidaurus in Argolis. By the 7th century B.C. it had become one of the leading commercial centres of Greece. This early prosperity of the Samians seems largely due to the island's position near the end of the Maeander and Cayster trade-routes, which facilitated the importation of textiles from inner Asia Minor. But the Samians also developed an extensive oversea commerce. They helped to open up trade with the Black Sea and with Egypt, and were credited with having been the first Greeks to reach the Straits of Gibraltar. Their commerce brought them into close relations with Cyrene, and probably also with Corinth and Chalcis, but made them bitter rivals of their neighbours of Miletus. The feud between these two states broke out into open strife during the Lelantine War (7th century B.C.), with which we may connect a Samian innovation in Greek naval warfare, the use of the trireme. The result of this conflict was to confirm the supremacy of the Milesians in eastern waters for the time being; but in the 6th century the insular position of Samos preserved it from those aggressions at the hands of Asiatic kings to which Miletus was henceforth exposed. About 535 B.C., when the existing oligarchy was overturned by the tyrant Polycrates (*q.v.*), Samos reached the height of its prosperity. Its navy not only protected it from invasion, but ruled supreme in Aegean waters. The city was beautified with public works, and its school of sculptors, metal-workers and engineers achieved high repute (see below). After Polycrates' death Samos suffered a severe blow when the Persians conquered and partly depopulated the island. It had regained much of its power when in 499 it joined the general revolt of the Ionians against Persia; but owing to its long-standing jealousy of Miletus it rendered indifferent service, and at the decisive battle of Lade (494) part of its contingent of sixty ships was guilty of downright treachery. In 479 the Samians led the revolt against Persia. In the Delian League they held a position of special privilege and remained actively loyal to Athens until 440, when a dispute with Miletus, which the Athenians had decided against them, induced them to secede. With a fleet of sixty ships they held their own for some time against a large Athenian fleet led by Pericles himself, but after a protracted siege were forced to capitulate and degraded to the rank of tributary state. At the end of the Peloponnesian War Samos appears as one of the most loyal dependencies of Athens; it served as a base for the naval war against the Peloponnesians, and as a temporary home of the Athenian democracy during the revolution of the Four Hundred at Athens (411 B.C.), and in the last stage of the war was rewarded with the Athenian franchise. This friendly attitude towards Athens was the result of a series of political revolutions which ended in the establishment of a democracy. After the downfall of Athens Samos was besieged by Lysander and again placed under an oligarchy. In 394 the withdrawal of the Spartan navy induced the island to declare its independence and re-establish a democracy, but by the peace of Antalcidas (387) it fell again under Persian dominion. It was recovered by the Athenians in 366 after a siege of eleven months, and received a strong body of military settlers. After the Samian War (322), when Athens was deprived of Samos, the vicissitudes of the island can no longer be followed. For some time (about 275–270 B.C.) it served as a base for the Egyptian fleet, at other periods it recognized the overlordship of Syria; in 189 B.C. it was transferred by the Romans to the kings of Pergamum. Enrolled from 133 in the Roman province of Asia, it sided with Aristonicus (132) and Mithradates (88) against its overlord, and consequently forfeited its autonomy, which it only temporarily recovered between the reigns of Augustus and Vespasian. Nevertheless, Samos remained comparatively flourishing, and was able to contest with Smyrna and Ephesus the title "first city of Ionia"; it was chiefly noted as a health resort and for the manufacture of pottery (see below). Under Byzantine rule Samos became the head of the Aegean *theme* (military district). After the 13th century it passed through much the same changes of government as Chios (*q.v.*), and, like the latter island, became the property of the Genoese firm of Giustiniani (1346–1566). At the time of the Turkish conquest it was severely depopulated, and had to be provided with new settlers, partly Albanians.

During the Greek War of Independence Samos bore a conspicuous part, and it was in the strait between the island and Mount Mycale that Canaris set fire to and blew up a Turkish frigate, in the presence of the army that had been assembled for the invasion of the island, a success that led to the abandonment of the enterprise, and Samos held its own to the very end of the war. On the conclusion of peace the island was indeed again handed over to the Turks, but since 1835 has held an exceptionally advantageous position, being in fact self-governed, though tributary to the Turkish empire, and ruled by a Greek governor nominated by the Porte, who bears the title of "Prince of Samos," but is supported and controlled by a Greek council and assembly. The prosperity of the island bears witness to the wisdom of this arrangement. Its principal article of export is its wine, which was celebrated in ancient times, and still enjoys a high reputation in the Levant. It exports also silk, oil, raisins and other dried fruits.

The ancient capital, which bore the name of the island, was situated on the S. coast at the modern Tigani, directly opposite to the promontory of Mycale, the town itself adjoining the sea and having a large artificial port, the remains of which are still visible, as are the ancient walls that surrounded the summit of a hill which rises immediately above it, and now bears the name of Astypalaea. This formed the acropolis of the ancient city, which in its flourishing times covered the slopes of Mount Ampelus down to the shore. The aqueduct cut through the hill by Polycrates may still be seen. From this city a road led direct to the far-famed temple of Hera, which was situated close to the shore, where its site is still marked by a single column, but even that bereft of its capital. This fragment, which has given to the neighbouring headland the name of Capo Colonna, is all that remains standing of the temple that was extolled by Herodotus as the largest he had ever seen, and which vied in splendour as well as in celebrity with that of Diana at Ephesus. Though so little of the temple remains, the plan of it has been ascertained, and its dimensions found fully to verify the assertion of Herodotus, as compared with all other Greek temples existing in his time, though it was afterwards surpassed by the later temple at Ephesus.

The modern capital of the island was, until recently, at a place called Khora, about 2 m. from the sea and from the site of the ancient city; but since the change in the political condition of Samos the capital has been transferred to Vathy, situated at the head of a deep bay on the N. coast, which has become the residence of the prince and the seat of government. Here a new town has grown up, well built and paved, with a convenient harbour.

Samos was celebrated in ancient times as the birth-place of Pythagoras. His name and figure are found on coins of the city of imperial date. It was also conspicuous in the history of art, having produced in early times a school of sculptors, commencing with Rhoecus and Theodorus, who are said to have invented the art of casting statues in bronze. Rhoecus was also the architect of the temple of Hera. The vases of Samos are among the most characteristic products of Ionian pottery in the 6th century. The name Samian ware, often given to a kind of red pottery found wherever there are Roman settlements, has no scientific value. It is derived from a passage in Pliny, *N.H.* xxxv. 160 sqq. Another famous Samian sculptor was Pythagoras, who migrated to Rhegium.

See Herodotus, especially book iii.; Thucydides, especially books i. and viii.; Xenophon, *Hellenica*, books i. ii.; Strabo xiv. pp. 636-639; E. L. Hicks and G. F. Hill, *Greek Historical Inscriptions* (Oxford, 1901), No. 81; B. V. Head, *Historia Numorum* (Oxford, 1887), pp. 515-518; Panofka, *Res Samiorum* (Berlin, 1822); Curtius, *Urkunden zur Geschichte von Samos* (Wesel, 1873); H. F. Tozer, *Islands of the Aegean* (London, 1890); J. Boshlan, *Aus ionischen und italischen Nekropolen*. (L. H. B.; M. O. B. C.; E. Gr.)

SAMOSATA (Σαμόσατα, -ατων, Ptol. v. 15 § 11; Strabo xvi. 749), called in Arabic literature Sumeisāṭ,[1] is now represented by the village of Samsāṭ, occupying a corner of the ancient site. On a broad plain 1500 ft. above sea-level, Samosata practically marks the place where the mountain course of the Euphrates ends (see Mesopotamia). When the water is high enough it is possible to descend in a *kelek* in one day to Bīrejik. The rocky banks contain many ancient cave-dwellings.

The stele found there and published by Humann and Puchstein (*Reisen in Kleinasien u. Nord-Syrien*, Atlas, plate xlix. 1-3) shows that it was at an early time a Hittite centre, probably marking an important route across the Euphrates: whether or not it was the place where later the Persian "royal road" crossed the Euphrates, in Strabo's time it was connected by a bridge with a Seleucia on the Mesopotamian side, and it is now connected by road with Severek and Diarbekr and with Rakka, connecting further, through Edessa and Ḥarrān, with other eastward routes. The Hittite sculptured object referred to above shows influences of an Assyrian type (P. Jensen, *Hittiter u. Armenier*, 1898, 13); but no cuneiform text referring to Samosata by name seems yet to have been published. Kummukh, however, the district to which it belonged, was overrun by early Assyrian kings. In consequence of revolt it was made an Assyrian province in 708 B.C. When the Assyrian empire passed through the hands of Babylon and Persia into those of the successors of Alexander, Samosata was the capital of Kummukh, called in Greek Commagene. How soon it became a Greek city we do not know. Although its ruler Ptolemy renounced allegiance to Antiochus IV. the dynasty of Iranian origin which ruled at Samosata, described by Strabo (*l.c.*) as a fortified city in a very fertile if not extensive district, allied itself with the Seleucids, and bore the dynastic name of Antiochus. There, not long after the little kingdom was in A.D. 72 made a province by the Romans, and its capital received the additional name of Flavia (Suet. *Vesp.* 8; Eutrop. 8. 19), the celebrated Greek writer Lucian the Satirist was born in the 2nd century (see Lucian), and more than a century later another Lucian, known as the Martyr, and Paul called "of Samosata." The remains of a fine aqueduct that once brought water from the Kiakhta Chai, which begins some 6 m. above the town, are probably of the 3rd century A.D. (*Geog. Journ.* viii. 323). Under Constantine Samosata gave place as capital of Euphratensis to Hierapolis (Malal. *Chron.* xiii. p. 317). It was at Samosata that Julian had ships made in his expedition against Sapor, and it was a natural crossing-place in the struggle between Heraclius and Chosroes in the 7th century. Mas'ūdi in the 10th century says it was known also as Ḳal'at aṭ-Ṭīn ("the Clay Castle"). It was one of the strong fortresses included in the county of Edessa (*q.v.*). In the 13th century, according to Yāqūt, one of its quarters was exclusively inhabited by Armenians. It is now a Kurdish village, which in 1894 consisted of about 100 houses, three of which were Armenian (*Geog. Journ.* viii. 322).

SAMOTHRACE (Turk. *Semadrek*), an island in the N. of the Aegean Sea, nearly opposite the mouth of the Hebrus, and lying N. of Imbros and N.E. of Lemnos. The island is a kaza of the Lemnos sanjak, and has a population of 3500, nearly all Greek. It is still called Samothraki, and though of small extent is, next to Mount Athos, by far the most important natural feature in this part of the Aegean, from its great elevation—the group of mountains which occupies almost the whole island rising to the height of 5240 ft. Its conspicuous character is attested by a well-known passage in the *Iliad* (xiii. 12), where the poet represents Poseidon as taking post on this lofty summit to survey the plain of Troy and the contest between the Greeks and the Trojans. This mountainous character and the absence of any tolerable harbour—Pliny, in enumerating the islands of the Aegean, calls it "importuosissima omnium"—prevented it from ever attaining to any political importance, but it enjoyed great celebrity from its connexion with the worship of the Cabeiri (*q.v.*), a mysterious triad of divinities, concerning whom very little is known, but who appear, like all the similar deities venerated in different parts of Greece, to have been a remnant of a previously existing Pelasgic mythology. Herodotus expressly tells us that the "orgies" which were celebrated at Samothrace were derived from the Pelasgians (ii. 51). The only occasion on which the island is mentioned in history is during the expedition of Xerxes (B.C. 480), when the Samothracians sent a contingent to the Persian fleet, one ship of which bore a conspicuous part in the battle of Salamis (Herod. viii. 90). But the island appears to have always enjoyed the advantage of autonomy, probably on account of its sacred character, and even in the time of Pliny it ranked as a free state. Such was still the reputation of its mysteries that Germanicus endeavoured to visit the island, but was driven off by adverse winds (Tac. *Ann.* ii. 54).

After visits by travellers, including Cyriac of Ancona (1444), Richter (1822) and Kiepert (1842), Samothrace was explored in 1857 by Conze, who published an account of it, and of the larger neighbouring islands, in 1860. The "Victory of Samothrace," set up by Demetrius Poliorcetes *c.* 305 B.C., was discovered in the

[1] Not to be confused, as Yāqūt remarks, with Shamshāṭ, the classical Arsamosata (Ptol. v. 13).

island in 1863, and is now in the Louvre. The ancient city, of which the ruins are called Palaeopoli, was situated on the N. side of the island close to the sea; its site is clearly marked, and considerable remains still exist of the ancient walls, which were built in massive Cyclopean style, as well as of the sanctuary of the Cabeiri, and other temples and edifices of Ptolemaic and later date. The modern village is on the hill above. A considerable sponge fishery is carried on round the coasts by traders from Smyrna. On the N. coast are much-frequented hot sulphur springs. In 1873 and 1875 excavations were carried out under the Austrian government.

Conze, *Reise auf den Inseln des Thrakischen Meeres* (Hanover, 1860); Conze, Hauser and Niemann, *Archäologische Untersuchungen auf Samothrake* (Vienna, 1875 and 1880); H. F. Tozer, *Islands of the Aegean* (London, 1890).

SAMOVAR (Russ. *samovarū*), an urn for making tea after the Russian fashion; it is usually of copper, and is kept boiling by a tube filled with live charcoal passing through the centre. The word is usually taken in Russia to mean "self-boiler" (*samū*, self, and *baritī*, boil), but it is more probably an adaptation of a Tatar word *sanabar*, a tea-urn.

SAMOYEDES, a tribe of the Ural-Altaic group, scattered in small groups over an immense area, from the Altai mountains down the basins of the Ob and Yenisei, and along the shores of the Arctic ocean from the mouth of the latter river to the White Sea. The tribe may be subdivided into three main groups: (*a*) The Yuraks in the coast-region from the Yenisei to the White Sea; (*b*) the Tavghi Samoyedes, between the Yenisei and the Khatanga; (*c*) the Ostiak Samoyedes, intermingled with Ostiaks, to the S. of the others, in the forest regions of Tobolsk and Yeniseisk. Their whole number may be estimated at from 20,000 to 25,000. The so-called Samoyedes inhabiting the S. of the governments of Tomsk and Yeniseisk have been much under Tatar influence and appear to be of a different stock; their sub-groups are the Kamasin Tatars, the Kaibals, the Motors, the Beltirs, the Karagasses and the Samoyedes of the middle Ob.

The proper place of the Samoyedes among the Ural-Altaians is very difficult to determine. As to their present name, signifying in its present Russian spelling "self-caters," many ingenious theories have been advanced, but that proposed by Schrenk, who derived the name "Samo-yedes" from "Syroyadtsy," or "raw-caters," leaves much to be desired. Perhaps the etymology ought to be sought in quite another direction, namely, in the likeness to Suomi. The names assumed by the Samoyedes themselves are Hazovo and Nyanyäz. The Ostiaks know them under the names of Orghoy, or Workho, both of which recall the Ugrians; the name of Hui is also in use among the Ostiaks, and that of Yaron among the Syrgenians.

The language now spoken by the Samoyedes belongs to the Finno-Ugrian group, and is allied to Finnish but has a more copious system of suffixes (see FINNO-UGRIC). It is a sonorous speech, pleasant to the ear. No fewer than three separate dialects and a dozen sub-dialects are known in it.

The conclusions deducible from their anthropological features—apart from the general difficulty of arriving at safe conclusions on this ground alone, on account of the variability of the ethnological type under various conditions of life—are also rather indefinite. The Samoyedes are recognized as having the face more flattened than undoubtedly Finnish stocks; their eyes are narrower, their complexion and hair darker. Zuyev describes them as like the Tunguses, with flattened nose, thick lips, little beard and black, hard hair. At first sight they may be mistaken for Ostiaks—especially on the Ob—but they are undoubtedly different. Castrén considers them as a mixture of Ugrians with Mongolians, and Zograf as brachycephalic Mongolians. Quatrefages classes them, together with the Voguls, as two families of the Ugrian sub-branch, this last, together with the Sabmes (Lapps), forming part of the Ugrian or Boreal branch of the yellow or Mongolic race.

It is probable that formerly the Samoyedes occupied the Altai mountains, whence they were driven N. by Turco-Tatars. Thus, the Kaibals left the Sayan mountains and took possession of the Abakan steppe (Minusinsk region), abandoned by the Kirghizes, in the earlier years of last century, and in N.E. Russia the Zyrians are still driving the Samoyedes farther N., towards the Arctic coast. Since the researches of Schrenk it may be regarded as settled that in historical times the Samoyedes were inhabitants of the so-called Ugria in the northern Urals, while Radlov considers that the numberless graves containing remains of the Bronze Period which are scattered throughout W. Siberia, on the Altai, and on the Yenisei in the Minusinsk region, are relics of Ugro-Samoyedes. According to his views this nation, very numerous at that epoch—which preceded the Iron-Period civilization of the Turco-Tatars,—were pretty well acquainted with mining; the remains of their mines, sometimes 50 ft. deep, and of the furnaces where they melted copper, tin and gold, are very numerous; their weapons of a hard bronze, their pots (one of which weighs 75 lb), and their melted and polished bronze and golden decorations testify to a high development of artistic feeling and industrial skill, strangely contrasting with the low level reached by their earthenware. They were not nomads, but husbandmen, and their irrigation canals are still to be seen. They kept horses (though in small numbers), sheep and goats, but no traces of their rearing horned cattle have yet been found. The Turkish invasion of S. Siberia, which took place in the 5th century, drove them farther N., and probably reduced most of them to slavery.

The Samoyedes, who now maintain themselves by hunting and fishing on the lower Ob, partly mixed in the S. with Ostiaks, recall the condition of the inhabitants of France and Germany at the epoch of the reindeer. Clothed in skins, like the troglodytes of the Vesper, they make use of the same implements in bone and stone, eat carnivorous animals—the wolf included—and cherish the same superstitions (of which those regarding the teeth of the bear are perhaps the most characteristic) as were current among the Stone-Period inhabitants of W. Europe. Their heaps of reindeer horns and skulls—memorials of religious ceremonies—are exactly similar to those dating from the similar period of civilization in N. Germany. Their huts often resemble the well-known stone huts of the Esquimaux; their graves are mere boxes left in the tundra. The religion is fetishism mixed with Shamanism, the shaman (*tadji-bei*) being a representative of the great divinity, the Num. The Yalmal peninsula, where they find great facilities for hunting, is especially venerated by the Ob Ostiak Samoyedes, and there they have one of their chief idols, Khese. They are more independent than the Ostiaks, less yielding in character, although as hospitable as their neighbours. They are said to be disappearing owing to the use of ardent spirits and the prevalence of smallpox. They still maintain the high standard of honesty mentioned by historical documents, and never will take anything left in the tundra or about the houses by their neighbours. The Yurak Samoyedes are courageous and warlike; they offered armed resistance to the Russian invaders, and it is only since the beginning of the century that they have paid tribute. The exact number of the Ostiak Samoyedes is not known; the Tavghi Samoyedes may number about 1000, and the Yuraks, mixed with the former, are estimated at 6000 in Obdorsk (about 150 settled), 5000 in European Russia in the tundras of the Mezen, and about 350 in Yeniseisk.

Of the S. Samoyedes, who are completely Tatarized, the Beltirs live by agriculture and cattle-breeding in the Abakan steppe. They profess Christianity, and speak a language closely resembling that of the Sagai Tatars. The Kaibals, or Koibals, can hardly be distinguished from the Minusinsk Tatars, and support themselves by rearing cattle. Castrén considers that three of their stems are of Ostiak origin, the remainder being Samoyedic. The Kamasins, in the Kansk district of Yeniseisk, are either herdsmen or agriculturists. They speak a language with an admixture of Tatar words, and some of their stems contain a large Tatar element. The interesting nomadic tribe of Karagasses, in the Sayan mountains, is disappearing; the few representatives are rapidly losing their anthropological features, their Turkish language and their distinctive dress. The Motors are now little more than a memory. One portion of the tribe emigrated to China and was there exterminated; the remainder have disappeared among the Tuba Tatars and the Soyotes. The Samoyedes on the Ob in Tomsk may number about 7000; they have adopted the Russian manner of life, but have difficulty in carrying on agriculture, and are a poverty-stricken population with little prospect of holding their own.

The works of M. A. Castrén are still the best authority on the Samoyedes. See *Grammatik der samoyedischen Sprachen* (1854); *Dictionary* (1855); *Ethnologische Vorlesungen über die altaischen Völker* (1857); *Versuch einer koibalischen und karagassischen Sprachlehre* (1857). See also A. Middendorf, *Reise in den äussersten Norden und Osten Sibiriens* (1875).

SAMPAN, the name of the typical light boat of far Eastern rivers and coastal waters; it is usually propelled by a single scull over the stern, and the centre and after part is covered by an awning or screen of matting. The word is said to be Chinese, *san*, thin, and *pan*, board. Others take it to be of Malay origin.

SAMPIERDARENA (*San Pier d'Arena, i.e.* St Peter of the Sands), a town of Liguria, Italy, in the province of Genoa, 2½ m. by rail W. of the city of that name, 16 ft. above sea-level. Pop. (1906) 37,582 (town); 43,654 (commune). It is practically a suburb of Genoa and contains a number of handsome palaces, including the Palazzo Spinola and the Palazzo Scassi, both probably built by G. Alessi. It has become a place of great industrial and commercial activity, the Ansaldo ship-building yard being the most important of its workshops. Near the

neighbouring town of Cornigliano is a bridge, where Masséna signed the capitulation of Genoa.

SAMPLE (through the O. Fr. *essemple*, from Lat. *exemplum*; a doublet of "example"), a small portion of merchandise taken from the whole to serve as a specimen or evidence of the whole; hence a pattern or model. Sale by sample obviates the necessity on the part of sellers of keeping large quantities of goods on premises unsuitable for storage, and on the part of buyers of having to make a special visit to inspect the goods in bulk. The sale of goods by sample is dealt with in England by the Sale of Goods Act 1893, s. 15, which provides that a contract of sale shall be a contract for sale by sample where there is a term in the contract, express or implied, to that effect. In the case of such a contract, there must be (*a*) an implied condition that the bulk shall correspond with the sample in quality; (*b*) an implied condition that the buyer shall have a reasonable opportunity of comparing the bulk with the sample; (*c*) an implied condition that the goods shall be free from any defect, rendering them unmerchantable, which would not be apparent on reasonable examination of the sample. (See also SALE OF GOODS.)

SAMPLER (from O. Fr. *essemplaire*, with dropping of initial *a*, Late Lat. *exemplariam*, from *exemplum*, example; it is a doublet of "examplar" or "exempler," as "sample" is of "example"), a model or pattern to be copied, particularly a small rectangular piece of embroidery worked on canvas or other material as a pattern or example of a beginner's skill in needlework, as a means of teaching the stitches. Down to comparatively recent times every little girl worked her "sampler," and examples of 17th-century work are still found and have become the object of the collector's search. They usually contained the alphabet, the worker's name, the date, and Bible texts, verses, mottoes, the whole surrounded with some conventional design.

The earliest sampler in existence is dated 1643 and is in the Victoria and Albert Museum, South Kensington (see M. B. Huish, *Samplers and Tapestry Embroideries*, 1900, and *List of Samplers in the Victoria and Albert Museum, South Kensington*, Board of Education, South Kensington, 1906).

SAMPSON, WILLIAM THOMAS (1840-1902), American naval commander, was born at Palmyra, New York, on the 9th of February 1840, and graduated at the head of his class from the U.S. Naval Academy in 1861. In this year he was promoted to master, and in the following year was made lieutenant. He was executive officer in the "Patapsco" when she was blown up in Charleston Harbor in January 1865. He served on distant stations and (1868–1871 and 1876–1878) at the Naval Academy, and became lieutenant-commander in 1866 and commander in 1874. He was a member of the International Prime Meridian and Time Conference in 1884, and of the Board of Fortifications in 1885–1886; was superintendent of the Naval Academy from 1886 to 1890; and was promoted to captain and served as delegate at the International Maritime Conference at Washington in 1889. He was chief of the Bureau of Ordnance in 1893–1897. About 95 % of the guns employed in the Spanish-American War were made under his superintendence. His influence was felt decisively in the distribution of guns and armour, and in the training of the *personnel* of the navy. He superintended the gunnery training and prepared a new drill-book for the fleet. In February 1898 Sampson, then a captain, was president of Board of Inquiry as to the cause of destruction of the "Maine." At the outbreak of the war with Spain he was placed in charge of the N. Atlantic squadron, and conducted the blockade of Cuba. When it was known that Admiral Cervera, with a Spanish fleet, had left the Cape Verde Islands, Sampson withdrew a force from the blockade to cruise in the Windward Passage, and made an attack upon the forts at San Juan, Porto Rico. After his return to the coast of Cuba he conducted the blockade of Santiago, and the ships under his command destroyed the Spanish vessels when they issued from the harbor of Santiago and attempted to escape (see SPANISH-AMERICAN WAR). Sampson himself was not actually present at the battle, having started for Siboney just before it began to confer with General Shafter, commanding the land forces. He reached the scene of battle as the last Spanish vessel surrendered, and the engagement was fought in accordance with his instructions. He was promoted to commodore in 1898, to rear-admiral on the 3rd of March 1899, and was made commandant of the Boston (Charlestown) Navy Yard in October of the same year. He died on the 6th of May 1902.

SAMSON (cf. Heb. *shémesh*, "sun"), in the Bible, the antagonist of the Philistines, reckoned as one of the "judges" of Israel (Judg. xv. 20, xvi. 31); the story itself (Judg. xiii. 2–xvi. 31*a*), however, represents him not as a judge but as a popular hero of vast strength and sarcastic humour. He is consecrated from his birth to be a Nazarite or religious devotee (ch. xiii., cf. Samuel), and it is possible that this was conceived simply as a vow of revenge, which is the meaning it would have in an Arab story (W. R. Smith). But he is inspired by no serious religious or patriotic purpose, and becomes the enemy of the Philistines only from personal motives of revenge, the one passion which is stronger in him than the love of women. The stories of his exploits are plainly taken from the mouths of the people and have all the appearance of folk-tales, not unmixed with mythical motives. Samson commenced his career by strangling a lion on his way to visit a Philistine woman. On his return he found that the carcase, like the skull of Onesilus (Herod. v. 114), was occupied by a swarm of bees; he took the honey and the incident suggested a riddle. The narrative of Samson's marriage and riddle is of peculiar interest as a record of manners; specially noteworthy is the custom of the wife remaining with her parents after marriage.[1] His next exploit, an act of revenge for the faithlessness of his wife, was to catch 300 foxes and set them loose in the fields with firebrands tied to their tails. (Analogous customs, *e.g.* the Roman Cerealia, are referred to in G. F. Moore's *Commentary*, p. 341.) The Philistines retaliated by burning her and her father's household, and Samson in his turn smote them "hip and thigh" and slew a thousand men with the jawbone of an ass.[2] The story has apparently been influenced by the existence of a rock, called by reason of its shape, "Ass's Jawbone," from which issued a fountain called *En-hakkōrē*, "the spring of the caller" (a name for the partridge). The well-known removal of the gates of Gaza to Hebron, 40 m. distant—"no journey of the Sabbath-day" (Milton, *Samson Agonistes*)—has been rendered still more marvellous by a later exaggeration (xvi. 2). Finally the Philistine Delilah (*q.v.*) worms out of Samson the secret of his strength, and by shaving his head[3] renders him an easy captive. He is blinded and put to menial work, and as his hair grows again his invincible strength returns. At a festival of Dagon he is led out before the Philistines in the temple, and by pulling down the house upon their heads kills more at his death than in all his life-time.

Points of similarity between Samson and the Babylonian Gilgamesh, the Egyptian Horus-Ra and Hercules, have been observed by many writers, and it has been inferred that the whole story of Samson is a solar myth. His name, and the proximity of Beth-shemesh ("house of the sun") to his father's home, favour the view that mythical elements have attached themselves to what may have been originally a legendary figure of the Danites, the tribe whose subsequent fortunes

[1] In Judg. xiv. 1-10 the narrative has been revised; originally Samson went down alone to Timnath to contract his marriage. The metrical riddle and its answer are thus translated by G. F. Moore (*Sacred Books of the Old Testament: Judges*):

"Out of the eater came something to eat,
And out of the strong came something sweet."

"If with my heifer ye did not plough,
Ye had not found out my riddle, I trow."

No doubt the Hebrews, like the Arabs, were fond of enigmas; see 1 Kings x. 1, and *Ency. Biblica*, *s.v.* "Riddle."

[2] The punning couplet of the original is thus rendered by G. F. Moore: "with the jawbone of an ass, I assailed my assailants" (more literally "I piled them in heaps," or perhaps "flayed them clean").

[3] For the hair as the seat of strength cf. J. G. Frazer, *Golden Bough*,[2] iii. 390 seq. In ch. xiii. the consecration of the hair is regarded differently.

are narrated in the chapters immediately following (Judg. xvii.-xviii.).

On the mythological interpretations, see further Ed. Stucken, *Mitteil. d. vorderasiat. Gesells.* (1902), iv. 54 (with references); Völter, *Ägypten und die Bibel* (Leiden, 1909), pp. 119-132; A. Jeremias, *Alte Testament im Lichte des alten Orients* (Leipzig, 1906), pp. 478 sqq., and the commentaries on the Book of JUDGES (*q.v.*). (S. A. C.)

SAMSON (1135–1211), abbot of St Edmund's, was educated in Paris and became a teacher in Norfolk, the county of his birth. In 1166 he entered the great Benedictine abbey of St Edmund's as a monk and was chosen abbot in February 1182. He was a careful and vigilant guardian of the property of the abbey, but he found time to attend royal councils and to take part in public business; also he was frequently entrusted with commissions from the pope. During the absence of Richard I. from England he acted with vigour against John and visited the king in his prison in Germany. He did some building at the abbey, where he died on the 30th of December 1211. Samson is famous for the encouragement which he gave to the town of Bury St Edmunds, the liberties of which he extended in spite of his own monks. His name is most familiar owing to the references to him in Carlyle's *Past and Present*.

See the chronicle of Jocelyn of Brakeloud in vol. i. of the *Memorials of St Edmund's Abbey*, edited by T. Arnold (1890); and J. R. Green, *Stray Studies* (1892).

SAMSON, JOSEPH ISIDORE (1793–1871), French actor and playwright, was born at St Denis on the 2nd of July 1793, the son of a restaurant keeper. He took the first prize for comedy at the Conservatoire in 1812, married an actress with whom he toured France, and came to the Comédie Française in 1826. Here he remained until 1863, creating more than 250 parts. He became a professor at the Conservatoire in 1829, and under him Rachel, Rose Chéri (1824–1861), the Brohans and others were trained. He wrote several comedies, among them *La Belle-Mère et le gendre* (1826), and *La Famille poisson* (1846). Samson died in Paris on the 28th of March 1871.

SAMSUN (anc. *Amisus*), the chief town of the Janik sanjak of the Trebizond vilayet of Asiatic Turkey, situated on the S. coast of the Black Sea between the deltas of the Kizil and Yeshil Irmaks. Pop. about 15,000, two-thirds Christian. It is connected by metalled roads with Sivas and Kaisarieh, and by sea with Constantinople. It is a thriving town, and the outlet for the trade of the Sivas vilayet. Steamers lie about 1 m. from the shore in an open roadstead, and in winter landing is sometimes impossible. Its district is one of the principal sources of Turkish tobacco, a whole variety of which is known as "Samsun." Samsun exports cereals, tobacco and wool. Both exports and imports are about stationary, the Angora railway having neutralized any tendency to rise. Amisus, which stood on a promontory about 1½ m. N.W. of Samsun, was, next to Sinope, the most flourishing of the Greek settlements on the Euxine, and under the kings of Pontus it was a rich trading town. By the 1st century A.D. it had displaced Sinope as the N. port of the great trade route from Central Asia, and later it was one of the chief towns of the Comneni of Trebizond. There are still a few remains of the Greek settlement. (D. G. H.)

SAMUEL, a prominent figure in Old Testament history, was born at Ramah and was dedicated to the service of Yahweh at the sanctuary of Shiloh where his youth was spent with Eli (*q.v.*).[1] Here he announced the impending fate of the priesthood and gained reputation throughout Israel as a prophet. Best known as "king-maker," two distinct accounts are preserved of his share in the institution of the monarchy. In one, the Philistines overthrow Israel at Ebenezer near Aphek, Eli's sons are slain, and the ark is captured (1 Sam. iv.). After a period of oppression, Samuel suddenly reappears as a great religious leader of Israel, summons the people to return to Yahweh, and convenes a national assembly at Mizpah. The Philistines are defeated at Ebenezer (near Mizpah) through the direct interposition of Yahweh, and Samuel rules peacefully as a theocratic judge (vii). But in his old age the elders demand a king, his sons are corrupt, a monarchy and a military leader are wanted (viii. 3, 5, 20). The request for a monarchy is a deliberate offence against Yahweh (viii. 7, cf. x. 19, xii. 12); nevertheless, an assembly is called, and the people are warned of the drawbacks of monarchical institutions (viii. 11-21; note the milder attitude in Deut. xvii. 14-20). At Mizpah, after another solemn warning, the sacred lot is taken and falls upon Saul of Benjamin, who, however, is not at first unanimously accepted (x. 17-27*a*). About a month later (x. 27*b*; see Revised Version, margin), Saul—with Samuel (xi. 7)—leads an army of Israel and Judah to deliver Jabesh-Gilead from the Ammonites, and is now recognized as king. Samuel in a farewell address formally abdicates his office, reviews the past history, and, after convincing the people of the responsibility they had incurred in choosing a king, promises to remain always their intercessor (xii., cf. Jer. xv. 1). So, according to one view, Samuel's death marks a vital change in the fortunes of Israel (xxv. 1, xxviii. 3, 6, 15). But, according to an earlier account, instead of a state of peace after the defeat of the Philistines (vii. 14) the people groan under their yoke, and the position of Israel moves Yahweh to pity. Samuel is a local seer consulted by Saul, and is bidden by Yahweh to see in the youth the future ruler. Saul is privately anointed and receives various signs as proof of his new destiny (ix. 1–x. 16). Despite the straitened circumstances of Israel, an army is mustered, a sudden blow is struck at the Philistines, and, as before, supernatural assistance is at hand. The Hebrews who had fled across the Jordan (xiii. 7), or who had sought refuge in caverns (xiii. 6, xiv. 11), or had joined the enemy (xiv. 21), rallied together and a decisive victory is obtained. That these two accounts are absolutely contradictory is now generally recognized by Biblical scholars, and it is to the former (and later) of them that the simple story of Samuel's youth at Shiloh will belong. Next we find that Samuel's interest on behalf of the Israelite king is transferred to David, the founder of the Judaean dynasty, and it is his part to announce the rejection of Saul and Yahweh's new decision (xiii. 7*b*-15*a*, xv. 10-35, xxviii. 17), to anoint the young David, and, as head of a small community of prophets, to protect him from the hostility of Saul (xvi. 1-13, xix. 18-24).

All these features in the life of Samuel reflect the varying traditions regarding a figure who, like Elijah and Elisha, held an important place in N. Israelite history. That he was an Ephrathite and lived at Ramah may only be due to the incorporation of one cycle of specifically local tradition; the name of his grandfather Jeroham (or Jerahmeel, so Septuagint) suggests a southern origin, and one may compare the relation between Saul and the Kenites (1 Sam. xv. 6) or Jehu and the Rechabites (2 Kings x. 15). But, although his great victory in 1 Sam. vii. may imply that he was properly a secular leader, comparable to Othniel, Gideon or Jephthah (see 1 Sam. xii. 11, cf. Heb. xi. 32), the idea of non-hereditary rulers over all Israel in the pre-monarchical age is a later theory (see JUDGES). However, so epoch-making an event as the institution of the monarchy naturally held a prominent place in later ideas and encouraged the growth of tradition. The Saul who became the first king of N. Israel must needs be indebted to the influence of the prophet (cf. Jehu in 2 Kings ix.). While the figure of Samuel grows in grandeur, the disastrous fate of Saul invited explanation, which is found in his previous acts of disobedience (1 Sam. xv., xxviii. 16-18; cf. Ahab, 1 Kings xx. 35-43). Further, while on the one side the institution of the monarchy is subsequently regarded as hostile to the pre-eminence of Yahweh, Samuel's connexion with the history of David belongs to a relatively late stage in the history of the written traditions where events are viewed from a specifically Judaean aspect. Samuel's name ultimately becomes a by-word for the inauguration and observance of religious custom (see 1 Chron. ix. 22, xxvi. 28, 2 Chron. xxxv. 18, Ps. xcix. 6, Ecclus. xlvi. 13 sqq.). According to the late post-exilic genealogies he was of Levitical origin (1 Chron. vi. 28, 33). See further DAVID; SAMUEL, BOOKS OF; SAUL. (S. A. C.)

SAMUEL OF NEHARDEA, usually called MAR SAMUEL or YARḤINAI (*c.* 165–*c.* 257), Babylonian Rabbi, was born in Nahardea in Babylonia and died there *c.* 257. He is associated

[1] The name Samuel (*Shĕmū'ēl*), on the analogy of Penuel, Reuel, seems to mean "name (*i.e.* manifestation) of El" (God). Other interpretations are "posterity of God" or "his name (*shĕmō*; perhaps Yahweh's) is God." "Heard of God," based on 1 Sam. i. 20, is quite impossible and the interpretation of the passage is really only appropriate to Saul ("the asked one"): the two names are sometimes confused in the Septuagint (*Ency. Bib.* col. 4303, n. 3). Ramah is presumably er-Rām, 5 m. N. of Jerusalem (probably the Arimathaea of Matt. xxvii. 57), or Bēt Rīma, W. of Jiljilia (Gilgal), and N.W. of Beitin, *i.e.* Bethel (cf. the Ramathaim of 1 Macc. xi. 34).

with the fame of his great contemporary Rab (Abba Araka *q.v.*). Besides his mastery in the traditional Law, which added much to the growing reputation of the Rabbinic Academy of his native town, Samuel was famed for his scientific attainments. In particular his knowledge of astronomy was profound, and he was one of the first to compile a Calendar of the Jewish year, thus preparing the way for the fixation of the festivals by means of scientific calculations. But Samuel's fame rests on the service which he rendered in adapting the life of the Jews of the diaspora to the law of the land. "The law of the State is binding law," was the principle which Samuel enunciated, here carrying to its logical outcome the admonition of Jeremiah. When the king of Persia, Shapur, captured Mazaca-Caesarea, the Cappadocian capital, Samuel refused to mourn for the 12,000 Jews who lost their lives in its defence. As Graetz says: "To Jeremiah and Mar Samuel Judaism owes the possibility of existence in a foreign country."

See Graetz, *History of the Jews* (English translation), vol. ii. ch. xix. (I. A.)

SAMUEL, BOOKS OF, two books of the Old Testament, which in the Jewish canon are ranked among the Former Prophets (Joshua-Kings), in contrast to the Latter Prophets (Isaiah-Malachi). The division into two (like the two Hebrew books of Kings) follows the Septuagint and the Vulgate, whose four books of "kingdoms" correspond to the Hebrew books of Samuel and Kings. Both Samuel and Kings, like Judges, are made up of a series of extracts and abstracts from various sources, worked over from time to time by successive editors, and freely handled by copyists down to a comparatively late date, as is shown by the numerous and often important variations between the Hebrew text and the Greek version (Septuagint). The main redaction of Judges and Kings was made under the influence of the ideas which characterize Deuteronomy, that is, after the reforms ascribed to Josiah (2 Kings xxiii.); but in Samuel the "Deuteronomistic" hand is much less prominent and the chronological system which runs through Judges and Kings occurs only sporadically. The book of Samuel completes the history of the "judges" of Israel, (11th century B.C.), and begins by relating the events which led to the institution of the monarchy under Saul, the part played by Samuel being especially prominent (1 Sam. i.–xiv.). The interest is then transferred to David, the founder of the Judaean dynasty, and his early life is narrated with great wealth of detail. As Saul loses the divine favour, David's position advances until, after the death of Saul and the overthrow of Israel, he gains the allegiance of a disorganized people (1 Sam. xv.–2 Sam. iv.), and Jerusalem becomes the centre of his empire (v.–viii.) —*c.* 1000 B.C. A more connected narrative is now given of the history of David (ix.–xx.), which is separated from the account of his death and Solomon's accession (1 Kings i. ii.) by an appendix of miscellaneous contents (xxi.-xxiv.). Three lines of interest are to be recognized: (*a*) that naturally taken by Israel (the northern kingdom) in the history of its first king, Saul; (*b*) the leading position of the prophets in the political and religious events; and (*c*) the superiority of the Judaean dynasty, a feature of paramount importance in the study of a book which has come ultimately through Judaean hands. (On the ambiguity of the name "Israel," see JEWS, § 5).

1. Position and contents.

Proof of the diversity of sources is found in the varying character of the narratives (historical, romantic, &c.); in the different literary styles (annalistic, detailed and vivid, Deuteronomic); in the representation of different standpoints and tastes; in the concluding summaries, 1 Sam. xiv. 47-51 compared with xv., 2 Sam. viii. compared with x.; in the double lists in 2 Sam. viii. 15-18, xx. 23-26, &c. The religious views are so varied that a single writer or even a single age cannot be postulated; note especially 1 Sam. xv. 22 seq. contrasted with the use of teraphim in xix. 13, and the different conceptions of Yahweh (1 Sam. xii. 21 seq., xv. 22 and xxvi. 19, &c.).[1] Unsystematic additions appear to have been made from time to time on a considerable scale, and we not seldom find two accounts of the same events which not only differ in detail but are certainly of very different date. Thus, the saying "Is Saul also among the prophets?" (1 Sam. x. 12) finds another explanation in xix. 18-24, where Samuel holds a new position as head of a community of prophets and the words are adapted to an incident in the history of David, who flees *north* (not south) and is wondrously preserved. The episode, with the interview between Saul and Samuel, and with its interesting attitude to Saul and to the prophets, was evidently unknown to the writer of xv. 35. Other and more profound differences relating to the rise of the monarchy (§ 2), the career of Saul (§ 3) and David's conquest of Jerusalem (§ 4) represent irreconcilable historical background.

The first part of the book is concerned with *Samuel and Saul*. The introductory account (i.-iv.1*a*) of the birth, dedication and calling of the young prophet Samuel is a valuable picture of religious life at the sanctuary at Shiloh. It is connected by the prophecy of the punishment of the house of Eli (iii. 11 sqq.) with the defeat of the Israelites by the Philistines at Ebenezer near Aphek, the loss of the ark (iv. 1*b*-22), and its subsequent fortunes (v.–vii. 1). A Philistine oppression of twenty years ends when Samuel, here the recognized "judge" of Israel, gains a great victory at Ebenezer near Mizpah (vii.). But the overthrow of the Philistines is also ascribed to Saul (xiv.), there is no room for both in the history of the prophet (see vii. 14), and it is now generally recognized that two conflicting representations have been combined. In one (*a*) Samuel, after his victory, continues to rule peacefully as a theocratic judge over the Israelites, the people demand a king, and although their request is viewed as hostile to the worship of Yahweh the tribes are summoned at Mizpah and the sacred lot falls upon Saul of Benjamin (vii. viii. x. 17-27). But in the other (*b*) the Philistines have occupied the heart of the land, the Israelites are thoroughly disorganized, and their miserable condition moves Yahweh to send as a deliverer the otherwise unknown Saul, who is anointed by Samuel, a seer of local renown (ix. 1–x. 16, xiii. xiv.). The conclusion of the former is found in Samuel's farewell address (xii.) and the entire representation of Samuel's position, Saul's rise, and the characteristic attitude towards the monarchy (viii. 7, x. 19, xii. 12, cf. Deut. xvii. 14-20, Judg. viii. 22 seq., Hos. viii. 4, xiii. 11), separate it sharply from the relatively fragmentary narrative in (*b*); see further SAMUEL. The former, now predominating, account (*a*) is that of the Deuteronomic school, and, although a running narrative, appears on closer inspection to be based upon earlier sources of different origin. The account of Eli, Shiloh and the ark (i.–iii.) is the natural prelude to iv.–vii. 1, where, however, we lose sight of Samuel and the prophecy. The punishment of Eli and his sons (iv.) becomes a passing interest, and the fate of the ark is by no means so central an idea as its wonder-working in the Philistine territory. Moreover, the sequel of the defeat in iv. is not stated, although other allusions to the fall of Shiloh (Jer. vii. 12-15, xxvi. 6, 9, Ps. lxxviii. 60 sqq.), and the subsequent reappearance of the priestly family at Nob (xxi. seq.) have led most scholars to the conclusion that a fuller account of the events must have been extant. A narrative of Eli and the priesthood of Shiloh has probably been used to form an introduction to Samuel's victory (vii.), and it has been supplemented partly by the account of the early life of the future prophet and judge (note the present abrupt introduction of Eli in i. 3) and partly by narratives of the history of the ark (v. seq.). That this section was handled at a relatively late period is clear not only from the presence of the Deuteronomic prophecy in ii. 27-36 (see § 6), but also from the insertion of Hannah's psalm (ii. 1-10)—the prototype of the "Magnificat"—a post-exilic passage, "probably composed in celebration of some national success" (Driver), the present suitability of which rests upon the interpretation placed on verse 5.

2. Institution of the monarchy.

For the more fragmentary account of Saul's rise (ix. 1–x. 16, xiii. 2-7*a*, 15*b*-23, xiv. 1-47), see above, page 194. Chapter xi., where he leads Israel and Judah to the rescue of their kinsmen of Jabesh-Gilead,

[1] It is of course necessary to note carefully whether the religious ideas have any real chronological value. Thus, 1 Sam. xvii. 36, 46 seq. contain ideas of Yahweh characteristic of exilic and post-exilic writings (see T. K. Cheyne, *Ency. Bib.* col. 1755), but no proof of an early date is furnished by xxvi. 19*b* (cf. Ruth i. 16, 1 Kings xx. 23, 2 Kings xvii. 26 seq.); or 2 Sam. xxiv. 1 (cf. 1 Kings xxii. 20, Ezek. xlv. 9), or 2 Sam. xxi. 1 (note drought as the punishment for not rebuilding the temple, Hag. i.; or for not attending the feast of Tabernacles, Zech. xiv. 16-19).

represents a situation which belongs to (*a*) rather than to the state of chaos represented in (*b*); it describes how the newly-elected king proved his worth (cf. x. 27, xi. 12 seq.). The compiler has used a story in which Saul is a private individual of Gibeah, whither the messengers came in the course of their mission (xi. 4 seq.). This valuable narrative is of quite distinct origin. Further, Samuel's speech includes himself among the past judges (xii. 11, cf. vii.), and refers to an Ammonite invasion (*v.* 12). The latter finds no place in the present history, although the local story of Jephthah's deliverance of Gilead (Judg. xi.) has been treated as the occasion of a general Ammonite oppression, which leads to an Israelite gathering, also at Mizpah (Judg. x. 7, 9, 17). For other evidence of compositeness in this section, see A. Lods, *Études de théologie* (Paris, 1901), pp. 250-284, and below, § 6.

Saul.—Saul's reign is introduced in xiii. 1 where a blank has been left for his age at accession (some MSS. insert "thirty"); the duration of his reign is also textually uncertain. The formula is parallel to that in 2 Sam. ii. 10 seq., v. 4 seq., and frequently in the Book of Kings, with the additional feature that the age at accession, there usually confined to the Judaean kings, is here given for the Israelite Saul and his son Ishbosheth (*i.e.* Ishbaal). The summary in xiv. 47 sqq. is evidently by an admirer; it is immediately followed by a reference to the continuous Philistine warfare (*v.* 52, contrast vii. 13) which forms an introduction to the life of David. This summary gives a picture of Saul's ability and position which differs so markedly from the subsequent more extensive narratives of David's history that its genuineness has sometimes been questioned; nevertheless it is substantiated by the old poem quoted from the Book of Jashar in 2 Sam. i. 19-27, and a fundamental divergence in the traditions may be assumed. Similarly in 2 Sam. ii. 8-10*a*, the length of Ishbaal's reign conflicts with the history of David (ii. 11 and iv. 1–v. 3), and the reorganization of (north) Israel with the aid of Abner does not accord with other traditions which represent David as the deliverer of (all?) Israel from the Philistine yoke (iii. 18, xix. 9). But ii. 8-10*a*, in common with 1 Sam. xiii. 1, xiv. 47-51 (cf. also the introduction in 1 Sam. vii. 2 and the conclusion vii. 15-17), are of a literary character different from the detailed narratives; the redactional or annalistic style is noticeable, and they contain features characteristic of the annals which form the framework of Kings.[1] In Kings the Israelite and Judaean records are kept carefully separate and the independent standpoint of each is at once obvious. Here, however, much complication arises from the combination of traditions of distinct origin: independent records of Saul having been revised or supplemented by writers whose interest lay in David. Little old tradition of Saul is preserved. The disastrous overthrow of Israel in the north (xxxi.) finds its explanation in an interview with the dead Samuel (xxviii. 3-25, here a famous prophet), where the Israelite catastrophe is foreshadowed, and Saul learns that he has lost the favour of Yahweh, and that his kingdom will pass to David (*vv.* 16-19). Allusion is made to his campaign against Amalek (mentioned in xiv. 48 apparently as an active enemy), the story of which contains another denunciation and again a reference to the coming supremacy of David (xv. 28). This peculiar treatment of Saul's history by writers of the prophetical school (cf. Ahab in 1 Kings xx. 35-43) has been adapted to the life of David, and the Amalekite war (1 Sam. xv.) is now the prelude to the anointing of the youth of Bethlehem by Samuel (xvi. 1 sqq.). Yet another account of Saul's rejection is found in xiii. 8-14, even before his defeat of the Philistines, and Saul is warned of the impending change (cf. *v.* 13 seq. with 2 Sam. vii. 11-16). But the incident was evidently unknown to the author of chap. xv., and in this subordination of the history of Saul to that of David, in the reshaping of writings by specifically Judaean hands, we have a preliminary clue to the literary growth of the book.

3. The kingdom of Saul.

The unambiguous allusions in xiii. 13 seq., xv. 26-28, and the anointing of David by Samuel in xvi. are ignored in the narratives of the relations between David and Saul, of whose first meeting two contradictory accounts are given (contrast xvi. 21 sqq. and xvii. 55 sqq.). The independent stories of David place him in the south of Judah, an outlaw with a large following, or a vassal of the Philistines; and his raids upon south Judaean clans are treated as attacks upon Saul's kingdom (xxvii. 10-12). But the earlier stages are extremely confused. Two very similar narratives describe Saul's pursuit of David in the Judaean desert (xxiv. xxvi.)[2] The main points are Saul's confession and his recognition that David would prevail (xxvi. 21-25); the latter is more emphatic when he foresees that David will gain the kingdom of Israel and he adjures him to spare his seed (xxiv. 20-22). This last feature is prominent in xxiii. 15-18 (the prelude to xxiv.), where a passage is inserted to describe the covenant between David and Saul's son Jonathan. The account of David's flight is equally intricate. The tradition that David slew Goliath, brought his head to Jerusalem, and deposited his sword in Nob (xvii., cf. xxi. 9, xxii. 10) is incompatible with the simpler notice in 2 Sam. xxi. 19 (1 Chron. xx. 5 seeks to avoid the discrepancy); and even if the *name* Goliath be a later addition to the story of some great exploit (A. R. S. Kennedy, *Sam.*, pp. 122, 149), or a descriptive title (W. E. Barnes, *Chron.*, p. 104), it is surely difficult, on historical grounds, to reconcile David's recurring fights with the Philistines with his subsequent escape from Saul to Achish of Gath (xxvii.; already anticipated in xxi. 10-15); see further § 6. Saul's jealousy, however, is in some way kindled, and there is already a hint at David's succession (xviii. 8 sqq., Septuagint omits 10 seq.). The stories of Merab (xviii. 17-19) and Michal (*vv.* 20 sqq.) are duplicate, and a number of internal difficulties throughout are only partially removed in the shorter text of the Septuagint. In xx. David has realized Saul's hatred; but Jonathan scarcely credits it, although in xix. 1-7 Saul had instructed his attendants to slay the youth and his son had effected a reconciliation. This is ignored also in xix. 8-10 (cf. xviii. 10 seq., xx. 31 sqq.), and again in *vv.* 11-17 where David is saved by Michal his wife (see xxv. 44), and in *vv.* 18-24 (David with Samuel, see § 1 end). Even in xx. the urgent preparations for flight are delayed in *vv.* 11-17, where Jonathan entreats David's kindness for his descendants (see 2 Sam. ix. 1, below), and again in *vv.* 40-42, where the second meeting with a renewal of the covenant stultifies the preceding plans.[3]

David.—All the stories of the relations between the founders of the respective monarchies are so closely interwoven that the disentanglement of distinct series of narratives is a task of the greatest difficulty.[4] They reflect in varying forms the popular interest in David and are of the greatest value in illustrating current traditions, thought and styles of literature. Apart from the more detailed and continuous history, there are miscellaneous passages in 2 Sam. v.–viii., with introduction (v. 1-3), and a concluding chapter rounding off his reign (viii.). A similar collection in xxi.–xxiv. severs the narratives in ix.–xx. from David's death in 1 Kings i.–ii. Their contents range over all periods, from the Amalekite war (viii. 12, cf. 1 Sam. xxx.) to David's "last words" (xxiii. 1, but see 1 Kings i. and ii. 1). In particular they narrate the capture of Jerusalem from the Jebusites (v. 6-10) and other fights in that district as far as Gezer (*vv.* 17-25), the purchase of land from a Jebusite for the erection of an altar (xxiv.; see 1 Chron. xxi.–xxii. 1, 2 Chron. iii. 1), and the remarkable story of the pacification of the Gibeonites (xxi. 1-14). With the conflicts in v. are closely connected the exploits in xxi. 15 sqq., xxiii. 8 sqq., and the probability of some disarrangement is supported by the repetition of the list of officials in viii. 15-18 and xx. 23-26, which many scholars (after Budde) attribute to the later insertion of ix.–xx. 22. On this view, at an earlier stage the two groups v.–viii., xxi.–xxiv. were contiguous—though

4. The kingdom of David.

[1] Characteristic expressions of Deuteronomic writers are found in 1 Sam. xiv. 47 seq. (cp. Judg. ii. 14 sqq.); similarly in the (north) Israelite writer in 2 Kings xiii. 3 sqq. (see KINGS).

[2] It is difficult to decide which is the older; for xxvi. see especially M. Löhr, *Sam.*, p. xlv.; H. Gressmann, *Schriften d. A. T., ad loc.*; for xxiv. see W. W. Guth, *Journ. of Bibl. Lit.* (1906), pp. 114 sqq.

[3] The keen interest in Jonathan is also conspicuous at the very commencement of Saul's career, where the youth (in ix. Saul himself appears to be represented as an inexperienced youth) is the centre of the narrative (see xiii. 3, xiv. 1-14, 17, 21, 27-45), rather than the father who now achieves the task to which he was called by Yahweh. But the revision has been too complicated for any satisfactory discussion of the literary stages.

[4] On the attempts (especially of K. Budde, *Richter u. Samuel*, 1890, and elsewhere) to recover here the Yahwistic (or Judaean) and Elohistic (or Ephraimite) sources of the Hexateuch, see the criticisms of B. Stade, *Theolog. Lit. Zeitung* (1896), No. 1; Steuernagel, *ib.* (1903), No. 17; W Riedel, *Theol. Lit. Blatt* (1904), No. 3, col. 28; also H. P. Smith, *Journ. Bibl. Lit.*, 15 (1896), pp. 1-8; and W. W. Guth, *Die ältere Schicht in den Erzählungen über Saul u. David* (1904); and "Unity of the Older Saul-David Narratives" (see note 2 above).

not necessarily in their *present* form or order.[1] Budde's further conclusion that 1 Kings i. ii. 1-9, 13 sqq. were likewise wanting (*Sam.* p. xi.) is also valuable, since (*a*) 2 Sam. v.–viii. (with xxi.–xxiv.) finds its natural continuation, on the analogy of the Deuteronomic compiler's framework in Kings, in 1 Kings ii. 10-12, iii. 2, and (*b*) 1 Kings v. 3 seq. (also Deuteronomic) explicitly points back to the summary of the wars in 2 Sam. viii. It is commonly recognized that the compiler of 2 Sam. v.–viii. has wrongly placed *after* the capture of Jerusalem (v. 6 sqq.) the conflict with the Philistines (v. 17 sqq.), where the "hold" is not Zion but some place of retreat, perhaps Adullam (cf. xxiii. 14). This being so, the conflicts in xxi. 15 sqq., xxiii. 8 sqq., which are located around Gath, Lehi (so read xxiii. 11), Pasdammim (so *v.* 9; see 1 Chron. xi. 13), Bethlehem, and the valley of Rephaim, should also precede the occupation of Jerusalem and the subsequent partition of territory among David's sons and others (*e.g.* xiii. 23, near Bethel). These passages combine to furnish a representation of the events leading to the capture of the capital which is distinct from and now superseded by the detailed narratives in ii. 12–iv. Here, Ishbaal is east of the Jordan, David's men are engaged in fighting Benjamin and Israel—even at Gibeon (about 6 m. N.W. of Jerusalem), the interest of the history is in David's former relations with Israel at Saul's court, and he is regarded as the future deliverer of the oppressed people. These stories are, in fact, of a stamp with the detailed narratives already noticed (§ 3), and they conflict with the fragmentary traditions of David's steps to Jerusalem as seriously as the popular narratives of Saul conflicted with older evidence. But already Josh. ix. 17, xv. 63; Judg. i. 21, 29, 35, xix. 10-12; 2 Sam. v. 6 (cf. xxi. 2), indicate the presence of a line of alien cities including Jerusalem itself, and would point to an important alien district, the existence of which obviously bears upon the trustworthiness of the group of narratives encircling Bethlehem of Judah and Gibeah of Benjamin, the traditional homes of David and Saul.[2] On the other hand, this would ignore the representation of (north) Israelite extension over Judah by Joshua and Saul,[3] and it may be inferred that we have to allow for absolutely different and conflicting standpoints in regard to the history of the district, and that the Judaean traditions of David once had their own independent account of the occupation of Jerusalem and its neighbourhood. The fragments preserved in 2 Sam. v.–viii., xxi.–xxiv. are quite distinct from ii. 12–iv.; they throw another light upon David's relations to Saul's family (xxi. 1-14); and the stories of heroic conflicts with giant-like figures of Gath, &c. (xxiii. 9 seq., 18, cf. 1 Chron. xi. 11, 20) find no place by the side of the more detailed records of David's sojourn under the protection of a king of Gath, one of a confederation of Philistine cities (1 Sam. xxvii., xxix.). It is probable that popular stories of the conquest of the earlier inhabitants have been applied to the Philistines; their general character associates them with the legends of the "sons of Anak" who enter into Judaean (perhaps originally Calebite) tradition elsewhere (Num. xiii. 22; Josh. xi. 21 seq., xv. 14; see Budde, *Sam.*, p. 310 seq.).[4] Several intricate literary problems however at once arise in connexion with the two series v.–viii., xxi.–xxiv., and ix.–xx., since, apart from their earlier literary growth as distinct units, they have undergone some revision and alteration when compilers brought them into their present form.

The story of David and Bathsheba, an incident placed in the account of the Ammonite campaign, upon which it now depends (x.–xii.; with x. 15-19 cf. viii. 3-8), connects itself through the prophecy in xii. 10-12 with the subsequent family feuds, in particular with Absalom's rebellion (cf. xvi. 21 seq.), and again with 1 Kings i., where Adonijah's revolt rouses Bathsheba to persuade David to fulfil some promise of his to recognize her young son Solomon as his heir (i. 13, 17, 21, 29 seq.). The section is an admirable specimen of historiography. The whole is closely linked together for an ostensible purpose, a chronological scheme runs throughout (xiii. 23, 38, xiv. 28 and xv. 7),[5] and the section concludes with an account both of David's death and of Solomon's accession (see further SOLOMON). But 2 Sam. xii. 10-12 is an insertion (Wellhausen, Cornill, Kittel, &c.), even if xii. 1-15*a* itself be not of secondary origin (Winckler, Schwally, H. P. Smith, Nowack, Budde, Dhorme); and of the related passages, xv. 16 is a gloss (Budde), on xx. 3 see below, and the authenticity of xvi. 21-23 in its present context is not beyond doubt (see also AHITHOPHEL). Although xxi. 1-14 and ix. are of entirely distinct standpoints,[6] both are presupposed in xvi. 5-14, xix. 16-23, and in xvi. 1-4, xix. 24-30 respectively; the gloss xxi. 7 evidently dates *after* the insertion of ix., while the opening words of ix. 1 point back, not to xxi. which is ignored, but rather to iv., from which it is now severed by the miscellaneous group of passages in v.–viii.[7] In view of a few recognized signs of diverse origin (contrast xiv. 27 with xviii. 18, and see Budde on xv. 24 sqq., xvii. 17), it is possible that xvi. 1-14, xix. 16-30 are also secondary. In any case the new revolt of Sheba (xx. 1-22), can hardly be the original sequel to Absalom's rebellion (Winckler, H. P. Smith, B. Luther, E. Meyer); there is no historical prelude to 1 Kings i. (note the opening verse, David's old age, and cf. 2 Sam. xxiii. 1), and the literary introduction to the story of Sheba is to be found in the closing scene of xix., apparently at the point where David returns to the Jordan on his way to Gilgal (*v.* 40).[8] It is to be noticed that the murder of Amasa (xx. 8 sqq.) is parallel to that of Asahel (ii. 12 sqq.), and the two (now preceding the separate groups v.–viii. and xxi.–xxiv.) are closely associated in 1 Kings ii. 5.

The miscellaneous groups, v.–viii., xxi.–xxiv., are also certainly not in their original form. The introduction in v. 1-3 is twofold (*v.* 3 and the incomplete *v.* 1 seq.), and the list in iii. 2-5 (note the resuming link *v.* 6 after *v.* 1) is similar in character to that in v. 13-16, and has probably been removed from the context of the latter (cf. 1 Chron. iii. 1-8). The presence of a late hand is also proved by the psalm in xxii. (Ps. xviii.) and by David's "last words," which sever xxi. 15-22 and xxiii. 8 sqq. These in turn part two related narratives in xxi. 1-14 and xxiv., and the latter (with which note the divergent features in 1 Chron. xxi.) shows several signs of later origin or revision. Chap. vii. is to be read in the light of 1 Kings v. 3-5, viii. 14 sqq., all Deuteronomic passages, though not of one stamp. Continuous warfare prevented the building of the temple (1 Kings v. 3-5, cf. 2 Sam. viii.), and David's proposal to erect a house to Yahweh seems unnecessary after vi. 17 seq.; but vii. 1, 9, in fact, presuppose ch. viii., and the main object of the narrative is to emphasize Yahweh's promise to build David's house, *i.e.* his dynasty. vii. is connected with 1 Kings viii. but an important variation (*v.* 16 contrast 2 Sam. vii. 6-8) illustrates the complexity of the Deuteronomic sources. It is important to notice that, as in the account of the temple in the history of Solomon, the introduction to it in these chapters (2 Sam. vi. seq.) divides miscellaneous though closely-related material (see KINGS). On their prelude in 1 Sam. vi. see below, § 6.

5. Narratives of Saul and David.

Thus, the account of David's conflicts with giant heroes and the conquest of Jerusalem and its district seems to belong to a cycle of Judaean tradition (cf. Num. xiii. 22, 28; Josh. xi. 21, xv. 14), which has been almost superseded by other traditions of the rise of the Hebrew monarchy and by the more popular narratives of early relations between the Judaean David and the (north) Israelite king and

[1] Cornill, Nowack, Stenning and Kennedy (see *Literature*, below) accept Budde's suggestion that ix.–xx. were inserted by a hand later than the first Deuteronomic editor of viii.; but the further assumption that this editor had deliberately omitted ix.–xx. from his edition cannot be proved, and deals with a literary stage too early for any confident opinion or even for any critical investigation of value.

[2] "Jerusalem" in 1 Sam. xvii. 54 is usually treated as an anachronism, because of its occupation by the Jebusites, and Kirjath-jearim (vii. 1, 2, perhaps *Kiryat el-Enab*, 9 m. W. of Jerusalem) is commonly admitted to be in alien hands. But it is clear that Nob (1 Sam. xxi. seq.), about 2 m. N. of the capital, on this view, was scarcely an Israelite city, yet the presence of the priests of Shiloh there is essential to the present structure of the book.

[3] For Joshua, see the older portions of Josh. x., and for Saul, 1 Sam. xiv. 47-51 (his wars), xv. 4 (his Judaean army), xvii. 54 (Jerusalem), xxvii. 7-12 (south Judaean clans under Israelite suzerainty) and 2 Sam. i. 12 (Septuagint).

[4] For this cf. the "Anakim" of Gaza, Gath and Ashdod, &c., in Josh. xi. 21 seq., with the "Philistine" lords, *ib.* xiii. 3, and see PHILISTINES.

[5] In xv. 7 we must read *four* for *forty* (the vow in this verse refers to Absalom's exile some years previously).

[6] On this and on the character of the detailed narratives in general, see B. Luther in E. Meyer, *Israeliten u. ihre Nachbarstämme*, pp. 184-199. See, generally, the studies by W. Caspari, *Aufkommen u. Krise d. israel. Königtums unter David* (1909) and *Theol. Stud. u. Krit.* (1909), pp. 317 sqq., 619 sqq.; and also H. Gressmann (*Literature*, below).

[7] Chap. ix. belongs to the joint traditions of David and Saul (cf. ii. 5–iv.); *v.* 13, which presupposes chap. v., appears to be an addition (see H. P. Smith, Dhorme).

[8] xix. 40 (all Judah and *half* Israel) resumes *v.* 15 (where Israel is not mentioned). For the view that Absalom's revolt originally concerned Judah alone, see the related section in DAVID. Dhorme, it may be observed, finds in ix.–xx. another source for x. 1-14, xii. 1-15*a*, xv. 1-6, 10, 24-26, 29, xvi. 5-14, xvii. 27-29, xix. 16-23 and xx. 1-22.

people. The persistent emphasis upon such features as the rejection of Saul, his enmity towards David, the latter's chivalry, and his friendship for Jonathan, will partly account for the present literary intricacies; and, on general grounds, traditions of quite distinct origin (Calebite or Jerahmeelite; indigenous Judaean; North Israelite or Benjamite) are to be expected in a work now in post-exilic form.[1] David's history is handled independently of Saul in 1 Sam. xxv.; and the narrative, now editoria y connected with the context (*v.* 1, see xxviii. 3, and *v.* 44, see 2 Sam. iii. 15), gives a valuable picture of his life in the south of Palestine.[2] With this notice his relations with south Judaean cities in xxx. 26-31. His flight northwards to the Philistine king of Gath (xxvii.) is hardly connected with the preceding situations in xxiv. 17-22, xxv. or xxvi. 21-25, and his previous slaughter of the Philistines at Keilah (xxiii. 1-15) raises historical difficulties. This is not to mention his earlier successes over the same people, which are very explicitly ignored in xxix. 5, although the famous couplet there quoted now finds its only explanation in xviii. 7 after the death of Goliath and the defeat of the Philistines. The traditions of varying relations between Judah and the Philistines attached to David (cf. xxvii. 5 seq.) are quite distinct from the popular stories of giants of Gath, and now form part of the joint history of David and Saul. The independent narratives of the latter's fate seem to represent one of those disastrous attacks upon the north which are familiar in the later history of the northern kingdom (xxviii. 4, xxix; see JEWS: *History*, § 12). The geographical data are confused by the stories of David (see 1 Sam. xxviii. 4, xxix. 1, and the commentaries), and, while the "Philistines" for once march north to Jezreel to deliver their attack, David's presence is not discovered until Aphek is reached (xxix.). His journey is the opportunity for an Amalekite raid (xxx. cf. xxvii. 8 seq.), and this new defeat of Amalek, ascribed to David, proves a more successful undertaking than that which led to the rejection of Saul (xv. 20 seq. 26-28). Similarly, Saul's disaster leaves Israel again in the hands of the "Philistines" (xxxi. 7, cf. xiii. 6 seq.), and it is for David to save the people of Israel out of their hands (2 Sam. iii. 18, cf. 1 Sam. ix. 16).[3] The sequel to the joint history has another version of Saul's death (2 Sam. i. 6-10, 13-16), and an Amalekite is the offender; contrast his death in i. 15 seq. with iv. 10 seq. The chapter explains the transference of the royal insignia from Israel to Judah. Here is quoted (from the "Book of Jashar") the old poetical lament over the death of the valiant friends Saul and Jonathan, describing their successful warlike career, the wealth they brought the people, and the vivid sense of national misfortune (i. 19-27). It is utilized for the history of David, to whom its authorship is attributed. In general, it appears that those narratives wherein the histories of Saul and David are combined—very much in the favour of the latter—were originally distinct from those where (*a*) Saul's figure is more in accord with the old poem from the Book of Jashar, and (*b*) where David's victories over prehistoric giants and his warlike movements to Jerusalem pave the way for the foundation—from a particular Judaean standpoint—of his remarkably long dynasty.

6. Literary and historical problems.

The literary problems of the books of Samuel are those of the writing of the history of the monarchies from different points of view; and the intimate connexion of the books with those that precede and follow shows that a careful consideration of the internal literary and historical features of these also is necessary. The first step is the recognition of a specific Deuteronomic redaction in Joshua—Kings, an intricate process which extended into the post-exilic age.[4] Certain phenomena suggest that the first compilation was made outside Judah—in Israel, whereas others represent a Judaean and anti-Israelite feeling. The close interconnexion of Judg. x.–1 Sam. xii. is as crucial as that of 2 Sam. v.–1 Kings ii. The (probably Deuteronomic) framework of Israelite history in Kings can be traced in Samuel, and it is a natural assumption that it should have gone back beyond the time of Jeroboam I. While the detailed history of Israelite kings and prophets in 1 Kings xvii.–2 Kings x. (Ahab to Jehu) finds more developed parallels in the narratives of Saul and Samuel, the peculiar treatment of the lives of David and Solomon (Judaean kings over a united Israel) and of the division of the monarchy has complicated the present sources. Although the contents of 2 Sam. v.-viii., xxi.-xxiv., 1 Kings ii. 10-12, iii. 2, appear to have been consecutive (in some form) at an earlier stage, the connexion has been broken by ix.-xx., 1 Kings i. ii. 1-9, 13 sqq., and the further vicissitudes can scarcely be recovered; and while there are clear signs of more than one Deuteronomic hand in the former group, the latter shows in 1 Kings ii. 2-4 a Deuteronomic revision, either of independent origin or in the combination of the sources in their present form. Moreover, Samuel's farewell address (1 Sam. xii.) belongs to the Deuteronomic and later account of Saul's rise, and closes the period of (*a*) the Israelite "judges" (see Judg. ii. 6–iii. 6, an extremely composite passage), and (*b*) the Ammonite and Philistine oppression (*ib.* x. 6 sqq.).[5] The former follows upon Joshua's two concluding speeches, one given by a Deuteronomic writer in xxiii., and the other incorporated by another though similar hand in xxiv. Although the pre-monarchical age is viewed as one of kinglike "judges," the chiefs are rather local heroes (so Ehud, Gideon, Jephthah), and the boisterous giant Samson (Judg. xiii.-xvi.), and the religious leaders Eli and Samuel are "judges" from other standpoints. Perplexity is caused, also, in the oldest account of Saul's rise (1 Sam. ix.) by the sudden introduction of a Philistine oppression which cannot be connected with vii. 2–viii., or even with 1 Sam. iv.–vii. 1.[6] On the other hand, Judg. x. 6 sqq. refers to a Philistine oppression which has no sequel. It may be conjectured that there was an original literary connexion between the two which has been broken by the insertion of traditions relating to Samuel and Saul.[7] This finds support (*a*) in the internal evidence for the later addition of Judg. xvii.-xxi., and of certain portions of the opening chapters of 1 Samuel; (*b*) in the absence of any continuity in the intervening history; and (*c*) in the material relationship between portions of the highly composite Judg. x. 6 sqq. and the rise of Saul. The literary processes thus involved find an analogy in the original connexion between 2 Sam. v.-viii. and xxi.-xxiv., or between Exod. xxxiii. seq. and Num. x. 29-36, xi. (see SAUL).

The section 1 Sam. iv.-vii. 1 forms the prelude to Samuel's great victory and belongs to the history of Shiloh and the priesthood of Eli. But the fall of this sanctuary scarcely belongs to this remote age (11th century); it was sufficiently recent to serve as a warning to Jerusalem in the time of Jeremiah (close of 7th century). This event of supreme importance to north Israel (cf. Judg. xviii. 30 seq.) is already connected with Samuel's prophecy in iii., but the latter is strengthened by the Deuteronomic passage, ii. 27-36, which links the disaster, not with the history of Samuel, but with the rise of the Zadokite Levites of Jerusalem, and thus represents a specifically Judaean standpoint. This is analogous to the Judaean adaptation of the prophetical treatment of Saul's life, and it also reflects certain priestly rivalries (see LEVITES). With the loss of Shiloh is explained the appearance of the priests at Nob outside Jerusalem (xxi. 1, xxii. 9), which is followed by their massacre, the flight of Abiathar (xxii.), and the transference of the sacred ephod to David (xxiii. 6).[8] Here, however, the emphasis laid upon the ephod brought by Abiathar, the survivor of the house of Eli (cf. ii. 28, xxi. 9), points away from what was once a common object of cult to the late and post-exilic restriction of its use to the Aaronite high priests (see EPHOD).

Moreover, according to 1 Kings ii. 26, Abiathar bore the *ark*, and while some traditions traced its history to Shiloh, or even found it at Bethel (Judg. xx. 27 seq.), others apparently ran quite another course, associated it with southern clans ultimately settled in Judah, and supposed that Jerusalem was its first resting-place. The author of 2 Sam. vii. 6 (cf. also 1 Chron. xxiii. 25 sq.) can scarcely have known 1 Sam. i.-iii. with its temple at Shiloh, and although 2 Sam. vi. finds its present prelude in 1 Sam. vi. 17–vii. 1, that passage actually brings the story of its fortunes to a close by relating the return of the ark from Philistine territory to the care of Abinadab and Eleazar at Kirjath-jearim (note the "Levitical" type of the names; Budde, *Sam.* p. 47). From Josh. ix. 17 (post-exilic source) it might indeed be argued that the district was not under Israelite jurisdiction (see Kennedy, *Sam.* p. 325 seq.), although to judge from the older

[1] The late genealogy of Saul in 1 Chron. viii. 29 sqq., ix. 35 sqq., is evidence for a keen interest in the Saulidae in post-exilic times.

[2] The chapter with the prophecy of Abigail may be of Calebite origin.

[3] So also, David's wars (2 Sam. viii.) bear a certain resemblance to those of Saul (1 Sam. xiv. 47).

[4] See G. F. Moore, *Ency. Bib.* "Historical Literature," § 6 seq. "Joshua," §§ 5, 11; "Judges," § 14.

[5] With the length of office in 1 Sam. iv. 18 (cf. vii. 15) compare the similar notices in Judg. x. 2 seq., xii. 7 sqq., xv. 20, xvi. 31, and with the length of oppression in vii. 2, cf. Judg. iii. 8, 14, iv. 3, vi. 1, x. 8, xiii. 1.

[6] Nowack, p. 39; Riedel, *Theolog. Lit. Blatt* (1904), No. 3, col. 28.

[7] S. A. Cook, *Critical Notes*, p. 127 seq. (cf. Dhorme, *Rev. Bibl.*, 1908, p. 436; Godbey, *Amer. Journ. Theol.*, 1909, p. 610).

[8] Although writers sought to explain Saul's disastrous end (cf. 1 Chron. x. 13), it is only Josephus (*Ant.* vi. 14, 9) who refers to the atrocity at Nob. The significance of the tradition is unknown; some connexion with Saul's religious zeal at Gibeon has been conjectured (2 Sam. xxi. 2). That the actual murderer was an Edomite may perhaps be associated with other traditions of Edomite hostility.

traditions of Saul it was doubtless part of his kingdom. It may be that the narrative (which presuppose some account of the fall of Shiloh) is part of an attempt to co-ordinate different traditions of the great palladium.[1]

7. Summary.

Consequently, the literary structure of the Book of Samuel is throughout involved with a careful criticism of the historical traditions ascribed to the 11th and beginning of the 10th century B.C. The perspective of the past has often been lost, earlier views have been subordinated to later ones, conflicting standpoints have been incorporated. The intricacy of the Deuteronomic redactions still awaits solution, and the late insertion of earlier narratives (which have had their own vicissitudes) complicates the literary evidence. Greater care than usual was taken to weave into the canonical representation of history sources of diverse origin, and it is scarcely possible at present to do more than indicate some of the more important features in the composition of a book, one of the most important of all for the critical study of biblical history and theology.

The Hebrew text is often corrupt but can frequently be corrected with the help of the Septuagint. The parallel portions in Chronicles also sometimes preserve better readings, but must be used with caution as they may represent other recensions or the result of rewriting and reshaping. As a whole, Chronicles presents the period from a later ecclesiastical standpoint, presupposing (in contrast to Samuel) the fully developed "Mosaic" ritual (see CHRONICLES). After tribal and priestly lists (1 Chron. i.-ix.), Saul's end is suddenly introduced (x., note *v.* 13 seq.). David appears no less abruptly, the sequence being 2 Sam. v. 1-3, 6-10, xxiii. 8-39 (with additions, xi. 41-47, and a list of his supporters at Ziklag and Hebron). To 2 Sam. vi. 2-11 there is a "Levitical" prelude (xiii. 1-5), then follow v. 11-25, and vi. 12-19, which is embedded in novel material. Next, 2 Sam. vii. seq., x., xi. 1, xii. 30 seq., xxi. 18-22, and finally xxiv. (Chron. xxi.). The last is the prelude to an account of the preparation for the temple and the future sovereignty of Solomon, and ends with David's army and government (Chron. xxvii.), and his concluding acts (xxviii. seq.). The compiler was not ignorant of other sources (see x. 13, xii. 19, 21, 23), and, in general, carries out, though from a later standpoint, tendencies already manifest in Samuel. The latter in fact is no less the result of editorial processes and since it is now in post-exilic form, this is the starting-point for fresh criticism. The representation of the remote past in Samuel must be viewed, therefore, in the light of that age when, after a series of vital internal and external vicissitudes in Judah and Benjamin, Judaism established itself in opposition to rival sects and renounced the Samaritans who had inherited the traditions of their land. See further JEWS, §§ 6-8, 20-23, PALESTINE: *Old Test. History*, pp. 614-616.

LITERATURE.—See further the commentaries of M. Lohr (1898); W. Nowack, K. Budde (1902); H. P. Smith in the *International Critical Commentary* (1899), with his *Old Testament History*, pp. 107-155, and the small but well-annotated edition of A. R. S. Kennedy in the *Century Bible* (1905). All these give fuller bibliographical information, for which see also S. R. Driver, *Introduction to Literature of Old Testament*, and the articles by J. Stenning in Hastings's *Dictionary* and B. Stade in *Ency. Bib.* For the text, see especially J. Wellhausen's model *Text-Bücher Sam.* (1871); S. R. Driver, *Text of Samuel* (1890); K. Budde's edition in Haupt's *Sacred Books of the Old Testament* (1894); P. Dhorme, *Livres de Samuel* (1910). Of special value for the psychological character of the various narratives is H. Gressmann's *Schriften d. A. T. in Auswahl*, i.-iii. (Göttingen, 1909–1910). In so far as the present article takes other views of the results of literary analysis in the light of historical criticism, see S. A. Cook, *American Journ. of Sem. Lang.* (1900), pp. 145 sqq.; and *Critical Notes on Old Testament History* (1907) (*passim*). (S. A. C.)

SANA (*Senā'a*), a town in S. Arabia, the capital of the Turkish vilayet of Yemen. It is situated in 15° 22′ N. and 44° 10′ E. in a broad valley running nearly N. and S., 7250 ft. above sea-level, on the E. slope of the great meridional range, over which the road runs to Hodeda, on the Red Sea coast 130 m. distant, crossing the Karn al Wa'l pass, over 9000 ft., about 25 m. W. of the city. The mean temperature of the year is 60° F., with a summer maximum of 77°, and a regular rainfall which falls chiefly during the S.W. monsoon from June to September. The usual cereals, fruits and vegetables of the temperate zone, wheat, barley, apples, apricots, vines, potatoes, cabbages, beans, &c., are abundant and excellent.

The town consists of three parts—(1) the Medina, the old city, now the Arab quarter, on the E. containing the principal mosques, baths, &c., with the citadel, el Kasr, at its S.E. corner at the foot of Jebel Nukum on the crest of which 2000 ft. above the valley are the ruins of the old fort of el Birash, traditionally attributed to Shem the son of Noah, and the Mutawakkil, formerly containing the palace and gardens of the imams, covering its W. face; (2) the Bir Azab W. of the city, consisting of detached houses and gardens, chiefly occupied by the higher Turkish officials, and (3) on the extreme W. the Ka'el Yahud or Jewish quarter. The city with the Kasr and Mutawakkil is surrounded by ramparts built of clay and sun-dried brick, 25 to 30 ft. high and of great thickness. The Bir Azab and Ka'el Yahud are enclosed in a similar enceinte but of more recent construction, connected with that of the city by the Mutawakkil; the whole forms a rough figure of eight, some 2½ m. long from E. to W., and ¾ m. in breadth. The walls are pierced by several gates; the principal are the Bab esh Shu'b and the Bab el Yemen in the N. and S. faces of the city respectively, and the Bab es Sabah in its W. face leading into the Mutawakkil, and thence by a broad street through the Bir Azab and Ka'el Yahud to the Bāb el Ka', the main entrance to the town from the Hodeda road. The city itself has narrow, paved streets, with massive, flat-roofed houses of several storeys, and many extensive groups of buildings, mosques, serais and baths. The Jāmi 'Masjid, or principal mosque stands on the site of the Christian church built by Abraha ruler of Yemen during the period of Ethiopian domination, about A.D. 530. It consists of a great rectangular courtyard paved with granite, surrounded by a triple arcade, the domed roofs of which are supported by numerous columns of stone or brick; in the centre there is a model of the Ka'ba at Mecca covered with stone flags of various colours arranged chequer-wise. Among the other mosques, of which there are forty-eight in all, that of Salah ed din with its beautiful minaret is one of the finest. Of the Kasr Ghumdan and other ancient buildings, the splendours of which were sung by the poets of the early days of Islam, nothing but mutilated ruins remain; the old palace of the imams, the Mutawakkil, was destroyed during the years of anarchy preceding the Turkish occupation, and the site is now occupied by a military hospital standing in well-kept gardens. The houses consist generally of a ground floor built of dressed stone, surmounted by two or three storeys of burnt brick; as a rule the lower storey has no openings but an arched doorway; the façade of the upper storeys is pierced by long narrow window recesses, divided into three parts, the lowest of which forms a square window closed by carved wooden shutters, while the upper ones contain round or pointed windows fitted with coloured glass, or thin slabs of alabaster which admit a subdued light.

The valley in which Sana lies is generally sterile, but in places where water is brought from the hill streams on the W. fields of barley, lucerne and market gardens are to be seen, particularly at Randa, the garden suburb, 6 m. N. of the town, and in the deep gorges of the Wadi Dhahr and W. Hadda, the terraced orchards of which are celebrated for their fine fruit-trees. The water supply of the town is derived from numerous wells, and from the Ghail Aswad, a small canal which supplies the military cantonment outside and S. of the walls, and runs through the gardens in the Mutawakkil.

The population was estimated by R. Manzoni in 1887 at 20,000 Arabs, 3000 Turks and 1700 Jews, or less than 25,000 altogether; H. Burchardt in 1891 put it at 50,000; the city has, however, suffered severely from the state of unrest which has been chronic in Yemen since 1893, and more particularly in 1905, when it was taken by the insurgents, and held by them for three months, and the actual numbers at present do not probably exceed Manzoni's estimate.

Arabic writers give many discordant and fabulous traditions about the oldest history of Sana and its connexion with the ancient kingdom of Himyar. But most agree that its oldest name was Azāl, which seems to be the same word with Uzal in Gen. x. 27. A Himyarite nation of Auzalites occurs in a Syriac writer of the 6th century. The better-informed Arab writers knew also that the later name is due to the Abyssinian conquerors of Yemen, and that it meant in their language "fortified" (Bakri, p. 606; Nöldeke, *Gesch. d. Pers. u. Arab.* p. 187). Sana became the capital of the Abyssinian Abraha (*c.* 530 A.D.) who built here the famous church (*Kalis*), which was destroyed two centuries later by order of the caliph Mansur (Azraki, p. 91).

[1] This is on the usual assumption that there was only *one* ark in the history of Judah and Israel.

AUTHORITIES.—Niebuhr, *Travels in Arabia* (Amsterdam, 1774); R. Manzoni, *Il Yemen* (Rome, 1884); D. Charnay and A. Deflers, *Excursions au Yémen. Tour du monde* (Paris, No. 24, 1898).
(R. A. W.)

SANĀ'Ī, the common name of ABULMAJD MAJDŪD B. ĀDAM, the earliest among the great Ṣūfic poets of Persia, was a native of Ghazni (in Afghanistan). He flourished in the reigns of the Ghaznevid sultāns Ibrāhīm (1059–1099, 451–492 A.H.), his son Mas'ūd (1099–1114), and his grandson Bahrām (1118–1152). Persian authorities are greatly at variance as to the dates of the poet's birth and death. At any rate, he must have been born in the beginning of the second half of the 11th century and have died between 1131 and 1150 (525 and 545 A.H.). He composed chiefly *qaṣīdas* in honour of his sovereign Ibrāhīm and the great men of the realm, but the ridicule of a half-mad jester is said to have caused him to abandon the career of a court panegyrist and to devote his poetical abilities to higher subjects. For forty years he led a life of retirement and poverty, and, although Bahrām offered him a high position at court and his own sister in marriage, he remained faithful to his austere and solitary life. But, partly to show his gratitude to the king, partly to leave a lasting monument of his genius behind him, he began to write his great double-rhymed poem on ethics and religious life, which served as model to the masterpieces of Farīd-uddīn 'Attār and Jelāl ud-dīn Rūmī, the *Ḥadīqat ul-ḥaqīqat*, or "Garden of Truth" (also called *Alkitāb alfakhrī*), in ten cantos. This poem deals with such topics as: the unity of the Godhead, the divine word, the excellence of the prophet, reason, knowledge and faith, love, the soul, worldly occupation and inattention to higher duties, stars and spheres and their symbolic lore, friends and foes, separation from the world. One of Sanā'ī's earliest disciples, Mahommed b. 'Alī Raqqām, generally known as 'Alī al-Raffā, who wrote a preface to this work, assigns to its composition the date 1131 (525 A.H.), and states besides that the poet died immediately after the completion of his task. Now, Sanā'ī cannot possibly have died in 1131, as another of his mathnawīs, the *Ṭarīq-i-taḥqīq*, or "Path to the Verification of Truth," was composed, according to a chronogram in its last verses, in 1134 (528 A.H.), nor even in 1140, if he really wrote, as the Ātashkada says, an elegy on the death of Amīr Mu'izzī; for this court-poet of Sultan Sinjar lived till 1147 or 1148 (542 A.H.). It seems, therefore, that Taqī Kāshī is right in fixing Sanā'ī's death in 1150 (545 A.H.), the more so as 'Alī al-Raffā himself distinctly says in his preface that the poet breathed his last on the 11th of Sha'bān, "which was a Sunday," and it is only in 1150 that this day happened to be the first of the week. Sanā'ī left, besides the *Ḥadīqah* and the *Ṭarīq-i-taḥqīq*, several other Ṣūfic mathnawīs of similar purport: for instance, the *Sair ul'ibād ilā'lma'ād*, or "Man's Journey towards the Other World" (also called *Kunūz-urrumūz*, "The Treasures of Mysteries"); the *'Ishqnāma*, or "Book of Love"; the *'Aqlnāma* or "Book of Intellect"; the *Kārnāma*, or "Record of Stirring Deeds," &c.; and an extensive dīwān or collection of lyrical poetry. His tomb, called the "Mecca" of Ghazni, is still visited by numerous pilgrims.

See Abdullatīf al-'Abbāsī's commentary (completed 1632 and preserved in a somewhat abridged form in several copies of the India Office Library); on the poet's life and works, Ouseley, *Biogr. Notices*, 184-187; Rieu's and Flügel's *Catalogues*, &c.; E. G. Browne, *Literary History of Persia* (1906), ii. 317-322; H. Ethé in W. Geiger's *Grundriss der iranischen Philologie*, ii. 282-284.

SAN ANTONIO, a city and the county-seat of Bexar county, Texas, U.S.A., about 80 m. S.S.W. of Austin, on the San Antonio river, at the mouth of the San Pedro. Pop. (1900) 53,321, of whom 18,880 were of foreign parentage, 9348 were foreign-born (including 3288 Mexicans and 3031 Germans) and 7538 were negroes; (1910 census), 96,614. San Antonio is the largest city of Texas. It is served by the Galveston, Harrisburg & San Antonio, the International & Great Northern, the San Antonio & Aransas Pass, and the Missouri, Kansas & Texas railways. The city lies at an elevation of 610-750 ft. above the sea. The San Antonio river (which has a winding course of 13 m. within the city limits) and its affluent, the San Pedro (which is 10 m. long in its course through San Antonio), divide the city into three main portions, and these water-courses and the Acequia (7 m. long) are spanned by 17 large iron bridges and about 2500 smaller bridges and culverts. Among the public buildings are the city hall in Military Plaza, the court-house on Main Plaza, the Federal building on the N. side of Alamo Plaza, the Carnegie library and the convention hall and market house on Milam Square. The most interesting building is the historic Alamo (named from the grove of cottonwood—alamo, the *Populus monilifera*—in which it stands) on the E. side of the Alamo Plaza, E. of the San Antonio river; it was begun probably in 1744 and was the chapel of the Mission San Antonio de Valero (often called "the Alamo mission"); in 1883 it was bought by the state and has since been maintained as a public monument. The San Fernando Cathedral [1] on Main Plaza was built in 1734, but there is very little of the original structure in the present building, which really dates from 1868–1873; the former governor's palace, built in 1749, is at No. 105 Military Plaza; at 128 Soledad is the Veramendi Palace, the residence of Governor Veramendi, father-in-law of Colonel James Bowie, and in this palace Colonel B. R. Milam was killed on the 5th of December 1835 by a sharpshooter hidden in a cypress tree; there is a monument to Colonel Milam in Milam Square. One mile N. of the city on Government Hill is Fort Sam Houston (established in 1865), headquarters of the Department of Texas, with an army hospital (1885) and a tower 88 ft. high. There are several old missions near the city, notably the Mission La Purisima Conception de Acuna (the "First Mission"), 2 m. S. of the city, built here in 1731–1752, having formerly been in E. Texas; the Mission San José de Aguayo (the "Second Mission"), 4 m. S. of San Antonio, built in 1720–1731; the Mission San Juan de Capistrano (the "Third Mission"), 6 m. S. of the Main Plaza built in 1731; and San Francisco de la Espada (the "Fourth Mission," also built in 1731 and also removed here from E. Texas), which is 8 m. S. of the Main Plaza and is now used for service by the local Mexicans. The city has 21 parks and plazas. Within the city limits in its N. central part is Brackenridge Park (200 acres) along the San Antonio; 1 m. N.E. of the city is San Pedro Park (40 acres), the source of the San Pedro river; in Travis Park is a Confederate monument; and 3 m. S. of the city are the International Fair Grounds, where in 1898 Colonel Theodore Roosevelt organized his "Rough Riders," and Riverside Park. The most notable of the plazas are Military, Main and Alamo. The anniversary of the Battle of San Jacinto, the 21st of April, is annually celebrated by a "Battle of Flowers." Annually in October an International Fair is held, to which Mexico sends an exhibit of Mexican products and manufactures. The climate is mild with a mean summer temperature of 82° F. and a winter average of 54°, and this and the dry purity of the air make it a health resort; it is also the winter home of many Northerners. There is good shooting (doves, quail, wild turkey and deer) in the vicinity; there are fine golf links and there is a large ranch for breeding and training polo ponies. In the southern suburbs two artesian wells, 1800-2000 ft. deep, discharge 800,000 gallons a day of strong sulphur water (temperature 103°-106° F.), which is valuable in cases of rheumatism and skin diseases. Near one of these wells is the South-western (State) Hospital for the Insane (1892). The city has a good public school system, including, besides the usual departments, departments of manual training and domestic science. In 1910 there were 30 schools—26 for whites and 4 for negroes. Among the educational institutions in San Antonio are the San Antonio Female College (Methodist Episcopal, South; 1894), the West Texas Military Academy; Peacock Military School; St Mary's Hall (Roman Catholic); St Louis College; and the Academy of Our Lady of the Lake (under the Sisters of Divine Providence, who have a convent here). The city is the see of Protestant Episcopal and

[1] The cathedral is the centre of the city according to the charter, which describes the city as including "six miles square, of which the sides shall be equi-distant from what is known as the cupola of the cathedral of San Fernando and three miles therefrom."

Roman Catholic bishops. Among the charitable institutions are the City Hospital (1886), the Santa Rosa Infirmary (1869), maintained by Sisters of Charity, a House of Refuge (1897), a Rescue Home (1895), a home for destitute children and aged persons (1897), the St Francis Home for the Aged (1893), St John's Orphan Asylum (1878), St Joseph's Orphan Asylum (1871) and the Protestant Home for Destitute Children (1887).

The principal manufactures are malt liquors, flour and grist-mill products and steam railway cars. San Antonio is the commercial centre of a great live stock and farming region.

Under the charter of 1903, as amended in 1907, the municipal government consists of a city council, composed of the mayor, four aldermen, elected at large, and eight ward aldermen; all elected for a term of two years, as are the other elective officers; a city attorney, an assessor, a collector, a treasurer, an auditor and judge of the Corporation Court. Any elective officer may be removed by the vote of eight members of the council. Other officers are appointed by the mayor with the confirmation of the council. The city water supply, owned by a private corporation, is obtained from artesian wells with a capacity of 40,000,000 gallons a day. The city has a sewer-farm of 530 acres which the charter forbids it to sell.

San Antonio was the capital of Texas during the periods of Spanish and Mexican rule. The presidio of San Antonio de Bexar and the mission of San Antonio de Valero were founded in 1718 under the direction of Martin de Alarcón, governor of Coahuila. San Antonio was accordingly from the beginning a combination of two of the three types of Spanish settlement, the military and the ecclesiastical (see TEXAS: *History*). To these was added the third, the civil type, in 1731, when the *villa* of San Fernando was established. Several missions were established in the neighbourhood, including those already mentioned and San Xavier de Náxera (1722), a new foundation. All of these missions decreased in importance with the disappearance of the Indians and by the close of the period of Spanish rule (1821) had been abandoned. San Antonio was captured by the Magee-Gutierrez party in 1813, but was recovered by the Mexican royalists (see TEXAS: *History*). It was besieged by the Texas army under General Stephen F. Austin and Edward Burleson in 1835 and was finally taken early in December as the result of an attack led by Colonel Benjamin R. Milam. Its recapture by Santa Anna, February–March 1836, was distinguished by the heroic defence of the mission (particularly the chapel of the Alamo) by Colonels William Barrett Travis, James Bowie and Davy Crockett, and 178 others against the attack of about 4000 Mexicans. After a bombardment lasting from the 23rd of February to the 6th of March, the Mexicans assaulted on the 6th, were twice beaten back, and then overpowered and slaughtered the garrison, the five survivors being subsequently bayonetted in cold blood. Three women, one a Mexican, two children and a negro servant were spared. "Remember the Alamo" became a war-cry of the Texans. The Mexicans again invaded Texas in 1842, and San Antonio was twice captured and held for short periods, first by General Vasquez and later by General Woll. After 1836 there was a large influx of Anglo-Americans and Germans, and the Mexican element long ago ceased to predominate. Charters of incorporation were granted in 1837, 1842, 1852, 1856, 1870 and 1903. At San Antonio in February 1861 General David E. Twiggs (1790–1862), a veteran of the Mexican War, surrendered the Department of Texas, without resistance, to the Confederate general, Ben McCulloch; for this General Twiggs was dismissed from the United States army, and in May he became a major-general in the Confederate service. The rapid growth of San Antonio dates from 1878, when the first railway entered the city.

See William Corner, *San Antonio de Bexar* (San Antonio, 1890); *The Quarterly of the Texas State Historical Association*, ii. 217-226, viii. 277-352; and George P. Garrison, *Texas* (Boston and New York, 1903), in the "American Commonwealths Series."

SAN ANTONIO DE LOS BAÑOS, a small town in Havana Province, Cuba, about 23 m. (by rail) S.W. of Havana. Pop. (1907) 9125. San Antonio de los Baños is served by the W. branch of the United Railways of Havana. It is on the banks of the Ariguanabo river, which drains a lake of the same name, and is itself one of the many "disappearing rivers" of the island: it disappears in a cave near San Antonio. The town has mineral springs and baths, and is a summer resort of the people of Havana. Though spreading over hills, the plan of the town is regular. The tobacco of the Vuelta Abajo lands immediately around the city is famous. The pueblo arose in the middle of the 18th century as a camp for convicts from Mexico. It became a *villa* in 1794. Early in the 19th century refugees from Santo Domingo settled here and founded coffee estates that gave the place great prosperity until the expulsion of the French in 1809; subsequently the cultivation of tobacco renewed its prosperity.

SANATORIUM (a modern Latinism, formed from *sanare*, to cure, restore to health, *sanus*, whole, healthy, well; often wrongly spelled *sanatarium* or *sanitarium*), an establishment where persons suffering from disease, or convalescents, may be received for medical treatment, rest cures and the like; in recent modern usage particularly used for establishments where patients suffering from phthisis may undergo the open-air treatment (see THERAPEUTICS). The mis-spellings of the word, *sanitarium* and *sanatarium*, are due to a confusion of "sanatory," *i.e.* giving health, from *sanare*, and "sanitary," pertaining to health, from *sanitas*, health.

SANATRUCES (*Sinatruces*, Pers. *Sanatruk*), Parthian king. In the troublous times after the death of Mithradates II. (*c.* 88 B.C.) he was made king by the Sacaraucae, a Mongolian tribe who had invaded Iran in 76 B.C. He was eighty years old and reigned seven years; his successor was his son Phraates III. (Lucian, *Macrob.* 15; Phlegon, fr. 12 *ap.* Phot. cod. 97; Appian, *Mithr.* 104; Dio Cass. xxxvi. 45). Another Sanatruces (Sanatrucius) is mentioned as an ephemeral Parthian king in A.D. 115 (Malalas, *Chron.* p. 270, 273). (ED. M.)

SAN BERNARDINO, a city and the county-seat of San Bernardino county, California, U.S.A., about 60 m. E. of Los Angeles. Pop. (1900) 6150, of whom 873 were foreign-born. It is served by the Atchison, Topeka & Santa Fé, the Southern Pacific and the San Pedro, Los Angeles & Salt Lake railways, and by an interurban electric line. The city is situated in a valley at an altitude of about 1050 ft., at the S. base of the San Bernardino mountain range and 20 m. W. of San Bernardino mountain (11,600 ft.). Among the public buildings are a Carnegie library (1903; the library was established in 1891), with 10,000 volumes in 1909, and the county court house. There are two public parks, Lugo, near the centre of the city, and Meadowbrook, on the E. outskirts. San Bernardino is one of several places (Redlands, Highland, Rialto, Colton, Bloomington, Riverside, Pomona) that lie near together in part of the citrus fruit, alfalfa and grain region of S. California. The Santa Fé railway has extensive repair and construction shops here. San Bernardino is popularly known as the "Gate City of Southern California." Five miles N. of the city, and connected with it by electric railway, at the base of a mountain on whose side is a great blaze shaped like an arrow-head, are the Arrowhead Hot Springs (196° F.), resembling the Carlsbad waters; the hotel at the Springs is heated by their waters. Other hot springs near San Bernardino are the Urbita, 1½ m. S., and the Harlem, 4 m. N.E. About 1822 Spanish missionaries settled about 5 m. from the site of the present city and called their mission San Bernardino (from St Bernardin of Siena). In 1851 the Mormons established here a colony, which was abandoned in 1857. The county was organized in 1853 with the county-seat at San Bernardino, which was incorporated as a town in 1854. It was deprived of its charter in 1861, but received a new one in 1864. The Southern Pacific in 1876 gave the city connexion with the ocean, and the Santa Fé in 1885 connected it with the East. Under a state enactment in 1905 San Bernardino adopted a new charter which provides for the "recall" by petition, the initiative and the referendum.

SANCERRE, a town of central France, capital of an arrondissement in the department of Cher, 34 m. N.E. of Bourges by rail. Pop. (1906) 2232. Sancerre, which gives its name to the small district of Sancerrois, is situated on an isolated vine-clad hill

(1000 ft.) about 1 m. from the left bank of the Loire It has a modern château, in the grounds of which there is a cylindrical keep of the 15th century, the only relic of an ancient stronghold. From 1037 to 1152 the title of count of Sancerre was held by the counts of Champagne; from the latter year till 1640 it had its own counts, who were descended from Theobald IV. of Champagne, but in 1226 came under the suzerainty of the crown. In 1640 it became the property of Henri de Condé, whose descendants possessed it till the Revolution. During the religious wars it was a stronghold of Protestantism, and in 1573 was besieged by the Catholics, who did not succeed in capturing it till after nearly eight months of siege. The town has a subprefecture, a tribunal of first instance and a communal college. Good wine is grown in the vicinity.

SANCHEZ. Three persons of this name enjoyed considerable literary celebrity: (1) FRANCISCO SANCHEZ (Sanctius) (1523–1601), successively professor of Greek and of rhetoric at Salamanca, whose *Minerva*, first printed at that town in 1587, was long the standard work on Latin grammar. (2) FRANCISCO SANCHEZ, a Portuguese physician of Jewish parentage, born at Tuy (in the diocese of Braga) in 1550, took a degree in medicine at Montpellier in 1574, became professor of philosophy and physic at Toulouse, where he died in 1623; his ingenious treatise (*Quod nihil scitur*, 1581) marks the high-water of reaction against the dogmatism of his time; he is said to have been distantly related to Montaigne. (3) TOMÁS SANCHEZ of Cordova (1551–1610), Jesuit and casuist, whose treatise *De matrimonio* (Genoa, 1592) is more notorious than celebrated.

SĀNCHI, a small village in India, at which there is now a railway station on the Bombay-Baroda line. It is famous as the site of what are almost certainly the oldest buildings in India now standing. They are Buddhist topes (Pali. *thūpa*: Sanskrit, *stūpa*), that is, memorial mounds, standing on the level top of a small sandstone hill about 300 ft. high on the left bank of the river Betwa. The number of topes on this and the adjoining hills is considerable. On the Sānchi hill itself are only ten, but one of these is by far the most important and imposing of all. All these topes were opened and examined by General Alexander Cunningham and Lieut.-Colonel Maisey in 1851; and the great tope has been described and illustrated by them and by James Fergusson. This is a solid dome of stone, about 103 ft. in diameter, and now about 42 ft. high. It must formerly have been much higher, the top of the tope having originally formed a terrace, 34 ft. in diameter, on which stood lofty columns. Cunningham estimates the original height of the building as about 100 ft. Round the base is a flagged pathway surrounded by a stone railing and entered at the four points of the compass by gateways some 18 ft. high. Both gateways and railing are elaborately covered with bas-reliefs and inscriptions. The latter give the names of the donors of particular portions of the architectural ornamentation, and most of them are written in the characters used before and after the time of Asoka in the middle of the 3rd century B.C. The monuments are Buddhist, the bas-reliefs illustrate passages in the Buddhist writings, and the inscriptions make use of Buddhist technical terms. Some of the smaller topes give us names of men who lived in the Buddha's time, and others give names mentioned among the missionaries sent out in the time of Asoka. It is not possible from the available data to fix the exact date of any of these topes, but it may be stated that the smaller topes are probably of different dates both before and after Asoka, and that it is very possible that the largest was one of three which we are told was erected by Asoka himself. The monuments at Sānchi are now under the charge of the archaeological department; they are being well cared for, and valuable photographs have been taken of the bas-reliefs and inscriptions. The drawings in Fergusson's work entitled *Tree and Serpent Worship* are very unsatisfactory, and his suggestion that the carvings illustrate tree and serpent worship is quite erroneous.

BIBLIOGRAPHY.—Alex. Cunningham, *Bhilsa Topes* (London, 1854); James Fergusson, *Tree and Serpent Worship* (London, 1873); General F. C. Maisey, *Sanchi and its Remains* (London, 1892); Rhys Davids, *Buddhist India* (London, 1902). (T. W. R. D.)

SANCHUNIATHON (Gr. form of Phoenician *Sakkun-yathon*, "the god Sakkun has given"), an ancient Phoenician sage, who belongs more to legend than to history. He is said to have flourished "even before the Trojan times," "when Semiramis was queen of the Assyrians." Philo Herennius of Byblus claimed to have translated his mythological writings from the Phoenician originals. According to Philo, Sanchuniathon derived the sacred lore from the mystic inscriptions on the Ἀμμουνεῖς (probably *ḥammānim*, "sun pillars," cf. Is. xxvii. 9, &c.) which stood in the Phoenician temples. That any writings of Sanchuniathon ever existed it is impossible to say. Philo drew his traditions from various sources, adapted them to suit his purpose, and conjured with a venerable name to gain credit for his narrative. Porphyry says that Sanchuniathon (here called a native of Byblus) wrote a history of the Jews, based on information derived from Hierombal (*i.e.* Jeruba'al), a priest of the god Jevo (*i.e.* Yahveh, Jehovah), and dedicated it to Abelbal or Abibal, king of Berytus. The story is probably a pure invention; the reference to Berytus shows that it is late.

See Eusebius, *Praep. Ev.* i. 9 (Muller, *Fragm. hist. Graec.* iii. pp. 563 foll.).

SAN CRISTÓBAL (formerly called SAN CRISTÓBAL DE LOS LLANOS, CIUDAD DE LAS CASAS, and CIUDAD REAL), a town of Mexico, in the state of Chiapas, on a level tableland about 6700 ft. above sea-level and 48 m. E.N.E. of Tuxtla Gutierrez. Pop. (1892 estimate) 16,000. The surrounding country is fertile and healthful and is populated chiefly with Indians. The town possesses a cathedral, hospital and other public institutions. San Cristóbal was founded in 1528 on the site of an Indian village, and afterwards was famous as the residence of Las Casas, Bishop of Chiapas. It was the capital of Chiapas until near the end of the 19th century. There are traces of an early Indian civilization in the vicinity.

SANCROFT, WILLIAM (1616–1693), archbishop of Canterbury, was born at Fressingfield in Suffolk 30th January 1616, and entered Emmanuel College, Cambridge, in July 1634. He became M.A. in 1641 and fellow in 1642, but was ejected in 1649 for refusing to accept the "Engagement." He then remained abroad till the Restoration, after which he was chosen one of the university preachers, and in 1663 was nominated to the deanery of York. In 1664 he was installed dean of St Paul's. In this situation he set himself to repair the cathedral, till the fire of London in 1666 necessitated the rebuilding of it, towards which he gave £1400. He also rebuilt the deanery, and improved its revenue. In 1668 he was admitted archdeacon of Canterbury upon the king's presentation, but he resigned the post in 1670. In 1677, being now prolocutor of the Convocation, he was unexpectedly advanced to the archbishopric of Canterbury. He attended Charles II. upon his deathbed, and "made to him a very weighty exhortation, in which he used a good degree of freedom." He wrote with his own hand the petition presented in 1687 against the reading of the Declaration of Indulgence, which was signed by himself and six of his suffragans. For this they were all committed to the Tower, but were acquitted. Upon the withdrawal of James II. he concurred with the Lords in a declaration to the prince of Orange for a free parliament, and due indulgence to the Protestant dissenters. But, when that prince and his consort were declared king and queen, he refused to take the oath to them, and was accordingly suspended and deprived. From 5th August 1691 till his death on the 24th of November 1693, he lived a very retired life in his native place. He was buried in the churchyard of Fressingfield, where there is a Latin epitaph to his memory. Sancroft was a patron of Henry Wharton (1664–1695), the divine and church historian, to whom on his deathbed he entrusted his manuscripts and the remains of Archbishop Laud (published in 1695).

He published *Fur praedestinatus* (1651), *Modern Politics* (1652), and *Three Sermons* (1694). *Nineteen Familiar Letters to Mr North* (afterwards Sir Henry North) appeared in 1757.

SANCTION (Lat. *sanctio*, from *sancire*, to decree or ordain), in jurisprudence, the means provided for the enforcement of a law. According to T. E. Holland (*Elements of Jurisprudence*,

1906, p. 85), "the real meaning of all law is that, unless acts conform to the course prescribed by it, the state will not only ignore and render no aid to them, but will also, either of its own accord or if called upon, intervene to cancel their effects. This intervention of the state is what is called the 'sanction' of law." So Justinian (*Inst.* ii. 1, 10), "Legum eas partes quibus poenas constituimus adversus eos qui contra leges fecerint, sanctiones vocamus." In general use, the word signifies approval or confirmation.

SANCTIS, FRANCESCO DE (1817–1883), Italian publicist, was born at Morra Irpino, and educated at the institute of the Marchese Basilio Puoti. Becoming a teacher in a private school of his own, he made a name as a profound student of literature; and after the troubles of the '48, when he held office under the revolutionary government and was imprisoned for three years at Naples, his reputation as a lecturer on Dante at Turin brought him the appointment of professor at Zurich in 1856. He returned to Naples as minister of public instruction in 1860, and filled the same post under the Italian monarchy in 1861, 1878 and 1879, having in 1861 become a deputy in the Italian chamber. In 1871 he became professor at Naples University. As a literary critic, De Sanctis took a very high place, notably with his *Storia della letteratura italiana* (2nd ed., 1873) and with his critical studies, published in several volumes, some of them since his death at Naples in 1883.

SANCTI SPIRITUS, an old Cuban city in Santa Clara province, situated on a sandy plain in an angle of the Yayabo river, which winds through the city. Pop. (1907) 17,440. It is connected by railway with Zaza del Medio, on the main railway line of the island, and with its port, Tunas de Zaza, 30 m. (by rail) to the S. The hill called Pan de Azucar (Sugar-loaf) is S.W. of the city. One church is said to be as old as the city, and others date from 1699, 1716, 1717, &c. The surrounding country is devoted principally to grazing. Sancti Spiritus was one of the seven cities founded by Diego Velasquez. Its settlement was ordered in 1514 and accomplished in 1516, and it is the fifth town of the island in age. The present city is about two leagues from the original site (Pueblo Viejo). In 1518, as a result of the war of the Comunidades of Castille, a mimic war broke out in Sancti Spiritus among its two score villagers. The place was sacked by French and English corsairs in 1719. Illicit trade with Jamaica was the basis of local prosperity in the 18th century.

SANCTUARY (from the late Lat. *sanctuarium*, a sacred place), a sacred or consecrated place, particularly one affording refuge, protection or right of asylum; also applied to the privilege itself, the right of safe refuge. In Egyptian, Greek or Roman temples it was applied to the *cella* in which stood the statue of the god, and the Latin word for altar, *ara*, was used for protection as well. In Roman Catholic usage sanctuary is sometimes applied to the whole church, as a consecrated building, but is generally limited to the choir. The idea that such places afforded refuge to criminals or refugees is founded upon the primitive and universal belief in the contagion of holiness. Hence it was sacrilege to remove the man who had gained the holy precincts; he was henceforth invested with a part of the sacredness of the place, and was inviolable so long as he remained there. Some temples had peculiar privileges in this regard. That of Diana at Ephesus extended its inviolability for a perimeter of two stadia, until its right of sanctuary was refused by the Romans. Not all Greek and Roman temples, however, had the right in an equal degree. But where it existed, the action of the Roman civil law was suspended, and in imperial times the statues and pictures of the emperors were a protection against pursuit. Tacitus says that the ancient Germans held woods, even lakes and fountains, sacred; and the Anglo-Saxons seem to have regarded several woods as holy and to have made sanctuaries of them, one of these being at Leek in Staffordshire.

The use of Christian churches as sanctuaries was not based upon the Hebrew cities of refuge, as is sometimes stated. It is part of the general religious fact of the inviolability attaching to things sacred. The Roman law did not recognize the use of Christian sanctuaries until toward the end of the 4th century, but the growing recognition of the office of bishop as intercessor helped much to develop it. By 392 it had been abused to such an extent that Theodosius the Great was obliged to limit its application, refusing it to the *publici debitores*. Further evidence of its progress is given by the provision in 397 forbidding the reception of refugee Jews pretending conversion in order to escape the payment of debts or just punishment. In 398, according to contemporary historians, the right of sanctuary was completely abolished, though the law as we have it is not so sweeping. But next year the right was finally and definitely recognized, and in 419 the privilege was extended in the western empire to fifty paces from the church door. In 431, by an edict of Theodosius and Valentinian it was extended to include the church court-yard and whatever stood therein, in order to provide some other place than the church for the fugitives to eat and sleep. They were to leave all arms outside, and if they refused to give them up they could be seized in the church. Capital punishment was to be meted out to all who violated the right of sanctuary. Justinian's code repeats the regulation of sanctuary by Leo I. in 466, but Justinian himself in a Novel of the year 535 limited the privilege to those not guilty of the grosser crimes. In the new Germanic kingdoms, while violent molestation of the right of sanctuary was forbidden, the fugitive was given up after an oath had been taken not to put him to death (Lex. Rom. Burgund. tit. 2, § 5; Lex. Visigoth vi. tit. 5, c. 16). This legislation was copied by the church at the council of Orleans in 511; the penalty of penance was added, and the whole decree backed by the threat of excommunication. Thus it passed into Gratian's Decretum. It also formed the basis of legislation by the Frankish king Clotaire (511-588), who, however, assigned no penalty for its violation. Historians like Gregory of Tours have many tales to tell showing how frequently it was violated. The Carolingians denied the right of sanctuary to criminals already condemned to death.

The earliest extant mention of the right of sanctuary in England is contained in the code of laws issued by the Anglo-Saxon king Æthelberht in A.D. 600. By these he who infringed the church's privilege was to pay twice the fine attaching to an ordinary breach of the peace. At Beverley and Hexham 1 m. in every direction was sacred territory. The boundaries of the church frith were marked in most cases by stone crosses erected on the highroads leading into the town. Four crosses, each 1 m. from the church, marked the mile limits in every direction of Hexham Sanctuary. Crosses, too, inscribed with the word "Sanctuarium," were common on the highways, serving probably as sign-posts to guide fugitives to neighbouring sanctuaries. One is still to be seen at Armathwaite, Cumberland; and another at St Buryan's, Cornwall, at the corner of a road leading down to some ruins known locally as "the Sanctuary." That such wayside crosses were themselves sanctuaries is in most cases improbable, but there still exist in Scotland the remains of a true sanctuary cross. This is known as MacDuff's Cross, near Lindores, Fifeshire. The legend is that, after the defeat of the usurper, Macbeth, in 1057, and the succession of Malcolm Canmore as Malcolm III. to the Scottish throne, MacDuff, as a reward for his assistance, was granted special sanctuary privileges for his kinsmen. Clansmen within the ninth degree of relationship to the chief of the clan, guilty of unpremeditated homicide, could, on reaching the cross, claim remission of the capital sentence. Probably the privilege has been exaggerated, and fugitive kinsmen were exempt from outside jurisdiction and liable only to the court of the earl of Fife.

The canon law allowed the protection of sanctuary to those guilty of crimes of violence for a limited time only, in order that some compensation (*wergild*) should be made, or to check blood-vengeance. In several English churches there was a stone seat beside the altar which was known as the *frith-stool* (peace-stool), upon which the seeker of sanctuary sat. Examples of such sanctuary-seats still exist at Hexham and Beverley, and of the sanctuary knockers which hung on church-doors one is still in position at Durham Cathedral. The procedure, upon seeking

sanctuary, was regulated in the minutest detail. The fugitive had to make confession of his crime to one of the clergy, to surrender his arms, swear to observe the rules and regulations of the religious houses, pay an admission fee, give, under oath, fullest details of his crime (the instrument used, the name of the victim, &c.), and at Durham he had to toll a special bell as a formal signal that he prayed sanctuary, and put on a gown of black cloth on the left shoulder of which was embroidered a St Cuthbert's cross.

The protection afforded by a sanctuary at common law was this: a person accused of felony might fly for safeguard of his life to sanctuary, and there, within 40 days, go, clothed in sackcloth, before the coroner, confess the felony and take an oath of *abjuration of the realm*, whereby he undertook to quit the kingdom, and not return without the king's leave. Upon confession he was, *ipso facto*, convict of the felony, suffered attainder of blood and forfeited all his goods, but had time allowed him to fulfil his oath. The abjurer started forth on his journey, armed only with a wooden cross, bareheaded and clothed in a long white robe, which made him conspicuous among medieval wayfarers. He had to keep to the king's highway, was not allowed to remain more than two nights in any one place, and must make his way to the coast quickly. The time allowed for his journey was not long. In Edward III.'s reign only nine days were given an abjurer to travel on foot from Yorkshire to Dover.

Under the Norman kings there appear to have been two kinds of sanctuary; one *general*, which belonged to every church, and another *peculiar*, which had its force in a grant by charter from the king. This latter type could not be claimed by prescription, and had to be supported by usage within legal memory. General sanctuaries protected only those guilty of felonies, while those by special grant gave immunity even to those accused of high or petty treason, not for a time only but apparently for life. Of chartered sanctuaries there were at least 22: Abingdon, Armathwaite, Beaulieu, Battle Abbey, Beverley, Colchester, Derby, Durham, Dover, Hexham, Lancaster, St Mary le Bow (London), St Martin's le Grand (London), Merton Priory, Northampton, Norwich, Ripon, Ramsey, Wells, Westminster, Winchester, York (Soc. of Antiq. of London, *Archaeologia*, viii. 1-44, London, 1787. *Sketch of the History of the Asylum or Sanctuary*, by Samuel Pegge). Sanctuary being the privilege of the church, it is not surprising to find that it did not extend to the crime of sacrilege; nor does it appear that it was allowed to those who had escaped from the sheriff after they had been delivered to him for execution.

Chartered sanctuaries had existed before the Norman invasion. About thirty churches, from a real or pretended antiquity of the privilege, acquired special reputation as sanctuaries, *e.g.* Westminster Abbey (by grant of Edward the Confessor); Ripon (by grant of Whitlase, king of the Mercians); St Buryans, Cornwall (by grant of Æthelstan); St Martin's le Grand, London, and Beverley Minster. "The precincts of the Abbey," says Dean Stanley, "were a vast cave of Adullam for all the distressed and discontented in the metropolis, who desired, according to the phrase of the time, to 'take Westminster.'" Elizabeth Woodville, queen of Edward IV., took refuge in the Abbey with her younger children from the hostility of Richard III. In the next reign the most celebrated sanctuary-seeker was Perkin Warbeck, who thus twice saved his neck, at Beaulieu and Sheen. John Skelton, tutor and afterwards court poet to Henry VIII., fearing the consequences of his caustic wit as displayed in an attack on Wolsey, took sanctuary at Westminster and died there in 1529

The law of abjuration and sanctuary was regulated by numerous and intricate statutes (see Coke, *Institutes*, iii. 115); but grave abuses arose, especially in the peculiar sanctuaries. The attack on these seems to have begun towards the close of the 14th century, in the reign of Richard II. During the 15th century violations of sanctuary were not uncommon; the Lollards were forced from churches; and Edward IV. after the battle of Tewkesbury had the duke of Somerset and twenty Lancastrian leaders dragged from sanctuary and beheaded. At the Reformation general and peculiar sanctuaries both suffered drastic curtailment of their privileges, but the great chartered ones suffered most. By the reforming act of 1540 Henry VIII. established seven cities as peculiar sanctuaries. These were Wells, Westminster, Northampton, Manchester, York, Derby and Launceston. Manchester petitioned against being made a sanctuary town, and Chester was substituted. By an act of James I. (1623), sanctuary, as far as crime was concerned, was abolished throughout the kingdom. The privilege lingered on for civil processes in certain districts which had been the site of former religious buildings and which became the haunts of criminals who there resisted arrest—a notable example being that known as Whitefriars between Fleet Street and the Thames, E. of the Temple. This locality was nicknamed Alsatia (the name first occurs in Shadwell's plays in Charles II.'s reign), and there criminals were able to a large extent to defy the law (see Sir Walter Scott's *Fortunes of Nigel* and *Peveril of the Peak*), arrests only being possible under writs of the Lord Chief Justice. So flagrant became the abuses here and in the other quasi-sanctuaries that in 1697 an act of William III., known as "The Escape from Prison Act," finally abolished all such alleged privileges. A further amending act of 1723 (George I.) completed the work of destruction. The privileged places named in the two acts were the Minories, Salisbury Court, Whitefriars, Fulwood's Rents, Mitre Court, Baldwin's Gardens, The Savoy, The Clink, Deadman's Place, Montague Close, The Mint and Stepney. (See Stephen, *History of Crim. Law*, i. 113.)

In Scotland excommunication was incurred by any who attempted to arrest thieves within sanctuary. The most famous sanctuaries were those attaching to the Church of Wedale, now Stow, near Galashiels, and that of Lesmahagow, Lanark. All religious sanctuaries were abolished in the Northern Kingdom at the Reformation. But the debtor found sanctuary from "diligence" in Holyrood House and its precincts until late in the 17th century. This sanctuary did not protect criminals, or even all debtors, *e.g.* not crown debtors or fraudulent bankrupts; and it was possible to execute a *meditatio fugae* warrant within the sanctuary. After twenty-four hours' residence the debtor had to enter his name in the record of the Abbey Court in order to entitle him to further protection. Under the Act 1696 c. 5, insolvency concurring with retreat to the sanctuary constituted *notour* bankruptcy (see Bell, *Commentaries*, ii. 461). The abolition of imprisonment for debt in 1881 practically abolished this privilege of sanctuary.

A presumptive right of sanctuary attached to the royal palaces, and arrests could not be made there. In Anglo-Saxon times the king's peace extended to the palace and 3000 paces around it: it extended to the king himself beyond the precincts. At the present day Members of Parliament cannot be served with writs or arrested within the precincts of the Houses of Parliament, which extend to the railings of Palace Yard. During the Irish agitation of the 'eighties Parnell and others of the Irish members avoided arrest for some little while by living in the House and never passing outside the gates of the yard.

The houses of ambassadors were in the past quasi-sanctuaries. This was a natural corollary of their diplomatic immunities (see DIPLOMACY). The privilege was never strictly defined. At one time it was insisted that the immunity accorded an ambassador included his house and those who fled to it. At an earlier date sanctuary had actually been claimed for the quarter of the town in which the house stood. At Rome this privilege was formally abolished by Innocent XI. (Pope 1676-1689), and in 1682 the Spanish ambassador at the Papal Court renounced all right to claim immunity even for his house. His example was followed by the British ambassador in 1686. Portugal, Sweden, Denmark and Venice abolished by express ordinance in 1748 the asylum-rights of ambassadorial residences. In 1726 the Spanish government had forcibly taken the duke of Ripperda out of the hotel of the English ambassador at Madrid, although the Court of St James had sanctioned his reception there. At Venice, too, some Venetians who had betrayed state secrets to the French ambassador and had taken

refuge at his house were dragged out by troops sent by the senate.

In Europe, generally, the right of sanctuary survived under restrictions down to the end of the 18th century. In Germany the more serious crimes of violence were always excepted. Highwaymen, robbers, traitors and habitual criminals could not claim church protection. In 1418 sanctuary was further regulated by a bull of Martin V. and in 1504 by another of Julius II. In a modified form the German *Asylrecht* lasted to modern times, not being finally abolished till about 1780. In France *le droit d'asile* existed throughout the middle ages, but was much limited by an edict of Francis I. in 1539, *Ordonnance sur le faut de la justice*. At the Revolution the right of sanctuary was entirely abolished.

BIBLIOGRAPHY.—T. J. de Mazzinghi, *Sanctuaries* (Stafford, 1887); J. F. Stephen, *Hist. of Criminal Law of England* (3 vols., London, 1833); Luke Owen Pike, *History of Crime* (2 vols., 1875–1876); Aug. von Bulmerincq, *Das Asylrecht* (Dorpat, 1853); Henri Wallon, *Droit d'asile* (Paris, 1837); Samuel Pegge, "Sketch of History of Asylum or Sanctuary," Soc. of Antiq. of London, *Archaeologia*, viii. 1–44 (London, 1787); A. P. Stanley, *Memorials of Westminster Abbey* (London, 1882); Bissel, *The Law of Asylum in Israel* (1884); Graszhoff, "Die Gesetze der römischen Kaiser über das Asylrecht der Kirche," in the *Archiv f. kath. Kirchensrecht*, Bd. 37; E. Löning, *Geschichte der Kirchenrechts*, i. 37; ii. 355.

SANCY, NICOLAS DE HARLAY, SEIGNEUR DE (1546–1629), French soldier and diplomatist, belonged to the Protestant branch of the family of Harlay but adopted the Catholic religion in 1572 during the massacres of the Huguenots. In 1589 he obtained in Geneva and Berne sums sufficient to raise an army of mercenaries for Henry III., partly by the sale of jewels, among them the "Sancy" diamond which in 1835 found its way to the Russian imperial treasure, and partly by leading the Swiss to suppose that the troops were intended for serious war against Savoy. Henry IV. made him superintendent of his finances in 1594, but in 1599 he was replaced by Sully. Meanwhile he had been a second time converted to Catholicism, but his influence at court waned, and he retired from public life in 1605. He survived until the 13th of October 1629, leaving a *Discours sur l'occurrence des affaires*.

His son, ACHILLE HARLAY DE SANCY, bishop of Saint Malo (1581–1646), was educated for the church but resigned his vocation for the career of arms on the death of his elder brother in 1601. For seven years, from 1611 to 1618, he was ambassador at the Turkish court, where he amassed a fortune of some £16,000 sterling by doubtful means, and was bastinadoed by order of the sultan for his frauds. Harlay de Sancy was a learned man and a good linguist, who used his opportunities to acquire a valuable collection of oriental MSS., many of which are now in the Bibliothèque Nationale in Paris. On his return to France he joined the Oratorian Fathers, and when Marshal Bassompierre was sent to England in 1627 to regulate the differences between Henrietta Maria and her husband, Harlay de Sancy was attached to the queen's ecclesiastical household, but Charles I. secured his dismissal. He became bishop of St Malo in 1632, and died on the 20th of November 1646.

SAND, GEORGE (1804–1876), the pseudonym of Madame Amandine Lucile Aurore Dudevant, *née* Dupin, the most prolific authoress in the history of literature, and unapproached among the women novelists of France. Her life was as strange and adventurous as any of her novels, which are for the most part idealized versions of the multifarious incidents of her life. In her self-revelations she followed Rousseau, her first master in style, but while Rousseau in his *Confessions* darkened all the shadows, George Sand is the heroine of her story, often frail and faulty, but always a woman more sinned against than sinning. Thanks, however, to her voluminous correspondence that has recently been published and to family documents that her French biographers have unearthed, there are now full materials for tracing the history of her public and private career, and for forming a clear and unbiased estimate of her character and genius.

Her father was Maurice Dupin, a retired lieutenant in the army of the republic; her mother, Sophie Delaborde, the daughter of a Paris bird-fancier. Their ill-assorted marriage took place only a month before the birth of the child (July 1, 1804; at Paris). Her paternal grandfather was M. Dupin de Francueil, a farmer-general of the revenue, who married the widow of Count Horn, a natural son of Louis XV., she in her turn being the natural daughter of Maurice de Saxe, the most famous of the many illegitimate children of Augustus the Strong, by the lovely countess of Königsmarck. George Sand, who was a firm believer in the doctrine of heredity, devotes a whole volume of her autobiography (*Histoire de ma vie*, 1857 seq.) to the elaboration of this strange pedigree. She boasts of the royal blood which ran through her veins, and disregarding the bar sinister she claims affinity with Charles X. and Louis XVII., but she is no less frank in declaring that she is *vilaine et très vilaine*, a daughter of the people, who shares by birth their instincts and sympathies. Her birth itself was romantic. Her father was playing a country dance at the house of a fellow officer, the future husband of Sophie's sister, when he was told that his wife, who had not long left the room, had borne him a daughter. "She will be fortunate," said the aunt, "she was born among the roses to the sound of music."

Passing by her infantine recollections, which go back further than even those of Dickens, we find her at the age of three crossing the Pyrenees to join her father who was on Murat's staff, occupying with her parents a suite of rooms in the royal palace, adopted as the child of the regiment, nursed by rough old sergeants, and dressed in a complete suit of uniform to please the general.

For the next ten years she lived at Nohant, near La Châtre in Berri, the country house of her grandmother. Here her character was shaped; here she imbibed that passionate love of country scenes and country life which neither absence, politics nor dissipation could uproot; here she learnt to understand the ways and thoughts of the peasants, and laid up that rich store of scenes and characters which a marvellously retentive memory enabled her to draw upon at will. The progress of her mind during these early years well deserves to be recorded. Education, in the strict sense of the word, she had none. A few months after her return from Spain her father was killed by a fall from his horse. He was a man of remarkable literary gifts as well as a good soldier. "Character," says George Sand, "is in a great measure hereditary: if my readers wish to know me they must know my father." On his death the mother resigned, though not without a struggle, the care of Aurore to her grandmother, Mme. Dupin de Francueil, a good representative of the *ancien régime*. Though her husband was a patron of Rousseau, she herself had narrowly escaped the guillotine, and had only half imbibed the ideas of the Revolution. In her son's lifetime she had, for his sake, condoned the *mésalliance*, but it was impossible for the stately châtelaine and her low-born daughter-in-law to live in peace under the same roof. She was jealous as a lover of the child's affection, and the struggle between the mother and grandmother was one of the bitterest of Aurore's childish troubles.

Next to the grandmother, the most important person in the household at Nohant was Deschatres. He was an ex-abbé who had shown his devotion to his mistress when her life was threatened, and henceforward was installed at Nohant as factotum. He was maire of the village, tutor to Aurore's half-brother, and, in addition to his other duties, undertook the education of the girl. The tutor was no more eager to teach than the pupil to learn. He, too, was a disciple of Rousseau, believed in the education of nature, and allowed his Sophie to wander at her own sweet will. At odd hours of lessons she picked up a smattering of Latin, music and natural science, but most days were holidays and spent in country rambles and games with village children. Her favourite books were Tasso, *Atala* and *Paul et Virginie*. A simple refrain of a childish song or the monotonous chaunt of the ploughman touched a hidden chord and thrilled her to tears. She invented a deity of her own, a mysterious Corambé, half pagan and half Christian, and like Goethe erected to him a rustic altar of the greenest grass, the softest moss and the brightest pebbles.

From the free out-door life at Nohant she passed at thirteen to the convent of the English Augustinians at Paris, where for the first two years she never went outside the walls. Nothing better shows the plasticity of her character than the ease with which she adapted herself to this sudden change. The volume which describes her conventual life is as graphic as Miss Brontë's *Villette*, but we can only dwell on one passage of it. Tired of mad pranks, in a fit of home-sickness, she found herself one evening in the convent chapel.

"I had forgotten all; I knew not what was passing in me; with my soul rather than my senses, I breathed an air of ineffable sweetness. All at once a sudden shock passed through my whole being, my eyes swam, and I seemed wrapped in a dazzling white mist. I heard a voice murmur in my ear, '*Tolle, lege.*' I turned round, thinking that it was one of the sisters talking to me—I was alone. I indulged in no vain illusion; I believed in no miracle; I was quite sensible of the sort of hallucination into which I had fallen; I neither sought to intensify it nor to escape from it. Only I felt that faith was laying hold of me—by the heart, as I had wished it. I was so filled with gratitude and joy that the tears rolled down my cheeks. I felt as before that I loved God, that my mind embraced and accepted that ideal of justice, tenderness and holiness which I had never doubted, but with which I had never held direct communion, and now at last I felt that this communion was consummated, as though an invincible barrier had been broken down between the source of infinite light and the smouldering fire of my heart. An endless vista stretched before me, and I panted to start upon my way. There was no more doubt or lukewarmness. That I should repent on the morrow and rally myself on my over-wrought ecstasy never once entered my thoughts. I was like one who never casts a look behind, who hesitates before some Rubicon to be crossed, but having touched the farther bank sees no more the shore he has just left."

Such is the story of her conversion as told by herself. It reads more like a chapter from the life of Ste Thérèse or Madame Guyon than of the author of *Lélie*. Yet no one can doubt the sincerity of her narrative, or even the permanence of her religious feelings under all her many phases of faith and aberrations of conduct. A recent critic has sought in religion the clue to her character and the mainspring of her genius. Only in her case religion must be taken in an even more restricted sense than Matthew Arnold's "morality touched by emotion." For her there was no categorical imperative, no moral code save to follow the promptings of her heart. "Tenderness" she had abundantly, and it revealed itself not only in effusive sentimentality, as with Rousseau and Chateaubriand, but in active benevolence; "justice" too she had in so far as she sincerely wished that all men should share alike her happiness; but of "holiness," that sense of awe and reverence that was felt in divers kinds and degrees by Isaiah, Sophocles, Virgil and St Paul, she had not a rudimenatry conception.

Again in 1820 Aurore exchanged the restraint of a convent for freedom, being recalled to Nohant by Mme de Francueil, who had no intention of letting her granddaughter grow up a *dévote*. She rode across country with her brother, she went out shooting with Deschatres, she sat by the cottage doors on the long summer evenings and heard the flax-dressers tell their tales of witches and warlocks. She was a considerable linguist and knew English, Italian and some Latin, though she never tackled Greek. She read widely though unsystematically, studying philosophy in Aristotle, Leibnitz, Locke and Condillac, and feeding her imagination with *René* and *Childe Harold*. Her confessor lent her the *Genius of Christianity*, and to this book she ascribes the first change in her religious views. She renounced once for all the asceticism and isolation of the *De imitatione* for the more genial and sympathetic Christianity of Chateaubriand. Yet she still clung to old associations, and on her grandmother's death was about to return to her convent, but was dissuaded by her friends, who found her a husband.

Casimir Dudevant, whom she married on the 11th of December 1822, was the natural son of a Baron Dudevant. He had retired at an early age from the army and was living an idle life at home as a gentleman farmer. Her husband, though he afterwards deteriorated, seems at that time to have been neither better nor worse than the Berrichon squires around him, and the first years of her married life, during which her son Maurice and her daughter Solange were born, except for lovers' quarrels, were passed in peace and quietness, though signs were not wanting of the coming storm. Among these must be mentioned her friendship with Aurélien de Sèze, advocate-general at Bourdeau. De Sèze was a middle-aged lawyer with a philosophic turn of mind, and Madame Dudevant for two years kept up with him an intimate correspondence. The friendship was purely platonic, but the husband felt or affected jealousy, and resented an intimacy which he from his total lack of culture was unable to share. The breach quickly widened. He on his part was more and more repelled by a superior woman determined to live her own intellectual life, and she on hers discovered that she was mated, if not to a clown, at least to a *hobereau* whose whole heart was in his cattle and his turnips. So long as the conventionalities were preserved she endured it, but when her husband took to drinking and made love to the maids under her very eyes she resolved to break a yoke that had grown intolerable. The last straw that determined action was the discovery of a paper docketed "Not to be opened till after my death," which was nothing but a railing accusation against herself. She at once quitted Nohant, taking with her Solange, and in 1831 an amicable separation was agreed upon, by which her whole estate was surrendered to the husband with the stipulation that she should receive an allowance of £120 a year. She had regained her liberty, and made no secret of her intention to use it to the full. She endeavoured unsuccessfully to eke out her irregularly paid allowance by those expedients to which reduced gentlewomen are driven—fancy-work and painting fans and snuff-boxes; she lived in a garret and was often unable to allow herself the luxury of a fire. It was only as a last resource that she tried literature. Her first apprenticeship was served under Delatouche, the editor of *Figaro*. He was a native of Berri, like herself, a stern but kindly taskmaster who treated her much as Dr Johnson treated Fanny Burney. George Sand was methodical and had a ready pen, but she lacked the more essential qualities of a Parisian journalist, wit, sparkle and conciseness. At the end of a month, she tells us, her earnings amounted to fifteen francs. On the staff of *Figaro* was another compatriot with whom she was already intimate as a visitor at Nohant. Jules Sandeau was a clever and attractive young lawyer. Articles written in common soon led to a complete literary partnership, and in 1831 there appeared in the *Revue de Paris* a joint novel entitled *Prima Donna* and signed Jules Sand. Shortly after this was published in book form with the same signature a second novel, *Rose et Blanche*. The sequel to this literary alliance is best recounted in George Sand's own words: "I resisted him for three months but then yielded; I lived in my own apartment in an unconventional style." Her first independent novel, *Indiana* (1832), was written at the instigation of Delatouche, and the world-famous pseudonym George (originally Georges) Sand was adopted as a compromise between herself and her partner. The "George" connoted a Berrichon as "David" does a Welshman. The one wished to throw *Indiana* into the common stock, the other refused to lend his name, or even part of his name, to a work in which he had had no share. The novel was received with instant acclamation, and Sainte-Beuve only confirmed the judgment of the public when he pronounced in the *Globe* that this new author (then to him unknown) had struck a new and original vein and was destined to go far. Delatouche was the first to throw himself at her feet and bid her forget all the hard things he had said of her. *Indiana* is a direct transcript of the author's personal experiences (the disagreeable husband is M. Dudevant to the life), and an exposition of her theory of sexual relations which is founded thereon. To many critics it seemed that she had said her whole say and that nothing but replicas could follow. *Valentine*, which was published in the same year, indicated that it was but the first chapter in a life of endless adventures, and that the imagination which turned the crude facts into poetry, and the fancy which played about them like a rainbow, were inexhaustible.

As a novel *Valentine* has little to commend it; the plot is feeble and the characters shadowy. Only in the descriptions of

scenery, which here resemble too much purple patches, does George Sand reveal her true inspiration, the artistic qualities by which she will live. No one was more conscious than George Sand herself of her strength and of her weakness. In a preface to a later edition she tells us how the novel came to be written, and, though it anticipates events, this revelation of herself may best be given here.

"After the unexpected literary success of *Indiana* I returned to Berri in 1832 and found a pleasure in painting the scenes with which I had been familiar from a child. Ever since those early days I had felt the impulse to describe them, but as is the case with all profound emotions, whether intellectual or moral, what we most desire to realize to ourselves we are the least inclined to reveal to the world at large. This little nook of Berri, this unknown Vallée Noire, this quiet and unpretentious landscape, which must be sought to find it and loved to be admired, was the sanctuary of my first and latest reveries. For twenty-two years I had lived amongst these pollarded trees, these rutty roads, beside these tangled thickets and streams along whose banks only children and sheep can pass. All this had charms for me alone and did not deserve to be revealed to idle curiosity. Why betray the incognito of this modest country-side without historical association or picturesque sites to commend it to the antiquary or the tourist? The Vallée Noire, so it seemed to me, was part and parcel of myself, the framework in which my life was set, the native costume that I had always worn—what worlds away from the silks and satins that are suited for the public stage. If I could have foreseen what a stir my writings would make, I think I should have jealously guarded the privacy of this sanctuary where, till then, I perhaps was the only soul who had fed the artist's visions and the poet's dreams. But I had no such anticipation; I never gave it a thought. I was compelled to write and I wrote. I let myself be carried away by the secret charm of the air I breathed; my native air, I might almost call it. The descriptive parts of my novel found favour. The plot provoked some lively criticism on the anti-matrimonial doctrines that I was alleged to have broached before in *Indiana*. In both novels I pointed out the dangers and pains of an ill-assorted marriage. I thought I had simply been writing a story, and discovered that I had unwittingly been preaching Saint-Simonianism. I was not then at an age for reflecting on social grievances. I was too young to do more than see and note facts, and thanks to my natural indolence and that passion for the concrete, which is at once the joy and the weakness of artists, I should perhaps always have remained at that stage if my somewhat pedantic critics had not driven me to reflect and painfully search after the ultimate causes of which till then I had only grasped the effects. But I was so shrewdly taxed with posing as a strong-minded woman and a philosopher that one fine day I said to myself, 'What, I wonder, *is* philosophy?'"

Her liaison with Jules Sandeau, which lasted more than a year, was abruptly terminated by the discovery in their apartment on an unexpected return from Nohant of *une blanchisseuse quelconque*. For a short while she was broken hearted:—"My heart is a cemetery!" she wrote to Sainte-Beuve. "A necropolis," was the comment of her discarded lover when years later the remark was repeated to him.

Her third novel, *Lélia* (1833), is in the same vein, a stronger and more outspoken diatribe against society and the marriage law. Lélia is a female Manfred, and Dumas had some reason to complain that George Sand was giving them "du Lord Byron au kilo."

But a new chapter in her life was now to open. In her despair she turned for comfort and counsel to Sainte-Beuve, now constituted her regular father confessor. This ghostly Sir Pandarus recommended new friendships, but she was hard to please. Dumas was "trop commis-voyageur," Jouffroy too serenely virtuous and Musset "trop dandy." Mérimée was tried for a week, but the cool cynic and the perfervid apostle of women's rights proved mutually repulsive. Alfred de Musset was introduced, and the two natures leapt together as by elective affinity. The moral aspect has been given by Mr Swinburne in an epigram:—"Alfred was a terrible flirt and George did not behave as a perfect gentleman."

Towards the end of 1833 George Sand, after winning the reluctant consent of Musset's mother, set out in the poet's company for Italy, and in January 1834 the pair reached Venice, staying first at the Hôtel Danieli and then in lodgings. At first it was a veritable honeymoon; conversation never flagged and either found in the other his soul's complement. But there is a limit to love-making, and George Sand, always practical, set to work to provide the means of living. Musset, though he depended on her exertions, was first bored and then irritated at the sight of this *terrible vache à écrire*, whose pen was going for eight hours a day, and sought diversion in the cafés and other less reputable resorts of pleasure. The consequence was a nervous illness with some of the symptoms of delirium tremens, through which George Sand nursed him with tenderness and care. But with a strange want of delicacy, to use the mildest term, she made love at the same time to a young Venetian doctor whom she had called in, by name Pagello. The pair went off and found their way eventually to Paris, leaving Musset in Italy, deeply wounded in his affections, but, to do him justice, taking all the blame for the rupture on himself. George Sand soon tired of her new love, and even before she had given him his congé was dying to be on again with the old. She cut off her hair and sent it to Musset as a token of penitence, but Musset, though he still flirted with her, never quite forgave her infidelity and refused to admit her to his deathbed. Among the mass of *romans à clef* and pamphlets which the adventure produced, two only have any literary importance, Musset's *Confessions d'un enfant du siècle* and George Sand's *Elle et lui*. In the former woman appears as the serpent whose trail is over all; in the latter, written twenty-five years after the event, she is the guardian angel abused and maltreated by men. *Lui et elle*, the rejoinder of the poet's brother Paul de Musset, was even more a travesty of the facts with no redeeming graces of style.

It remains to trace the influence, direct or indirect, of the poet on the novelist. *Jacques* was the first outcome of the journey to Italy, and in precision and splendour of style it marks a distinct progress. The motive of this and of the succeeding novels of what may be called her second period is free (not to be confounded with promiscuous) love. The hero, who is none other than George Sand in man's disguise, makes confession of faith:—"I have never imposed constancy on myself. When I have felt that love was dead, I have said so without shame or remorse and have obeyed Providence that was leading me elsewhere." And the runaway wife writes to her lover:—"O my dear Octave, we shall never pass a night together without first kneeling down and praying for Jacques." Love is a divine instinct: to love is to be virtuous; follow the dictates of your heart and you cannot go wrong—such is the doctrine that George Sand preached and practised.

In *Les Lettres d'un voyageur*, which ran in the *Revue des deux mondes* between 1834 and 1836, we have not only impressions of travel, but the direct impressions of men and things not distorted by the exigencies of a novel. They reveal to us the true and better side of George Sand, the loyal and devoted friend, the mother who under happier conditions might have been reputed a Roman matron. We could not choose a more perfect specimen of her style than the allegory under which she pictures the "might have been."

"I care little about growing old; I care far more not to grow old alone, but I have never met the being with whom I could have chosen to live and die, or if I ever met him I knew not how to keep him. Listen to a story and weep. There was a good artist called Watelet, the best aquafortis engraver of his day. He loved Marguerite Lecomte, and taught her to engrave as well as himself. She left husband and home to go and live with him. The world condemned them; then, as they were poor and modest, it forgot them. Forty years afterwards their retreat was discovered. In a cottage in the environs of Paris called *Le Moulin joli*, there sat at the same table an old man engraving and an old woman whom he called his *meunière* also engraving. The last design they were at work upon represented the *Moulin joli*, the house of Marguerite, with the device *Cur valle permutem Sabina divitias operosiores?* It hangs in my room over a portrait the original of which no one here has seen. For a year the person who gave me this portrait sat with me every night at a little table and lived by the same work. At daybreak we consulted together on our work for the day, and at night we supped at the same little table, chatting the while on art, on sentiment, on the future. The future broke faith with us. Pray for me, O Marguerite Lecomte!"

The Everard of the *Lettres* introduces us to a new and for the time a dominant influence on the life and writings. Michel de Bourges was the counsel whose eloquent pleadings brought

the suit for a judicial separation to a successful issue in 1836.[1] Unlike her former lovers, he was a man of masterful will, a budge philosopher who carried her intellect by storm before he laid siege to her heart. He preached republicanism to her by the hour, and even locked her up in her bedroom to reflect on his sermons. She was but half converted, and fled before long from a republic in which art and poetry had no place. Other celebrities who figure in the *Lettres* under a transparent disguise are Liszt and Mme d'Agoult (known to literature as Daniel Stern), whom she met in Switzerland and entertained for some months at Nohant. Liszt, in after years when they had drifted apart, wrote of her: "George Sand catches her butterfly and tames it in her cage by feeding it on flowers and nectar—this is the love period. Then she sticks her pin into it when it struggles—that is the congé and it always comes from her. Afterwards she vivisects it, stuffs it, and adds it to her collection of heroes for novels." There is some truth in the satire, but it wholly misrepresents her rupture with Chopin.

To explain this we must open a new chapter of the life in which George Sand appears as the devoted mother. The letters to her daughter Solange, which have recently been published, irresistibly recall the letters of Mme de Sévigné to Mme de Grignan. Solange, who inherited all her mother's wild blood with none of her genius, on the eve of a marriage that had been arranged with a Berrichon gentleman, ran away with Clésinger, a sculptor to whom she had sat for her bust. George Sand not only forgave the elopement and hushed up the scandal by a private marriage, but she settled the young couple in Paris and made over to them nearly one-half of her available property. Clésinger turned out a thankless scapegrace and George Sand was at last compelled to refuse to admit him to Nohant. In the domestic quarrel that ensued Solange, who was a very Vivien, got the ear of Chopin. He upbraided the mother with her hard-heartedness, and when she resented his interference he departed in a huff and they never met again.

The mention of Liszt has led us to anticipate the end of the story, and we must revert to 1836, when the acquaintance began. She was then living in Paris, a few doors from her friend Mme d'Angoult, and the two set up a common *salon* in the Hôtel de France. Here she met two men, one of whom indoctrinated her with religious mysticism, the other with advanced socialism, Lamennais and Pierre Leroux. In the case of Lamennais the disciple outstripped the master. She flung herself into Lamennais's cause and wrote many unpaid articles in his organ, *Le Monde*, but they finally split on the questions of labour and of women's rights, and she complained that Lamennais first dragged her forwards and then abused her for going too fast. The *Lettres à Marcie* (1837) are a testimony to his ennobling and spiritualizing personality. Socialism was a more lasting phase, but her natural good sense revolted at the extravagant mummeries of Père Enfantin and she declined the office of high priestess.

It was doubtless a revulsion of feeling against the doctrinaires and in particular against the puritanic reign of Michel that made her turn to Chopin. She found the *maestro* towards the end of 1837 dispirited by a temporary eclipse of popularity and in the first stage of his fatal malady, and carried him off to winter with her in the south. How she roughed it on an island unknown to tourists is told in *Un hiver à Majorque* (1842), a book of travel that may take rank with Heine's *Reisebilder*. In nearly all George Sand's loves there was a strong strain of motherly feeling. Chopin was first petted by her like a spoilt darling and then nursed for years like a sick child.

During this, her second period, George Sand allowed herself to be the mouthpiece of others—"un écho qui embellissait la voix," as Delatouche expressed it. *Spiridion* (1838) and *Les Sept cordes de la lyre* (1840) are mystic echoes of Lamennais. *Le Compagnon du tour de France* (1841), *Les Maîtres mosaïstes* and *Le Meunier d'Angibault* (1845), *Le Péché de M. Antoine* (1847) are all socialistic novels, though they are much more, and good in spite of the socialism. *Consuelo* (1842–1844) and its sequel *La Comtesse de Rudolstadt* (1843–1845) are *fantaisies à la Chopin*, though the stage on which they are played is the Venice of Musset. Chopin is the Prince Karol of *Lucrezia Floriani* (1847), a self-portraiture unabashed as the *Tagebuch einer Verlorenen* and innocent as *Paul et Virginie*.

An enumeration of George Sand's novels would constitute a Homeric catalogue, and it must suffice to note only the most typical and characteristic. She contracted with Buloz to supply him with a stated amount of copy for the modest retaining fee of £160 a year, and her editor testifies that the tale of script was furnished with the punctuality of a notary. She wrote with the rapidity of Walter Scott and the regularity of Anthony Trollope. For years her custom was to retire to her desk at 10 P.M. and not to rise from it till 5 A.M. She wrote *à la diable*, starting with some central thesis to set forth or some problem to investigate, but with no predetermined plot or plan of action. Round this nucleus her characters (too often mere puppets) grouped themselves, and the story gradually crystallized. This unmethodical method produces in her longer and more ambitious novels, in *Consuelo* for instance and its continuation, a tangled wilderness, the clue to which is lost or forgotten; but in her novelettes, when there is no change of scenery and the characters are few and simple, it results in the perfection of artistic writing, "an art that nature makes."

From novels of revolt and tendency novels George Sand turned at last to simple stories of rustic life, the genuine pastoral. It is here that she shows her true originality and by these she will chiefly live. George Sand by her birth and bringing-up was half a peasant herself, in M. Faguet's phrase, "un paysan qui savait parler." She had got to know the heart of the peasant—his superstitions, his suspiciousness and low cunning, no less than his shrewdness, his sturdy independence and his strong domestic attachments.

Jeanne (1844) begins the series which has been happily called the Bucolics of France. To paint a Joan of Arc who lives and dies inglorious is the theme she sets herself, and through most of the novel it is perfectly executed. The last chapters when Jeanne appears as the Velida of Mont Barbot and the Grande Pastoure are a falling off and a survival of the romanticism of her second manner. *La Mare au diable* (1846) is a clear-cut gem, perfect as a work of Greek art. *François le champi* and *La Petite Fadette* are of no less exquisite workmanship. *Les Maîtres sonneurs* (1853)—the favourite novel of Sir Leslie Stephen—brings the series of village novels to a close, but as closely akin to them must be mentioned the *Contes d'une grande-mère*, delightful fairy tales of the Talking Oak, Wings of Courage and Queen Coax, told to her grandchildren in the last years of her life.

The revolution of 1848 arrested for a while her novelistic activities. She threw herself heart and soul into the cause of the extreme republicans, composed manifestos for her friends, addressed letters to the people, and even started a newspaper. But her political ardour was short-lived; she cared little about forms of government, and, when the days of June dashed to the ground her hopes of social regeneration, she quitted once for all the field of politics and returned to her quiet country ways and her true vocation as an interpreter of nature, a spiritualizer of the commonest sights of earth and the homeliest household affections. In 1849 she writes from Berri to a political friend: "You thought that I was drinking blood from the skulls of aristocrats. No, I am studying Virgil and learning Latin!"

In her latest works she went back to her earlier themes of romantic and unchartered love, but the scene is shifted from Berri, which she felt she had exhausted, to other provinces of France, and instead of passionate manifestos we have a gallery of *genre* pictures treated in the spirit of *François le champi*. "Vous faites," she said to her friend Honoré de Balzac, "la comédie humaine; et moi, c'est l'églogue humaine que j'ai voulu faire."

A word must be said of George Sand as a playwright. She

[1] The final settlement was concluded in 1836. Mme Dudevant was granted sole legal rights over the two children and her Paris home was restored to her. In return she made over to her husband 40,000 fr. vested in the funds.

was as fond of acting as Goethe, and like him began with a puppet stage, succeeded by amateur theatricals, the chief entertainment provided for her guests at Nohant. Undaunted by many failures, she dramatized several of her novels with moderate success—*François le champi*, played at the Odéon in 1849, and *Les Beaux Messieurs de Bois-Doré* (1862) were the best; *Claudie*, produced in 1851, is a charming pastoral play, and *Le Marquis de Villemer* (1864) (in which she was helped by Dumas fils) was a genuine triumph. Her statue by Clésinger was placed in the foyer of the Théâtre Français in 1877.

Of George Sand's style a foreigner can be but an imperfect judge, but French critics, from Sainte-Beuve, Nisard and Caro down to Jules Lemaître and Faguet, have agreed to praise her spontaneity, her correctness of diction, her easy opulence—the *lactea ubertas* that Quintilian attributes to Livy. The language of her country novels is the genuine *patois* of middle France rendered in a literary form. Thus in *La Petite Fadette*, by the happy device of making the hemp dresser the narrator, she speaks (to quote Sainte-Beuve) as though she had on her right the unlettered rustic and on her left a member of the Académie, and made herself the interpreter between the two. She hits the happy mean between the studied archaism of Courier's *Daphnis et Cloë* and the realistic *patois* of the later kailyard novel which for Southerners requires a glossary. Of her style generally the characteristic quality is fluidity. She has all the abandon of an Italian improvisatore, the simplicity of a Bernardin de St Pierre without his mawkishness, the sentimentality of a Rousseau without his egotism, the rhythmic eloquence of a Chateaubriand without his grandiloquence.

As a painter of nature she has much in common with Wordsworth. She keeps her eye on the object, but adds, like Wordsworth, the visionary gleam, and receives from nature but what she herself gives. Like Wordsworth she lays us on the lap of earth and sheds the freshness of the early world. She, too, had found love in huts where poor men dwell, and her miller, her bagpipers, her workers in mosaic are as faithful renderings in prose of peasant life and sentiment as Wordsworth's leechgatherer and wagoners and gleaners are in verse. Her psychology is not subtle or profound, but her leading characters are clearly conceived and drawn in broad, bold outlines. No one has better understood or more skilfully portrayed the artistic temperament—the musician, the actor, the poet—and no French writer before her had so divined and laid bare the heart of a girl. She works from within outwards, touches first the mainspring and then sets it to play. As Mr Henry James puts it, she interviews herself. Rarely losing touch of earth, and sometimes of the earth earthy, she is still at heart a spiritualist. Her final word on herself rings true, "Toujours tourmentée des choses divines."

Unlike Victor Hugo and Balzac, she founded no school, though Fromentin, Theuriet, Cherbuliez, Fabre and Bazin might be claimed as her collateral descendants. In Russia her influence has been greater. She directly inspired Dostoievski, and Turgenieff owes much to her. In England she has found her warmest admirers. Elizabeth Barrett Browning wrote sonnets to "the large-brained woman and large-hearted man, self-named George Sand." To Thackeray her diction recalled the sound of village bells falling sweetly and softly on the ear, and it sent a shiver through John Stuart Mill, like a symphony of Haydn or Mozart. Leslie Stephen advised Thomas Hardy, then an aspiring contributor to the *Cornhill*, to read George Sand, whose country stories seemed to him perfect. "The harmony and grace, even if strictly inimitable, are good to aim at." He pronounced the *Histoire de ma vie* about the best biography he had ever read. F. W. H. Myers claimed her as *anima naturaliter Christiana* and the inspired exponent of the religion of the future.

George Eliot by her very name invites and challenges comparison with George Sand. But it was as a humble follower, not as a rival, that she took George Sand as sponsor. Both women broke with social conventions, but while George Sand (if the expression may be allowed) kicked over the traces, George Eliot was impelled all the more emphatically, because of her exceptional circumstances, to put duty before inclination and to uphold the reign of law and order. Both passed through phases of faith, but while even Positivism did not cool George Eliot's innate religious fervour, with George Sand religion was a passing experience, no deeper than her republicanism and less lasting than her socialism, and she lived and died a gentle savage. Rousseau's *Confessions* was the favourite book of both (as it was of Emerson), but George Eliot was never converted by the high priest of sentimentalism into a belief in human perfectibility and a return to nature. As a thinker George Eliot is vastly superior; her knowledge is more profound and her psychological analysis subtler and more scientific. But as an artist, in unity of design, in harmony of treatment, in purity and simplicity of language, so felicitous and yet so unstudied, in those qualities which make the best of George Sand's novels masterpieces of art, she is as much her inferior.

Mr Francis Gribble has summed up her character in "a scornful, insular way" as a light woman. A truer estimate is that of Sainte-Beuve, her intimate friend for more than thirty years, but never her lover. "In the great crises of action her intellect, her heart and her temperament are at one. She is a thorough woman, but with none of the pettinesses, subterfuges, and mental reservations of her sex; she loves wide vistas and boundless horizons and instinctively seeks them out; she is concerned for universal happiness and takes thought for the improvement of mankind—the last infirmity and most innocent mania of generous souls. Her works are in very deed the echo of our times. Wherever we were wounded and stricken her heart bled in sympathy, and all our maladies and miseries evoked from her a lyric wail."

George Sand died at Nohant on the 8th of June 1876. To a youth and womanhood of storm and stress had succeeded an old age of serene activity and then of calm decay. Her nights were spent in writing, which seemed in her case a relaxation from the real business of the day, playing with her grandchildren, gardening, conversing with her visitors—it might be Balzac or Dumas, or Octave Feuillet or Matthew Arnold—or writing long letters to Sainte-Beuve and Flaubert. "Calme, toujours plus de calme," was her last prayer, and her dying words, "Ne détruisez pas la verdure."

BIBLIOGRAPHY.—The collected edition of George Sand's works was published in Paris (1862–1883) in 96 volumes, with supplement 109 volumes; the *Histoire de ma vie* appeared in 20 volumes in 1854–1855. The *Étude bibliographique sur les œuvres de George Sand* by "le bibliophile Isaac" (vicomte de Spoelberch) (Brussels, 1868) gives the most complete bibliography. Of Vladimir Karenin's (pseudonym of Mme Komarova) *George Sand*, the most complete life, the first two volumes (1899–1901) carry the life down to 1839. There is much new material in *George Sand et sa fille*, by S. Rocheblave (1905), *Correspondance de G. Sand et d'Alfred de Musset* (Brussels, 1904), *Correspondance entre George Sand et Gustave Flaubert* (1904), and *Lettres à Alfred de Musset et à Sainte-Beuve* (1897). E. M. Caro's *George Sand* (1887) is rather a critique than a life. Lives by Mirecourt (1855) and by Haussonville (1878) may also be consulted. Of the numerous shorter studies may be mentioned those of Sainte-Beuve in the *Causeries du lundi* and in *Portraits contemporains*; Jules Lemaître in *Les Contemporains*, vol. iv.; E. Faguet, *XIXe Siècle*; F. W. H. Myers, *Essays Ancient and Modern* (1883); Henry James in *North American Review* (April 1902); Matthew Arnold, *Mixed Essays* (1879). See also René Doumic's *George Sand* (1909), which has been translated into English by Alys Hallard as *George Sand: Some Aspects of her Life and Writings* (1910). (F. S.)

SAND. When rocks or minerals are pulverized by any agencies, natural or artificial, the products may be classified as gravels, sands and muds or clays, according to the size of the individual particles. If the grains are so fine as to be impalpable (about $\frac{1}{1600}$ in. in diameter) the deposit may be regarded as a mud or clay; if many of them are as large as peas the rock is a gravel. Sands may be uniform, when they have been sorted out by some agency such as a gentle current of water or the wind blowing steadily across smooth arid lands, but usually they vary much both in the coarseness of their grains and in their mineral composition. The great source of natural sands is the action of the atmosphere, frost, rain, plants and other agencies in breaking up the surfaces of rocks and reducing them to the condition of fine powder; in other words sands are ordinarily the product of the agencies of denudation operating on the rocks of the earth's

crust. Not all, however, are of this kind, for a few are artificial, like the crushed tailings produced in the extractions of metals from their ores; there are also volcanic sands which have originated by explosions of steam in the craters of active volcanoes.

A great part of the surface of the globe is covered by sand. In fertile regions the soil is very often of a sandy nature; though most soils are mixtures of sand with clay or stones, and may be described as loams rather than as sands. Pure sandy soils are found principally near sea-coasts where the sand has been blown inwards from the shore, or on formations of soft and friable sandstone like the Greensand. The soil of deserts also is often arenaceous, but there the finer particles have been lifted and borne away by the wind. Accumulations of sand are found also in some parts of the courses of our rivers, very often over wide stretches of the seashore, and more particularly on the sea bottom, where the water is not very deep, at no great distance from the land.

Of the rock-making minerals which are common on the earth's crust only a limited number occur at all frequently in sand deposits. For several reasons quartz is by far the commonest ingredient of sands. It is a very abundant mineral in rocks and is comparatively hard, so that it is not readily worn down to a very fine muddy paste. It also possesses practically no cleavage, and does not split up naturally into thin fragments. If we add to this that it is nearly insoluble in water and that it does not decompose, but preserves its freshness unaltered after long ages of exposure to weathering, we can see that it has all the properties necessary for furnishing a large portion of the sandy material produced by the detrition of rock masses. With quartz there is often a small amount of felspar (principally microcline, orthoclase and oligoclase), but this mineral, though almost as common as quartz in rocks, splits up readily on account of its cleavage, and decomposes into fine, soft, scaly aggregates of mica and kaolin, which are removed by the sifting action of water and are deposited as muds or clays. Small plates of white mica, which, though soft and very fissile, decompose very slowly, are often mingled with the quartz and felspar. In addition to these, all sands contain such minerals as garnet, tourmaline, zircon, rutile and anatase, which are common rock-forming minerals, both hard and resistant to decomposition. Among the less common ingredients are topaz, staurolite, kyanite, andalusite, chlorite, iron oxides, biotite, hornblende and augite, while small particles of chert, felsite and other fine-grained rocks appear frequently in the coarser sand deposits.

Shore sands and river sands, which have not been transported for any great distance from their parent rocks, often contain minerals that are too soft or too readily decomposed to persist. In the Lizard district of Cornwall the sands at the base of cliffs of serpentine are rich in olivine, augite, enstatite, tremolite and chromite. Near volcanic islands such minerals as biotite, hornblende, augite and zeolites may form a large portion of the local sand deposits. In marine sands also organic substances are almost universally present, either fragments of plants or the debris of calcareous shells, in fact many sands consist almost entirely of such fragments (shell sands). Around coral islands there are often extensive deposits of comminuted coral (coral sands), mixed with which there is a varying proportion of broken skeletons of calcareous algae, sponge-spicules and other debris of organic origin. The Greensands which are widely distributed over the floor of the oceans, in places where the continental shelf merges into the greater depths, owe their colour to small rounded lumps of glauconite.

Among the accessory ingredients of sands which are of great value and interest are the precious metals, especially gold and platinum. These are found usually in the lower parts of the sand deposits resting on the bed-rock, because of their high specific gravity, and have been derived from the destruction of the rocks in which they originally occurred either in quartzose veins or as disseminated particles. Tinstone occurs also in this way ("stream-tin"), and in Ceylon, Burma, Brazil, South Africa, &c., precious stones such as the diamond, ruby, spinel, chrysoberyl and tourmaline are found in beds of sand and gravel (gem sands).

In general the sand grains have a rounded or oviform shape due to mutual attrition during transport. Those which have been carried farthest are most rounded; sands deposited at no great distance from their parent rock often consist largely of angular grains. The smaller fragments may be carried along in suspension in water, and may travel for many miles without being sensibly worn; but coarse sands and fine gravels are swept along the bottom and are subjected to an intense grinding action. Something depends also on the hardness of the minerals present in the sands, yet even the diamonds and other gems found in sand deposits have often their corners worn and smoothed. Minerals with very perfect cleavage, such as mica, split up into thin plates under the shock of impact with adjacent grains, and are never rounded like quartz or tourmaline. In deserts the transport of the sands is effected by the wind, and owing to the low viscosity of air even the smallest grains are not held in suspension but are rolled along the ground; hence very fine quartzose sands are sometimes met with in arid regions with every particle smoothed and polished. These sands flow almost like a liquid and are used in hour-glasses. Similar "desert sands" occur among the sandstones of the Trias and were doubtless formed in the manner described.

In addition to river sands, shore sands, marine sand deposits and desert sands, there are many other types of sand deposits. Blown sands are usually found near the seashore, but occur also at the margin of some great lakes like those of N. America; desert sands belong in great part to this category. These sands have been blown into their present position by the wind, and unless fixed by vegetation are constantly though slowly in movement, being in consequence a menace to agricultural land on their leeward sides. They may be shell sands, quartz sands or mixed sands, and often show very marked oblique stratification or "current bedding." The surface of blown sand deposits is generally marked by dunes. Glacial sands are common in districts like Britain and those parts of N. America which have been covered by an ice-sheet. They are really water-borne and have been deposited by streams, though they occur in situations where rivers no longer flow. The waters produced by the melting of the ice-sheets flooded extensive tracts of country, laying down sand and mud deposits in temporary lakes. These sands are usually angular, because they have not been transported to any great distance. The old high-level terraces which border the lower courses of many rivers, though usually consisting of gravel, are often accompanied by considerable sand deposits.

Many of the Tertiary and some of the Secondary sandstone rocks are so incompletely consolidated by cementation that they are essentially sand rocks, and especially when weathered may be used as sources of sand. Thus in Britain there are Pliocene sands (St Erth, Cornwall, &c.), Eocene sands (Bagshot sands and Thanet sands); and the Lower and Upper Greensand (Cretaceous) are often dug in pits, though sometimes firmly coherent and more properly described as sandstones (*q.v.*).

The economic uses of sands are very numerous. They are largely employed for polishing and scouring both for domestic and manufacturing purposes. "Bath bricks" are made from the sand of the river Parrett near Bridgwater. Sand for glass-making was formerly obtained at Alum Bay in the Isle of Wight and at Lynn in Norfolk, but must be very pure for the best kinds of glass, and crushed quartz or flint is often preferred on this account. One of the principal uses of sand is for making mortar and cement: for this any good clean quartzose sand free from salts is suitable; it may be washed to remove impurities and sifted to secure uniformity in the size of the individual grains. Moulding sands, adapted for foundry purposes, generally contain a small admixture of clay. Sands are also employed in brick-making, in filtering, and for etching glass and other substances by means of the sand blast. (J. S. F.)

SANDAL (from the Latinized form of Gr. *σανδάλιον* or *σάνδαλον*: this probably represents the Persian *sandal*, slipper: it is not to be referred to Gr. *σανίς*, board), the foot-covering which consists of a sole of leather or other material attached to the sole of the foot by a thong of leather passing between the great and second toe, crossed over the instep and fastened round the ankle (see SHOE and COSTUME, section *Greek* and *Roman*). Sandals are only worn regularly among the peoples of Western civilization by friars, though forms of them are found among the peasants in Spain and the Balkans. They have in recent times been adopted by the extreme advocates of hygienic dress, especially for young children. In the early part of the 19th century a form of low, light slipper fastened by a ribbon crossed over the instep and round the ankle, and worn by women, was known as a sandal.

SANDALWOOD (from Fr. *sandal*, *santal*, Gr. *σάνταλον*, *σάνδαλον*, Pers. *sandal*, *chandan*, Skt. *chandana*, the sandal tree; the form "sanders" is probably an English corruption), a fragrant wood obtained from various trees of the natural order Santalaceae, and principally from *Santalum album*, a native of India. The use of sandalwood dates as far back at least as the 5th century B.C. It is still extensively used in India and China, wherever Buddhism prevails, being employed in funeral rites and religious ceremonies. Until the middle of the 18th century India was the only source of sandalwood. The discovery of a sandalwood in the islands of the Pacific led to difficulties with the natives, often ending in bloodshed, the celebrated missionary John Williams (1796–1839), amongst others, having fallen a victim to an indiscriminate retaliation by the natives on white men visiting the islands. The loss of life in this trade was at one time even greater than in that of whaling, with which it ranked as one of the most adventurous of callings. In India sandalwood is largely used in the manufacture of boxes, fans and other ornamental articles of inlaid work, and to a limited extent in medicine as a domestic remedy for all kinds of pains and aches.

The oil, obtained by distilling the wood in chips, is largely used as a perfume, few native Indian attars or essential oils being free from admixture with it In the form of powder or paste the wood is employed in the pigments used by the Brahmans for their distinguishing caste-marks.

Red sandalwood, known also as *red sanders wood*, is the product of a small leguminous tree, *Pterocarpus santalinus*, native of S. India, Ceylon and the Philippine Islands. A fresh surface of the wood has a rich deep red colour, which on exposure, however, assumes a dark brownish tint. In medieval times red sandalwood possessed a high reputation in medicine, and it was valued as a colouring ingredient in many dishes. It is pharmacologically quite inert. Now it is a little used as a colouring agent in pharmacy, its principal application being in wool-dyeing. Several other species of *Pterocarpus*, notably *P. indicus*, contain the same dyeing principle and can be used as substitutes for red sandalwood. The barwood and camwood of the Guinea Coast of Africa, from *Baphia nitida* or an allied species, called *santal rouge d'Afrique* by the French, are also in all respects closely allied to the red sandalwood of Oriental countries.

As a substitute for copaiba (*q.v.*), sandalwood oil, distilled from the wood of *Santalum album*, is more expensive and pleasanter to take, but it is less efficient, as it does not contain any analogue to the valuable resin in copaiba.

SANDARACH (Fr. *sandaraque*, Lat. *sandaraca*, Gr. σανδαράκη), realgar or red sulphide of arsenic, cf. Pers. *sandarus*, Skt. *sindura*, realgar), in mineralogy realgar or native arsenic disulphide, but generally (a use found in Dioscorides) a resinous body obtained from the small coniferous tree *Callitris quadrivalvis*, native of the north-west regions of Africa, and especially characteristic of the Atlas mountains. The resin, which is procured as a natural exudation on the stems, and also obtained by making incisions in the bark of the trees, comes into commerce in the form of small round balls or elongated tears, transparent, and having a delicate yellow tinge. It is a little harder than mastic, for which it is sometimes substituted. It is also used as incense, and by the Arabs medicinally as a remedy for diarrhoea. It has no medicinal advantages over many of the resins employed in modern therapeutics. An analogous resin is procured in China from *Callitris sinensis*, and in S. Australia, under the name of pine gum, from *C. Reissii*.

SANDBACH, a market town in the Crewe parliamentary division of Cheshire, England, 5 m. N.E. of Crewe, on the London & North-Western and North Staffordshire railways. Pop. of urban district (1901) 5558. It lies on a headstream of the small river Wheelock, a tributary of the Weaver. The parish church of St Mary is Perpendicular, with a fine carved roof of the 17th century. A few old timbered houses, of the same period, remain. In the market-place are two remarkable crosses covered with rude carvings, and assigned by some to the 7th century, being similar to those at Monasterboice and elsewhere in Ireland. There are boot and shoe factories, chemical works and a manufacture of fustians, with salt-works and iron-works in the adjacent township of Wheelock.

SANDBERGER, KARL LUDWIG FRIDOLIN VON (1826–1898), German palaeontologist and geologist, was born at Dillenburg, Nassau, on the 22nd of November 1826. He was educated at the universities of Bonn, Heidelberg and Giessen, at the last of which he graduated Ph.D. in 1846. He then studied at the university of Marburg, where he wrote his first essay, *Übersicht der geologischen Verhältnisse des Herzogtums Nassau* (1847). In 1849 he became curator of the Natural History Museum at Wiesbaden, and began to study the Tertiary strata of the Mayence Basin, and also the Devonian fossils of the Rhenish provinces, on which he published elaborate memoirs. In 1855 he was appointed professor of mineralogy and geology at the Polytechnic Institute at Karlsruhe, and he took part in the geological survey of Baden. From 1863 to 1896 he was professor of mineralogy and geology at the university of Würzburg. His great work *Die Land- und Süsswasser-Conchylien der Vorwelt* was published in 1870–1875. Later he issued an authoritative work on mineral veins, *Untersuchungen über Erzgänge* (1882–1885). He died at Würzburg on the 11th of April 1898. His brother GUIDO SANDBERGER (1821–1869) was an authority on fossil cephalopoda, and together they published *Die Versteinerungen des rheinischen Schichtensystems in Nassau* (1850–1856).

SANDBY, PAUL (1725–1809), English water-colour painter, was born at Nottingham in 1725. In 1746 he was appointed by the duke of Cumberland draughtsman to the survey of the Highlands. In 1752 he quitted this post and retired to Windsor, where he occupied himself with the production of water-colour drawings of scenery and architecture. Sir Joseph Banks commissioned him to bring out in aquatint (a method of engraving then peculiar to Sandby) forty-eight plates drawn during a tour in Wales. Sandby displayed considerable power as a caricaturist in his attempt to ridicule the opposition of Hogarth to the plan for creating a public academy for the arts. In 1768 he was chosen a foundation-member of the Royal Academy and appointed chief drawing-master to the Royal Military Academy at Woolwich. He held this situation till 1799. Sandby is best remembered, however, by his water-colour paintings. They are topographical in character, and, while they want the richness and brilliancy of modern water-colour, he nevertheless impressed upon them the originality of his mind. His etchings, such as the *Cries of London* and the illustrations to Ramsay's *Gentle Shepherd*, and his plates, such as those to Tasso's *Jerusalem Delivered*, are numerous and carefully executed. He died in London on the 9th of November 1809.

SANDEAU, LÉONARD SYLVAIN JULIEN [JULES] (1811–1883), French novelist, was born at Aubusson (Creuse) on the 19th of February 1811. He was sent to Paris to study law, but spent much of his time with unruly students. He met Madame Dudevant (George Sand) at Le Coudray in the house of a friend, and when she came to Paris in 1831 she joined Sandeau. The intimacy did not last long, but it produced *Rose et Blanche* (1831), a novel written in common under the pseudonym Jules Sand, from which George Sand took the idea of her famous *nom de guerre*.

Sandeau continued for nearly fifty years to produce novels and to collaborate in plays. His best works are *Marianna* (1839), in which he draws a portrait of George Sand; *Le Docteur Herbeau* (1841); *Catherine* (1845); *Mademoiselle de la Seiglière* (1848), a successful picture of society under Louis Philippe, dramatized in 1851; *Madeleine* (1848); *La Chasse au roman* (1849); *Sacs et parchemins* (1851); *La Maison de Penarvan* (1858); *La Roche aux mouettes* (1871) The famous play of *Le Gendre de M. Poirier* is one of several which he wrote with Émile Augier—the novelist usually contributing the story and the dramatist the theatrical working up. Meanwhile Sandeau had been made conservateur of the Mazarin library in 1853, elected to the Academy in 1858, and next year appointed librarian of St Cloud. At the suppression of this latter office, after the fall of the empire, he was pensioned. He died on the 24th of April 1883. He was never a very popular novelist, and the quiet grace of his style, and his refusal to pander to the popular taste in the morals and incidents of his novels, may have disqualified him for popularity.

See G. Planche, *Portraits littéraires* (1849), vol. i.; J. Clarétie, *J. Sandeau* (1883); F. Brunetière in the *Revue des deux mondes* (1887).

SAND-EEL, or SAND-LAUNCE. The fishes known under these names form a small family (*Ammodytidae*) now included with the *Scombresocidae* in the sub-order Percesoces. They were formerly placed in the Anacanthini and supposed to be allied to the *Gadidae*, but a fossil form *Cobitopsis* has recently been described in which the pelvic fins are present, and are abdominal in position as in *Belone* and *Scombresox*.

Their body is of an elongate-cylindrical shape, with the head terminating in a long conical snout, the projecting lower jaw forming the pointed end. A low long dorsal fin, in which no distinction between spines and rays can be observed, occupies nearly the whole length of the back, and a long anal, composed of similar short and delicate rays, commences immediately behind the vent, which is placed about midway between the head and caudal fin. The caudal is forked and the pectorals are short. The total absence of ventral fins indicates the burrowing habits of these fishes. The scales, when present, are very small; but generally the development of scales has only proceeded to the formation of oblique folds of the integuments. The eyes are lateral and of moderate size; the dentition is quite rudimentary.

Sand-eels are small littoral marine fishes, only one species attaining a length of 18 in. (*Ammodytes lanceolatus*). They live in shoals at various depths on a sandy bottom, and bury themselves in the sand on the slightest alarm. Other shoals live in deeper water. When they are surprised by fish of prey or porpoises they are frequently driven to the surface in such dense masses that numbers of them can be scooped out of the water with a bucket or hand-net. Sand-

eels destroy a great quantity of fry and other small creatures, such as the lancelet (*Amphioxus*), which lives in similar localities. They are excellent eating, and are much sought after for bait. They are captured by small meshed seines, as well as by digging in the sand. The eggs of sand-eels are small, heavier than sea-water and slightly adhesive: they are scattered among the grains of sand in which the fishes live, and the larvae and young at various stages of growth may be taken with the row-net in sandy bays in summer.

Sand-eels are common in the N. Atlantic; a species scarcely distinct from the European common sand-launce occurs on the Pacific side of N. America, another on the E. coast of S. Africa. On the British coasts three species are found: the greater sand-eel (*Ammodytes lanceolatus*), distinguished by a tooth-like bicuspid prominence on the vomer; the common sand-launce (*A. tobianus*), from 5 to 7 in. long, with unarmed vomer, even dorsal fin, and with the integuments folded; and the southern sand-launce (*A. siculus*), with unarmed vomer, smooth skin, and with the margins of the dorsal and anal fins undulated. The last species is common in the Mediterranean, but local farther N. It has been found near the Shetlands at depths from 80 to 100 fathoms.

SANDEFJORD, the oldest and most famous spa in Norway, in Jarlsberg-Laurvik *amt* (county), 86 m. S.S.W. of Christiania by the Skien railway. Pop. (1900) 4847. The springs are sulphurous, saline and chalybeate. Specimens of *jaettegryder* or giant's cauldrons may be seen at Gaardaasen and Vindalsbugt, some upwards of 23 ft. in depth.

SANDEMAN, SIR ROBERT GROVES (1835–1892), Indian officer and administrator, was the son of General Robert Turnbull Sandeman, and was born on the 25th of February 1835. He was educated at Perth and St Andrews University, and joined the 33rd Bengal Infantry in 1856. When that regiment was disarmed at Phillour by General Nicholson during the Mutiny in 1857, he took part in the final capture of Lucknow as adjutant of the 11th Bengal Lancers. After the suppression of the Mutiny he was appointed to the Punjab Commission by Sir John Lawrence. In 1866 he was appointed district officer of Dera Ghazi Khan, and there first showed his capacity in dealing with the Baluch tribes. He was the first to break through the close-border system of Lord Lawrence, by extending British influence to the independent tribes beyond the border. In his hands this policy worked admirably, owing to his tact in managing the tribesmen and his genius for control. In 1876 he negotiated the treaty with the khan of Kalat, which subsequently governed the relations between Kalat and the Indian government; and in 1877 he was made agent to the governor-general in Baluchistan, an office which he held till his death. During the second Afghan War in 1878 his influence over the tribesmen was of the utmost importance, since it enabled him to keep intact the line of communications with Kandahar, and to control the tribes after the British disaster at Maiwand. For these services he was made K.C.S.I. in 1879. In 1889 he occupied the Zhob valley, a strategic advantage which opened the Gomal Pass through the Waziri country to caravan traffic. Sandeman's system was not so well suited to the Pathan as to his Baluch neighbour. But in Baluchistan he was a pioneer, a pacificator and a successful administrator, who converted that country from a state of complete anarchy into a province as orderly as any in British India. He died at Bela, the capital of Las Bela state, on the 29th of January 1892, and there he lies buried under a handsome tomb.

See T. H. Thornton, *Sir Robert Sandeman* (1895); and R. I. Bruce, *The Forward Policy* (1900).

SANDERS, DANIEL (1819–1896), German lexicographer, was born on the 12th of November 1819 at Altstrelitz in Mecklenburg, of Jewish parentage. He was educated at the "Gymnasium Carolinum" in the neighbouring capital Neustrelitz, and the universities of Berlin and Halle, where he took the degree of *doctor philosophiae*. From 1842 to 1852 he conducted with success the school at Altstrelitz.

In 1852 he subjected Grimm's *Deutsches Wörterbuch* to a rigorous examination, and as a result published his dictionary of the German language, *Wörterbuch der deutschen Sprache* (3 vols., 1859–1865). This was followed by his *Ergänzungswörterbuch der deutschen Sprache* (1878–1885). Among others of his works in the same field are *Fremdwörterbuch* (Leipzig, 1871; 2nd ed., 1891), *Wörterbuch der Hauptschwierigkeiten in der deutschen Sprache* (1872; 22nd ed., 1892) and *Lehrbuch der deutschen Sprache für Schulen* (8th ed., 1888). Sanders laid down his views in his *Katechismus der deutschen Orthographie* (1856; 4th ed., 1878), and was an active member of the orthographical conference in Berlin in 1876. He published a translation in verse of the *Song of Songs* (1866), and wrote some poems for the young, *Heitere Kinderwelt* (1868). In 1887 he founded the *Zeitschrift für die deutsche Sprache*, which he conducted almost down to his death at Altstrelitz on the 11th of March 1897.

See Friedrich Düsel, *Daniel Sanders* (1886; 2nd ed., 1890); A Segert-Stein, *Daniel Sanders, ein Gedenkbuch* (1897).

SANDERS, NICHOLAS (*c.* 1530–1581), Roman Catholic agent and historian, born about 1530 at Charlwood, Surrey, was a son of William Sanders, once sheriff of Surrey, who was descended from the Sanders of Sanderstead. Educated at Winchester and New College, Oxford, he was elected fellow in 1548 and graduated B.C.L. in 1551. The family had strong Catholic leanings, and two of Nicholas's sisters, who must have been much older than he was, became nuns of Sion convent before its dissolution. Nicholas was selected to deliver the oration at the reception of Cardinal Pole's visitors by the university in 1557, and soon after Elizabeth's accession he went to Rome where he was befriended by Pole's confidant, Cardinal Morone; he also owed much to the generosity of Sir Francis Englefield (*q.v.*). He was ordained priest at Rome, and was, even before the end of 1550, mentioned as a likely candidate for the cardinal's hat. For the next few years he was employed by Cardinal Hosius, the learned Polish prelate, in his efforts to check the spread of heresy in Poland, Lithuania and Prussia. In 1565, like many other English exiles, he made his headquarters at Louvain, and after a visit to the Imperial Diet at Augsburg in 1566, in attendance upon Commendone, who had been largely instrumental in the reconciliation of England with Rome in Mary's reign, he threw himself into the literary controversy between Bishop Jewel (*q.v.*) and Harding. His *De visibili Monarchia Ecclesiae*, published in 1571, contains the first narrative of the sufferings of the English Roman Catholics. Its extreme papalism and its strenuous defence of Pius V.'s bull excommunicating and deposing Elizabeth marked out Sanders for the enmity of the English government, and he retaliated with lifelong efforts to procure the deposition of Elizabeth and restoration of Roman Catholicism.

His expectations of the cardinalate were disappointed by Pius V.'s death in 1572, and Sanders spent the next few years at Madrid trying to embroil Philip II., who gave him a pension of 300 ducats, in open war with Elizabeth. "The state of Christendom," he wrote, "dependeth upon the stout assailing of England." His ardent zeal was sorely tried by Philip's cautious temperament; and Sir Thomas Stukeley's projected Irish expedition, which Sanders was to have accompanied with the blessings and assistance of the pope, was diverted to Morocco where Stukeley was killed at the battle of Al Kasr al Kebir in 1578. Sanders, however, found his opportunity in the following year, when a force of Spaniards and Italians was despatched to Smerwick to assist James Fitzmaurice and his Geraldines in stirring up an Irish rebellion. The Spaniards were, however, annihilated by Lord Grey in 1580, and after nearly two years of wandering in Irish woods and bogs Sanders died of cold and starvation in the spring of 1581. The English exiles were disgusted at the waste of such material: "Our Sanders," they exclaimed, "is more to us than the whole of Ireland." His writings have been the basis of all Roman Catholic histories of the English Reformation. The most important was his *De Origine ac Progressu schismatis Anglicani*, which was continued after 1558 by Edward Rishton, and printed at Cologne in 1585; it has been often re-edited and translated, the best English edition being that by David Lewis (London, 1877). Its statements earned Sanders the nickname of Dr Slanders in England; but a considerable number of the "slanders" have been confirmed by corroborative evidence, and others, *e.g.* his story that Ann Boleyn was Henry VIII's own daughter, were simply borrowed by Sanders from earlier writers. It is not a more untrustworthy account than a vehement controversialist engaged in a life and death struggle might be expected to write of his theological antagonists.

See Lewis's *Introduction* (1877); *Calendars of Irish, Foreign and Spanish State Papers, and of the Carew MSS.*; Knox's *Letters of Cardinal Allen*; T. F. Kirby's *Winchester Scholars*; R. Bagwell's *Ireland under the Tudors*; A. O. Meyer's *England und die katholische Kirche unter Königin Elisabeth* (1910); and T. G. Law in *Dict. Nat. Biogr.* i. 259-261 where a complete list of Sanders's writings is given.

(A. F. P.)

SANDERSON, ROBERT (1587–1663), English divine, was born probably at Sheffield, Yorkshire, in September 1587. He was educated at Rotherham grammar school and at Lincoln College, Oxford, took orders in 1611, and was promoted successively

to several benefices. On the recommendation of Laud he was appointed one of the royal chaplains in 1631, and was a favourite preacher with the king, who made him regius professor of divinity at Oxford in 1642. The Civil War kept him from entering the office till 1646; and in 1648 he was ejected by the Parliamentary visitors. He recovered his position at the Restoration, was moderator at the Savoy Conference, 1661, and was promoted to the bishopric of Lincoln. He died two years later on the 29th of January 1663.

His most celebrated work is his *Cases of Conscience*, deliberate judgments upon points of morality submitted to him. They are distinguished by moral integrity, good sense and learning. His practice as a college lecturer in logic is better evidenced by these "cases" than by his *Compendium of Logic*, first published in 1618. A complete edition of Sanderson's works (6 vols.) was edited by William Jacobson in 1854. It includes the *Life* by Izaak Walton, revised and enlarged.

SANDFORD, JOHN DE (d. 1294), archbishop of Dublin, was probably an illegitimate son of the baronial leader, Gilbert Basset (d. 1241), or of his brother Fulk Basset, bishop of London from 1241 until his death in 1259, a prelate who was prominent during the troubles of Henry III.'s reign. John was a nephew of Sir Philip Basset (d. 1271), the justiciar. He first appears as an official of Henry III. in Ireland and of Edward I. in both England and Ireland; he was appointed dean of St Patrick's, Dublin, in 1275. In 1284 he was chosen archbishop of Dublin in succession to John of Darlington; some, however, objected to this choice and Sandford resigned his claim; but was elected a second time while he was in Rome, and returning to Ireland was allowed to take up the office. In 1288, during a time of great confusion, the archbishop acted as governor of Ireland. In 1290 he resigned and returned to England. Sandford served Edward I. in the great case over the succession to the Scottish throne in 1292 and also as an envoy to the German king, Adolph of Nassau, and the princes of the Empire. On his return from Germany he died at Yarmouth on the 2nd of October 1294.

Sandford's elder brother, Fulk (d. 1271), was also archbishop of Dublin. He is called Fulk de Sandford and also Fulk Basset owing to his relationship to the Bassets. Having been archdeacon of Middlesex and treasurer and chancellor of St Paul's Cathedral, London, he was appointed archbishop of Dublin by Pope Alexander IV. in 1256. He took some slight part in the government of Ireland under Henry III. and died at Finglas on the 4th of May 1271.

SANDGATE, a watering-place of Kent, England, on the S.E. coast, 1½ m. W. of Folkestone, on the South-Eastern & Chatham railway. Pop. of urban district (1901) 2023. It is connected with Hythe, 3 m. W., by a tramway belonging to the railway company. It is included in the parliamentary borough of Hythe. Sandgate Castle was built by Henry VIII., but on the formation of a camp here in 1806 it was considerably altered. The camp of Shorncliffe lies N. of the town on a plateau.

SAND-GROUSE, the name[1] by which are commonly known the members of a small group of birds frequenting sandy tracts, and having their feet more or less clothed with feathers after the fashion of grouse (*q.v.*), to which they were originally thought to be closely allied; the species first described were by the earlier systematists invariably referred to the genus *Tetrao*. Their separation therefrom is due to C. J. Temminck, who made for them a distinct genus which he called *Pterocles*.[2] Further investigation of the osteology and pterylosis of the sand-grouse revealed still greater divergence from the normal Gallinae (to which the true grouse belong), as well as several curious resemblances to the pigeons; and in the Zoological Society's *Proceedings* for 1868 (p. 303) T. H. Huxley proposed to regard them, under the name of Pteroclomorphae, as forming a group equivalent to the Alectoromorphae and Peristeromorphae. They are now generally regarded as forming a separate sub-order *Pterocles* of Charadriiform birds, allied to pigeons (see BIRDS).

The Pteroclidae consist of two genera—*Pterocles*, with about fifteen species, and *Syrrhaptes*, with two. Of the former, two species inhabit Europe, *P. arenarius*, the sand-grouse proper, and that which is usually called *P. alchata*, the pin-tailed sand-grouse. The European range of the first is practically limited to Portugal, Spain and S. Russia, while the second inhabits also the S. of France, where it is generally known by its Catalan name of *Ganga*, or locally as *Grandaulo*, or, strange to say, *Perdrix d'Angleterre*. Both species are also abundant in Barbary, and have been believed to extend E. through Asia to India, in most parts of which country they seem to be only winter-visitants; but in 1880 M. Bogdanow pointed out to the Academy of St Petersburg (*Bulletin*, xxvii. 164) a slight difference of coloration between eastern and western examples of what had hitherto passed as *P. alchata*; analogy would suggest that a similar difference might be found in examples of *P. arenarius*. India, moreover, possesses five other species of *Pterocles*, of which, however, only one, *P. fasciatus*, is peculiar to Asia, while the others inhabit Africa as well, and all the remaining species belong to the Ethiopian region—one, *P. personatus*, being peculiar to Madagascar, and four occurring in or on the borders of the Cape Colony.

The genus *Syrrhaptes*, though in general appearance resembling *Pterocles*, has a conformation of foot quite unique among birds, the three anterior toes being encased in a common "podotheca," which is clothed to the claws with hairy feathers, so as to look much like a fingerless glove. The hind toe is wanting. The two species of *Syrrhaptes* are *S. tibetanus*—the largest sand-grouse known—inhabiting the country whence its trivial name is derived, and *S. paradoxus*, ranging from N. China across Central Asia to the confines of Europe, which it occasionally invades. Though its attempts at colonization in the extreme W. have failed, it would seem to have established itself in the neighbourhood of Astrakhan (*Ibis*, 1882, p. 220). It appears to be the "Barguerlac" of Marco Polo (ed. Yule, i. p. 239); and the "Loung-Kio" or "Dragon's Foot," so unscientifically described by the Abbé Huc (*Souvenirs d'un Voyage dans la Tartarie*, i. p. 241), can scarcely be anything else than this bird.

The sand-grouse assimilates in general colour to that of the ground, being above of a dull ochreous hue, more or less barred or mottled by darker shades, while beneath it is frequently varied by belts of deep brown intensifying into black. Lighter tints are, however, exhibited by some species and streaks or edgings of an almost pure white relieve the prevailing sandy or fawn-coloured hues that especially characterize the group. The sexes seem always to differ in plumage, that of the male being the brightest and most diversified. The expression is decidedly dove-like, and so is the form of the body, the long wings contributing also to that effect, so that among Anglo-Indians these birds are commonly known as "rock-pigeons." The long wings, the outermost primary of which in *Syrrhaptes* has its shaft produced into an attenuated filament, are in all the species worked by exceedingly powerful muscles, and in several forms the middle rectrices are likewise protracted and pointed, so as to give to their wearers the name of Pin-tailed Sand-Grouse.[3] The nest is a shallow hole in the sand. Three seems to be the regular complement of eggs, but there are writers who declare that the full number in some species is four. These eggs are almost cylindrical in the middle and nearly alike at each end, and are of a pale earthy colour, spotted, blotched or marbled with darker shades, the markings being of two kinds, one superficial and the other more deeply seated in the shell. The young are hatched fully clothed in down (*P.Z.S.*, 1866, pl. ix. fig. 2), and appear to be capable of locomotion soon after birth. The remains of an extinct species of *Pterocles*, *P. sepultus*, intermediate apparently between *P. alchata* and *P. gutturalis*, have been recognized in the Miocene caves of the Allier by A. Milne-Edwards (*Ois. foss. de la France*, p. 294, pl. clxi., figs. 1-9); and, in addition to the other authorities on this very interesting group of birds already cited, reference may be made to D. G. Elliot's "Study" of the Family (*P.Z.S.*, 1878, pp. 233-264) and H. F. Gadow, "On Certain Points in the Anatomy of *Pterocles*" (*op. cit.*, 1882, pp. 312-332). (A. N.)

SANDHURST, a town in the Wokingham parliamentary division of Berkshire, England, 9 m. N. of Aldershot. Pop. (1901) 2386. Two miles south-east of the town, near the villages of Cambridge Town and York Town, and the railway stations of Blackwater and Camberley on the South-Eastern and Chatham and South-Western lines, is the Sandhurst Royal Military College. It was settled here in 1812, having been already removed by its founder, the duke of York, from High Wycombe, where it was opened in 1799, to Great Marlow in 1802. It stands in beautiful grounds, which contain a large lake. Wellington College station on the South-Eastern branch line to Reading, near Sandhurst itself, serves Wellington College, one of the principal modern public schools of England, founded in memory

[1] It seems to have been first used by J. Latham in 1783 (*Synopsis*, iv. p. 751) as the direct translation of the name *Tetrao arenarius* given by Pallas.

[2] He states that he published this name in 1809; but hitherto research has failed to find it used until 1815.

[3] These were separated by Bonaparte (*Comptes rendus*, xlii. p. 880) as a distinct genus, *Pteroclurus*, which later authors have justly seen no reason to adopt.

of the great duke of Wellington, and incorporated in 1853. Its primary object was the education of the sons of deceased army officers. In the vicinity is Broadmoor Prison for criminal lunatics.

SAN DIEGO, a city, port of entry and the county-seat of San Diego county, in S. California, U.S.A., on the Pacific Ocean, about 10 m. N. of the Mexican border, and about 126 m. (by rail) S.E. of Los Angeles. Pop. (1880) 2637; (1890) 16,159; (1900) 17,700, of whom 3768 were foreign-born; (1910 census) 39,578. It is served by numerous steamship lines and by the Atchison, Topeka & Santa Fé, the Los Angeles & San Diego Beach, the San Diego Southern, and the San Diego, Cuyamaca & Eastern railways. A railway between Yuma, Arizona and San Diego was under construction in 1910. The harbour, next to that of San Francisco the best in California, has an area of some 22 sq. m. The Federal government has made various improvements in the harbour, building a jetty 7500 ft. long on Zuninga Shoal at the entrance and making a channel 225 ft. wide and 27-28 ft. deep at low tide. The city site, which is a strip of land 25 m. long and 2 to 4 m. wide, is nearly level near the bay. San Diego is the seat of a State Normal School and has a Carnegie library. There is a coaling station of the United States Navy, and the United States government maintains a garrison in Fort Rosecrans. At Coronado (pop. 1900, 935) across the bay are Coronado Beach, and the Hotel del Coronado, with fine botanical and Japanese gardens; on the beach people live in tents except in the stormier season. Within the city, on the top of Point Loma, is the Theosophical Institution of the "Universal Brotherhood." San Diego has one of the most equable climates in the world, and there are several sanatoriums here. The economic interests centre in fruit culture, especially the raising of citrus fruits and of raisin grapes. There are also warehouses, foundries, lumber yards, saw-mills and planing-mills —logs are rafted here from Washington and Oregon. National City (pop. 1900, 1086), adjoining San Diego on the S. and the S. terminus of the Atchison, Topeka & Santa Fé system, has large interests in lemon packing and the manufacture of oil, citric acid and other lemon by-products. In 1905 the total value of the factory products of the city was $1,974,430 (194·8 % more than in 1900).

San Diego is under the commission form of government; in 1905 the city secured as a charter right the power to "recall" by petition any unsatisfactory city official and to elect another in his place, and the initiative and referendum were incorporated in the charter, but were practically inoperative for several years. By a charter amendment of 1909, the city is governed by a commission of a mayor and five councilmen, elected at large.

About 4 m. N. of the business centre of San Diego is the site of the first Spanish settlement in Upper California. It was occupied in April 1769; a Franciscan "mission" (the earliest of twenty-one established in California) was founded on the 16th of July, and a military presidio somewhat later. San Diego began the first revolution against Governor M. Victoria and Mexican authority in 1831, but was intensely loyal in opposition to Governor J. B. Alvarado and the northern towns in 1836. It was made a port of entry in 1828. In 1840 it had a population of 140. It was occupied by the American forces in July 1846, and was reoccupied in November after temporary dispossession by the Californians, no blood being shed in these disturbances. In 1850 it was incorporated as a city, but did not grow, and lost its charter in 1852. In 1867 it had only a dozen inhabitants. A land promoter, A. E. Horton (d. 1909), then laid out a new city about 3 m. S. of the old. Its population increased to 2300 in 1870, and this new San Diego was incorporated in 1872, and was made a port of entry in 1873. The old town still has many ruined adobe houses, and the old "mission" is fairly well preserved. The prosperity of 1867–1873 was followed by a disastrous crash in 1873–1874, and little progress was made until 1884, when San Diego was reached by the Santa Fé railway system. After 1900 the growth of the city was again very rapid.

SANDOMIR, or SEDOMIERZ, a town of Russian Poland, in the government of Radom, 140 m. S.S.E. of Warsaw by river and on the left bank of the Vistula, opposite the confluence of the San. Pop. (1881) 6265, or, including suburbs, 14,710; (1897) 6534. It is one of the oldest towns of Poland, being mentioned as early as 1079; from 1139 to 1332 it was the chief town of the principality of the same name. In 1240, and again in 1259, it was burned by the Mongols. Under Casimir III. it reached a high degree of prosperity. In 1429 it was the seat of a congress for the establishment of peace with Lithuania, and in 1570 the "Consensus Sandomiriensis" was held here for uniting the Lutherans, Calvinists and Moravian Brethren. Subsequent wars, and especially the Swedish (*e.g.* in 1655) ruined the town even more than did numerous conflagrations, and in the second part of the 18th century it had only about 2000 inhabitants. Here in 1702 the Polish supporters of Augustus of Saxony banded together against Charles XII. of Sweden. The beautiful cathedral was built between 1120 and 1191; it was rebuilt in stone in 1360, and is one of the oldest monuments of Polish architecture. Two of the churches are fine relics of the 13th century. The castle, built by Casimir III. (14th century), still exists. The city gives title to an episcopal see (Roman Catholic).

SANDOWAY, a town and district in the Arakan division of Lower Burma. The town (pop. 1901, 12,845) is very ancient, and is said to have been at one time the capital of Arakan. The district has an area of 3784 sq. m.; pop. (1901) 90,927, showing an increase of 16 % in the decade. The country is mountainous, the Arakan range sending out spurs which reach the coast. Some of the peaks in the N. attain 4000 and more ft. The streams are only mountain torrents to within a few miles of the coast; the mouth of the Khwa forms a good anchorage for vessels of from 9 to 10 ft. draught. The rocks in the Arakan range and its spurs are metamorphic, and comprise clay, slates, ironstone and indurated sandstone; towards the S., ironstone, trap and rocks of basaltic character are common; veins of steatite and white fibrous quartz are also found. The rainfall in 1905 was 230·49 in. Except a few acres of tobacco, all the cultivation is rice. Sandoway was ceded to the British, with the rest of Arakan, by the treaty of Yandabo in 1826.

SANDOWN, a watering-place in the Isle of Wight, England, 6½ m. S. of Ryde by rail. Pop. of urban district (1901) 5006. It is beautifully situated on rising ground overlooking Sandown Bay and the English Channel, on the S.E. coast of the island. There is a wide expanse of sandy shore, and bathing is excellent.

SANDPIPER (Ger. *Sandpfeifer*), the name applied to nearly all the smaller kinds of the group Limicolae which are not Plovers (*q.v.*) or Snipes (*q.v.*), but may be said to be intermediate between them. According to F. Willughby in 1676 it was the name given by Yorkshiremen to the bird popularly known in England as the "Summer-Snipe,"—the *Tringa hypoleucos* of Linnaeus and the *Totanus hypoleucus* of later writers,—but probably even in Willughby's time the name was of much wider signification. Placed by most systematists in the family Scolopacidae, the birds commonly called Sandpipers seem to form three sections, which have been often regarded as Subfamilies—Totaninae, Tringinae and Phalaropodinae, the last indeed in some classifications taking the higher rank of a Family—Phalaropodidae. This section comprehends three species only, known as Phalaropes or swimming sandpipers, which are distinguished by the membranes that fringe their toes, in two of the species forming marginal lobes,[1] and by the character of their lower plumage, which is as close as that of a duck. The most obvious distinctions between Totaninae and Tringinae may be said to lie in the acute or blunt form of the tip of the bill (with which is associated a less or greater development of the sensitive nerves running almost if not quite to its extremity, and therefore greatly influencing the mode of feeding) and in the style of plumage—the Tringinae, with blunt and flexible bills, mostly assuming a summer-dress in which some tint of chestnut or reddish-brown

[1] These are *Phalaropus fulicarius* and *P.* (or *Lobipes*) *hyperboreus*, and were thought by some of the older writers to be allied to the Coots (*q.v.*). The third species is *P.* (or *Steganopus*) *wilsoni*. All are natives of the higher parts of the N. hemisphere, and the last is especially American, though perhaps a straggler to Europe.

is prevalent, while the Totaninae, with acute and stiffer bills, display no such lively colours. Furthermore, the Tringinae, except when breeding, frequent the sea-shore much more than do the Totaninae.[1] To the latter belong the Greenshank (*q.v.*) and Redshank (*q.v.*), as well as the Common Sandpiper, the "Summer-Snipe" above-mentioned, a bird hardly exceeding a skylark in size, and of very general distribution throughout the British Islands, but chiefly frequenting clear streams, especially those with a gravelly or rocky bottom, and most generally breeding on the beds of sand or shingle on their banks. It usually makes its appearance in May. The nest, in which four eggs are laid with their pointed ends meeting in its centre (as is usual among Limicoline birds), is seldom far from the water's edge, and the eggs, as well as the newly-hatched and down-covered young, closely resemble the surrounding pebbles. The Common Sandpiper is found over the greater part of the Old World. In summer it is the most abundant bird of its kind in the extreme N. of Europe, and it extends across Asia to Japan. In winter it makes its way to India, Australia and the Cape of Good Hope. In America its place is taken by a closely kindred species, which is said to have also occurred in England—*T. macularius*, the "Peetweet," or Spotted Sandpiper, so called from its usual cry, or from the almost circular marks which spot its lower plumage. In habits it is very similar to its congener of the Old World, and in winter it migrates to the Antilles and to Central and South America.

Of other Totaninae, one of the most remarkable is that to which the inappropriate name of Green Sandpiper has been assigned, the *Totanus* or *Helodromas ochropus* of ornithologists, which differs (so far as is known) from all others of the group both in its osteology[2] and mode of nidification, the hen laying her eggs in the deserted nests of other birds,—Jays, Thrushes or Pigeons,—but nearly always at some height (from 3 to 30 ft.) from the ground (*Proc. Zool. Society*, 1863, pp. 529-532). This species occurs in England the whole year round, and is presumed to have bred there, though the fact has never been satisfactorily proved, and knowledge of its erratic habits comes from naturalists in Pomerania and Sweden. This sandpiper is characterized by its dark upper plumage, which contrasts strongly with the white of the lower part of the back and gives the bird as it flies much the look of a very large house-martin. The so-called wood-sandpiper, *T. glareola*, which, though much less common, is known to have bred in England, has a considerable resemblance to the species last mentioned, but can be distinguished by the feathers of the axillary plume being white barred with greyish-black, while in the green sandpiper they are greyish-black barred with white. It is an abundant bird in most parts of northern Europe, migrating in winter very far to the southward.

Of the section Tringinae the best known are the Knot (*q.v.*) and the Dunlin, *T. alpina*. The latter, often also called Ox-bird, Plover's Page, Purre and Stint,—names which it shares with some other species,—not only breeds commonly on many of the elevated moors of Britain, but in autumn resorts in countless flocks to the shores. In winter of a nearly uniform ash-grey above and white beneath, in summer the feathers of the back are black, with deep rust-coloured edges, and a broad black belt occupies the breast. The Dunlin varies considerably in size, examples from N. America being almost always recognizable from their greater bulk, while in Europe there appears to be a smaller race which has received the name of *T. schinzi*. In the breeding-season the male Dunlin utters a most peculiar and far-sounding whistle, somewhat resembling the continued ringing of a high-toned musical bell.

Next to the Dunlin and Knot the commonest British Tringinae are the Sanderling, *Calidris arenaria* (distinguished from every other bird of the group by wanting a hind toe), the Purple Sandpiper, *T. striata* or *maritima*, the Curlew-Sandpiper, *T. subarquata* and the Little and Temminck's Stints, *T. minuta* and *T. temminckii*. *T. minutilla*, the American stint, is darker, with olive feet, and ranges from the Arctic New World to Brazil. *T. fuscicollis*, Bonaparte's sandpiper, with white upper tail-coverts inhabits Arctic America, but reaches the greater part of South America in winter, whilst *T. bairdi*, with brownish median tail-coverts, extends over nearly all North America, breeding towards the north.

The broad-billed sandpiper, *T. platyrhyncha*, of the Old World, seems to be more snipe-like than any that are usually assigned to this section. The spoon-billed sandpiper, *Eurinorhynchus pygmaeus*, breeds in north-eastern Asia and N.W. America, and ranges to China and Burma in winter. (A. N.)

SANDRART, JOACHIM VON (1606–1688), German art-historian and painter, was born at Frankfort, and after studying in Germany, Holland and England, went in 1627 to Italy, where he became famous as a portrait-painter. He subsequently revisited Holland and then settled in Nuremberg, where he died. His "Peace-Banquet, 1649" is in the town hall there. He is best known as the author of books on art, some of them in Latin, and especially for his historical work, the *Deutsche Akademie* (1675–1679), of which there is a modern edition by Sponsel (1896).

SANDRINGHAM, a village in the N.W. parliamentary division of Norfolk, England, 3 m. from the shore of the Wash, and 2½ from Wolferton station on the Great Eastern railway. Sandringham House was a country seat of King Edward VII., acquired by him when Prince of Wales by purchase in 1861. Ten years later the mansion then existing was replaced by the present picturesque building in brick and stone in Elizabethan style. The estate, of some 7000 acres, includes a park of 200 acres, entered by fine wrought iron gates constructed at Norwich. The church of St Mary Magdalene contains many memorials of the royal family.

SANDSTONE, in petrology, a consolidated sand rock built up of sand grains held together by a cementing substance. The size of the particles varies within wide limits and in the same rock may be uniform or irregular: the coarser sandstones are called grits, and form a transition to conglomerates (*q.v.*), while the finer grained usually contain an admixture of mud or clay and pass over by all stages into arenaceous shales and clay rocks. Greywackes (*q.v.*) are sandstones belonging to the older geological systems, such as the Silurian or Cambrian, usually of brown or grey colour and very impure.

The minerals of sandstones are the same as those of sands. Quartz is the commonest; with it often occurs a considerable amount of felspar, and usually also some white mica. Chlorite, argillaceous matter, calcite and iron oxides, are exceedingly common in sandstones, and in some varieties are important constituents; garnet, tourmaline, zircon, epidote, rutile and anatase are often present though rarely in any quantity. According to their composition we may distinguish siliceous sandstones (some of these are so pure that they contain 99% of silica, *e.g.* Craigleith stone and some gannisters), felspathic sandstones or arkoses (less durable and softer than the siliceous sandstones); micaceous sandstones, with flakes of mica lying along the bedding planes; argillaceous sandstones; ferruginous sandstones, brown or red in colour with the sand grains coated with red haematite or brownish yellow limonite; impure sandstones, usually in the main consisting of quartz with a large addition of other minerals.

The cementing material is often fine chalcedonic silica, and exists in such small quantity that it is difficult to recognize even with the microscope. In some of the cherty sandstones of the Greensand the chalcedonic cement is much more abundant: these rocks also contain rounded grains of glauconite, to which they owe their green colour. Crystalline silica (quartz) is deposited interstitially in some sandstones, often in regular parallel crystalline growth on the original sand grains, and when there are cavities or fissures in the rock may show the development of regular crystalline facets. By this process the rock becomes firmly compacted, and is then described as a quartzite (*q.v.*). A calcareous cement is almost equally common: it may be derived from particles of shells or other calcareous fossils originally mixed with the sand and subsequently dissolved and redeposited in the spaces between the other grains. In Fontainebleau sandstone and some British Secondary rocks the calcite is in large crystalline masses, which when broken show plane cleavages mottled with small rounded sand grains; in the French rock external rhombohedral faces are present and the crystals may be of considerable size. Many of the British Jurassic and Cretaceous sandstones (*e.g.* Kentish Rag, Spilsby Sandstone) are of this calcareous type. In ferruginous sandstones the iron oxides usually form only a thin pellicle coating each grain, but sometimes, in the greensands, is more abundant, especially in concretionary masses or segregations. In argillaceous sandstones the fine clayey material, compacted by pressure, holds the sand grains together, and rocks of this kind are

[1] There are no English words adequate to express these two sections. By some British writers the Tringinae have been indicated as "Stints," a term cognate with Stunt and wholly inapplicable to many of them, while American writers have restricted to them the name of "Sandpiper," and call the Totaninae, to which that name is especially appropriate, "Willets."

[2] It possesses only a single pair of posterior "emarginations" on its sternum, in this respect resembling the Ruff (*q.v.*). Among the Plovers and Snipes other similarly exceptional cases may be found.

soft and break up easily when exposed to the weather or submitted to crushing tests. Among other cementing materials may be mentioned, dolomite, barytes, fluorite and phosphate of lime, but these are only locally found.

Many sandstones contain concretions which may be several feet in diameter, and are sometimes set free by weathering or when the rock is split open by a blow. Most frequently these are siliceous, and then they interfere with the employment of the rock for certain purposes, as for making grindstones or for buildings of fine dressed stone. Argillaceous concretions or clay galls are almost equally common, and nodules of pyrites or marcasite; the latter weather to a brown rusty powder, and are most undesirable in building stones. Phosphatic, ferruginous, barytic and calcareous concretions occur also in some of the rocks of this group. We may also mention the presence of lead ores (the Eifel, Germany), copper ores (Chessy and some British Triassic sandstones) and manganese oxides. In some districts (*e.g.* Alsace) bituminous sandstones occur, while in N. America many Devonian sandstones contain petroleum. Many Coal-Measures sandstones contain remains of plants preserved as black impressions.

The colours of sandstones arise mostly from their impurities; pure siliceous and calcareous sandstones are white, creamy or pale yellow (from small traces of iron oxides). Black colours are due to coal or manganese dioxide; red to haematite (rarely to copper oxide); yellow to limonite, green to glauconite. Those which contain clay, fragments of shale, &c., are often grey (*e.g.* the Pennant Grit of S. Wales).

Sandstones are very extensively worked, mostly by quarries but sometimes by mines, in all districts where they occur and are used for a large variety of purposes. Quarrying is facilitated by the presence of two systems of joints, developed approximately in equal perfection, nearly at right angles to one another and perpendicular to the bedding planes. Sometimes this jointing determines the weathering of the rock into square pillar-like forms or into mural scenery (*e.g.* the Quader Sandstein of Germany). As building stones sandstones are much in favour, especially in the Carboniferous districts of Britain, where they can readily be obtained. They have the advantage of being durable, strong and readily dressed. They are usually laid "on the bed," that is to say, with their bedding surfaces horizontal and their edges exposed. The finer kinds of sandstone are often sawn, not hewn or trimmed with chisels. Pure siliceous sandstones are the most durable, but are often very expensive to dress and are not obtainable in many places. Sandstones are also used for grindstones and for millstones. For engineering purposes, such as dams, piers, docks and bridges, crystalline rocks, such as granite, are often preferred as being obtainable in larger blocks and having a higher crushing strength. Very pure siliceous sandstones (such as the gannisters of the north of England) may be used for lining furnaces, hearths, &c. As sandstones are always porous, they do not take a good polish and are not used as ornamental stones, but this property makes them absorb large quantities of water, and consequently they are often important sources of water supply (*e.g.* the water-stones of the Trias of the English Midlands). Silver is found in beds of sandstone in Utah, lead near Kommern in Prussia, and copper at Chessy near Lyons. (J. S. F.)

SANDUR, or SUNDOOR, a petty state of S. India, surrounded by the Madras district of Bellary. Area, 161 sq. m. Pop. (1901), 11,200; estimated revenue, £3500. The raja is a Mahratta of the Ghorpade family. On the western border is a hill range, which contains the military sanatorium of Ramandrug. Manganese and hematite iron ore have been found, both of unusual purity.

SANDUSKY, a city, port of entry, and the county-seat of Erie County, Ohio, U.S.A., on Sandusky Bay, an arm of Lake Erie, about 56 m. W. by S. of Cleveland. Pop. (1890), 18,471; (1900), 19,664, of whom 4002 were foreign-born and 295 were negroes; (1910, census) 19,989. Sandusky is served by the Lake Shore & Michigan Southern, the Cleveland, Cincinnati, Chicago & Saint Louis, the Pennsylvania, the Baltimore & Ohio, and the Lake Erie & Western railways, by several interurban electric lines, and by steamboats to the principal ports on the Great Lakes. Among the public buildings are the United States Government Building and the Court House. The city has a Carnegie library (1897), and is the seat of the Lake Laboratory (biological) of the Ohio State University, and of the Ohio Soldiers' and Sailors' Home (26 buildings).

At the entrance to Sandusky Bay is Cedar Point, with a beach for bathing. At the mouth of the harbour is Johnson's Island, where many Confederate prisoners were confined during the Civil War. A few miles farther N. are several fishing resorts, among them Lakeside and Put-in-Bay; at the latter the United States government maintains a fish hatchery, and out of the bay Oliver Hazard Perry and his fleet sailed on the morning of the 10th of September 1813 for the Battle of Lake Erie. Sandusky has a good harbour, which has been greatly improved by the United States government; and its trade in coal, lumber, stone, cement, fish, fruit, ice, wine and beer is extensive; in 1908 the value of its exports, chiefly to Canada, was $580,191 and the value of its imports $57,762. The value of its factory products increased from $2,833,506 in 1900 to $4,878,563 in 1905, or 72·2 %.

English traders were at Sandusky as early as 1749, and by 1763 a fort had been erected; but on the 16th of May of that year, during the Pontiac rising, the Wyandot Indians burned the fort. The first permanent settlement was made in 1817, and in 1845 Sandusky was chartered as a city.

SANDWICH, EDWARD MONTAGU, or **MOUNTAGU,** 1ST EARL OF (1625–1672), English admiral, was a son of Sir Sidney Montagu (d. 1644) of Hinchinbrook, who was a brother of Henry Montagu, 1st earl of Manchester, and of Edward Montagu, 1st Lord Montagu of Boughton. He was born on the 27th of July 1625, and although his father was a royalist, he himself joined the parliamentary party at the outbreak of the Civil War. In 1643 he raised a regiment, with which he distinguished himself at the battles of Marston Moor and Naseby and at the siege of Bristol. Though one of Cromwell's intimate friends, he took little part in public affairs until 1653, when he was appointed a member of the council of state. His career as a seaman began in 1656, when he was made a general-at-sea, his colleague being Robert Blake. Having taken some part in the operations against Dunkirk in 1657, he was chosen a member of Cromwell's House of Lords, and in 1659 he was sent by Richard Cromwell with a fleet to arrange a peace between Sweden and Denmark. After the fall of Richard he resigned his command and joined with those who were frightened by the prospect of anarchy in bringing about the restoration of Charles II. Again general-at-sea early in 1660, Montagu carried the fleet over to the side of the exiled king, and was entrusted with the duty of fetching Charles from Holland. He was then made a knight of the Garter, and in July 1660 was created earl of Sandwich. His subsequent naval duties included the conveyance of several royal exiles to England and arranging for the cession of Tangier and for the payment of £300,000, the dowry of Catherine of Braganza.

During the war with the Dutch in 1664–1665 Sandwich commanded a squadron under the duke of York and distinguished himself in the battle off Lowestoft on the 3rd of June 1665. When the duke retired later in the same year he became commander-in-chief, and he directed an unsuccessful attack on some Dutch merchant ships which were sheltering in the Norwegian port of Bergen; however, on his homeward voyage he captured some valuable prizes, about which a great deal of trouble arose on his return. Personal jealousies were intermingled with charges of irregularities in dealing with the captured property, and the upshot was that Sandwich was dismissed from his command, but as a solatium was sent to Madrid as ambassador extraordinary. He arranged a treaty with Spain, and in 1670 was appointed president of the council of trade and plantations. When the war with the Dutch was renewed in 1672 Sandwich again commanded a squadron under the duke of York, and during the fight in Southwold Bay on the 28th of May 1672, his ship, the "Royal George," after having taken a conspicuous part in the action, was set on fire and was blown up. The earl's body was found some days later and was buried in Westminster Abbey. Edward (d. 1688) the eldest of his six sons, succeeded to the titles; another son, John Montagu (*c.* 1655–1728) was dean of Durham.

Lord Sandwich claimed to have a certain knowledge of science, and his translation of a Spanish work on the *Art of Metals* appeared in 1674. Many of his letters and papers are in the British Museum, the Bodleian Library at Oxford, and in the possession of the present earl of Sandwich. He is mentioned very frequently in the *Diary* of his kinsman, Samuel Pepys. See also J. Charnock, *Biographia Navalis*, vol. i. (1794); John Campbell, *Lives of the British Admirals*, vol. ii. (1779); and R. Southey, *Lives of the British Admirals*, vol. v. (1840).

SANDWICH, JOHN MONTAGU, 4TH EARL OF (1718–1792), was born on the 3rd of November 1718 and succeeded his grandfather, Edward, the 3rd earl, in the earldom in 1729. Educated at Eton and at Trinity College, Cambridge, he spent some time in travelling, and on his return to England in 1739 he took his

seat in the House of Lords as a follower of the duke of Bedford. He was soon appointed one of the commissioners of the admiralty under Bedford and a colonel in the army. In 1746 he was sent as plenipotentiary to the congress at Breda, and he continued to take part in the negotiations for peace until the treaty of Aix-la-Chapelle was concluded in 1748. In February 1748 he became first lord of the admiralty, retaining this post until he was dismissed by the king in June 1751. In August 1753 Sandwich became one of the principal secretaries of state, and while filling this office he took a leading part in the prosecution of John Wilkes. He had been associated with Wilkes in the notorious fraternity of Medmenham, and his attitude now in turning against the former companion of his pleasures made him very unpopular, and, from a line in the *Beggar's Opera*, he was known henceforward as "Jemmy Twitcher." He was postmaster-general in 1768, secretary of state in 1770, and again first lord of the admiralty from 1771 to 1782. For corruption and incapacity Sandwich's administration is unique in the history of the British navy. Offices were bought, stores were stolen and, worst of all, ships, unseaworthy and inadequately equipped, were sent to fight the battles of their country. The first lord became very unpopular in this connexion also, and his retirement in March 1782 was hailed with joy. Sandwich married Dorothy, daughter of Charles, 1st viscount Fane, by whom he had a son John (1743–1814), who became the 5th earl. He had also several children by the singer Margaret, or Martha, Ray, of whom Basil Montagu (1770–1851), writer, jurist and philanthropist, was one. The murder of Miss Ray by a rejected suitor in April 1779 increased the earl's unpopularity, which was already great, and the stigmas of the prosecution of Wilkes and the corrupt administration of the navy clung to him to the last. He died on the 30th of April 1792.

The Sandwich Islands (see HAWAII) were named after him by Captain Cook. His *Voyage round the Mediterranean in the Years 1738 and 1739* was published posthumously in 1779, with a very flattering memoir by the Rev. J. Cooke; the *Life, Adventures, Intrigues and Amours of the celebrated Jemmy Twitcher* (1770), which is extremely rare, tells a very different tale. See also the various collections of letters, memoirs and papers of the time, including Horace Walpole's *Letters* and *Memoirs* and the *Bedford Correspondence*.

SANDWICH, a market town, municipal borough, and one of the Cinque Ports in the St Augustine's parliamentary division of Kent, England, 12 m. E. of Canterbury, on the South-Eastern & Chatham railway. Pop. (1901), 3170. It is situated 2 m. from the sea, on the river Stour, which is navigable up to the bridge for vessels of 200 tons. The old line of the walls on the land side is marked by a public walk. The Fisher Gate and a gateway called the Barbican are interesting; but the four principal gates were pulled down in the 18th century. St Clement's church has a fine Norman central tower, and St Peter's (restored), said to date from the reign of King John, has interesting medieval monuments. The curfew is still rung at St Peter's. A grammar school was founded by Sir Roger Manwood in 1564, but the existing school buildings are modern. There are three ancient hospitals; St Bartholomew's has a fine Early English chapel of the 12th century. The establishment of the railway and of the St George's golf links (1886) rescued Sandwich from the decay into which it had fallen in the earlier part of the 19th century. The links are among the finest in England.

Richborough Castle, 1¼ m. N. of Sandwich, is one of the finest relics of Roman Britain. It was called *Rutupiae*, and guarded one of the harbours for continental traffic in Roman times, and was in the 4th century a fort of the coast defence along the Saxon shore.

The situation of Sandwich on the Wantsum, once a navigable channel for ships bound for London, made it a famous port in the time of the Saxons, who probably settled here when the sea receded from the Roman port of Richborough. In 973 Edgar granted the harbour and town to the monastery of Christ Church, Canterbury, and at the time of the Domesday Survey Sandwich supplied 40,000 herrings each year to the monks. As one of the Cinque Ports, Sandwich owed a service of five ships to the king, and shared the privileges granted to the Cinque Ports from the reign of Edward the Confessor onwards. At the end of the 13th century the monks granted the borough, with certain reservations, to Queen Eleanor; a further grant of their rights was made to Edward III. in 1364, the crown being thenceforward lord of the borough. A charter of Henry II. confirmed the customs and rights which Sandwich had previously enjoyed, and this charter was confirmed by John in 1205, by Edward II. in 1313 and by Edward III. in 1365. The town was a borough by prescription, and was governed in the 13th century by a mayor and jurats; a mayor was elected as early as 1226. The governing charter until 1835 was that granted by Charles II. in 1684. During the middle ages Sandwich was one of the chief ports for the continent, but as the sea gradually receded and the passage of the Wantsum became choked with sand the port began to decay, and by the time of Elizabeth the harbour was nearly useless. In her reign Walloons settled here and introduced the manufacture of woollen goods and the cultivation of vegetables; this saved the borough from sinking into unimportance. Three fairs to be held at Sandwich were granted to Queen Eleanor in 1290; Henry VII. granted two fairs on the 7th of February and the 5th of June, each to last for thirty days, and in the governing charter two fairs, on the 1st of April and the 1st of October, were granted; these all seem to have died out before the end of the 18th century. A corn market on Wednesday and a cattle market on every alternate Monday are now held. Representatives from the Cinque Ports were first summoned to parliament in 1265; the first returns for Sandwich are for 1366, after which it returned two members until it was disfranchised in 1885. Sandwich is governed by a mayor, 4 aldermen and 12 councillors. Area, 707 acres.

See W. Boys, *Collections for History of Sandwich* (1792); E. Hasted, *History of Kent* (1778–1799), *Victoria County History* (Kent).

SANDYS, SIR EDWIN (1561–1629), British statesman and one of the founders of the colony of Virginia, was the second son of Edwin Sandys, archbishop of York, and his wife Cecily Wilford. He was born in Worcestershire on the 9th of December 1561. He was educated at Merchant Taylors' school, which he entered in 1571, and at Corpus Christi College, Oxford, where he was sent in 1577. He became B.A. in 1579 and B.C.L. in 1589. In 1582 his father gave him the prebend of Witwang in York Minster, but he never took orders. He was entered in the Middle Temple in 1589. At Oxford his tutor had been Hooker, author of the *Ecclesiastical Polity*, whose life-long friend and executor he was. Sandys is said to have had a large share in securing the Mastership of the Temple for Hooker. From 1593 till 1599 he travelled abroad. When in Venice he became closely connected with Fra Paolo Sarpi, who helped him in the composition of the treatise on the religious state of Europe, known as the *Europae speculum*. In 1605 this treatise was printed from a stolen copy under the title, *A Relation of the State of Religion in Europe*. Sandys procured the suppression of this edition, but the book was reprinted at the Hague in 1629. In 1599 he resigned his prebend, and entered active political life. He had already been member for Andover in 1586 and for Plympton in 1589. After 1599, in view of the approaching death of Queen Elizabeth, he paid his court to King James VI., and on James's accession to the throne of England in 1603 Sandys was knighted. He sat in the king's first parliament as member for Stockbridge, and distinguished himself as one of the assailants of the great monopolies. He endeavoured to secure to all prisoners the right of employing counsel, a proposal which was resisted by some lawyers as subversive of the administration of the law. He had been connected with the East India Company before 1614, and took an active part in its affairs till 1629. His most memorable services were, however, rendered to the (London) Virginia Company, to which he became treasurer in 1619. He promoted and supported the policy which enabled the colony to survive the disasters of its early days, and he continued to be a leading influence in the Company till his death. Sir Edwin Sandys sat in the later parliaments of James I. as member for Sandwich in 1621, and for Kent in 1624. His

tendencies were towards opposition, and he was suspected of hostility to the court; but he disarmed the anger of the king by professions of obedience. He was member for Penrhyn in the first parliament of Charles I. in 1625. He died in October 1629.

See Alex. Brown's *Genesis of the United States* (London, 1890).

SANDYS, FREDERICK (1832-1904), English painter and draughtsman, was born at Norwich on the 1st of May 1832, and received his earliest lessons in art from his father, who was himself a painter. His early studies show that he had a natural gift for careful and beautiful drawing, and that he sought after absolute sincerity of presentment. Sandys worked along the same lines as Millais, Madox Brown, Holman Hunt and Rossetti. He first met Rossetti in 1857, and carried away with him the impression of the painter-poet's features, which he reproduced so cleverly in "A Nightmare," a caricature of "Sir Isumbras at the Ford," by Millais. Both the picture and the skit upon it by Sandys attracted much attention in 1857. The caricaturist turned the horse of Sir Isumbras into a donkey labelled "J. R., Oxon." (John Ruskin). Upon it were seated Millais himself, in the character of the knight, with Rossetti and Holman Hunt as the two children, one before and one behind. Rossetti and Sandys became intimate friends, and for about a year and a quarter, ending in the summer of 1867, Sandys lived with Rossetti at Tudor House (now called Queen's House) in Cheyne Walk, Chelsea. By this time Sandys was known as a painter of remarkable gifts. He had begun by drawing for *Once a Week*, the *Cornhill Magazine*, *Good Words* and other periodicals. He drew only in the magazines. No books illustrated by him can be traced. So his exquisite draughtsmanship has to be sought for in the old bound-up periodical volumes which are now hunted by collectors, or in publications such as Dalziel's *Bible Gallery* and the *Cornhill Gallery* and books of drawings, with verses attached to them, made to lie upon the drawing-room tables of those who had for the most part no idea of their merits. Every drawing Sandys made was a work of art, and many of them were so faithfully engraved that they are worthy of the collector's portfolio. Early in the 'sixties he began to exhibit the paintings which set the seal upon his fame. The best known of these are "Vivien" (1863), "Morgan le Fay" (1864), "Cassandra" and "Medea." Sandys never became a popular painter. He painted little, and the dominant influence upon his art was the influence exercised by lofty conceptions of tragic power. There was in it a sombre intensity and an almost stern beauty which lifted it far above the ideals of the crowd. The Scandinavian Sagas and the *Morte d'Arthur* gave him subjects after his own heart. "The Valkyrie" and "Morgan le Fay" represent his work at its very best. He made a number of chalk drawings of famous men of letters, including Tennyson, Browning, Matthew Arnold, and James Russell Lowell. Sandys died in Kensington on the 20th of June 1904.

See also Esther Wood, *The Artist* (Winter number, 1896).

SANDYS, GEORGE (1578–1644), English traveller, colonist and poet, the seventh and youngest son of Edwin Sandys, archbishop of York, was born on the 2nd of March 1578. He studied at St Mary Hall, Oxford, but took no degree. On his travels, which began in 1610, he first visited France; from North Italy he passed by way of Venice to Constantinople, and thence to Egypt, Mt. Sinai, Palestine, Cyprus, Sicily, Naples and Rome. His narrative, dedicated, like all his other works, to Charles (either as prince or king), was published in 1615, and formed a substantial contribution to geography and ethnology. He also took great interest in the earliest English colonization in America. In April 1621 he became colonial treasurer of the Virginia Company and sailed to Virginia with his niece's husband, Sir Francis Wyatt, the new governor. When Virginia became a crown colony, Sandys was created a member of council in August 1624; he was reappointed to this post in 1626 and 1628. In 1631 he vainly applied for the secretaryship to the new special commission for the better plantation of Virginia; soon after this he returned to England for good. In 1621 he had already published an English translation of part of Ovid's *Metamorphoses*; this he completed in 1626; on this mainly his poetic reputation rested in the 17th and 18th centuries. He also began a version of Virgil's *Aeneid*, but never produced more than the first book. In 1636 he issued his famous *Paraphrase upon the Psalms and Hymns dispersed throughout the Old and New Testaments*; in 1640 he translated *Christ's Passion* from the Latin of Grotius; and in 1641 he brought out his last work, a *Paraphrase of the Song of Songs*. He died, unmarried, at Boxley, near Maidstone, Kent, in 1644. His verse was deservedly praised by Dryden and Pope; Milton was somewhat indebted to Sandys' *Hymn to my Redeemer* (inserted in his travels at the place of his visit to the Holy Sepulchre) in his *Ode on the Passion*.

See Sandys' works as quoted above; the travels appeared as *The Relation of a Journey begun an. Dom. 1610, in four books* (1615); also the Rev. Richard Hooper's edition, with memoir, of *The Poetical Works of George Sandys*; and Alexander Brown's *Genesis of the United States*, pp. 540, 989, 992, 994-995, 1032, 1063; article, "Sandys, George," in *Dictionary of National Biography*.

SAN FERNANDO, a seaport of southern Spain, in the province of Cadiz, on the Isla de León, a rocky island among the salt marshes which line the southern shore of Cadiz Bay. Pop. (1900), 29,635. San Fernando is one of the three principal naval ports of Spain; together with Ferrol and Cartagena it is governed by an admiral who has the distinctive title of captain-general. The town is connected with Cadiz (4½ m. N.W.) by a railway, and there is an electric tramway from the arsenal (in the suburb of La Carraca) to Cadiz. The principal buildings are government workshops for the navy, barracks, a naval academy, observatory, hospital, bull-ring and a handsome town hall. In the neighbourhood salt is largely produced and stone is quarried; the manufactures include spirits, beer, leather, esparto fabrics, soap, hats, sails and ropes; and there is a large iron-foundry.

San Fernando was probably a Carthaginian settlement. On a hill to the S. stood a temple dedicated to the Tyrian Hercules; to the E. is a Roman bridge, rebuilt in the 15th century after partial demolition by the Moors. The arsenal was founded in 1790. During the Peninsular War the cortes met at San Fernando (1810), but the present name of the town dates only from 1813; it was previously known as Isla de León.

SAN FRANCISCO, the chief seaport and the metropolis of California and the Pacific Coast, the ninth city in population (1900) of the United States, and the largest and most important city W. of the Missouri river, situated centrally on the coast of the state in 37° 47′ 22·55″ N. and 122° 25′ 40·76″ W., at the end of a peninsula, with the ocean on one side and the Bay of San Francisco on the other. Pop. (1850), 34,000; (1890), 298,997; (1900), 342,782, of whom 116,885 were foreign-born and 17,404 coloured (mainly Asiatics); (1910) 416,912.

General Description.—The peninsula is from 6 to 8 m. broad within the city limits. The magnificent bay is some 50 m. long in its medial line, and has a shore-line of more than 300 m.; its area is about 450 sq. m., of which 79 are within the three-fathom limit, including San Pablo Bay. This great inland water receives the two principal rivers of California, the Sacramento and the San Joaquin. The islands of the bay are part of the municipal district, as are also the Farallones, a group of rocky islets about 30 m. out in the Pacific. The bay islands are high and picturesque. Several are controlled by the national government and fortified. On Alcatraz Island is the United States Prison, and on Goat Island the United States Naval School of the Pacific. The old Spanish "presidio" is now a United States military reservation, and another smaller one, the Fort Mason Government Reservation, is in the vicinity. The naval station of the Pacific is on Mare Island in San Pablo Bay, opposite Vallejo (*q.v.*). Between 1890 and 1900 the harbour entrance from the Pacific was strongly fortified; it lies through what is called the Golden Gate, a strait about 5 m. long and 1 m. wide at its narrowest point. The outlook from Mt. Tamalpais (2592 ft.), a few miles N., gives a magnificent

view of the city and bay. The site of the city is very hilly and is completely dominated by a line of high rocky elevations that run like a crescent-formed background from N.E. to S.W. across the peninsula, culminating in the S.W. in the Twin Peaks (Las Papas, "The Breasts"), 925 ft. high. Telegraph Hill in the extreme N.E., the site in 1849 of the criminal settlement called "Sydney Town" and later known as the "Latin Quarter," is 294 ft. high; Nob Hill, where the railway and mining "kings" of the 'sixties and 'seventies of the 19th centu y built their homes, which only in recent years has lost its exclusiveness, is 300 ft. high; Pacific Heights, which became the site of a fashionable quarter, is still higher; and in Golden Gate Park there is Strawberry Hill, 426 ft. Hilly as it remains to-day, the site was once much more so, and has been greatly changed by man. Great hills were razed and tumbled into the bay for the gain of land; others were pierced with cuts, to conform to street grades and to the checker-board city plan adopted in the early days. An effort to induce the city to adopt, in the rebuilding after the earthquake of 1906, an artistic plan failed, and reconstruction followed practically the old plan of streets, although the buildings which had marked them had been for the most part obliterated. Some minor suggestions for improvement in arrangement only were observed. Cable lines were first practically tested in San Francisco, in 1873; since the earthquake they have given place, with slight exceptions, to electric car lines. A drive of some 20 m may be taken along the ocean front, through the Presidio, Golden Gate Park, and a series of handsome streets in the west end. Market Street, the principal business street, is more than 3 m. long and 120 ft. broad. For nearly its full extent, excepting the immediate water-front, and running westward to Van Ness Avenue, a distance of 2 m., the buildings lining it on both sides and covering the adjoining area, a total of some 2000 acres, or 514 blocks, equivalent to ⅛ of the city plan, were reduced to ruins in the fire following the earthquake; only a few large buildings of so-called "fire-proof" construction remained standing on the street, and these had their interiors completely "gutted." Repairs on the buildings left standing on this street alone involved an outlay of $5,000,000. Almost the whole of this area was built up again by 1910. As the result of the reconstruction of this section, thousands of wooden buildings, which had been a striking architectural characteristic of the city, were replaced by structures of steel, brick, and, especially, reinforced concrete. Before the earthquake wood had been employed to a large extent, partly because of the accessibility, cheapness and general excellence of redwood, but also because of the belief that it was better suited to withstand earthquake shocks. While the wooden buildings were little damaged by the shocks, the comparative non-inflammability of redwood proved no safeguard and fire swept the affected area irresistibly. In 1900 only one-thirteenth of the buildings in the city were of other material than wood. Of the 28,000 buildings destroyed in the disaster of 1906, valued approximately at $105,000,000, only 5000 were such as had involved steel, stone or brick in their construction. The new buildings, on which an estimated amount of $150,000,000 had been expended up to April 1909, and numbering 25,000 at that date, were built under stringent city ordinances governing the methods of building employed, to reduce the danger from fire to a minimum. The use of reinforced concrete as a building material received a special impetus in consequence. In size and value the new buildings generally exceed their predecessors, buildings eight to eighteen storeys in height being characteristic in the Market Street section. Owing to the complete reconstruction of its business section San Francisco is equalled by few cities in the possession of office and business buildings of the most modern type.

Buildings.—Among the buildings in the burned section restored since 1906, the Union Trust, Mutual Savings, Merchants Exchange, Crocker, Flood and the *Call* (newspaper) buildings are notable. Among business buildings built since the fire are the Phelan building (costing more than $2,000,000), the buildings of the Bank of California, the Alaska Commercial Company, the First National Bank and the San Francisco Savings Union, and the *Chronicle* (newspaper) building. The architecture of the city until the earthquake and fire of 1906 was very heterogeneous. Comparatively few buildings were of striking merit. The old City Hall (finished in 1898), destroyed in 1906, was a great edifice of composite and original style, built of bricks of stucco facing (cost $6,000,000). Provision was made to erect a new building at a cost of $5,000,000. The Hall of Justice, which houses the criminal and police courts and the police department of the city, was another fine structure. Provision was made in 1909 to replace it by a new building. Since the fire of 1906 a new Custom House has been built, costing $1,203,319. The other Federal buildings are not architecturally noteworthy. The Post Office, which withstood the fire and has since undergone repairs, is a massive modern building of granite (original cost $5,000,000). The buildings of the church and college (St Ignatius) of the Jesuits cover more than a city block; those of the Dominicans are equally extensive, and are architecturally imposing. There are several magnificent hotels. The Palace, an enormous structure covering a city block (it had 1200 rooms and cost more than $3,000,000), known as the oldest and most famous hostelry of the city, and architecturally interesting, was completely destroyed by the fire, but has been replaced by a new building. The St Francis, completely reconstructed since the fire, and the Fairmont are new. A revival of the old Spanish-Moorish "mission" (monastery) style has exercised an increasing influence and is altogether the most pleasing development of Californian architecture. Many buildings or localities, not in themselves remarkable, have interesting associations with the history and life of the city. Such are Pioneer Hall, the home of the Society of California Pioneers (1850), endowed by James Lick; Portsmouth Square, where the flag of the United States was raised on the 8th of July 1846, and where the Committee of Vigilance executed criminals in 1851 and 1856; Union Square, a fashionable shopping centre, decorated with a column raised in honour of the achievements of the United States Navy in the Spanish-American War of 1898; also the United States Branch Mint, associated with memories of the early mining days (the present mint dates only from 1874).

Parks.—The parks of the city are extensive and fine. Golden Gate Park (about 1014 acres) was a waste of barren sand dunes when acquired by the municipality in 1870, but skilful planting and cultivation have entirely transformed its character. It is now beautiful with semi-tropic vegetation. The Government presidio or military reservation (1542 acres) is practically another city park, more favourably situated and of better land than Golden Gate Park, and better developed. A beautiful drive follows the shore, giving views of the Golden Gate and the ocean. Near the W. end of Golden Gate Park are the ocean beach, the Cliff House, repeatedly burned down and rebuilt, the last time in 1907– a public resort on a rocky cliff overhanging the sea—the seal rocks, frequented all the year round by hundreds of sea-lions, Sutro Heights, the beautiful private grounds of the late Adolph Sutro, long ago opened to the public, and the Sutro Baths, one of the largest and finest enclosed baths and winter gardens of the world. Nearly in the centre of the city is the old Franciscan mission (San Francisco de Asis, popularly known as Mission Dolores), a landmark of San Francisco's history (1770).

Libraries, Museums, &c.—The Public Library has more than 100,000 volumes (it had more than 165,000 volumes before the fire of 1906, but then lost all but about 25,000). That left to the city by Adolph Sutro had more than 200,000 volumes, but suffered from the fire and earthquake of 1906 and now has about 125,000. It included remarkable incunabula, 16th-century literature, and scientific literature; and among its special collections are Lord Macaulay's library of British Parliamentary papers, a great collection of English Commonwealth pamphlets, one on the history of Mexico, and other rarities. The Mechanics-Mercantile Library (35,000 volumes) was formed before the fire of 1906 (when the entire collection of 200,000 volumes was destroyed) by the merging of the Mechanics Institute Library (116,000 volumes) and the Mercantile Library (founded 1852; 80,000 volumes). The Law Library, the libraries of the San Francisco Medical Society, and the French library of La Ligue Nationale Française (1874), were destroyed in the fire of 1906 and re-established. The building of the California Academy of Sciences (founded 1853, endowed by James Lick with about $600,000) was destroyed in 1906. In Golden Gate Park is a museum owned by the city with exhibits of a wide range, including history, ethnology, natural history, the fine arts, &c. Very fine mineral exhibits by the State Mining Bureau, and California Agricultural and Pacific Coast commercial displays by the California Development Board, are housed in the Ferry Building, and there is a Memorial Museum in Golden Gate Park. The California School of Mechanic Arts was endowed by James Lick with $540,000. The San Francisco Institute of Art, conducted by the San Francisco Art Association (organized 1872), known until the fire of 1906 as the Mark Hopkins Institute of Art, was deeded (1893) to the Regents of the State University in trust for art purposes by a later owner. The building was totally destroyed and the institute was re-established under the new name on the same site. The school conducted by this institute had a fine collection of casts, presented to the city by the government of France. It is said to be the largest university art school of the country. The law, medical, dental, chemical and pharmaceutical departments of the State University are also in the city. Among other educational institutions are the Cogswell Polytechnic College, the Wilmerding School

of Industrial Arts, and the California School of Design. In sculpture and painting not much has yet been done to adorn the city.

The self-sufficingness of San Francisco, long forced upon it by the great distance from the older culture of the Eastern States, has thus far shown itself particularly only in the general features of society. Few names belong by exclusive right to San Francisco's literary annals,—the most noteworthy being those of Bret Harte, Joaquin Miller and Henry George; but perhaps a score among the better known of the more recent writers in the country have done enough of their work here to connect them enduringly with the city. The Bohemian Club is a famous centre of literary and artistic life. Among the daily newspapers the *San Francisco Examiner* (Independent-Democratic, 1865), the *Chronicle* (Republican, 1865), the *Call* (Republican, 1856) and the *San Francisco Bulletin* (Independent-Republican, 1855) are chiefly important.

Suburbs.—The city suburbs are partly across the bay and partly to the north and south on the peninsula. Oakland, Berkeley, the home of the State University (damaged by the earthquake), and Alameda, all eastward just across the bay; Burlingame, San Mateo, Menlo Park and Palo Alto, wealthy and fashionable towns southward on the peninsula; Sausalito and San Rafael, summer residence towns on the northern peninsula across the Golden Gate; all lie well within an hour of San Francisco, and are practically suburbs of the metropolis. Many excursions into the surrounding country are very attractive. Mt. Tamalpais has already been referred to. The railroad in making this ascent makes curves equivalent to forty-two whole circles in a distance of 8½ m., at one place paralleling its track five times in a space of about 300 ft.

Climate.—San Franciscan climate is breezy, damp and at times chilling; often depressing to the weakly, but a splendid tonic to others. In a period of 32 years, ending December 1903, the extremes of temperature were 29° and 100° F.; the highest monthly average 65°, the lowest 46°; the average for January, March, June, September and December, respectively 50°, 54°, 59°, 61°, and 51° F. The average rainfall was 22·5 in., falling mostly from November to March. Every afternoon, especially from October to May, a stiff breeze sweeps the city; every afternoon in the summer the fogs roll over it from the ocean. Though geraniums and fuchsias bloom through the year in the open, an overcoat is often needed in summer.

Communications and Commerce.—San Francisco Bay is the most important as well as the largest harbour on the Pacific coast of the United States. There is a difference of a fathom in the mean height of the tides. Deep-water craft can go directly to docks within a short distance of their sources of supply, around the bay. In 1909 extensive improvements to the water front were under way, and land has been purchased west of Fort Mason for the construction of wharves and warehouses for the United States Transport Service. The largest craft can always enter and navigate the bay, and there are ample facilities of dry and floating docks. Steamer connexions are maintained with Australia, Hawaii, Mexico, Central and South America, the Philippines, China and Japan. San Francisco in 1909 had much the largest commerce of any of the Pacific ports. For 1909 the total imports of merchandise for the port were valued at $51,468,597 and the exports at $31,100,309. From 1891 to 1900 San Francisco dropped from the fifth to the eighth rank among the customs districts of the United States in point of aggregate commerce (the ports of Puget Sound rising in the same period from the twentieth to the tenth place). From 1893 to 1903 the yearly imports averaged $37,968,152, exports $33,658,266, and duties collected $6,642,173. The vessel movement for 1909 amounted to 4,959,728 tons arrivals and 4,974,922 tons departures. The foreign trade is chiefly with British Columbia, South America, China and Japan, and there is a considerable trade with Europe, Australia and Mexico. Trade with the Philippine Islands and the Hawaiian Islands and Alaska is important, while the coastwise trade with Pacific ports exceeds all the rest in tonnage. Lumber, grain and flour, fruits and their products, fish, tea and coffee are characteristic staples of commerce. While the export grain business had by 1909 shifted to ports in Oregon and Washington, San Francisco is the great receiving port for cereals on the Pacific Coast. San Francisco's permanence as one of the greatest ports of the country is assured by its magnificent position, the wealth of its "back country," and its command of trans-Pacific and trans-continental commercial routes. It is very nearly the shortest route, great circle sailing, from Panama to Yokohama and Hongkong; the Panama Canal will shorten the sea route from Liverpool and Hamburg by about 5500 m. and from New York by 7800. Three trans-continental railway systems—the Southern Pacific (with two trans-continental lines, the Southern and the old Central Pacific), the Atchison, Topeka & Santa Fé, and the Western Pacific—connect the city with the Eastern States; and besides these, it has traffic connexions with the three trans-continental lines of the north, the Canadian Pacific, Great Northern and Northern Pacific. Lines of the Southern Pacific and its branches connect the whole state with the city, a number of smaller roads—of which the most important is the North-Western Pacific—joining it with the surrounding districts. On the 1st of July 1900 the first train of the Santa Fé left San Francisco for the East; a significant event, as there had before been practically only one railway corporation (the Southern Pacific) controlling trans-continental traffic at San Francisco since 1869. Only one railway, the Southern Pacific's lower coast route, actually enters the city. Some ten other roads, great and small, have their terminals around the bay.

Manufactures.—San Francisco in 1900 held twelfth place among the cities of the Union in value of output; in 1905 it ranked thirteenth. The total value of the factory products of the city in 1905 was $137,788,233 as against $107,023,567 in 1900. The leading products and their value in 1905, where given, were: sugar and molasses refining; printing and publishing, $9,424,494 (of which $5,575,035 was for newspapers and periodicals); slaughtering and meat packing (wholesale), $8,994,992; shipbuilding; foundry and machine-shop products, $8,991,449; clothing, $4,898,095; canning and preserving, $4,151,414; liquors (malt, $4,106,034; vinous, $53,511); coffee and spice roasting and grinding, $3,979,865; flour and grist-mill products, $3,422,672; lumber, planing and mill products, including sash, doors and blinds, $2,981,552; leather, tanning and finishing, $2,717,542; bags, $2,473,170; paints, $2,048,250. The development of the petroleum fields of the state has greatly stimulated manufactures, as coal has always been dear, whereas the crude oil is now produced very cheaply. The Union Iron Works on the peninsula is one of the greatest shipbuilding plants of the country.

Government.—Charters were granted to the city in 1850, 1851 and 1856. By the last the city and county, which until then had maintained separate governments, were consolidated. Under this charter San Francisco throve despite much corruption, and it was because the provisions of the State Constitution of 1879 seemed likely to compel the adoption of another charter that the city decisively rejected that constitution. After many years of notorious "boss" rule, the city in 1896 elected a reform mayor. This was the most important movement for good government in its history since the Vigilance Committee of 1856. It was followed by the adoption (1898) of a new charter, which came into effect on the 1st of January 1900. Elections are biennial. The inclusion in the charter of the principle of the "initiative and referendum" enables a percentage of the voters to compel the submission of measures to public approval. The city's control is centralized, great power being given to the mayor. He appoints and removes members of the fire, police, school, election, park, civil service, health and public works commissions of the city; his veto may not be overcome by less than a five-sixths vote of the board of supervisors, and he may veto separate items of the budget. Taxation for ordinary municipal purposes is limited to 1 % on property values, extra taxes being allowed for unusual purposes; but the city cannot be bonded without the affirmative vote of two-thirds of the electorate. Civil service is also provided for. There is a highly developed license system. The board of public works, composed of engineers, controls streets, sewers, buildings and public improvements. In 1885 the assessed property valuation of the city, on a basis of 60 % of the actual value, was $223,509,560; in 1905, 502,892,459;[1] in 1910 the total was $492,867,037. The net bonded debt on the 30th of June 1909 was $10,130,062·32. The water-supply system was greatly improved after the earthquake of 1906; whereas before the earthquake one main supply pipe brought all the water to the city, there have since been installed five systems which work independently of each other. Provision is made for filling the mains with salt water from the bay if necessary in fighting fire. While the supply had been furnished by a private corporation, the city was in 1910 planning for the ownership of its water-system, the supply to be drawn from the Sierras at a cost of some $45,000,000. Water was at that time in remote parts of the city drawn from artesian wells. In 1903 almost ten-elevenths of the street railways were controlled by one Eastern corporation, which was involved in the charges of municipal corruption that were the most prominent feature of the recent political history of the city. The electric power and light are drawn from the Sierras, 140 m. distant.

Population.—The population of San Francisco increased in successive decades after 1850 by 67·6, 16·3, 56·5, 27·8 and 14·6 %. The population is very cosmopolitan. Germans and Irish are not so numerous here, relatively, as in various other cities, although in 1900 the former constituted 30·1 and the latter 13·6 % of the total population. There is a large Ghetto, a so-called Latin Quarter, where Spanish sounds and signs are dominant, a Little Italy and a Chinese quarter of which no other city has the like. Chinatown, at the foot of Nob Hill, covers some twelve city blocks, and with its temples, rich bazaars, strange life and show of picturesque colours and customs, it is to strangers one of the most interesting portions of the city. It was completely destroyed in the fire of 1906, and its inhabitants removed temporarily across the bay to Oakland, but by 1910 the quarter had been practically rebuilt in an improved manner, yet retaining its markedly oriental characteristics. The new Chinatown gained considerably in sanitation and in the housing of its commercial establishments. San Francisco has naturally been the centre of anti-Chinese agitation. The success of the exclusion laws is seen (though this is not the sole cause) in the decrease of the Chinese population from 24,613 to 13,954 between 1890 and 1900.

[1] For the fiscal year 1906–1907 the assessed value was $375,932,447, indicating the drop in values immediately after the earthquake and fire, and, by comparison with the 1910 figures, the extent of recovery.

The Japanese numbered 1781 in 1900 and have very rapidly increased. The question of their admission to the public schools, rivalry in labour and trade, and other racial antagonisms attendant on their rapid increase in numbers, created conflicts that at one time seriously involved the relations of the two countries. Two Chinese papers are published. More than half of the daily papers are foreign in language.

History.—A Spanish presidio (military post), and the Franciscan mission of San Francisco de Asis, on the Laguna de los Dolores, were founded near the northern end of the peninsula in 1776. San Francisco was not one of the important settlements. Even the very important fact whether it was ever actually a pueblo—*i.e.* a legally recognized and organized town—was long a controverted question. Up to 1835 there were two settlements on the peninsula—one about the presidio, the other about the mission; the former lost importance after the practical abandonment of the presidio in 1836, the latter after the secularization of the mission, beginning in 1834. The year 1835–1836 marked the beginning of a third settlement destined to become the present San Francisco. This was Yerba Buena ("good herb," *i.e.* wild mint), founded on a little cove of the same name S.E. of Telegraph Hill, extending inland to the present line of Montgomery Street. (The cove was largely filled in as early as 1851.)

The site of the city is very different from that of most American towns, and seemed a most unpromising location. The hills were barren and precipitous, and the interspaces were largely shifting sand-dunes; but on the E. the land sloped gently to the bay. In 1835–1839 "San Francisco" had an ayuntamiento (town-council), and the different municipal officers seem to have been located at the same or different times at the mission, the presidio, or at Yerba Buena; the name San Francisco being applied indifferently to all three settlements. The ayuntamiento, apparently recognizing the future of Yerba Buena, granted lots there, and as the older settlements decayed Yerba Buena throve. In 1840 there were only a handful of inhabitants; in 1846, when (on the 9th of July) the flag of the United States was raised over the town, its prosperity already marked it as the future commercial "metropolis" of the coast. In this year a Mormon colony joined the settlement, making it for a time a Mormon town. The population in the year before the gold discovery probably doubled, and amounted to perhaps 900 in May 1848.

The first news of the gold discoveries of January 1848 was received with incredulity at San Francisco (to give Yerba Buena the name it formally assumed in 1847), and there was little excitement until April. In May there was an exodus. By the middle of June the hitherto thriving town had been abandoned by a large majority of its inhabitants. Realty at first fell a half in value, labour rose many times in price. Newspapers ceased publication, the town council suspended sessions, churches and business buildings were alike empty. When the truth became known regarding the mines a wonderful "boom" began. The population is said to have been 2000 in February (in which month the first steamer arrived with immigrants from the East over the Isthmus), 6000 in August, and 20,000 by the end of the year. A city of tents and shanties rose on the sand-dunes. Realty values rose ten-fold in 1849. Early in 1850 more than 500 vessels were lying in the bay, most of them deserted by their crews. Many rotted; others were beached, and were converted into stores and lodging houses. Customs revenues rose from $20,000 in the first half of 1848 to $175,000 in the second half and to $4,430,000 in the year ending in June 1852. There wss at first no idea of permanent settlement, and naturally no time whatever to improve the city. Great quantities of expensive merchandise glutted the market and were sunk in the liquid mud of the streets as fillage for the construction of sidewalks. Between December 1849 and June 1851 seven "great" fires, destroying in the aggregate property valued at twenty or twenty-five millions of dollars, swept the business district. Half of this was in the fire of the 4th of May 1851, which almost completely destroyed the city. These misfortunes led to a more general employment of brick and stone in the business quarter. It is characteristic of the vagaries of Californian commerce in the early years that dressed granite for some buildings was imported from China.

In these days the society of San Francisco was extraordinary. It was the most extreme of all democracies. Probably never before nor since in America was there a like test of self-development. Unusual courage and self-reliance were necessary for success. Amusements were coarse and unrestrained. Gambling was the fiercest passion. Property was at first, in San Francisco as in the mines, exceptionally secure; then insecure. Crime became alarmingly common, and the city government was too corrupt and inefficient to repress it. It was estimated (Bancroft) that up to 1854 there were 4200 homicides and 1200 suicides; in 1855 the records show 583 deaths by violence. There were almost no legal convictions and executions. Juries would not punish homicide with severity. In 1851 the first Committee of Vigilance was formed and served from June to September, when it disbanded; it was the nucleus of the second and greater committee, active from May to August of 1856. By these committees criminals were summarily tried, convicted and punished; suspicious characters were deported or intimidated. These vigilantes were the good citizens (the committee of 1851 included some 800 and that of 1856 some 6000-8000 citizens of all classes), who organized outside of law, "not secretly, but in debate, in daylight, with sobriety and decorum," to defend and establish, through defying, its rule. In this they were comparatively successful. Crime was never again so brazen and daring, and 1856 marks also the beginning of political reform. San Francisco's action was widely imitated over the state. In 1877 during the labour troubles a Committee of Safety was again organized, but had a very brief existence.

The United States military authorities in August 1847 authorized a municipal government. Under a municipal ordinance another was chosen in December 1848 to succeed it, but the parent government pronounced the election illegal; nevertheless the new organization continued to act, though another was chosen and recognized as legal. There were for a time at the end of 1848 three (and for a longer time two) civil governments and one military. Neither the military nor municipal organization was competent to give adequate law and peace to the community; and therefore in February 1849 the citizens elected a "Legislative Assembly," which they empowered to make laws not in "conflict with the Constitution of the United States nor the common laws thereof." This was proclaimed revolutionary by the military authorities, but such illegalities continued to spread over the state, until in June 1849 the Convention was called that formed the State Constitution, California being admitted soon afterwards to the Union. Provisional civil officers were elected throughout the state, and the Legislative Assembly came to an end. The charters of 1850, 1851 and 1856 have already been referred to.

The first public school was established in 1849. In 1855–1856 a disastrous commercial panic crippled the city; and in 1858, when at the height of the Fraser river gold-mine excitement it seemed as though Victoria, B.C., was to supplant San Francisco as the metropolis of the Pacific, realty values in the latter city dropped for a time fully a half in value. In 1859 foreign coin was first refused by the banks. Up to this time first gold dust, then private coins, and later money of various countries, had circulated in California. In 1860 mail communication was established with the East by a pony express, the charge being $5·00 for a half-ounce.

Some reference must be made to the Mexican land-grant litigation. The high value of land in and about the city caused the fabrication of two of the most famous claims examined and rejected as fraudulent by the United States courts (the Limantour and Santillan claims). They involved 7 sq. leagues of land and many millions of dollars. Another land question already referred to (that whether San Francisco was entitled as a pueblo to 4 sq. leagues of public land) was settled affirmatively in 1867, but the final land patents were not issued until 1884 by the national government.

When the Civil War came in 1861 the attitude of San Francisco

was at first uncertain, for the pro-slavery Democrats had controlled the state and city, although parties were remaking in the late 'fifties. About 75,000 arms are supposed to have been surreptitiously sent to California by the secessionist Secretary of War, J. B. Floyd; and the pro-slavery party seems to have planned to try for union with the Confederacy, or to organize a Pacific Coast republic. Thomas Starr King (1824–1864), a Unitarian minister, was the heroic war-time figure of the city, the leader of her patriotism. Her money contributions to the Sanitary Funds were, it is said, greater than those of any city in the country; and in every other way she abundantly evidenced her love for the Union. The curious Chapman (or Asbury Harpending) case of 1863 was a Confederate scheme involving piracy on Federal vessels in the Pacific and an effort to gain the secession of the state. It had no practical importance.

From 1859–1877 was the "silver era" of San Francisco (see CALIFORNIA). It paralleled the excitement and gambling of 1849, and despite losses was a great stimulus to the city's growth. In September 1869 the Central Pacific line was completed to Oakland, and in the next four years there was a crash in real estate values inflated during the railway speculation. In 1876 railway connexion was made with Los Angeles. The 'seventies were marked by the growth of the anti-Chinese movement, and labour troubles, culminating in 1877–1879 with the "sand-lots" agitation and the formation of the Constitution of 1879 (see CALIFORNIA), in all of which San Francisco was the centre. The feeling against the Chinese found expression sometimes in unjust and mean legislation, such as the famous "queue ordinance" (to compel the cutting of queues—the gravest insult to the Chinese), and an ordinance inequitably taxing laundries. The Chinese were protected against such legislation by the Federal courts. The startling and romantic changes of earlier years long ago gave way to normal municipal problems and ordinary municipal routine. In the winter of 1894 the California Midwinter International Exposition was held in Golden Gate Park. Since 1898 the governmental changes previously referred to, the location of a new trans-continental railway terminus on the bay, and the new outlook to the Orient, created by the control of the Philippines by the United States, and increased trade in the Pacific and with the Orient, have stimulated the growth and ambitions of the city.

Special mention must be made of the two citizens to whom San Francisco, as it is to-day, owes so much, viz. James Lick (1796–1876), a cold man with few friends, who gave a great fortune to noble ends; and Adolph Sutro (1830–1898), famous for executing the Sutro Tunnel of the Comstock mines of Virginia City, Nevada, and the donor of various gifts to the city.

The partial destruction of San Francisco by earthquake and fire in 1906 was one of the great catastrophes of history. Earthquakes had been common but of little importance in California until 1906. In more than a century there had been three shocks called "destructive" (1839, 1865, 1868) and four "exceptionally severe" at San Francisco, besides very many light shocks or tremors. The worst was that of 1868; it caused five deaths, and cracked a dozen old buildings. Heavy earthquake shocks on the morning of the 18th of April, 1906, followed by a fire which lasted three days, and a few slighter shocks, practically destroyed the business section of the city and some adjoining districts. The heaviest shock began at 12 minutes 6 seconds past 5 o'clock a.m., Pacific standard time, and lasted 1 minute 5 seconds. Minor shocks occurred at intervals for several days. The earthquake did serious damage throughout the coast region of California from Humboldt county to the southern end of Fresno county, a belt about 50 m. wide. The damage by earthquake to buildings in San Francisco was, however, small in comparison to that wrought by the fire which began soon after the principal shock on the morning of the 18th. About half the population of the city, it was estimated, spent the nights while the fire was in progress out of doors, with practically no shelter. Some 200,000 camped in Golden Gate Park and 50,000 in the presidio military reservation. The difficulty of checking the fire was increased through the breaking of the water-mains by the earthquake, draining the principal reservoirs. Traffic by street cars was made impossible by the twisting of the tracks.

To stop the fire rows of buildings were dynamited. In this way many fine mansions on Van Ness Avenue were destroyed, and the westward advance of the conflagration was stopped at Franklin Street, one block west. General Frederick Funston, in command at the presidio, with the Federal troops under him, assumed control, and the city was put under military law, the soldiers assisting in the work of salvage and relief. On the 21st the fire was reported under control. A committee of safety was organized by the citizens and by the city authorities acting in conjunction with General Funston, and measures were adopted for the prevention of famine and disease, permanent camps being established for those who had been rendered homeless and not provided for by removal to other cities. Assistance with money and supplies was immediately given by the nation and by foreign countries, a committee of the Red Cross Society being put in charge of its administration. By the 23rd of April about $10,000,000 had been subscribed by the people of the United States; Congress voted $2,500,000 from the national treasury. The committee organized as the Red Cross Relief Corporation completed its work in 1908, having spent for the relief of the hungry, for the sick and injured, and for housing and rehabilitation of individuals and families, in round numbers $9,225,000. As the result of the earthquake and fire about 500 persons lost their lives; of those two were shot as looters. Buildings valued at approximately $105,000,000 were destroyed. The total loss in damage to property has been variously estimated at from $350,000,000 to $500,000,000. To cover the loss there was about $235,000,000 of insurance in some 230 companies. Reconstruction in the burned section began at once, with the result that it was practically rebuilt in the three years following the earthquake. Wages for men employed in building, owing in part to scarcity of labour but chiefly to action of the labour unions, rose enormously, masons being paid $12 a day for a day of 8 hours. High prices of materials and of haulage and freight rates added difficulty to the task of rebuilding, which was accomplished with remarkable energy and speed. In May 1907 there was a street-car strike of large dimensions. Van Ness Avenue, which during the process of rebuilding had assumed the character of a business thoroughfare, did not maintain this status, the business centre returning to the reconstructed Market Street. A new retail business district developed in what is known as the mission district and in Fillmore Street. A new residence district known as Parkside was developed south of Golden Gate Park.

For description and general features, see *Doxey's Guide to San Francisco and the Pleasure Resorts of California* (San Francisco, 1897); and various guides and other publications of the California Development Board (formed by consolidation of the State Board of Trade and California Promotion Committee) in San Francisco. For economic interests and history see the bibliography of the article CALIFORNIA. See also Frank Soule and others, *Annals of San Francisco* (San Francisco, 1858); John S. Hittell, *A History of the City of San Francisco* (San Francisco, 1878); B. E. Lloyd, *Lights and Shades of San Francisco* (San Francisco, 1876); C. W. Stoddard, *In the Footprints of the Padres* (San Francisco, 1900); Bernard Moses, *The Establishment of Municipal Government in San Francisco* (Johns Hopkins University Studies, 1889). Many legal questions of interesting constitutional, treaty and common law import have been decided in the Federal (and state) courts in cases involving Chinese; see the collections of reports. For good accounts of the great earthquake and fire, see D. S. Jordan (ed.), *The California Earthquake of 1906* (1906); F. W. Aitken and E. Hilton, *History of the Earthquake and Fire in San Francisco* (1907); G. K. Gilbert and others, *San Francisco Earthquake and Fire* (Washington, 1907).

SANGALLO, the surname of a Florentine family, several members of which became distinguished in the fine arts.

I. GIULIANO DI SANGALLO (1445–1516) was an architect, sculptor, tarsiatore and military engineer. His father, Francesco di Paolo Giamberti, was also an able architect, much employed by Cosimo de' Medici. During the early part of his life Giuliano worked chiefly for Lorenzo the Magnificent, for whom he built

a fine palace at Poggio-a-Cajano, begun in 1485, between Florence and Pistoia, and strengthened the fortifications of Florence, Castellana and other places. Lorenzo also employed him to build a monastery of Austin Friars outside the Florentine gate of San Gallo, a nobly designed structure, which was destroyed during the siege of Florence in 1530. It was from this building that Giuliano received the name of Sangallo, which was afterwards used by so many Italian architects. While still in the pay of Lorenzo, Giuliano visited Naples, and worked there for the king, who sent him back to Florence with many handsome presents of money, plate and antique sculpture, the last of which Giuliano presented to his patron Lorenzo. After Lorenzo's death in 1492, Giuliano visited Loreto, and built the dome of the church of the Madonna, in spite of serious difficulties arising from its defective piers, which were already built. In order to gain strength by means of a strong cement, Giuliano built his dome with pozzolana brought from Rome. Soon after this, at the invitation of Pope Alexander VI., Giuliano went to Rome, and designed the fine panelled ceiling of S. Maria Maggiore. He was also largely employed by Julius II., both for fortification walls round the castle of S. Angelo, and also to build a palace adjoining the church of S. Pietro in Vincoli, of which Julius had been titular cardinal. Giuliano was much disappointed that Bramante was preferred to himself as architect for the new basilica of St Peter, and this led to his returning to Florence, where he did much service as a military engineer and builder of fortresses during the war between Florence and Pisa. Soon after this Giuliano was recalled to Rome by Julius II., who had much need for his military talents both in Rome itself and also during his attack upon Bologna. For about eighteen months in 1514–1515 Giuliano acted as joint-architect to St Peter's together with Raphael, but owing to age and ill-health he resigned this office about two years before his death.

II. Antonio di Sangallo (1455?–1534) was the younger brother of Giuliano, and took from him the name of Sangallo. To a great extent he worked in partnership with his brother, but he also executed a number of independent works. As a military engineer he was as skilful as Giuliano, and carried out important works of walling and building fortresses at Arezzo, Montefiascone, Florence and Rome. His finest existing work as an architect is the church of S. Biagio at Montepulciano, in plan a Greek cross with central dome and two towers, much resembling, on a small scale, Bramante's design for St Peter's. He also built a palace in the same city, various churches and palaces at Monte Sansavino, and at Florence a range of monastic buildings for the Servite monks. Antonio retired early from the practice of his profession, and spent his latter years in farming.

III. Francesco di Sangallo (1493–1570), the son of Giuliano di Sangallo, was a pupil of Andrea Sansovino, and worked chiefly as a sculptor. His works have for the most part but little merit—the finest being his noble effigy of Bishop Leonardo Bonafede, which lies on the pavement of the church of the Certosa, near Florence. It is simply treated, with many traces of the better taste of the 15th century. His other chief existing work is the group of the "Virgin and Child and St Anne," executed in 1526 for the altar of Or San Michele.

IV. Bastiano di Sangallo (1481–1551), sculptor and painter, was a nephew of Giuliano and Antonio. He is usually known as Aristotile, a nickname he received from his air of sententious gravity. He was at first a pupil of Perugino, but afterwards became a follower of Michelangelo.

V. Antonio di Sangallo, the younger (1485?–1546), another nephew of Giuliano, went while very young to Rome, and became a pupil of Bramante, of whose style he was afterwards a close follower. He lived and worked in Rome during the greater part of his life, and was much employed by several of the popes. His most perfect existing work is the brick and travertine church of S. Maria di Loreto, close by Trajan's column, a building remarkable for the great beauty of its proportions, and its noble effect produced with much simplicity. The lower order is square in plan, the next octagonal; and the whole is surmounted by a fine dome and lofty lantern. The lantern is, however, a later addition. The interior is very impressive, considering its very moderate size. Antonio also carried out the lofty and well-designed church of S. Giovanni dei Fiorentini, which had been begun by Jacobo Sansovino. The east end of this church rises in a very stately way out of the bed of the Tiber, near the bridge of S. Angelo; the west end has been ruined by the addition of a later façade, but the interior is a noble example of a somewhat dull style. Great skill was shown in successfully building this large church, partly on the solid ground of the bank and partly on the shifting sand of the river bed. Antonio also built the Cappella Paolina and other parts of the Vatican, together with additions to the walls and forts of the Leonine City. His most ornate work is the lower part of the cortile of the Farnese palace, afterwards completed by Michelangelo, a very rich and well-proportioned specimen of the then favourite design, a series of arches between engaged columns supporting an entablature, an arrangement taken from the outside of the Colosseum. A palace in the Via Giulia built for himself still exists under the name of the Palazzo Sacchetti, much injured by alterations. Antonio also constructed the very deep and ingenious rock-cut well at Orvieto, formed with a double spiral staircase, like the well of Saladin in the citadel of Cairo.

See Raviolo, *Notizie sui lavori . . . dei nove Da San Gallo* (Rome, 1860); G. Clausse, *Les Sangallo* (Paris, 1900–1901). (J. H. M.)

SANGER, JOHN (1816–1889), English circus proprietor, was born at Chew Magna, Somerset, in 1816, the son of an old sailor who had turned showman. In 1845 he started with his brother George a conjuring exhibition at Birmingham. The venture was successful, and the brothers, who had been interested spectators of the equestrian performances at Astley's Amphitheatre, London, then started touring the country with a circus entertainment consisting of a horse and pony and three or four human performers. This enterprise was a success from the beginning, and in due course John and George Sanger became lessees of the Agricultural Hall, London, and there produced a large number of elaborate spectacles. In 1871 the Sangers leased Astley's where they gave an equestrian pantomime every winter, touring in the summer with a large circus. Subsequently the partnership was dissolved, each brother producing his own show. John Sanger died while touring, at Ipswich on the 22nd of August 1889, the business being continued by his son.

SANGERHAUSEN, a town of Germany, in the Prussian province of Saxony, situated on the Gonna, near the south base of the Harz mountains, 30 m. W. of Halle, on the main line of railway Berlin-Nordhausen-Cassel. Pop. (1905) 12,439. Among many medieval buildings, the church of St Ulrich, one of the finest specimens of Romanesque architecture in Germany, and the church of St James, with a magnificent altar screen and interesting tombs and effigies, are particularly noticeable. There are a gymnasium, two hospitals dating from the 14th century and an old town-hall. The industries include the manufacture of sugar, furniture, machinery, boots and buttons. Brewing and brickmaking are also extensively carried on, and there is a considerable agricultural trade.

Sangerhausen is one of the oldest towns in Thuringia, being mentioned in a document of 991 as appertaining to the estates of the emperor. By marriage it passed to the landgrave of Thuringia, and after 1056 it formed for a while an independent country. Having been again part of Thuringia, it fell in 1249 to Meissen, and in 1291 to Brandenburg. In 1372 it passed to Saxony and formed a portion of that territory until 1815, when it was united with Prussia.

See K. Meyer, *Chronik des landrätlichen Kreises Sangerhausen* (Nordhausen, 1892); and F. Schmidt, *Geschichte der Stadt Sangerhausen* (Sangerhausen, 1906).

SAN GERMAN, a city of the department of Mayaguez, Porto Rico, in the south-western part of the island, about 10 m. S.S.E. of the city of Mayaguez. Pop. of the city (1899) 3954; of the municipal district 20,246, of whom 10,715 were of mixed races. The city is served by the American railway of Porto Rico. It is situated near the Guanajibo river, in a fertile agricultural region which produces sugar, coffee, fruit, cacao and tobacco.

In one of the public squares is a Dominican church built in 1538.

San German was founded in 1517, was plundered by the French in 1528, was destroyed by corsairs in 1554, and was unsuccessfully attacked by the English in 1748. Until 1782 it was the seat of government of the western district of the island. It was made a city in 1877.

SAN GIMIGNANO, a town of Tuscany, Italy, in the province of Siena, 24 m. N.W. of Siena, at an elevation of 1089 ft. Pop. (1901) 4060 (town); 10,066 (commune). Being surrounded by its ancient walls, and retaining thirteen out of its original fifty towers, it is, with its predominantly Gothic architecture, a thoroughly medieval town in appearance. In the council chamber of the town-hall (1288–1323) is a fresco by Lippo Memmi of the Madonna enthroned of 1317, copied closely from the similar fresco (the "Majestas") by his master Simone di Martino in the Palazzo Pubblico at Siena; there is also a curious frescoed frieze of 1291, with knights in armour. The museum in the same building contains pictures and other objects of art. The tower is the highest in the town (174 ft.), while the Torre dell' Orologio (167 ft.) close by marks the height beyond which private individuals might not build. In the same piazza is the Collegiata (the former cathedral) of the 12th century, enlarged after 1466 by Giuliano da Maiano, whose brother Benedetto erected the chapel of S. Fina from his plans in 1468, and carved the fine marble altar, the original painting and gilding of which are still preserved. The marble ciborium, a small reproduction of the splendid one in S. Domenico at Siena, is also by Benedetto. The beautiful frescoes with scenes from the life of the saint (a local saint who died at the age of fifteen) are the earliest work of Domenico Ghirlandaio, completed before 1475. There are also some frescoes of his cousin Bastiano Mainardi (d. 1513). The cathedral contains other 14th-century and early Renaissance paintings, the former including some Passion scenes, the only certain work of Barna da Siena, and some fine choir stalls. S. Agostino (1280–1298) contains a famous series of seventeen frescoes by Benozzo Gozzoli, with scenes from the life of St Augustine (1463–1467). They have been to some extent restored. The altar of S. Bartoldus, by Benedetto da Maiano, is not unlike that in the Collegiata (1494). The town was independent in the 13th century, but in 1353, owing to the dissensions of the Salvucci (Ghibellines) and Ardinghelli (Guelphs), it fell into the hands of Florence.

See R. Pantini, *San Gimignano e Certaldo* (Bergamo, 1905).

SANGLI, a native state of India, in Bombay, ranking as one of the Southern Mahratta Jagirs. The territory is widely scattered among other native states and British districts. Area, 1112 sq. m. Pop. (1901) 226,128; estimated revenue, £10,000. The river Kistna waters part of the country, which is exceedingly fertile. Millet, rice, wheat and cotton are the chief crops, and cotton cloth is manufactured. The chief, whose title is Tatya Saheb Patwardhan, is a Brahman by caste. The town of Sangli, on the river Kistna, has a station on the Southern Mahratta railway, 11 m. from Miraj Junction. Pop. (1901) 16,829.

SANJO, SANETOMI, Prince (1837–1891), Japanese statesman, was one of the old court nobles (*kuge*) of Japan, and figured prominently among the little band of reformers who accomplished the overthrow of feudalism and the restoration of the administration to the Mikado. He served as the first prime minister (*daijo daijin*) in the newly organized *Meiji* government.

SAN JOSÉ, a city and the county-seat of Santa Clara county, California, U.S.A., situated in the coast ranges, about 46 m. S.E. of San Francisco and 8 m. S.E. of the southern end of San Francisco Bay, in the heart of the beautiful Santa Clara Valley. Pop. (1890) 18,060; (1900) 21,500, of whom 4577 were foreign-born; (1910 census) 28,946; land area (1906), about 6 sq. m. It is served by the Southern Pacific railway, which has car shops and terminal yards here. The city lies mainly on a gently rising plateau (altitude, 90 to 125 ft.) between the Coyote and Guadalupe rivers. It is a popular health resort.

Besides St James and City Hall parks in the city, San José has Alum Rock Canyon Park, a tract of 1000 acres, with sixteen mineral springs, in Penitencia Canyon, 7 m. east. This park is connected by electric railway with the city. San José is the seat of the University of the Pacific (Methodist Episcopal), which was founded at Santa Clara in 1851, removed to its present site just outside the city in 1871, and had 358 students in all departments in 1909–1910; of the College of Notre Dame (1851; Roman Catholic), and of a State Normal School. Among charitable institutions are a Home of Benevolence (1878) for orphans and abandoned children, the Notre Dame Institute (for orphans) under the Sisters of Notre Dame, and the O'Connor Sanatorium. The Lick Observatory, opened in 1888 on the top of Mount Hamilton (4209 ft.) with a legacy of $700,000 left by James Lick (1796–1876) of San Francisco, is 26 m. distant by road, and the New Almaden quicksilver mine (the greatest producer in California and long among the greatest in the world) is about 14 m. south. The Santa Clara Valley has many vegetable and flower-seed farms; it is one of the most fertile of the fruit regions of California, prunes, grapes, peaches and apricots being produced in especial abundance. More than half the prune crop of California comes from Santa Clara county. In 1905 the total value of the factory product of San José was $6,388,445 (94·1 % more than in 1900); nearly one half ($3,039,803) was the value of canned and preserved fruits and vegetables, $619,532 of planing-mill products, and $518,728 of malt liquors—much barley is grown in the Santa Clara Valley.

San José de Guadalupe (after 1836 for a time "de Alvarado" in honour of Governor J.B. Alvarado) was founded in November 1777, and was the first Spanish pueblo of California. The mission of Santa Clara was founded in the vicinity in January 1777, and the mission of San José, about 12 m. north-east, in 1797. Near the original site of the former, in the town of Santa Clara (pop. 1900, 3650), a suburb of San José, now stands Santa Clara College (Jesuit; founded 1851, chartered 1855). Throughout the Spanish-Mexican period San José was a place of considerable importance. In 1840 its population was about 750. In the last years of Mexican dominion it was the most prominent of the northern settlements in which the Hispano-Californian element predominated over the new American element. The town was occupied by the forces of the United States in July 1846; and a skirmish with the natives occurred in its vicinity in January 1847. San José was the first capital of the state of California (1849–1851), and in 1850 was chartered as a city.

SAN JOSÉ, or San José de Costa Rica, the capital of the republic of Costa Rica, and of the department of San José; in the central plateau of the country, 3868 ft. above sea-level, and on the transcontinental railway from the Pacific port of Puntarenas to the Atlantic port of Limón. Pop. (1908) about 26,500. San José is an episcopal see, the most populous city in Costa Rica, and the centre of a rich agricultural region; its climate is temperate, its water-supply pure and abundant. The city was founded in 1738, and became the capital in 1823 (see Costa Rica: *History*). It is thoroughly modern in appearance, with macadamized streets lighted by electricity; its houses are one-storeyed so as to minimize the danger from earthquake. The suburbs consist chiefly of cane huts, tenanted by Indians and half-castes. The larger of two public gardens, the Morazan Park, contains a representative collection of the Costa Rican flora. The principal buildings are the cathedral, founded in the 18th century but restored after 1870, the hospital, government offices, institutes of law and medicine and of physical geography, training school for teachers, national bank, museum, library and barracks. The staple trade of San José is in coffee.

SAN JUAN, an Andine province of Argentina, bounded N. and E. by La Rioja, S. by San Luis and Mendoza, and W. by Chile, from which it is separated by the Andean Cordilleras. Area, 33,715 sq. m.; pop. (1904, estimate) 99,955. It is roughly mountainous, and belongs to the closed drainage basin of western Argentina, centring in the province of Mendoza. It is traversed by several rivers, fed by the melting snows of the Andes and discharging into the swamps and lagoons in the S.E. part of the province, the largest of which are the Huanacache lagoons. The largest of these rivers are the Vermejo, Zanjón or Jachal and San Juan. They are all used for irrigation. The climate is extremely hot and dry in summer, but the winter temperature is mild and pleasant. Agriculture is the principal occupation of its inhabitants, though the soil is generally sterile

and the rainfall uncertain and very light. Cereals are grown in some localities, and there are large vineyards where irrigation is possible, from which excellent wine is made. The province contains gold, silver, copper, iron, lead, coal and salt, but mining has never been developed to any extent. Pastoral interests are largely in feeding cattle for the Chilean markets, for which large areas of alfalfa are grown in the irrigated valleys of the Andes. The Argentine Great Western railway connects Mendoza with the capital of the province, and with the principal cities of the republic.

The capital of the province is SAN JUAN, once called SAN JUAN DE LA FRONTERA (pop. 1904, estimate, 11,500), in a great bend of the San Juan river, 95 m. N. of Mendoza and 730 m. from Buenos Aires by rail. The great bend of the river affords easy irrigation, and the surrounding country is covered by a network of irrigating canals, even the paved streets of the town having streams of cool water running through them. The public buildings include a cathedral, three churches, and several schools, including the "Escuela Sarmiento," a fine edifice with a Greek façade, named after President Domingo Faustino Sarmiento (1811–1886), who was a native of this city. There is also a botanical garden.

San Juan was founded in 1561 by Juan Yufré, a companion of Captain Castillo, the founder of Mendoza. Both came from Chile, to which these outlying colonies were at first subject. From 1776 to 1820 it was governed from Mendoza, and then a popular uprising made the province independent and the town its capital. It has suffered severely from political disorders, and in 1894 was nearly destroyed by an earthquake. The original settlement, now called Pueblo Viejo, 4 m. N., was abandoned on account of frequent inundations. The present town is situated about 2165 ft. above sea-level and is defended from inundations by an embankment above the town, called the Murallon. San Juan exports wine, and has a profitable trade with Chile over the Patos and Uspallata passes.

SAN JUAN (SAN JUAN BAUTISTA DE PUERTO RICO), the capital and largest city of Porto Rico, on a small and narrow island which lies near the north coast, about 35 m. from the east end of Porto Rico, and is united to the mainland by the bridge of San Antonio. Pop. (1899) 32,048, including 5236 negroes and 11,529 of mixed races; (1910) 48,716. San Juan is served by the American railroad of Porto Rico and by steamboats from New York and other ports. The harbour lies between the city and the mainland. It is capacious and landlocked, except on the north. A portion of it is 30 ft. in depth, and in 1907 Congress passed an Act for enlarging this area by dredging and especially for widening the entrance for large vessels; the work was virtually completed in 1909. San Juan is noteworthy for its fortifications and public buildings, and is the only fortified city of Porto Rico.

On a bluff about 100 ft. high at the west end of the island and commanding the entrance to the harbour rise the battlements of Morro Castle, which was completed about 1584 and in which there is a lighthouse. The Castle of San Cristobal (begun early in the 17th century, completed in 1771) extends across the island in the rear portion of the city. A wall on each side of the island connects the two castles. The Cañuelo is an abandoned fort on an islet opposite the Morro and less than 1000 yds. from it, the main channel lying between the two; and Forts San Antonio and San Geronimo protect the bridge of San Antonio. Inland rises a range of lofty mountains. Within the walls (which are 50-100 ft. high) the streets are narrow, smoothly paved with glazed brick and well cleaned. Princessa, Covadonga and Puerta de Tierra are lined with shady trees and occasionally widen into refreshing plazas. Between streets the space is packed closely with massive, flat-roofed brick and stone buildings, the walls of which, like the fortifications, are covered with plaster of various colours—green, blue, white, brown, pink, yellow and vermilion; red tile roofs add to the effect. Near Morro Castle is the Casa Blanca, a palace on land which belonged to the family of Ponce de Leon. The tomb of Ponce de Leon is in the Cathedral, and in the Plaza de San José is a bronze statue (said to have been cast from cannon taken from the English in 1797) to his memory. In the Plaza Colon is a marble and granite monument to Columbus. In the church of San Francisco are some good paintings by José Campeche (1752–1809), a local artist. Other churches are the severely beautiful Santo Domingo, the Santa Ana, the Cathedral, with a rich shrine of Nuestra Señora de la Providencia, and the church of San José, which was formerly the Dominican convent. Among the prominent buildings and institutions are the custom-house, the executive mansion (formerly the palace of the governor-general) situated near the Casa Blanca, the archiepiscopal palace, a Seminary College, the City Hall, the Intendencia, the Post Office, the large barracks (Cuartel de Ballajá), the Penitentiary, the Military Hospital, the Presbyterian Hospital, two municipal hospitals (one surgical, one medical), a municipal bath-house and a small public library (the "Cervantes"). At Rio Piedras, not far from San Juan, is the Normal School and Agricultural School of Porto Rico. Other suburbs are Marina, with wharves and piers, Puerta de Tierra and on the mainland, Santurce, with a country club, the Union Club, a beautiful market-place, two charity schools and some attractive villas. Industries are of little importance. The sanitation of the city has been installed since the American occupation; sewers have been laid and a water-supply is piped from Rio Piedras.

From Caparra, established in 1508 by Juan Ponce de Leon and now known as Pueblo Viejo, the Spanish settlement removed in 1520 to San Juan or San Juan Bautista de Puerto Rico, nearer the coast. The new settlement became the capital of the eastern district of the island, to the whole of which the latter part of the name came to be applied. It was sacked by Sir Francis Drake in 1595, and captured by Admiral George Clifford, earl of Cumberland (1558–1605), in 1597, but was abandoned by the conquerors on account of an epidemic. It was unsuccessfully attacked by the English under Sir Ralph Abercromby in April 1797; and it was bombarded by an American fleet under Rear-Admiral William T. Sampson on the 12th of May 1898 during the Spanish-American war, and was blockaded by the auxiliary cruiser "St Paul," which on the 22nd of June drove back into the harbour the Spanish destroyer "Terror" and the gunboat "Isabella II."; but the city was not occupied by the Americans until after the suspension of hostilities.

SAN JUAN (or HARO) **ISLANDS,** an archipelago (San Juan, Orcas, Shaw, Lopez, Blakely, Cypress, &c.) lying between Vancouver Island and the mainland of North America. These islands were for many years the subject of dispute between the British and the United States governments, and were finally assigned to the latter country by the arbitration of the emperor of Germany (on the 21st of October 1872). Geographically the cluster certainly belongs to the mainland, from which it is separated by Rosario Strait, generally much under 50 fathoms in depth, while Haro Strait, separating it from Vancouver Island, has depths ranging from 100 to 190 fathoms. In 1873 the islands, formerly considered part of Whatcom county, Washington, were made the separate county of San Juan. Of the total area of 200 sq. m., about 60 are in San Juan, 60 in Orcas and 30 in Lopez.

See *Papers relating to the Treaty of Washington*, vol. v. (Washington, 1872), and the map in *Petermann's Mitteilungen* (1873).

SANKARA ACHARYA (*c.* 789–820), Hindu theologian, was born about the year 788, probably at the village of Kaladi in Malabar. He belonged to the Nambudri class of Brahmins. He wandered far and wide, and engaged in much philosophical and theological debate. He taught the existence of the Supreme God and founded the sect of the Smarta Brahmins. His great achievement was the perfecting of the Mimansa or Vedanta philosophy. So great were his learning and piety that he was regarded as an incarnation of Siva, and his works (commentaries on the Vedanta Sutras, the Bhagavad Gita and the Upanishads) exercised a permanent influence on Hindu thought. He died at Kedarnata in the Himalayas when only 32 years of age.

See *Sri Sankaracharya*, by C. N. Krishnasurami Aiyar and Pandit Sitanath Tattvabhushan (Madras, 1902).

SANKT JOHANN, a town of Germany, in the Prussian Rhine province, on the right bank of the Saar, opposite Saarbrücken with which it is connected by three bridges. It is 49 m. N.E. from Metz and at the junction of lines from Trier, Bingerbrück and Zweibrücken. Pop. (1905) 24,140. Sankt Johann is the seat of extensive industries, the chief being the manufacture of railway plant and machinery, iron-founding, wire-drawing and brewing; its rapid industrial development is due mainly to the extensive railway system of which it is the centre.

Sankt Johann obtains its name from a chapel erected here. From 1321 to 1859 it formed a single town with Saarbrücken,

and then was united to form one municipality with Saarbrücken and Malstatt-Burbach (united population, 90,000).

SANKT PÖLTEN, an old town and episcopal see of Austria, in Lower Austria, 38 m. W. of Vienna by rail. Pop. (1900) 14,510. It is situated on the Traisen, a tributary of the Danube, and contains an interesting old abbey church, founded in 1030 and restored in 1266 and again at the beginning of the 18th century. There are several religious educational institutions in the town, and a military academy for engineers. The industries include cotton spinning and milling, as well as the manufacture of iron and hardware, and small arms. Sankt Pölten was an inhabited place in the Roman period. An abbey dedicated to St Hippolytus was founded here in the 9th century, around which the town developed. It was called *Fanum Sancti Hippolyti*, from which, by corruption, the actual name is derived. It was surrounded with walls and fortifications in the time of Rudolf of Habsburg, but these were demolished in modern times.

See Lampel, *Urkundenbuch des Chorherrenstifts Sankt Polten* (Wien, 1891–1901, 2 vols.).

SAN LUCAR (or SANLÚCAR DE BARRAMEDA), a fortified seaport of southern Spain, in the province of Cadiz; 27 m. by sea from Cadiz, on the left bank of the Guadalquivir estuary, and on the Puerto de Santa Maria-San Lucar and Jerez de la Frontera-Bonanza railways. Pop. (1900) 23,883. The town is divided into two parts, Alta (" upper ") and Baja (" lower "); for it is built partly on the flat foreshore, partly on the rising ground to the south. The upper part is the older; it culminates in the ruins of a Moorish citadel. On the outskirts are many villas surrounded by pine, palm and orange groves, and often occupied in summer by families from Seville, who come to San Lucar for the excellent sea-bathing. The 14th-century church and the palace of the dukes of Medina Sidonia contain many valuable pictures. The hospital of St George was established by Henry VIII. of England in 1517 for English sailors. The Guadalquivir estuary is deep and sheltered, and lighted by four lighthouses. Bonanza, 2 m. by rail up the river, and on the same bank, is the headquarters of the shipping and fishing trades. It is named after a chapel dedicated here by the South American Company of Seville to the Virgin of Fair Weather (*Virgen de la Bonanza*). The fisheries and agricultural trade of San Lucar are considerable; there are flour mills in the town and a dynamite factory among the surrounding sandhills. Coal is imported from Great Britain, sulphur from France. The imports include sherry, manzanilla and other wines, salt, oats and fruit.

Inscriptions and ruins prove that San Lucar and Bonanza were Roman settlements, though the original names are unknown. San Lucar was captured from the Moors in 1264, after an occupation lasting more than five and a half centuries. After 1492 it became an important centre of trade with America. From this port Columbus sailed across the Atlantic in 1498, and Magellan started in 1519 to circumnavigate the world.

SAN LUIS, a province of Argentina, bounded N. by Rioja, E. by Cordoba, S. by the La Pampa territory and W. by Mendoza. Area, 28,535 sq. m. Pop. (1904, estimated) 97,458. San Luis belongs partly to the semi-arid pampa region, and partly to the mountainous region of the eastern Andes and Cordoba whose ranges terminate between the 33rd and 34th parallels. It is one of the least important of the Argentine provinces because of its aridity and lack of available resources. The rough northern districts, where an occasional stream affords irrigation for a fertile soil, are noted for a remarkably uniform, dry, mild and healthful climate. The Rio Quinto has its sources in these ranges; the Desaguadero, or Salado, forms its western boundary; and the Conlara flows northward among its broken ranges to the great *salinas* of western Cordoba. Only in the mountains are these streams available, as they soon become impregnated with saline matter on the plains. The southern part of the province is a great, arid, saline plain, practically uninhabitable. Agriculture and grazing occupy some attention in the north, but are handicapped by lack of water. The mountains are rich in minerals, however, and a number of gold mines have been opened. The exports include cattle, hides, skins, wool and ostrich feathers. The capital is San Luis (pop. 1904, about 10,500) on the Arroyo Chorillos, a little S. of the *cerro* called Punta de los Venados, 374 m. by rail (the Argentine Great Western) W. of Rosario, and magnificently situated on a plateau 2490 ft. above sea-level. Next in importance is the town of Mercedes or Villa Mercedes (pop. 1904, about 6000) on the Rio Quinto, an important railway junction where the railways from Buenos Aires, Rosario, Mendoza and San José unite.

San Luis, the capital, was founded in 1697 by Martin de Loyola and was for nearly 200 years only a frontier outpost. It suffered much in the civil wars of 1831–1865.

SAN LUIS POTOSÍ, a central state of Mexico, bounded N. by Coahuila, E. by Nuevo Leon, Tamaulipas and Vera Cruz, S. by Hidalgo, Querétaro and Guanajuato, and W. by Zacatecas. Area, 25,316 sq. m. Pop. (1900) 575,432. The state belongs wholly to the high plateau region, with the exception of a small area in the S.E. angle, where the tableland breaks down into the tropical valley of the Panuco. The surface is comparatively level, with some low mountainous wooded ridges. The eastern part borders on the Sierra Madre Oriental, where there are extensive forests. The mean elevation is about 6000 ft., insuring a temperate climate. The state lies partly within the arid zone of the north, the southern half receiving a more liberal rainfall through the influence of the " northers " on the Gulf coast. The rainfall, however, is uncertain and the state is poorly provided with rivers. The soil is fertile and in favourable seasons large crops of wheat, Indian corn, beans and cotton are grown on the uplands. In the low tropical valleys, sugar, coffee, tobacco, peppers and fruit are staple products. Stock-raising is an important industry and hides, tallow and wool are exported. Fine cabinet and construction woods are also exported to a limited extent. At one time San Luis Potosí ranked among the leading mining provinces of Mexico, but the disorders following independence resulted in a great decline in that industry. The Catorce district has some of the richest silver mines in the country. Other well-known silver mining districts are Peñón Blanco, Ramos and Guadalcázar. The development of Guadalcázar dates from 1620 and its ores yield gold, copper, zinc and bismuth, as well as silver. In the Ramos district, the Cocinera lode is said to have a total yield of over $60,000,000. Railway facilities are provided by the Mexican Central and Mexican National lines, the former crossing a corner of the state and having a branch from the capital to Tampico, and the latter passing through the state from N. to S. The capital is San Luis Potosí, and other towns, with their populations, are: Matehuala (13,101 in 1895), a mining town 20 m. E. by W. of Catorce, with which it is connected by a branch railway; Catorce (9547 in 1895), an important mining town 110 m. N. (direct) of San Luis Potosí (capital) and 8 m. from its railway station on the Mexican National; at an elevation of 8780 ft., Santa Maria del Rio (8440 in 1900), 37 m. S.E. of the capital; Venado (5750 in 1895), 45 m. N. of the capital; Rio Verde (5759 in 1900), an agricultural centre with a national agriculture experiment station in its vicinity; Soledad Diez Gutierrez (5730 in 1895), near the capital.

SAN LUIS POTOSÍ, a city of Mexico and capital of a state of the same name, near the head of the valley of the Rio Verde (a tributary of the Panuco), 215 m. by rail N.W. of the city of Mexico. Pop. (1900) 61,019. The city is served by the Mexican Central and the Mexican National railways. It is built on a broad level space, laid out regularly with straight well-paved streets and shady plazas. The altitude of the city, 6168 ft. above sea-level, gives it a cool temperate climate, though the sun temperatures are high. The water-supply was formerly very deficient, but two artesian wells have been drilled to a depth of 450 ft. and furnish 30,000 gallons a day each, in addition to which a large dam 3 m. above the city has been built, having a storage capacity of 7,500,000 cubic meters (1,650,000,000 gallons), or 18 months' supply, which is used for irrigation and domestic purposes. The better class of residences are usually

two storeys high, and include many fine specimens of Spanish colonial architecture; but the suburbs consist chiefly of wretched hovels and stretch out over a large area. Among the more notable public buildings are the cathedral and government palace fronting on the Plaza Mayor, the latter conspicuous for its façade of rose-coloured stone; the churches of El Carmen, San Francisco and Guadalupe; the La Paz theatre, mint, penitentiary and the Institute Cientifico, in which law, medicine and science are taught. San Luis Potosí is an important railway and distributing centre, with a considerable trade in cattle, tallow, wool, hides and minerals. Its proximity to the port of Tampico, with which it was connected by a branch of the Mexican Central railway in 1885, has greatly increased its commercial importance, though in earlier days it was also one of the principal centres of the diligence and pack-train traffic of this part of Mexico. The city has cotton and woollen factories using modern machinery, and the smelting works of the Metalurgica Mexicana company, an American enterprise.

San Luis Potosí was founded in 1586. It was an important centre of colonial administration and played an important part in the civil wars and political disorders following Mexican independence. It was the seat of the Mexican government of Benito Juárez in 1863, but was soon afterwards captured by the French under Bazaine. It was recovered by Juárez in 1867, after the French had retired.

SAN MARINO, a republic in northern Italy, 14 m. S.W. of Rimini by road. Pop. (1901) about 1600 (town); 9500 (whole territory). It is the smallest republic in the world (32 sq. m. in area). According to tradition, the republic was founded by St Marinus during the persecutions under Diocletian, while his companion, St Leo, founded the village of that name 7 m. to the S.W., with La Rocca its old castle, now a prison, in which the impostor Cagliostro died in 1795. The history of S. Marino begins with the 9th century, the monastery of S. Marino having existed demonstrably since 885. In the 10th century a communal constitution was established. The republic as a rule avoided the faction fights of the middle ages, but joined the Ghibellines and was interdicted by the pope in 1247–1249. After this it was protected by the Montefeltro family, later dukes of Urbino, and the papacy, and successfully resisted the attempts of Sigismondo Malatesta against its liberty. In 1503 it fell into the hands of Caesar Borgia, but soon regained its freedom. Other attacks failed, but civil discords in the meantime increased. Its independence was recognized in 1631 by the papacy. In 1739 Cardinal Alberoni attempted to deprive it of its independence, but this was restored in 1740 and was respected by Napoleon. Garibaldi entered it in 1849, on his retreat from Rome, and there disbanded his army. The town stands on the north end of a precipitous rock (2437 ft.) which bears the name of Monte Titano; each of the three summits is crowned by fortifications—that on the north by a castle, the other two by towers. The arms of the republic are three peaks, each crowned with a tower. There are traces of three different enceintes, of the 14th, 15th and 16th centuries. The chief square, the Pianello, contains the new Palazzo del Governo in the Gothic style (1894) and a statue of Liberty (1876). The principal church (Pieve), in classical style, dates from 1826–1838, and contains the body of St Marinus. The old church, then demolished, is first mentioned in 1113, but was several times restored. S. Francesco has some paintings by Niccolo Alunno of Foligno and other later artists, and a pretty loggia. The museum contains a few pictures of various schools and some Umbrian antiquities. Bartolommeo Borghesi, the epigraphist and numismatist, resided here from 1821 until his death in 1860. The Borgo at the base of the rock is a chiefly commercial village.

The supreme power of the republic resides in the general assembly (*Arringo*) which meets twice a year. It is governed by two *Capitani Reggenti*, selected twice a year from the 60 life-members of the Great Council, which is composed of 20 representatives of the nobility,[1] 20 of the landowners and 20 of the citizens. They are assisted by a small committee of 12 of the Great Council. The available armed forces of the republic form a total of about 1200 men, all citizens able to bear arms being technically obliged to do so from the age of 16 to 60 years. San Marino issues its own postage-stamps, and makes thereby a considerable income. It also issues its own copper coinage, which circulates in Italy also; but Italian money is current for the higher values. Most of the republic falls within the diocese of Montefeltro, a small portion within that of Rimini.

[1] Not a few Italians possess titles of nobility of San Marino.

See C. Ricci, *La Repubblica di San Marino* (Bergamo, 1903).

SAN MARTIN, JOSÉ DE (1778–1850), South American soldier and statesman, was born at Yapeyú on the Uruguay river on the 25th of February 1778. His father was a captain in the Spanish army, and young San Martin was taken to Madrid and educated for a military career. He served in the Moorish wars and in the great struggle against Napoleon, and his distinguished conduct at the battle of Baylen brought him the rank of lieutenant-colonel. In 1812 he offered his services to the government of Buenos Aires in the struggle for the independence of Argentina. He was appointed early in 1814 to the command of the revolutionary army operating against the royalists on the borders of Upper Peru. But he soon resigned his command, realizing that for the permanent success of the revolutionary cause it was necessary first to oust the Spaniards from Chile and then to organize an expedition thence against the stronghold of Spanish power in Peru. With this end in view he secured his appointment to the governorship of the province of Cuyo, bordering on the Chilean Andes, and established himself at Mendoza, where he prepared for the invasion of Chile. Assisted by Bernardo O'Higgins, he rallied the Chilean patriots who had fled across the mountains after their defeat at Rancagua; he enlisted the sympathies of the Argentine government, and after two years succeeded in raising a well-trained army of Chileans and Argentines and in collecting the material resources necessary for a crossing of the Andes. In January 1817 he set out on his enterprise. By the swiftness of his movements and by a clever feint he evaded opposition, and he led his army, of about 3000 infantry and 1000 cavalry, together with artillery and large baggage trains, through a barren and difficult region, and over passes 13,000 ft. above sea-level. The victory of Chacabuco (Feb. 12, 1817) over the royalist army led to the re-establishmtne of a nationalist government at Santiago under Bernardo O'Higgins, as San Martin himself wished to prepare for the invasion of Peru; but in 1818 he took command of the Chilean forces against a fresh royalist army, and by his victory at the river Maipo in April finally secured the independence of Chile. This left him free to organize the expedition against Peru, and assisted by O'Higgins and the Argentine government, he procured the necessary fleet and the army. He set out in August 1820, landed his forces for a short time at Pisco, where he tried to enter into negotiations with the viceroy of Lima, and then transported his army with the help of the fleet to a point on the coast a little way north of Lima. Here he spent several months of inaction, hoping that the demonstration of force and the influence of popular feeling would lead to a peaceful withdrawal of the Spaniards. In July 1821 the Spaniards evacuated Lima, San Martin entered the city, proclaimed the independence of Peru and assumed the reins of government with the title of Protector. His position, however, was far from secure. The royalist party, never having been decisively crushed, organized risings in the interior, and San Martin was embarrassed by the jealousy which his authority roused among the patriots, and by the rivalry of Bolivar, who had arrived with an army on the northern frontier of Peru. San Martin resigned his authority on the 20th of September 1822 and left the country. He spent a short time in Chile and in Argentina, but his many enemies had embittered popular feeling against him, and constant attempts were made to involve him in political intrigues. Unable to live a peaceful private life, he was compelled to exile himself in Europe, where he lived, often in great poverty, till his death at Boulogne on the 17th of August 1850.

San Martin did more than any man for the cause of independence in the Argentine, Chile and Peru. He was not only an able soldier; in

the clearness with which he realized that the independence of each state could only be secured by the co-operation of all, and in the perseverance with which he carried his views into execution he showed himself a far-seeing and honest statesman.

See W. Pilling, *Emancipation of South America* (London, 1893), a translation of B. Mitre's life of San Martin; P. B. Figueroa, *Diccionario biografico de Chile* (Santiago, 1888) and J. B. Suarez, *Rasgos biograficos de hombres notables de Chile* (Valparaiso, 1886), both giving sketches of prominent characters in Chilean history. See also works on the period mentioned under CHILE: *Bibliography*.

SANMICHELE, MICHELE (1484–1559), Italian architect, was born in San Michele near Verona. He learnt the elements of his profession from his father Giovanni and his uncle Bartolommeo, who both practised as architects at Verona with much success. He went at an early age to Rome to study classic sculpture and architecture. Among his earliest works are the duomo of Montefiascone (an octagonal building surmounted with a cupola), the church of San Domenico at Orvieto, and several palaces at both places. He also executed a fine tomb in S. Domenico. He was no less distinguished as a military architect, and was much employed by the signoria of Venice, not only at home, but also in strengthening the fortifications of Corfu, Cyprus and Candia. One of Sanmichele's most graceful designs is the Cappella de' Peregrini in the church of S. Bernardino at Verona—square outside and circular within, of the Corinthian order. He built a great number of fine palaces at Verona, including those of Canossa, Bevilacqua and Pompei, as well as the graceful Ponte Nuovo. In 1527 Sanmichele began to transform the fortifications of Verona according to the newer system of corner bastions—a system for the advancement of which he did much valuable service. His last work, begun in 1559, was the round church of the Madonna di Campagna, 1½ m. from Verona on the road to Venice. Like most other distinguished architects of his time he wrote a work on classic architecture, *I Cinque Ordini dell' architettura*, printed at Verona in 1735.

See Ronzani and Luciolli, *Fabbriche . . . di M. Sanmichele* (Venice, 1832); and Selva, *Elogio di Sanmichele* (Rome, 1814).

SAN MIGUEL, the capital of the department of San Miguel, Salvador; 80 m. E. by S. of San Salvador, near the right bank of the Rio Grande, and at the foot of the volcano of San Miguel or Jucuapa (7120 ft.). Pop. (1905) about 25,000. San Miguel is an important and attractive city, although the extensive swamps in the Rio Grande valley render malaria common. It possesses several handsome churches, municipal buildings, law courts and two well-equipped hospitals. Near it are the ruins of an ancient Indian town. San Miguel has a flourishing trade in indigo, grain, rubber and cattle. Its port is La Union (*q.v.*). San Miguel was founded in 1530 by Spanish settlers, and became a city in 1586. Its fairs formerly attracted merchants from all parts of Salvador, Guatemala and Honduras, and it is now third in size among the cities of the republic.

SAN MIGUEL DE MAYUMO, a town of the province of Bulacan, Luzon, Philippine Islands, about 40 m. N. of Manila. Pop. (1903) 14,919. In 1903, after the census had been taken, San Ildefonso (pop. 5326) was annexed to San Miguel. It has a cool and very healthy climate, and commands a beautiful view of the surrounding country. The soil is very fertile, and many of the inhabitants have acquired much wealth from the cultivation of rice. Sugar-cane, Indian corn and cotton are also produced in abundance, and cattle are raised. Near the town are iron mines and quarries of limestone, and on the neighbouring mountains are forests containing valuable hardwood timber. About 8 m. N.E. are the medicinal springs of Sibul, to which large numbers of patients from the neighbouring provinces come. The San Miguel river, which flows near, affords a means of transportation, and the town has considerable commerce. Some beautiful furniture is made out of the hardwood from the mountains, and cotton fabrics are woven in considerable quantities by the women. The principal language is Tagalog. The chief buildings were destroyed in 1901 in a fire started by a band of thieves.

SAN MINIATO, a town and episcopal see of Tuscany, Italy, in the province of Florence, 26 m. W. by S. of Florence by the railway to Pisa, 512 ft. above sea-level, on a hill 2 m. S. of the railway. Pop. (1901) 4421 (town); 20,242 (commune). Its cathedral dates from the 10th century. It was remodelled in 1488, and has a façade decorated with disks of majolica. It manufactures glass, olive oil, leather and hats. It has a castle of the emperor Frederick I., the residence of the imperial governors of Tuscany from 1226 to 1286, and from them bears the name of San Miniato al Tedesco.

SANNAZARO, JACOPO (1458–1530), Italian poet of the Renaissance, was born in 1458 at Naples of a noble family, said to have been of Spanish origin, which had its seat at San Nazaro near Pavia. His father died during the boyhood of Jacopo, who was brought up at Nocera Inferiore. He afterwards studied at Naples under Giovanni Pontanus, when, according to the fashion of the time, he assumed the name Actius Syncerus, by which he is occasionally referred to. After the death of his mother he went abroad—driven, we are told, by the pangs of despised love for a certain Carmosina, whom he has celebrated in his verse under various names; but of the details of his travels nothing is recorded. On his return he speedily achieved fame as a poet and place as a courtier, receiving from Frederick III. as a country residence the Villa Mergillina near Naples. When his patron was compelled to take refuge in France in 1501 he was accompanied by Sannazaro, who did not return to Italy till after his death (1504). The later years of the poet seem to have been spent at Naples. He died on the 27th of April 1530.

The *Arcadia* of Sannazaro, begun in early life and published in 1504, is a somewhat affected and insipid Italian pastoral, in which in alternate prose and verse the scenes and occupations of pastoral life are described. See Scherillo's edition (Turin, 1888). His now seldom read Latin poem *De partu Virginis*, which gained for him the name of the "Christian Virgil," appeared in 1526, and his collected *Sonetti e canzoni* in 1530.

SAN NICOLÁS DE LOS ARROYOS, a town and river port of Argentina, in the province of Buenos Aires, on the W. bank of the Paraná, 150 m. by rail N.W. of the city of Buenos Aires. Pop. (1904, estimate), 18,000. It is a flourishing commercial town, and a port of call both for river and ocean-going steamers of medium tonnage. It is a station on the Buenos Aires & Rosario, and the terminus of a branch from Pergamino of the Central Argentine railway, and exports wheat, flour, wool and frozen mutton. The town is the judicial centre for the northern district of Buenos Aires. San Nicolás was founded in 1749 by José de Aguillar on lands given for that purpose by his wife (*née* Ugarte). Its growth was very slow until near the end of the 19th century.

SAN PABLO, a town of the province of Laguna, Luzon, Philippine Islands, 9½ m. S. of Laguna de Bay and about 35 m. S.S.E. of Manila. Pop. (1903) 22,612. It is an important road centre, and in the vicinity are five small mountain lakes. Coconut palms grow in great abundance in the town and vicinity, and copra is the principal product; hemp and, to a less degree, rice, are grown here. The language is Tagalog.

SANQUHAR, a royal and police burgh of Dumfriesshire, Scotland. Pop. (1901) 1379. It is situated on the Nith, 26 m. N.W. of Dumfries by the Glasgow and South-Western railway. It became a burgh of barony in 1484 and a royal burgh in 1596, and was the scene of the exhibition of the Covenanters' Declaration, attached to the market cross in 1680 by Richard Cameron and in 1685 by James Renwick. The industries include coal-mining and the making of bricks and tiles, spades and shovels. The coal-field, measuring 7 m. long by 2½ m. broad, is the most extensive in the shire and is the main source of supply for Dumfries and other towns. The cattle and sheep fairs are important, and an agricultural show is held every May. Sanquhar Castle, on a hill overlooking the Nith, once belonged to the Crichtons, ancestors of the marquess of Bute, but is now a ruin. Eliock House, in the parish, was the birthplace of James ("the Admirable") Crichton in 1560.

SAN REMO, a seaport of Liguria, Italy, in the province of Porto Maurizio, on the Riviera di Ponente, 9¾ m. E. of Ventimiglia by rail, and 84 m. S.W. of Genoa. Pop. (1901) 17,114 (town); 20,027 (commune). Climbing the slope of a steep hill

it looks south over a small bay, and, protected towards the north by hills rising gradually from 500 to 8000 ft., it is in climate one of the most favoured places on the whole coast, a fact which accounts for the great reputation as a winter resort which it has enjoyed since 1861. The older town, with its narrow steep streets and lofty sombre houses protected against earthquakes by arches connecting them, contrasts with the new visitors' town, containing all the public buildings, which has grown up at the foot of the hill. The fort of S. Tecla protects the small harbour, sheltered by its sickle-shaped mole, 1300 ft. long. The promenade of San Remo is the Corso dell' Imperatrice, running from the main street, the Via Vittorio Emanuele, along the coast to the Giardino dell' Imperatrice; it is a broad road shaded by palm-trees, and was, like the garden, constructed at the expense of the empress Maria Alexandrovna of Russia (d. 1880). The Villa Thiem has a valuable picture-gallery, containing for the most part examples of the great 17th-century masters of the Netherlands. Besides the Gothic ex-cathedral of San Siro, the white-domed church of the Madonna della Costa, at the top of the old town, may be mentioned. In front of it is a large hospital. On the east of the harbour, the promenade along the coast is called the Passeggiata Imperatore Federico in memory of the German emperor Frederick, whose visit to the town in 1887–1888 greatly increased its repute as a winter resort. Flowers, especially roses and carnations, are extensively grown for export, and olives, lemons and palms are also cultivated.

San Remo appears to have been dependent on Genoa in its early days, but became independent in 1361. In 1544 the town was attacked by Barbarossa, and in 1625 by the French and Savoyards. The Genoese, against whose encroachments it had long defended its independence, subjugated it in 1753; in 1797 it was incorporated in the Ligurian republic, and in 1814 passed to Piedmont.

SAN SALVADOR, the capital of the republic of Salvador; situated in the valley of Las Hamacas, on the river Asalguate, at an altitude of 2115 ft., and 30 m. inland from the Pacific. Pop. (1905) about 60,000. San Salvador is connected by rail with Santa Ana on the north-west and with the Pacific ports of La Libertad and Acajutla. In addition to the government offices, its buildings include a handsome university, a wooden cathedral, a national theatre, an academy of science and literature, a chamber of commerce, an astronomical observatory and a number of hospitals and charitable institutions. There are two large parks and an excellent botanical garden. In the Plaza Morazan, the largest of many shady squares, is a handsome bronze and marble monument to the last president of united Central America, from whom the plaza takes its name. San Salvador is the only city in the republic which has important manufactures; these include the production of soap, candles, ice, shawls and scarves of silk, cotton cloth, cigars, flour and spirits. The city is admirably policed, has an abundant water supply, and can in many respects compare favourably with the smaller provincial capitals of Europe and America. It was founded by Don Jorge de Alvarado in 1528, at a spot near the present site, to which it was transferred in 1539. Except for the year 1839–1840 it has been the capital of the republic since 1834. It was temporarily ruined by earthquakes in 1854 and 1873.

SANS-CULOTTES (French for "without knee-breeches"), the term originally given during the early years of the French Revolution to the ill-clad and ill-equipped volunteers of the Revolutionary army, and later applied generally to the ultra-democrats of the Revolution. They were for the most part men of the poorer classes, or leaders of the populace, but during the Terror public functionaries and persons of good education styled themselves *citoyens sans-culottes*. The distinctive costume of the typical sans-culotte was the *pantalon* (long trousers)—in place of the *culottes* worn by the upper classes—the *carmagnole* (short-skirted coat), the red cap of liberty and *sabots* (wooden shoes). The influence of the Sans-culottes ceased with the reaction that followed the fall of Robespierre (July 1794), and the name itself was proscribed. In the Republican Calendar the complementary days at the end of the year were at first called *Sans-culottides*; this name was, however, suppressed by the Convention when the constitution of the year III. (1795) was adopted, that of *jours complémentaires* being substituted.

SAN SEBASTIAN (Basque *Iruchulo*), a seaport and the capital of the Spanish province of Guipúzcoa, on the Bay of Biscay, and on the Northern railway from Madrid to France. Pop. (1900) 37,812. In 1886 San Sebastian became the summer residence of the court. The influx of visitors, attracted by the presence of the royal family, by the prolonged local festivities, the bull-fights and the bathing, increases the number of the inhabitants in summer to about 50,000. The city occupies a narrow sandy peninsula, which terminates on the northern or seaward side in a lofty mass of sandstone, Monte Urgull; it is flanked on the east by the estuary of the river Uruméa, on the west by the broad bay of La Concha. The old town, rebuilt after the fire of 1813, lies partly at the foot of Monte Urgull, partly on its lower slopes. Until 1863 it was enclosed by walls and ramparts, and a strong fort, the Castillo de la Mola, still crowns the heights of Urgull. There are also batteries and redoubts facing landward and seaward below this fort; but the other defences have been either razed or dismantled. The Alameda, one of many fine avenues, was laid out on the site of the chief landward wall, and separates the old town from the new—in which the houses are uniformly modern, and built in straight streets or regular series of squares. The bay of La Concha has a broad sandy shore, the Playa de Baños, admirable for bathing and sheltered from sea-winds by the rocky islet of Santa Clara. Its centre is faced by the casino, a handsome building, and the summer palace and park of Miramar occupy the rising ground towards its western extremity. The other noteworthy buildings are the bull-ring, capable of seating 10,000 spectators, the theatre, fine provincial and municipal halls, barracks, a hospital, a Jesuit college, the American International School for girls, and many other schools. There are numerous breweries, saw and flour mills, and manufactures of preserves, soap, candles, glass and paper, especially in the busy suburb that has sprung up on the right bank of the Uruméa. The fisheries are important. The harbour consists of three artificial basins, opening into La Concha Bay, and situated in the midst of the old town; it is chiefly frequented by coasting and fishing vessels, and cannot accommodate large ships. From its position near the frontier San Sebastian was long a first-class fortress, and has sustained many sieges. The last and most memorable was in August 1813, when the allied British, Portuguese and Spanish armies under Lord Wellington captured the city from the French, and then sacked and burned it.

SAN SEPOLCRO, or BORGO S. SEPOLCRO, a town and episcopal see of Tuscany, Italy, in the province of Arezzo, from which it is 28 m. N.E. by rail. Pop. (1901) 4537 (town); 9077 (commune). It is situated 1083 ft. above sea-level, on the Tiber. It was the birthplace of Piero della Francesca (1420–1492) and of Raffaello del Colle (1490–1540), a pupil of Raphael. The Romanesque cathedral and the picture-gallery contain works by both these artists.

SAN SEVERINO (anc. *Septempeda*), a town and episcopal see of the Marches, Italy, in the province of Macerata, from which it is 18 m. W. by S. by rail. Pop. (1901) 3227 (town); 14,932 (commune). The lower town is situated 781 ft. above sea-level, and contains the new cathedral of S. Agostino, with a fine altar-piece by Pinturicchio (1489). The Palazzo Comunale has some interesting pictures by artists of the Marches. Lorenzo and Giacomo Salimbeni da San Severino, who painted an important series of frescoes in the oratory of S. Giovanni Battista at Urbino in 1416, were natives of the town. So was also the later master Lorenzo di Maestro Alessandro, of the end of the 15th century, whose pictures are mainly to be found in the Marches. The old cathedral of S. Severino is in the upper town (1129 ft. above sea-level); it contains frescoes by the two Salimbeni, while an altar-piece by Niccolo Alunno of Foligno (1468) has been removed hence to the picture gallery. The ancient Septempeda lay 1 m. below the modern town, on the branch road which ran from Nuceria Camellaria, on the Via Flaminia; and here the road divided—one branch going to

Ancona and the other through Tolentinum to Urbs Salvia and Firmum. No ruins of the old town exist, but a considerable number of inscriptions have been found, from which it may be gathered that it was a *colonia*.

SAN SEVERO, a city in Apulia, Italy, in the province of Foggia, from which it is 17 m. N.N.W. by rail. Pop. (1901) 28,550. San Severo lies at the foot of the spurs of Monte Gargano, 292 ft. above sea-level. It is the see of a bishop (since 1580), and has some remains of its old fortifications. San Severo dates from the middle ages. It was laid in ruins by Frederick II., and in 1053 was the scene of a victory by Robert Guiscard over the papal troops under Leo IX. In 1799 the town was taken by the French and again almost entirely destroyed. The overlordship was held in succession by the Benedictines of the abbey of Torre Maggiore, the Knights Templars, the crown of Naples and the Sangro family (commendatories of Torre Maggiore). In 1627, 1828 and 1851 the town suffered from earthquakes.

SAN-SHUI, a treaty port in the province of Kwang-tung, China, on the left bank of the West river, 99 m. from Canton, opened to foreign trade in 1897. Pop. about 5000. Its position is at the junction of the North and West rivers, and it is favourably situated as a distributing centre for foreign goods. Two lines of steamers converge at San-shui, from Canton and Hong-Kong respectively. The town is surrounded by a handsome wall built in the 16th century, but within this rampart the houses are mean. The foreign trade shows little signs of expansion. In 1902 the net foreign imports amounted in value to £474,175, and in 1904 to only £380,000, while the exports during the same two years amounted to £225,000 and £317,000 respectively. The direct foreign trade in 1908 was £507,827. There is a large junk traffic, and the local likin station is one of the richest in the province.

SANSKRIT, the name applied by Hindu scholars to the ancient literary language of India. The word *saṃskṛita* is the past participle of the verb *kar(kṛ)*, "to make" (cognate with Latin *creo*), with the preposition *sam*, "together" (cog. ἅμα, ὁμός, Eng. "same"), and has probably to be taken here in the sense of "completely formed" or "accurately made, polished, refined"—some noun meaning "speech" (esp. *bhāshā*) being either expressed or understood with it. The term was, doubtless, originally adopted by native grammarians to distinguish the literary language from the uncultivated popular dialects—the forerunners of the modern vernaculars of northern India—which had developed side by side with it, and which were called (from the same root *kar*, but with a different preposition) *Prākṛita*, *i.e.* either "derived" or "natural, common" forms of speech. This designation of the literary idiom, being intended to imply a language regulated by conventional rules, also involves a distinction between the grammatically fixed language of Brāhmanical India and an earlier, less settled, phase of the same language exhibited in the Vedic writings. For convenience the Vedic language is, however, usually included in the term, and scholars generally distinguish between the Vedic and the classical Sanskrit.

I. Sanskrit Language

The Sanskrit language, with its old and modern descendants, represents the easternmost branch of the great Indo-Germanic, or Aryan, stock of speech. Philological research has clearly established the fact that the Indo-Aryans must originally have immigrated into India from the north-west. In the oldest literary documents handed down by them their gradual advance can indeed be traced from the slopes of eastern Kabulistan down to the land of the five rivers (Punjab), and thence to the plains of the Yamunā (Jumna) and Gangā (Ganges). Numerous special coincidences, both of language and mythology, between the Vedic Aryans and the peoples of Iran also show that these two members of the Indo-Germanic family must have remained in close connexion for some considerable period after the others had separated from them.

The origin of comparative philology dates from the time when European scholars became accurately acquainted with the ancient language of India. Before that time classical scholars had been unable to determine the true relations between the then known languages of our stock. This fact alone shows the importance of Sanskrit for comparative research. Though its value in this respect has perhaps at times been overrated, it may still be considered the eldest daughter of the old mother-tongue. Indeed, so far as direct documentary evidence goes, it may be said to be the only surviving daughter; for none of the other six principal members of the family have left any literary monuments, and their original features have to be reproduced, as best they can, from the materials supplied by their own daughter languages: such is the case as regards the Iranic, Hellenic, Italic, Celtic, Teutonic and Letto-Slavic languages. To the Sanskrit the antiquity and extent of its literary documents, the transparency of its grammatical structure, the comparatively primitive state of its accent system, and the thorough grammatical treatment it has early received at the hand of native scholars must ever secure the foremost place in the comparative study of Indo-Germanic speech.

Alphabet.

The Sanskrit alphabet consists of the following sounds:—

(*a*) Fourteen vowels, viz.:
Ten simple vowels: *a, ā, i, ī, u, ū, ṛ, ṝ, ḷ (ḹ)*; and
Four diphthongs: *ĕ, āi, ŏ āu.*

(*b*) Thirty-three consonants, viz:
Five series of mutes and nasals:
guttural: *k kh g gh ṅ*
palatal: *c ch j jh ñ*
lingual: *ṭ ṭh ḍ ḍh ṇ*
dental: *t th d dh n*
labial: *p ph b bh m*;
Four semivowels: *y r l v (w)*
Three sibilants: palatal *ś (ç)*, lingual *ṣ (sh)*, dental *s*; and
A soft aspirate: *h.*

(*c*) Three unoriginal sounds, viz.
visarga (ḥ), a hard aspirate, standing mostly for original *s* or *r*; and two nasal sounds of less close contact than the mute-nasals, viz. *anusvāra (ṃ)* and *anunāsika (m̐)*.

Vowels.

As regards the vowels, a prominent feature of the language is the prevalence of *a*-sounds, these being about twice as frequent as all the others, including diphthongs taken together (Whitney).

The absence of the short vowels *ĕ* and *ŏ* from the Sanskrit alphabet, and the fact that Sanskrit shows the *a*-vowel where other vowels appear in other languages—*e.g. bharantam* — *φέροντα*, *ferentem*; *janas* = *γένος*, *genus* - were formerly considered as strong evidence in favour of the more primitive state of the Sanskrit vowel system as compared with that of the sister languages. Recent research has, however, shown pretty conclusively from certain indications in the Sanskrit language itself that the latter must at one time have possessed the same, or very nearly the same, three vowel-sounds, and that the differentiation of the original *a*-sound must, therefore, have taken place before the separation of the languages. Thus, Sans. *caratı*, he walks, would seem to require an original *kĕrĕti* (Gr. *πέλει* = *queleti*, Lat. *colit*), as otherwise the guttural *k* could not have changed to the palatal *c* (see below); and similarly Sans. *jānu*, knee, seems to stand for *gĕnu* (Lat. *genu*, Gr. *γόνυ*). Not impossibly, however, this prevalence of pure *a*-sounds in Sanskrit may from the very beginning have been a mere theoretical or graphic feature of the language, the difference of pronunciation having not yet been pronounced enough for the early grammarians to have felt it necessary to clearly distinguish between the different shades of *a*-sounds.

The vowels *ĕ* and *ŏ*, though apparently simple sounds, are classed as diphthongs, being contracted from original *ăi* and *ău* respectively, and liable to be treated as such in the phonetic modifications they have to undergo before any vowel except *ă*.

Consonants.

As regards the consonants, two of the five series of mutes, the palatal and lingual series, are of secondary (the one of Indo-Iranian, the other of purely Indian) growth.

The palatals are, as a rule, derived from original gutturals, the modification being generally due to the influence of a neighbouring palatal sound *i* or *y*, or *ĕ* (*ă*). The surd aspirate *ch*, in words of Indo-Germanic origin, almost invariably goes back to original *sk*: *e.g. chid-* (*chind-*) = *scindo*, *σχίζω*: *chāyā* = *σκιά* (O.E. *scin*, shine); Sans. *gacchatı* = *βάσκει*.

The palatal sibilant *ś* (pronounced *sh*) likewise originated from a guttural mute *k*, but one of somewhat different phonetic value from that represented by Sanskrit *k* or *c*. The latter, usually designated by k^2 (or *q*), is frequently liable to labialization (or dentalization) in Greek, probably owing to an original pronunciation *kw* (*qu*): *e.g. katara* = *πότερος*, *uter*; while the former (k^1) shows invariably *κ* in Greek, and a sibilant in the Letto-Slavic and the Indo-Iranian languages: *e.g. śvan* (*śun*) = *κύων* (*κυν*), *canis*, Ger. *Hund*; *daśan* = *δέκα*, *decem*, Goth. *taihun*.

The non-original nature of the palatals betrays itself even in Sanskrit by their inability to occur at the end of a word—*e.g.* acc. *vācam* = Lat. *vocem*, but nom. *vāk* = *vox*—and by otherwise frequently reverting to the guttural state.

The linguals differ in pronunciation from the dentals in their being uttered with the tip of the tongue turned up to the dome of the palate, while in the utterance of the dentals it is pressed against the upper teeth, not against the upper gums as is done in the English dentals, which to Hindus sound more like their own linguals. The latter, when occurring in words of Aryan origin, are, as a rule, modifications of original dentals, usually accompanied by the loss of an *r* or other adjoining consonant; but more commonly they occur in words of foreign, probably non-Aryan, origin. Of regular occurrence in the language, however, is the change of dental *n* into lingual *ṇ*, and of dental *s* into lingual *ṣ*, when preceded in the same word by certain other letters. The combination *kṣ* seems sometimes to stand for *ks* (? *kst*) as in Sans. *akṣa*, Gr. ἄξων, axle; Sans. *dakshiṇa*, Gr. δέξιος (but Lat. *dexter*); sometimes for *kt*, *e.g.* Sans. *kṣhiti*, Gr. κτίσις (but Sans. *kshiti* = Gr. φθίσις); Sans. *takshan*, Gr. τέκτων.

The sonant aspirate *h* is likewise non-original, being usually derived from original sonant aspirated mutes, especially *gh*, *e.g.* *haṃsa* = χήν (for χανς), *anser*, Ger. *Gans*; *aham* = ἐγών, *ego*, Goth. *ik*.

The contact of final and initial letters of words in the same sentence is often attended in Sanskrit with considerable euphonic modifications; and we have no means of knowing how far the practice of the vernacular language may have corresponded to these phonetic theories. There can be no doubt, however, that a good deal in this respect has to be placed to the account of grammatical reflection; and the very facilities which the primitive structure of the language offered for grammatical analysis and an insight into the principles of internal modification may have given the first impulse to external modifications of a similar kind.

Phonetic changes.

None of the cognate languages exhibits in so transparent a manner as the Sanskrit the cardinal principle of Indo-Germanic word-formation by the addition of inflectional endings—either case-endings or personal terminations (themselves probably original roots)—to stems obtained, mainly by means of suffixes, from monosyllabic roots, with or without internal modifications.

There are in Sanskrit declension three numbers and seven cases, not counting the vocative, viz. nominative, accusative, instrumental (or sociative), dative, ablative, genitive and locative. As a matter of fact, all these seven cases appear, however, only in the singular of *a*-stems and of the pronominal declension. Other noun-stems have only one case-form for the ablative and genitive singular. In the plural, the ablative everywhere shares its form with the dative (except in the personal pronoun, where it has the same ending as in the singular), whilst the dual shows only three different case-forms—one for the nominative and accusative, another for the instrumental, dative, and ablative, and a third for the genitive and locative.

Declension.

The declension of *a*-stems corresponding to the first and second Latin declensions is of especial interest, not so much on account of its being predominant from the earliest time, and becoming more and more so with the development of the language, but because it presents the greatest number of alternative forms, which supply a kind of test for determining the age of literary productions, a test which indeed has already been applied to some extent by Professor Lanman, in his excellent *Statistical Account of Noun Inflexion in the Veda*. These alternative case-forms are:—

1. *āsas* and *ās* for the nominative plural masc. and fem.: *e.g.* *aśvāsas* and *aśvās* = *equi* (*equae*). The forms in *āsas*—explained by Bopp as the sign of the plural *as* applied twice, and by Schleicher as the sign of the plural *as* added to the nominative singular—occur to those in *ās* (*i.e.* the ordinary plural sign *as* added to the *a*-stem) in the Rigveda in the proportion of 1 to 2, and in the peculiar parts of the Atharvaveda in that of 1 to 25, whilst the ending *ās* alone remains in the later language.

2. *ā* and *āni* for the nominative and accusative plural of neuters: as *yugā*, *yugāni* = ζυγά, *juga*. The proportion of the former ending to the latter in the Ṛik is 11 to 7, in the Atharvan 2 to 3, whilst the classical Sanskrit knows only the second form.

3. *ēbhis* and *āis* for the instrumental plural masc. and neuter, *e.g.* *devēbhis*, *devāis*. In the Ṛik the former forms are to the latter in the proportion of 5 to 6, in the Atharvan of 1 to 5, while in the later language only the contracted form is used. The same contraction is found in other languages; but it is doubtful whether it did not originate independently in them.

4. *ā* and *āu* for the nominative and accusative dual masc., *e.g.* *ubhā*, *ubhāu* = ἄμφω. In the Ṛik forms in *ā* outnumber those in *āu* more than eight times; whilst in the Atharvan, on the contrary, those in *āu* (the only ending used in the classical language) occur five times as often as those in *ā*.

5. *ā* and *ena* (*enā*) for the instrumental singular masc. and neut., as *dānā*, *dānena* = *dono*. The ending *ena* is the one invariably used in the later language. It is likewise the usual form in the Veda; but in a number of cases it shows a final long vowel which, though it may be entirely due to metrical requirements, is more probably a relic of the normal instrumental ending *ā*, preserved for prosodic reasons. For the simple ending *ā*, as compared with that in *ena*, Professor Lanman makes out a proportion of about 1 to 9 in the Ṛigveda (altogether 114 cases); while in the peculiar parts of the Atharvan he finds only 11 cases.

6. *ām* and *ānām* for the genitive plural, *e.g.* (*aśvām*), *aśvānām* = ἵππων, *equum* (*equorum*). The form with inserted nasal (doubtless for *anām*, as in Zend *aśpanām*), which is exclusively used in the later language, is also the prevailing one in the Ṛik. There are, however, a few genitives of *a*-stems in original *ām* (for *a-ām*), which also appear in Zend, Professor Lanman enumerating a dozen instances, some of which are, however, doubtful, while others are merely conjectural.

The Sanskrit verb system resembles that of the Greek in variety and completeness. While the Greek excels in nicety and definiteness of modal distinction, the Sanskrit surpasses it in primitiveness and transparency of formation. In this part of the grammatical system there is, however, an even greater difference than in the noun inflection between the Vedic and the classical Sanskrit. While the former shows, upon the whole, the full complement of modal forms exhibited by the Greek, the later language has practically discarded the subjunctive mood. The Indo-Aryans never succeeded in working out a clear formative distinction between the subjunctive and indicative moods; and, their syntactic requirements becoming more and more limited, they at last contented themselves, for modal expression, with a present optative and imperative, in addition to the indicative tense-forms, and a little-used aorist optative with a special "precative" or "benedictive" meaning attached to it.

Verb system.

Another part of the verb in which the later language differs widely from Vedic usage is the infinitive. The language of the old hymns shows a considerable variety of case-forms of verbal abstract nouns with the function of infinitives, a certain number of which can still be traced back to the parent language, as, for instance, such dative forms as *jīv-áse* = viv-ere; *sáh-adhyāi* = ἔσχεσθαι; *dā'-mane* = δόμεναι; *dā'-vane* = δοῦναι. Further, *ji-shé*, "to conquer," for *ji-sé*, apparently an aorist infinitive with the dative ending (parallel to the radical forms, such as *yudh-é*, "to fight," *dṛs'-é*, "to see"), thus corresponding to the Greek aorist infinitive λῦσαι (but cf. also Latin *da-re*, for *dase*, *es-se*, &c.). The classical Sanskrit, on the other hand, practically uses only one infinitive form, viz. the accusative of a verbal noun in *tu*, *e.g.* *sthātum*, *etum*, corresponding to the Latin supinum *datum*, *itum*. But, as in Latin another case, the ablative (*datū*), of the same abstract noun is utilized for a similar purpose, so the Vedic language makes two other cases do duty as infinitives, viz. the dative in *tavę* (*e.g.* *dā́tave*, and the anomalous *étavāi*) and the gen.-abl. in *tos* (*dā́tos*). A prominent feature of the later Sanskrit syntax is the so-called gerund or indeclinable participle in *tvā*, apparently the instrumental of a stem in *tvá* (probably a derivative from that in *tu*), as well as the gerund in *ya* (or *tya* after a final short radical vowel) made from compound verbs. The old language knows not only such gerunds in *tvā*, using them, however, very sparingly, but also corresponding dative forms in *tvāya* (*yuktvāya*) and the curious contracted forms in *tvī'* (*kṛtvi*, "to do"). And, besides those in *ya* and *tya*, it frequently uses forms with a final long vowel, as *bhid-yā*, *i-tyā*, thus showing the former to be shortened instrumentals of abstract nouns in *i* and *ti*.

The Sanskrit verb, like the Greek, has two voices, active and middle, called, after their primary functions, *parasmāi-pada*, "word for another," and *ātmane-pada*, "word for one's self." While in Greek the middle forms have to do duty also for the passive in all tenses except the aorist and future, the Sanskrit, on the other hand, has developed for the passive a special present-stem in *ya*, the other tenses being supplied by the corresponding middle forms, with the exception of the third person singular aorist, for which a special form in *i* is usually assigned to the passive.

The present-stem system is by far the most important part of the whole verb system, both on account of frequency of actual occurrence and of its excellent state of preservation. It is with regard to the different ways of present-stem formation that the entire stock of assumed roots has been grouped by the native grammarians under ten different classes. These classes again naturally fall under two divisions or "conjugations," with this characteristic difference that the one (corresponding to Gr. conj. in ω) retains the same stem (ending in *a*) throughout the present and imperfect, only lengthening the final vowel before terminations beginning with *v* or *m* (not final); while the other (corresponding to that in μι) shows two different forms of the stem, a strong and a weak form, according as the accent falls on the stem-syllable or on the personal ending: *e.g.* 3 sing. *bhára-ti*, φέρει—2 pl. *bhára-tha*, φέρετε: but *é-ti*, εἶσι—*i-thá*, ῑτε (for ῑτέ): 1 sing. *stṛṇó-mi*, στόρνυμι—1 pl. *stṛṇu-más* (στόρνυμες).

As several of the personal endings show a decided similarity to personal or demonstrative pronouns, it is highly probable that, as might indeed be a priori expected, all or most of them are of pronominal origin—though, owing to their exposed position and consequent decay, their original form and identity cannot now be determined with certainty. The active singular terminations, with the exception of the second person of the imperative, are unaccented and of comparatively light appearance; while those of the dual and plural, as well as the middle terminations, have the accent, being apparently too heavy to be supported by the stem-accent, either because, as Schleicher supposed, they are composed of two

different pronominal elements, or otherwise. The treatment of the personal endings in the modifying, and presumably older, conjugation may thus be said somewhat to resemble that of enclitics in Greek.

In the imperfect the present-stem is increased by the augment, consisting of a prefixed *a*. Here, as in the other tenses in which it appears, it has invariably the accent, as being the distinctive element (originally probably an independent demonstrative adverb "then") for the expression of past time. This shifting of the word-accent seems to have contributed to the further reduction of the personal endings, and thus to have caused the formation of a new, or secondary, set of terminations which came to be appropriated for secondary tenses and moods generally. As in Greek poetry, the augment is frequently omitted in Sanskrit.

The mood-sign of the subjunctive is *ă*, added to (the strong form of) the tense-stem. If the stem ends already in *ă*, the latter becomes lengthened. As regards the personal terminations, some persons take the primary, others the secondary forms, while others again may take either the one or the other. The first singular active, however, takes *ni* instead of *mi*, to distinguish it from the indicative. But besides these forms, showing the mood-sign *ă*, the subjunctive (both present and aorist) may take another form, without any distinctive modal sign, and with the secondary endings, being thus identical with the augmentless form of the preterite.

The optative invariably takes the secondary endings, with some peculiar variations. In the active of the modifying conjugation its mood-sign is *yā*, affixed to the weak form of the stem: *e.g.* root *as*—*syām* = Lat. *siem*, *sīm* (where Gr., from analogy to ἐστί, &c., shows irregularly the strong form of the stem, εἴην, for ἐσ-ιη-ν: as in 1st sing. of verbs in ω, it also has irregularly the primary ending, λείποιμι = S. *rece-y-am*); while in the *a*-conjugation and throughout the middle the mood-sign is ī, probably a contraction of *yā*: *e.g.* *bháres* = φέροις.

Besides the ordinary perfect, made from a reduplicated stem, with distinction between strong (active singular) and weak forms, and a partly peculiar set of endings, the later language makes large use of a periphrastic perfect, consisting of the accusative of a feminine abstract noun in *ā* (*-ām*) with the reduplicated perfect forms of the auxiliary verbs *kar*, "to do," or *as* (and occasionally *bhū*), "to be." Though more particularly resorted to for the derivative forms of conjugation—viz. the causative (including the so-called tenth conjugational class), the desiderative, intensive and denominative—this perfect-form is also commonly used with roots beginning with prosodically long vowels, as well as with a few other isolated roots. In the Ṛigveda this formation is quite unknown, and the Atharvan offers a single instance of it, from a causative verb, with the auxiliary *kar*. In the Vedic prose, on the other hand, it is rather frequent,[1] and it is quite common in the later language.

In addition to the ordinary participles, active and middle, of the reduplicated perfect—*e.g.* *jajan-ván*, γεγον-ώς: *bubudh-ānd*, πεπυσ-μένο—there is a secondary participial formation, obtained by affixing the possessive suffix *vat* (*vant*) to the passive past participle: *e.g.* *kṛta-vant*, lit. "having (that which is) done." A secondary participle of this kind occurs once in the Atharvaveda, and it is occasionally met with in the Brāhmaṇas. In the later language, however, it not only is of rather frequent occurrence, but has assumed quite a new function, viz. that of a finite perfect-form; thus *kṛtavān*, *kṛtavantas*, without any auxiliary verb, mean, not "having done," but "he has done," "they have done."

The original Indo-Germanic future-stem formation in *sya*, with primary endings—*e.g.* *dāsyáti* = δώσει (for δώσετι)—is the ordinary tense-form both in Vedic and classical Sanskrit—a preterite of it, with a conditional force attached to it (*ádāsyat*), being also common to all periods of the language.

Side by side with this future, however, an analytic tense-form makes its appearance in the Brāhmaṇas, obtaining wider currency in the later language. This periphrastic future is made by means of the nominative singular of a *nomen agentis* in *tar* (*dātar*, nom. *dātā*—Lat. *dator*), followed by the corresponding present forms of *as*, "to be" (*dātā-'smi*, as it were, *daturus sum*), with the exception of the third persons, which need no auxiliary, but take the respective nominatives of the noun.

The aorist system is somewhat complicated, including as it does augment-preterites of various formations, viz. a radical aorist, sometimes with reduplicated stem—*e.g.* *ásthām* = ἔστην: *śrudhi* κλῦθι; *ddudrot*; an *a*-aorist (or thematic aorist) with or without reduplication—*e.g.* *áricas* = ἔλιπες: *ápaptam*, cf. ἔπεφνον; and several different forms of a sibilant-aorist. In the older Vedic language the radical aorist is far more common than the *a*-aorist, which becomes more frequently used later on. Of the different kinds of sibilant-aorists, the most common is the one which makes its stem by the addition of *s* to the root, either with or without a connecting vowel *i* in different roots: *e.g.* root *ji*—1 sing. *ájāisham*, 1 pl. *ájāishma*; *ákramisham*, *ákramishma*. A limited number of roots take a double aorist-sign with inserted connecting vowel (*sish* for *sis*)—*e.g.* *ávāsisham* (cf. *scrip-sis-ti*); whilst others—very rarely in the older but more numerously in the later language—make their aorist-stem by the addition of *sa*—*e.g.* *ádikshas* = ἔδειξας.

As regards the syntactic functions of the three preterites—the imperfect, perfect and aorist—the classical writers make virtually no distinction between them, but use them quite indiscriminately. In the older language, on the other hand, the imperfect is chiefly used as a narrative tense, while the other two generally refer to a past action which is now complete—the aorist, however, more frequently to that which is only just done or completed. The perfect, owing doubtless to its reduplicative form, has also not infrequently the force of an iterative, or intensive, present.

The Sanskrit, like the Greek, shows at all times a considerable power and facility of noun-composition. But, while in the older language, as well as in the earlier literary products of the classical period, such combinations rarely exceed the limits compatible with the general economy of inflectional speech, during the later, artificial period of the language they gradually become more and more excessive, both in size and frequency of use, till at last they absorb almost the entire range of syntactic construction. ***Word-formation.***

One of the most striking features of Sanskrit word-formation is that regular interchange of light and strong vowel-sounds, usually designated by the native terms of *guṇa* (quality) and *vṛiddhi* (increase). The phonetic process implied in these terms consists in the raising, under certain conditions, of a radical or thematic light vowel *i*, *u*, *ṛ*, *ḷ*, by means of an inserted *a*-sound, to the diphthongal (guṇa) sounds *ai* (Sans. *ē*), *au* (Sans. *ō*), and the combination *ar* and *al* respectively, and, by a repetition of the same process, to the (vṛiddhi) sounds *āi*, *āu*, *ār*, and *āl* respectively. Thus from root *vid*, "to know," we have *véda*, "knowledge," and therefrom *vāidika*; from *yuj*, *yóga*, *yāúgika*. While the interchange of the former kind, due mainly to accentual causes, was undoubtedly a common feature of Indo-Germanic speech, the latter, or vṛiddhi-change, which chiefly occurs in secondary stems, is probably a later development. Moreover, there can be no doubt that the vṛiddhi-vowels are really due to what the term implies, viz. to a process of "increment," or vowel-raising. The same used to be universally assumed by comparative philologists as regards the relation between the guṇa-sounds *āi* (*ē*) and *au* (*ō*) and the respective simple *i*- and *u*-sounds. According to a more recent theory, however, which has been very generally accepted, we have rather to look upon the heavier vowels as the original, and upon the lighter vowels as the later sounds, produced through the absence of stress and pitch. The grounds on which this theory is recommended are those of logical consistency. In the analogous cases of interchange between *ṛ* and *ar*, as well as *ḷ* and *al*, most scholars have indeed been wont to regard the syllabic *ṛ* and *ḷ* as weakened from original *ar* and *al*, while the native grammarians represent the latter as produced from the former by increment. Similarly the verb *as* (*ēs*), "to be," loses its vowel wherever the radical syllable is unaccented, *e.g.* *ásti*, Lat. *est*—*smás*, *s(u)mus*; opt. *syām*, Lat. *siēm* (*sīm*). On the strength of these analogous cases of vowel-modification we are, therefore, to accept some such equation as this:—

ásmi: *smás* = δέρκομαι: ἔδρ(α)κον = λείπω: λιπεῖν
= *émi* (εἶμι): *imás* (ἴμεν for *iμέν*)
= φεύγω: φυγεῖν
= *dóhmi* (I milk): *duhmás*.

Acquiescence in this equation would seem to involve at least one important admission, viz. that original root-syllables contained no simple *i*- and *u*-vowels, except as the second element of the diphthongs *ai*, *ei*, *oi*; *au*, *eu*, *ou*. We ought no longer to speak of the roots *vid*, "to know," *dik*, "to show, to bid," *dhugh*, "to milk," *yug*, "to join," but of *veid*, *deik*, *dhaugh* or *dheugh*, *yeug*, &c. Nay, as the same law would apply with equal force to suffixal vowels, the suffix *nu* would have to be called *nau* or *neu*; and, in explaining, for instance, the irregularly formed δείκνυμι, δείκνυμεν, we might say that, by the affixion of *νευ* to the root δεικ, the present-stem δικνεύ was obtained (δικνεῦμι), which, as the stress was shifted forward, became 1 plur. δικνυμέσ(ι),—the subsequent modifications in the radical and formative syllables being due to the effects of "analogy" (cf. G. Meyer, *Griech. Gramm.*, § 487). Now, if there be any truth in the "agglutination" theory, according to which the radical and formative elements of Indo-Germanic speech were at one time independent words, we would have to be prepared for a pretty liberal allowance, to the parent language, of diphthongal monosyllables such as *deik neú*, while simple combinations such as *dik nu* could only spring up after separate syllable-words had become united by the force of a common accent. But, whether the agglutinationists be right or wrong, a theory involving the priority of the diphthongal over the simple sounds can hardly be said to be one of great prima facie probability; and one may well ask whether the requirements of logical consistency might not be satisfied in some other, less improbable, way.

Now, the analogous cases which have called forth this theory turn upon the loss of a radical or suffixal *a* (*ĕ*), occasioned by the shifting of the word-accent to some other syllable, *e.g.* acc. *mātáram*, instr. *mātrā́*; πέτομαι, ἐπτόμην: δέρκομαι, ἔδρ(α)κον: *ásmi*, *smás*. Might we not then assume that at an early stage of noun and verb inflection, through the giving way, under certain conditions, of the stem-*a* (*ĕ*), the habit of stem-gradation, as an element of inflection,

[1] It also shows occasionally other tense-forms than the perfect of the same periphrastic formation with *kar*.

came to establish itself and ultimately to extend its sphere over stems with *i*- and *u*-vowels, but that, on meeting here with more resistance [1] than in the *a* (*ĕ*)-vowel, the stem-gradation then took the shape of a raising of the simple vowel, in the "strong" cases and verb-forms, by that same *a*-element which constituted the distinctive element of those cases in the other variable stems? In this way the above equation would still hold good, and the corresponding vowel-grades, though of somewhat different genesis, would yet be strictly analogous. At all events in the opinion of the present writer, the last word has not yet been said on the important point of Indo-Germanic vowel-gradation.

Accentuation. The accent of Sanskrit words is marked only in the more important Vedic texts, different systems of notation being used in different works. Our knowledge of the later accentuation of words is entirely derived from the statements of grammarians. As in Greek, there are three accents, the *udātta* ("raised," *i.e.* acute), the *anudātta* ("not raised," *i.e.* grave), and the *svarita* ("sounded, modulated," *i.e.* circumflex). The last is a combination of the two others, its proper use being confined almost entirely to a vowel preceded by a semivowel *y* or *v*, representing an original acuted vowel. Hindu scholars, however, also include in this term the accent of a grave syllable preceded by an acuted syllable, and itself followed by a grave.

The Sanskrit and Greek accentuations present numerous coincidences. Although the Greek rule, confining the accent within the last three syllables, has frequently obliterated the original likeness, the old features may often be traced through the later forms. Thus, though augmented verb-forms in Greek cannot always have the accent on the augment as in Sanskrit, they have it invariably as little removed from it as the accentual restrictions will allow; *e.g.* *ábharam*, ἔφερον : *ábharāma*, ἐφέρομεν : *ábharāmahi*, ἐφερόμεθα.

The most striking coincidence in noun declension is the accentual distinction made by both languages between the "strong" and "weak" cases of monosyllabic nouns the only difference in this respect being that in Sanskrit the accusative plural, as a rule, has the accent on the case-ending, and consequently shows the weak form of the stem; *e.g.* stem *pad*, ποδ : *pádam*, πόδα : *padās*, ποδόs : *padi*, ποδί : *pádas*, πόδες : *padás*, πόδας : *padắm*, ποδών : *patsú*, ποσί. In Sanskrit a few other classes of stems (especially present participles in *ant*, *at*), accented on the last syllable, are apt to yield their accent to heavy vowel (not consonantal) terminations; compare the analogous accentuation of Sanskrit and Greek stems in *tār* : *pitáram*, πατέρα : *pitré*, πατρός : *pitáras*, πατέρες : *pitŕshu*, πατρ(ά)σι.

The vocative, when heading a sentence (or verse-division), has invariably the accent on the first syllable; otherwise it is not accented.

Finite verb-forms also, as a rule, lose their accent, except when standing at the beginning of a sentence or verse-division (a vocative not being taken into account), or in dependent (mostly relative) clauses, or in conjunction with certain particles. Of two or more co-ordinate verb forms, however, only the first is unaccented.

Written characters. In writing Sanskrit the natives, in different parts of India, generally employ the particular character used for writing their own vernacular. The character, however, most widely understood and employed by Hindu scholars, and used invariably in European editions of Sanskrit works (unless printed in Roman letters) is the Nāgarī, or "town-script," also commonly called *Devanāgarī*, or *nāgarī* of the gods.

The origin of the Indian alphabets is still enveloped in doubt. The oldest hitherto known specimens of Indian writing are a number of rock-inscriptions, containing religious edicts in Pāli (the Prākrit used in the southern Buddhist scriptures), issued by the emperor Aśoka (Piyadasi) of the Maurya dynasty, in 253–251 B.C., and scattered over the area of northern India from the vicinity of Peshawar, on the north-west frontier, and Girnar in Gujarat, to Jaugada and Dhauli in Katak, on the eastern coast. The most western of these inscriptions—those found near Kapurdagarhi or Shāhbāzgarhi, and Mansora—are executed in a different alphabet from the others. It reads from right to left, and is usually called the Arian Pāli alphabet, it being also used on the coins of the Greek and Indo-Scythian princes of Ariana; while the other, which reads from left to right, is called the Indian Pāli alphabet. The former—also called *Kharoshṭhī* or *Gāndhāra* alphabet (*lipi*)—which is manifestly derived from a Semitic (probably Aramaean) source, has left no traces on the subsequent development of Indian writing. The Indo-Pāli (or *Brāhmī*) alphabet, on the other hand, from which the modern Indian alphabets are derived, is of more uncertain origin. The similarity, however, which several of its letters present to those of the old Phoenician alphabet (itself probably derived from the Egyptian hieroglyphics) suggests for this alphabet also the probability of a Semitic origin, though, already at Aśoka's time, the Indians had worked it up to a high degree of perfection and wonderfully adapted it to their peculiar scientific ends. The question as to the probable time and channel of its introduction can scarcely be expected ever to be placed beyond all doubt. The late Professor Bühler has, however, made it very probable that this alphabet was introduced into India by traders from Mesopotamia about 800 B.C. At all events, considering the high state of perfection it exhibits in the Maurya and Andhra inscriptions, as well as the wide area over which these are scattered, it can hardly be doubted that the art of writing must have been known to and practised by the Indians for various purposes long before the time of Aśoka. The fact that no reference to it is found in the contemporary literature has probably to be accounted for by a strong reluctance on the part of the Brāhmans to commit their sacred works to writing.

As regards the numeral signs used in India, the Kharoshṭhī inscriptions of the early centuries of our era show a numerical system in which the first three numbers are represented by as many vertical strokes, whilst 4 is marked by a slanting cross, and 5–9 by 4(+) 1, &c., to 4(+)4(+)1; then special signs for 10, 20 and 100, the intervening multiples of 10 being marked in the vigesimal fashion, thus 50=20(+)20(+)10. This system has been proved to be of Semitic, probably Aramaic, origin. In the Brāhmī inscriptions up to the end of the 6th century of our era, another system is used in which 1–3 are denoted by as many horizontal strokes, and thereafter by special syllabic signs for 4–9, the decades 10 90, and for 100 and 1000. This system was most likely derived from hieratic sources of Egypt. The decimal system of cipher notation, on the other hand, which is first found used on a Gujarat inscription of A.D. 595, seems to be an invention of Indian astronomers or mathematicians, based on the existing syllabic (or word) signs or equivalents thereof.

The first two Sanskrit grammars published by Europeans were those of the Austrian Jesuit Wesdin, called Paulinus a Sancto Bartholomaeo (Rome, 1790 1804). These were followed by those of H. C. Colebrooke (1805; based on Pāṇini's system), Carey (1806), Wilkins (1808), Forster (1810), F. Bopp (1827), H. H. Wilson, Th Benfey, &c. These, as well as those of Max Müller, Monier Williams and F. Kielhorn, now most widely used, deal almost exclusively with classical Sanskrit; whilst that of W. D. Whitney treats the whole language historically; as does also J. Wackernagel's not yet completed *Altindische Grammatik*.

The first Sanskrit dictionary was that of H. H. Wilson (1819; 2nd ed., 1832), which was followed by the great Sanskrit-German *Wörterbuch*, published at St Petersburg in 7 vols. by Professors Böhtlingk and Roth. Largely based on this great thesaurus are the Sanskrit-English dictionaries by Sir M. Williams (2nd ed., 1899), Th. Benfey, A. A. Macdonell, &c. On the history of the Indian alphabets, cf. G. Bühler, *Indische Paläographie* (1896); A. C. Burnell, *Elements of South Indian Palaeography* (2nd ed., 1878), R. Cust's résumé in *Jour. Roy. As. Soc.*, N.S. vol. XVI.

II. Sanskrit Literature

The history of Sanskrit literature labours under the same disadvantage as the political history of ancient India from the total want of anything like a fixed chronology. In that vast range of literary development there is scarcely a work of importance the date of which scholars have fixed with absolute certainty. The original composition of most Sanskrit works can indeed be confidently assigned to certain general periods of literature, but as to many of them, and these among the most important, scholars have but too much reason to doubt whether they have come down to us in their original shape, or whether they have not undergone alterations and additions so serious as to make it impossible to regard them as genuine witnesses of any one phase of the development of the Indian mind. Nor can we expect many important chronological data from new materials brought to light in India. Though by such discoveries a few isolated spots may be lighted up here and there, the real task of clearing away the mist which at present obscures our view, if ever it can be cleared away, will have to be performed by patient research and a more minute critical examination of the multitudinous writings which have been handed down from the remote past. In the following sketch it is intended to take a rapid view of the more important works and writers in the several departments of literature.

In accordance with the two great phases of linguistic development referred to, the history of Sanskrit literature readily divides itself into two principal periods—the Vedic and the classical. These periods partly overlap, and some of the later Vedic works are included in that period on account of the subjects with which they deal, and for their archaic style, rather than for any just claim to a higher antiquity than may have to be assigned to the oldest works of the classical Sanskrit.

[1] We might compare the different treatment in Sanskrit of *an* and *in* bases (*mūrdhán-mūrdhnā*; *vādín-vādínā*); for, though the latter are doubtless of later origin, their inflection might have been expected to be influenced by that of the former. Also a comparison of such forms as (*devá*) *devānām* (*agní*) *agnīnām*, and (*dhenú*) *dhenūnām*, tells in favour of the *i*- and *u*-vowels, as regards power of resistance, inasmuch as it does not require the accent in order to remain intact.

1. The Vedic Period [1]

The term *veda*—*i.e.* "knowledge," (sacred) "lore"—embraces a body of writings the origin of which is ascribed to divine revelation (*śruti*, literally "hearing"), and which forms the foundation of the Brāhmanical system of religious belief. This sacred canon is divided into three or (according to a later scheme) four co-ordinate collections, likewise called Veda: (1) the *Ṛig-veda*, or lore of praise (or hymns); (2) the *Sāma-veda*, or lore of tunes (or chants); (3) the *Yajur-veda*, or lore of prayer (or sacrificial formulas); and (4) the *Atharva-veda*, or lore of the Atharvans. Each of these four Vedas consists primarily of a collection (*saṃhitā*) of sacred, mostly poetical, texts of a devotional nature, called *mantra*. This entire body of texts (and particularly the first three collections) is also frequently referred to as the *trayī vidyā*, or threefold wisdom, of hymn (*ṛich* [2]), tune or chant (*sāman*), and prayer (*yajus*)—the fourth Veda, if at all included, being in that case classed together with the Ṛik.

Saṃhitās.

The Brāhmanical religion finds its practical expression chiefly in sacrificial performances. The Vedic sacrifice requires for its proper performance the attendance of four officiating priests, each of whom is assisted by one or more (usually three) subordinate priests, viz.: (1) the *Hotar* (or *hotṛi*, *i.e.* either "sacrificer," or "invoker"), whose chief business is to invoke the gods, either in short prayers pronounced over the several oblations, or in liturgical recitations (*śastra*), made up of various hymns and detached verses; (2) the *Udgātar* (udgātṛi), or chorister, who has to perform chants (*stotra*) in connexion with the hotar's recitations; (3) the *Adhvaryu*, or offering priest *par excellence*, who performs all the material duties of the sacrifice, such as the kindling of the fires, the preparation of the sacrificial ground and the offerings, the making of oblations, &c.; (4) the *Brahman*, or chief "priest," who has to superintend the performance and to rectify any mistakes that may be committed. Now, the first three of these priests stand in special relation to three of the Vedic Saṃhitās in this way: that the Saṃhitās of the Sāmaveda and Yajurveda form special song and prayer books, arranged for the practical use of the udgātar and adhvaryu respectively; whilst the Ṛik-saṃhitā, though not arranged for any such practical purpose, contains the entire body of sacred lyrics whence the hotar draws the material for his recitations. The brahman, however, had no special text-book assigned to him, but was expected to be familiar with all the Saṃhitās as well as with the practical details of the sacrificial performance (see Brahman and Brāhmana). It sometimes happens that verses not found in our version of the Ṛik-saṃhitā, but in the Atharvaveda-saṃhitā, are used by the hotar; but such texts, if they did not actually form part of some other version of the Ṛik—as Sāyaṇa in the introduction to his commentary on the Ṛik-saṃhitā assures us that they did—were probably inserted in the liturgy subsequent to the recognition of the fourth Veda.

Classes of priests.

The several Saṃhitās have attached to them certain theological prose works, called *Brāhmaṇa*, which, though subordinate in authority to the Mantras or Saṃhitās, are like them held to be divinely revealed and to form part of the canon. The chief works of this class are of an exegetic nature,—their purport being to supply a dogmatic exposition of the sacrificial ceremonial and to explain the mystic import of the different rites and utterances included therein (see Brahmana).

Brāhmaṇas.

More or less closely connected with the Brāhmaṇas (and in a few exceptional cases with Saṃhitās) are two classes of treatises, called *Āraṇyaka* and *Upanishad*. The Āraṇyakas, *i.e.* works "relating to the forest," being intended to be read by those who have retired from the world and lead the life of anchorites, do not greatly differ in character and style from the Brāhmaṇas, but like them are chiefly ritualistic, treating of special ceremonies not dealt with, or dealt with only imperfectly, in the latter works, to which they thus stand in the relation of supplements. The Upanishads, however, are of a purely speculative nature, and must be looked upon as the first attempts at a systematic treatment of metaphysical questions. The number of Upanishads hitherto known is very considerable (about 170); but, though they nearly all profess to belong to the Atharvaveda, they have to be assigned to very different periods of Sanskrit literature—some of them being evidently quite modern productions. The oldest treatises of this kind are doubtless those which form part of the Saṃhitās, Brāhmaṇas and Āraṇyakas of the three older Vedas, though not a few others which have no such special connexion have to be classed with the later products of the Vedic age.[3]

Āraṇyakas and Upanishads.

As the sacred texts were not committed to writing till a much later period, but were handed down orally in the Brāhmaṇical schools, it was inevitable that local differences of reading should spring up, which in course of time gave rise to a number of independent versions. Such different text-recensions, called *śākhā* (*i.e.* branch), were at one time very numerous, but only a limited number have survived. As regards the Saṃhitās, the poetical form of the hymns, as well as the concise style of the sacrificial formulas, would render these texts less liable to change, and the discrepancies of different versions would chiefly consist in various readings of single words or in the different arrangement of the textual matter. But the diffuse ritualistic discussions and loosely connected legendary illustrations of the Brāhmaṇas offered scope for very considerable modifications in the traditional matter, either through the ordinary processes of oral transmission or through the special influence of individual teachers.

Different recensions.

Besides the purely ceremonial matter, the Brāhmaṇas also contained a considerable amount of matter bearing on the correct interpretation of the Vedic texts; and, indeed, the sacred obligation incumbent on the Brāhmans of handing down correctly the letter and sense of those texts necessarily involved a good deal of serious grammatical and etymological study in the Brāhmaṇical schools. These literary pursuits could not but result in the accumulation of much learned material, which it would become more and more desirable to throw into a systematic form, serving at the same time as a guide for future research. These practical requirements were met by a class of treatises, grouped under six different heads or subjects, called *Vedāngas*, *i.e.* members, or limbs, of the (body of the) Veda. None of the works, however, which have come down to us under this designation can lay any just claim to being considered the original treatises on their several subjects; they evidently represent a more or less advanced stage of scientific development. Though a few of them are composed in metrical form—especially in the ordinary epic couplet, the *anushṭubh śloka*, consisting of two lines of sixteen syllables (or of two octosyllabic pādas) each—the majority belong to a class of writings called *sūtra*, *i.e.* "string," consisting of strings of rules in the shape of tersely expressed aphorisms, intended to be committed to memory. The Sūtras form a connecting link between the Vedic and the classical periods of literature. But, although these treatises, so far as they deal with Vedic subjects, are included by the native authorities among the Vedic writings, and in point of language may, generally speaking, be considered as the latest products of the Vedic age, they have no share in the sacred title of *śruti* or revelation. They are of human, not of divine, origin. Yet, as the production of men of the highest standing, profoundly versed in Vedic lore, the Sūtras are regarded as works of great authority, second only to that of the revealed Scriptures; and their relation to the latter is expressed in the generic title of *Smṛiti*, or Tradition, usually applied to them.

Vedāngas.

Sūtras.

[1] J. Muir's *Original Sanskrit Texts* (5 vols., 2nd ed.) forms the most complete general survey of the results of Vedic research.

[2] The combination *ch*, used (in conformity with the usual English practice) in this sketch of the literature, corresponds to the simple *c*—as *ri* does to *ṛ*—in the scheme of the alphabet.

[3] Cf. P. Deussen, *The Philosophy of the Upanishads* (Edinburgh, 1906), where these treatises are classified; Jacob, *A Concordance to the Principal Upanishads and Bhagavadgītā* (Bombay S.S., 1891).

The six branches of Vedic science, included under the term Vedānga, are as follows :—

1. *Śikshā*, or Phonetics.—The privileged position of representing this subject is assigned to a small treatise ascribed to the great grammarian Pāṇini, viz. the *Pāṇiniyā śikshā*, extant in two different (Ṛik and Yajus) recensions. But neither this treatise nor any other of the numerous śikshās which have recently come to light can lay claim to any very high age. Scholars, however, usually include under this head certain works, called *Prātiśākhya*, *i.e.* "belonging to a certain *śākhā* or recension," which deal minutely with the phonetic peculiarities of the several Saṃhitās, and are of great importance for the textual criticism of the Vedic Saṃhitās.

Phonetics.

2. *Chhandas*, or Metre.—Tradition makes the *Chhandaḥ-sūtra* of Pingala the starting-point of prosody. The Vedic metres, however, occupy but a small part of this treatise, and they are evidently dealt with in a more original manner in the Nidāna-sūtra of the Sāmaveda, and in a chapter of the Ṛik-prātiśākhya. For profane prosody, on the other hand, Pingala's treatise is rather valuable, no less than 160 metres being described by him.

Metre.

3. *Vyākaraṇa*, or Grammar.—Pāṇini's famous grammar is said to be *the* Vedānga ; but it marks the culminating point of grammatical research rather than the beginning, and besides treats chiefly of the post-Vedic language.

Grammar.

4. *Nirukta*, or Etymology.—Yāska's *Nirukta* is the traditional representative of this subject, and this important work certainly deals entirely with Vedic etymology and explanation. It consists, in the first place, of strings of words in three chapters : (1) synonymous words ; (2) such as are purely or chiefly Vedic ; and (3) names of deities. These lists are followed by Yāska's commentary, interspersed with numerous illustrations. Yāska, again, quotes several predecessors in the same branch of science ; and it is probable that the original works on this subject consisted merely of lists of words similar to those handed down by him.

Etymology.

5. *Jyotisha*, or Astronomy.—Although astronomical calculations are frequently referred to in older works in connexion with the performance of sacrifices, the metrical treatise which has come down to us in two different recensions under the title of Jyotisha, ascribed to one Lagadha, or Lagata, seems indeed to be the oldest existing systematic treatise on astronomical subjects. With the exception of some apparently spurious verses of one of the recensions, it betrays no sign of the Greek influence which shows itself in Hindu astronomical works from about the 3rd century of our era ; and its date may therefore be set down as probably not later than the early centuries after Christ.

Astronomy.

6. *Kalpa*, or Ceremonial.—Tradition does not single out any special work as the Vedānga in this branch of Vedic science ; but the sacrificial practice gave rise to a large number of systematic sūtra-manuals for the several classes of priests. The most important of these works have come down to us, and they occupy by far the most prominent place among the literary productions of the sūtra-period. The Kalpa-sūtras, or rules of ceremonial, are of two kinds : (1) the *Śrauta-sūtras*, which are based on the śruti, and teach the performance of the great sacrifices, requiring three sacrificial fires ; and (2) the *Smārta-sūtras*, or rules based on the smṛiti or tradition. The latter class again includes two kinds of treatises : (1) the *Gṛihya-sūtras*, or domestic rules, treating of ordinary family rites, such as marriage, birth, name-giving, &c., connected with simple offerings in the domestic fire ; and (2) the *Sāmayāchārika-* (or *Dharma-*) *sūtras*, which treat of customs and temporal duties, and are supposed to have formed the chief sources of the later law-books. Besides, the Śrauta-sūtras of the Yajurveda have usually attached to them a set of so-called *Śulva-sūtras*, *i.e.* "rules of the cord," which treat of the measurement by means of cords, and the construction, of different kinds of altars required for sacrifices. These treatises are of special interest as supplying important information regarding the earliest geometrical operations in India. Along with the Sūtras may be classed a large number of supplementary treatises, usually called *Pariśishṭa* (παραλειπόμενα), on various subjects connected with the sacred texts and Vedic religion generally.

Ceremonial.

After this brief characterization of the various branches of Vedic literature, we proceed to take a rapid survey of the several Vedic collections.

A. *Ṛigveda*.[1]—The *Ṛigveda-saṃhitā* has come down to us in the recension of the Śākala school. Mention is made of several other versions ; and regarding one of them, that of the Bāshkalas, we have some further information, according to which it seems, however, to have differed but little from the Śākala text. The latter consists of 1028 hymns, including eleven so-called *Vālakhilyas*, which were probably introduced into the collection subsequently to its completion. The hymns are composed in a great variety of metres, and consist, on an average, of rather more than 10 verses each, or about 10,600 verses altogether. This body of sacred lyrics has been subdivided by ancient authorities in a twofold way, viz. either from a purely artificial point of view, into eight *ashṭakas* of about equal length, or, on a more natural principle, based on the origin of the hymns, and invariably adopted by European scholars, into ten books, or *maṇḍalas*, of unequal length. Tradition (not, however, always trustworthy in this respect) has handed down the names of the reputed authors, or rather inspired "seers" (*ṛishi*), of most hymns. These indications have enabled scholars to form some idea as to the probable way in which the Ṛik-saṃhitā originated, though much still remains to be cleared up by future research.

Ṛigveda saṃhitā.

Maṇḍalas ii.-vii. are evidently arranged on a uniform plan. Each of them is ascribed to a different family of ṛishis, whence they are usually called the six "family-books" : ii., the Gṛitsamadas ; iii., the Viśvāmitras or Kuśikas ; iv., the Vāmadevyas ; v., the Atris ; vi., the Bharadvājas ; and vii., the Vasishṭhas. Further, each of these books begins with the hymns addressed to Agni, the god of fire, which are followed by those to Indra, the Jupiter Pluvius, whereupon follow those addressed to minor deities—the Viśve Devāḥ ("all-gods"), the Maruts (storm-gods), &c. Again, the hymns addressed to each deity are arranged in a descending order, according to the number of verses of which they consist.

Maṇḍala i., the longest in the whole Saṃhitā, contains 191 hymns, ascribed, with the exception of a few isolated ones, to sixteen poets of different families, and consisting of one larger (50 hymns) and nine shorter collections. Here again the hymns of each author are arranged on precisely the same principle as the "family-books." Maṇḍalas viii. and ix., on the other hand, have a special character of their own. To the Sāmaveda-saṃhitā, which, as we shall see, consists almost entirely of verses chosen from the Ṛik for chanting purposes, these two maṇḍalas have contributed a much larger proportion of verses than any of the others. Now, the hymns of the eighth book are ascribed to a number of different ṛishis, mostly belonging to the Kāṇva family. The productions of each poet are usually, though not always, grouped together, but no other principle of arrangement has yet been discovered. The chief peculiarity of this maṇḍala, however, consists in its metres. Many of the hymns are composed in the form of stanzas, called *pragātha* (from *gā*, "to sing"), consisting of two verses in the *bṛihatī* and *satobṛihatī* metres ; whence this book is usually known under the designation of Pragāthās. The other metres met with in this book are likewise such as were evidently considered peculiarly adapted for singing, viz. the *gāyatrī* (from *gā*, "to sing") and other chiefly octosyllabic metres. It is not yet clear how to account for these peculiarities ; but further research may perhaps show either that the Kāṇvas were a family of udgātars, or chanters, or that, before the establishment of a common system of worship for the Brāhmanical community, they were accustomed to carry on their liturgical service exclusively by means of chants, instead of using the later form of mixed recitation and chant. One of the ṛishis of this family is called Pragātha Kāṇva ; possibly this surname "pragātha" may be an old, or local, synonym of udgātar, or perhaps of the chief chanter, the so-called *Prastotar*, or precentor. Another poet of this family is Medhātithi Kāṇva, who has likewise assigned to him twelve hymns in the first and largest groups of the first book. The ninth maṇḍala, on the other hand, consists entirely of hymns (114) addressed to *Soma*, the deified juice of the so-called "moon-plant" (*Sarcostemma viminale*, or *Asclepias acida*), and ascribed to poets of different families. They are called *pavamānī*, "purificational," because they were to be recited by the hotar while the juice expressed from the soma plants was clarifying. The first sixty of these hymns are arranged strictly according to their length, ranging from ten down to four verses ; but as to the remaining hymns no such principle of arrangement is observable, except perhaps in smaller groups of hymns. One might, therefore, feel inclined to look upon that first section as the body of soma hymns set apart, at the time of the first redaction of the Saṃhitā, for the special purpose of being used as *pavamānyas*,—the remaining hymns having been added at subsequent redactions. It would not, however, by any means follow that all,

[1] The Ṛigveda has been edited, together with the commentary of Sāyaṇa (of the 14th century), by Max Müller (6 vols., London, 1849–1874 ; 2nd ed., 4 vols., 1890–1892). The same scholar has published an edition of the hymns, both in the connected (*saṃhitā*) and the disjoined (*pada*) texts, 1873–1877. An edition in Roman transliteration was published by Th. Aufrecht (Berlin, 1861–1863, 2nd ed. 1877). Part of an English translation (chiefly based on Sāyaṇa's interpretation) was brought out by the late Professor H. H. Wilson (vols. i.-iii., 1850–1857) and completed by Professor E. B. Cowell (vols. iv.-vi., 1866–1888). We have also the first volume of a translation, with a running commentary, by M. Müller, containing 12 hymns to the Maruts or storm-gods (1869). These were reprinted, together with the remaining hymns to the Maruts, and those addressed to Rudra, Vāyu and Vāta, Vedic Hymns I. in *S.B.E.*, vol. xxxii. (1891) ; where (vol. xlvi.) H. Oldenberg has also translated the hymns to Agni, in maṇḍalas 1-5. A metrical English translation was published by R. H. T. Griffith (2 vols., Benares, 1896 - 1897). Complete German translations have been published, in verse, by H. Grassmann (1876–1877) and, in prose, with comm., A. Ludwig (1876–1888). Cf. also Kaegi, *The Rigveda* (Eng. trans. by Arrowsmith, Boston, 1886).

or even any, of the latter hymns were actually later productions, as they might previously have formed part of the family collections, or might have been overlooked when the hymns were first collected. Other maṇḍalas (viz. i. viii. and x.) still contain four entire hymns addressed to Soma, consisting together of 58 verses, of which only a single one (x. 25, 1) is found in the Sāmaveda-saṃhitā, as also some 28 isolated verses to Soma, and four hymns addressed to Soma in conjunction with some other deity, which are entirely unrepresented in that collection.

Maṇḍala x. contains the same number of hymns (191) as the first, which it nearly equals in actual length. The hymns are ascribed to many ṛishis, of various families, some of whom appear already in the preceding maṇḍalas. The traditional record is, however, less to be depended upon as regards this book, many names of gods and fictitious personages appearing in the list of its ṛishis. In the latter half of the book the hymns are clearly arranged according to the number of verses, in decreasing order—occasional exceptions to this rule being easily adjusted by the removal of a few apparently added verses. A similar arrangement seems also to suggest itself in other portions of the book. This maṇḍala stands somewhat apart from the preceding books, both its language and the general character of many of its hymns betraying a more recent origin. In this respect it comes nearer to the level of the Atharvaveda-saṃhitā, with which it is otherwise closely connected. Of some 1350 Ṛik-verses found in the Atharvan, about 550, or rather more than 40 %, occur in the tenth maṇḍala. In the latter we meet with the same tendencies as in the Atharvan to metaphysical speculation and abstract conceptions of the deity on the one hand, and to superstitious practices on the other. But, although in its general appearance the tenth maṇḍala is decidedly more modern than the other books, it contains not a few hymns which are little, if at all, inferior, both in respect of age and poetic quality, to the generality of Vedic hymns, being perhaps such as had escaped the attentions of the former collectors.

It has become the custom, after Roth's example, to call the Ṛik-saṃhitā (as well as the Atharvan) an historical collection, as compared with the Saṃhitās put together for purely ritualistic purposes. And indeed, though the several family collections which make up the earlier maṇḍalas may originally have served ritual ends, as the hymnals of certain clans or tribal confederacies, and although the Saṃhitā itself, in its oldest form, may have been intended as a common prayer-book, so to speak, for the whole of the Brāhmaṇical community, it is certain that in the stage in which it has been finally handed down it includes a certain portion of hymn material (and even some secular poetry) which could never have been used for purposes of religious service. It may, therefore, be assumed that the Ṛik-saṃhitā contains all of the nature of popular lyrics that was accessible to the collectors, or seemed to them worthy of being preserved. The question as to the exact period when the hymns were collected cannot be answered with any approach to accuracy. For many reasons, however, which cannot be detailed here, scholars have come to fix on the year 1000 B.C. as an approximate date for the collection of the Vedic hymns. From that time every means that human ingenuity could suggest was adopted to secure the sacred texts against the risks connected with oral transmission. But, as there is abundant evidence to show that even then not only had the text of the hymns suffered corruption, but their language had become antiquated to a considerable extent, and was only partly understood, the period during which the great mass of the hymns were actually composed must have lain considerably farther back, and may very likely have extended over the earlier half of the second millenary, or from about 2000 to 1500 B.C.

As regards the people which raised for itself this imposing monument, the hymns exhibit it as settled in the regions watered by the mighty Sindhu (Indus), with its eastern and western tributaries, the land of the five rivers thus forming the central home of the Vedic people. But, while its advanced guard has already debouched upon the plains of the upper Gangā and Yamunā, those who bring up the rear are still found loitering far behind in the narrow glens of the Kubhā (Cabul) and Gomatī (Gomal). Scattered over this tract of land, in hamlets and villages, the Vedic Āryas are leading chiefly the life of herdsmen and husbandmen. The numerous clans and tribes, ruled over by chiefs and kings, have still constantly to vindicate their right to the land but lately wrung from an inferior race of darker hue; just as in these latter days their Aryan kinsmen in the Far West are ever on their guard against the fierce attacks of the dispossessed red-skin. Not unfrequently, too, the light-coloured Āryas wage internecine war with one another—as when the Bharatas, with allied tribes of the Panjab, goaded on by the royal sage Viśvāmitra, invade the country of the Tritsu king Sudās, to be defeated in the "ten kings' battle," through the inspired power of the priestly singer Vasishṭha. The priestly office has already become one of high social importance by the side of the political rulers, and to a large extent an hereditary profession; though it does not yet present the baneful features of an exclusive caste. The Aryan housewife shares with her husband the daily toil and joy, the privilege of worshipping the national gods and even the triumphs of song-craft, some of the finest hymns being attributed to female seers.

The religious belief of the people consists in a system of natural symbolism, a worship of the elementary forces of nature, regarded as beings endowed with reason and power superior to those of man. In giving utterance to this simple belief, the priestly spokesman has, however, frequently worked into it his own speculative and mystic notions. Indra, the stout-hearted ruler of the cloud-region, receives by far the largest share of the devout attentions of the Vedic singer. His ever-renewed battle with the malicious demons of darkness and drought, for the recovery of the heavenly light and the rain-spending cows of the sky, forms an inexhaustible theme of spirited song. Next to him, in the affections of the people, stands Agni (ignis), the god of fire, invoked as the genial inmate of the Aryan household, and as the bearer of oblations, and mediator between gods and men. Indra and Agni are thus, as it were, the divine representatives of the king (or chief) and the priest of the Aryan community; and if, in the arrangement of the Saṃhitā, the Brāhmanical collectors gave precedence to Agni, it was but one of many avowals of their own hierarchical pretensions. Hence also the hymns to Indra are mostly followed, in the family collections, by those addressed to the Viśve Devāḥ (the "all-gods") or to the Maruts, the warlike storm-gods and faithful companions of Indra, as the divine impersonations of the Aryan freemen, the *viś* or clan. But, while Indra and Agni are undoubtedly the favourite figures of the Vedic pantheon, there is reason to believe that these gods had but lately supplanted another group of deities who play a less prominent part in the hymns, viz. Father Heaven (Dyaus Pitar, Ζεὺς πατήρ, Jupiter); Varuṇa (probably οὐρανός), the all-embracing (esp. nocturnal) heavens; Mitra (Zend. Mithra), the genial light of day; and Savitar, the quickener, and Sūrya (ἡέλιος), the vivifying sun.

Brāhmaṇas of Ṛigveda.

Of the Brāhmaṇas that were handed down in the schools of the *Bahvṛichas* (*i.e.* "possessed of many verses"), as the followers of the Ṛigveda are called, two have come down to us, viz. those of the Aitareyins and the Kaushītakins. The *Aitareya-brāhmaṇa*[1] and the *Kaushītaki-*[2] (or *Śāṅkhāyana-*) *brāhmaṇa* evidently have for their groundwork the same stock of traditional exegetic matter. They differ, however, considerably as regards both the arrangement of this matter and their stylistic handling of it, with the exception of the numerous legends common to both, in which the discrepancy is comparatively slight. There is also a certain amount of material peculiar to each of them. The Kaushītaka is, upon the whole, far more concise in its style and more systematic in its arrangement—features which would lead one to infer that it is probably the more modern work of the two. It consists of thirty chapters (*adhyāya*); while the Aitareya has forty, divided into eight books (or pentads, *pañchakā*), of five chapters each. The last ten adhyāyas of the latter work are, however, clearly a later addition—though they must have already formed part of it at the time of Pāṇini (*c.* 400 B.C. ?), if, as seems probable, one of his grammatical sūtras, regulating the formation of the names of Brāhmaṇas, consisting of thirty and forty adhyāyas, refers to these two works. In this last portion occurs the well-known legend (also found in the Śāṅkhāyana-sūtra, but not in the Kaushītaki-brāhmaṇa) of Śunaḥśepa, whom his father Ajīgarta sells and offers to slay, the recital of which formed part of the inauguration of kings. While the Aitareya deals almost exclusively with the Soma sacrifice, the Kaushītaka, in its first six chapters, treats of the several kinds of *haviryajña*, or offerings of rice, milk, ghee, &c., whereupon follows the Soma sacrifice in this way, that chapters 7-10 contain the practical ceremonial and 11-30 the recitations (*śastra*) of the hotar. Sāyaṇa, in the introduction to his commentary on the work, ascribes the Aitareya to the sage Mahidāsa Aitareya (*i.e.* son of Itarā), also mentioned elsewhere as a philosopher; and it seems likely enough that this person arranged the Brāhmaṇa and founded the school of the Aitareyins. Regarding the authorship of the sister work we have no information, except that the opinion of the sage Kaushītaki is frequently referred to in it as authoritative, and generally in opposition to the Paingya—the Brāhmaṇa, it would seem, of a rival school, the Paingins. Probably, therefore, it is just what one of the manuscripts calls it—the Brāhmaṇa of Śāṅkhāyana (composed) in accordance with the views of Kaushītaki.

Each of these two Brāhmaṇas is supplemented by a "forest-book," or Āraṇyaka. The *Aitareyāraṇyaka*[3] is not a uniform production. It consists of five books (*āraṇyaka*), three of which, the first and the last two, are of a liturgical nature, treating of the ceremony called *mahāvrata*, or great vow. The last of these books, composed in sūtra form, is, however, doubtless of later origin, and is, indeed, ascribed by native authorities either to Śaunaka or to Āśvalāyana. The second and third books, on the other hand, are purely speculative, and are also styled the *Bahvricha-brāhmaṇa-upanishad*. Again, the last four chapters of the second book are usually singled

[1] Edited, with an English translation, by M. Haug (2 vols., Bombay, 1863). An edition in Roman transliteration, with extracts from the commentary, has been published by Th. Aufrecht (Bonn, 1879).

[2] Edited by B. Lindner (Jena, 1887).

[3] Edited, with Sāyaṇa's commentary, by Rājendralāla Mitra, in the *Bibliotheca Indica* (1875-1876). The first three books have been translated by F. Max Müller in *S.B.E.* vol. i. A new edition of the work was published, with translation, by A. B. Keith (Oxford, 1909).

out as *the Aitareyopanishad*,[1] ascribed, like its Brāhmaṇa (and the first book), to Mahidāsa Aitareya; and the third book is also referred to as the *Saṃhitā-upanishad*. As regards the *Kaushītaki-āraṇyaka*,[2] this work consists of fifteen adhyāyas, the first two (treating of the mahāvrata ceremony) and the seventh and eighth of which correspond to the first, fifth, and third books of the Aitareyāraṇyaka respectively, whilst the four adhyāyas usually inserted between them constitute the highly interesting *Kaushītaki-(brāhmaṇa-) upanishad*,[3] of which we possess two different recensions. The remaining portions (9-15) of the Āraṇyaka treat of the vital airs, the internal Agnihotra, &c., ending with the vaṃśa, or succession of teachers. Of *Kalpa-sūtras*, or manuals of sacrificial ceremonial,[4] composed for the use of the hotar priest, two different sets are in existence, the *Āśvalāyana-* and the *Śānkhāyana-sūtra*. Each of these works follows one of the two Brāhmaṇas of the Ṛik as its chief authority, viz. the Aitareya and Kaushītaka respectively. Both consist of a *Śrauta-* and a *Gṛihya-sūtra*. Āśvalāyana seems to have lived about the same time as Pāṇini (? *c.* 400 B.C.)—his own teacher, Śaunaka, who completed the Ṛik-prātiśākhya, being probably intermediate between the great grammarian and Yāska, the author of the Nirukta. Śaunaka himself is said to have been the author of a Śrauta-sūtra (which was, however, more of the nature of a Brāhmaṇa) and to have destroyed it on seeing his pupil's work. A Gṛihya-sūtra is still quoted under his name by later writers. The Āśvalāyana Śrauta-sūtra [5] consists of twelve, the Gṛihya of four, adhyāyas.

Sūtras of Ṛigveda.

Regarding Śānkhāyana still less is known; but he, too, was doubtless a comparatively modern writer, who, like Āśvalāyana, founded a new school of ritualists. Hence the Kaushītaki-brāhmaṇa, adopted (and perhaps improved) by him, also goes under his name, just as the Aitareya is sometimes called Āśvalāyana-brāhmaṇa. The Śānkhāyana Śrauta-sūtra consists of eighteen adhyāyas. The last two chapters of the work are, however, a later addition,[6] while the two preceding chapters, on the contrary, present a comparatively archaic, brāhmaṇa-like appearance. The Gṛihya-sūtra [7] consists of six chapters, the last two of which are likewise later appendages. The *Śāmbavya Gṛihya-sūtra*, of which a single MS. is at present known, seems to be closely connected with the preceding work. Professor Bühler also refers to the Ṛigveda the *Vāsishṭha-dharmaśāstra*,[8] composed of mixed sūtras and couplets.

A few works remain to be noticed, bearing chiefly on the textual form and traditionary records of the Ṛik-saṃhitā. In our remarks on the Vedāngas, the Prātiśākhyas have already been referred to as the chief repositories of śikshā or Vedic phonetics. Among these works the *Ṛik-prātiśākhya* [9] occupies the first place. The original composition of this important work is ascribed to the same *Śākalya* from whom the vulgate recension of the (Śākala) Saṃhitā takes its name. He is also said to be the author of the existing *Pada-pāṭha* (*i.e.* the text-form in which each word is given unconnected with those that precede and follow it), which report may well be credited, since the pada-text was doubtless prepared with a view to an examination, such as is presented in the Prātiśākhya, of the phonetic modifications undergone by words in their syntactic combination. In the Prātiśākhya itself, Śākalya's father (or Śākalya the elder) is also several times referred to as an authority on phonetics, though the younger Śākalya is evidently regarded as having improved on his father's theories. Thus both father and son probably had a share in the formulation of the rules of pronunciation and modification of Vedic sounds. The completion or final arrangement of the Ṛik-prātiśākhya, in its present form, is ascribed to Śaunaka, the reputed teacher of Āśvalāyana. Śaunaka, however, is merely a family name ("descendant of Śunaka"), which is given even to the ṛishi Gṛitsamada, to whom nearly the whole of the second maṇḍala of the Ṛik is attributed. How long after Śākalya this particular Śaunaka lived we do not know; but some generations at all events would seem to lie between them, considering that in the meantime the Śākalas, owing doubtless to minor differences on phonetic points in the Saṃhitā text, had split into several branches, to one of which, the Śaiśira (or Śaiśirīya) school, Śaunaka belonged. While Śākalya is referred to both by Yāska and Pāṇini, neither of these writers mentions Śaunaka. It seems, nevertheless, likely, for several reasons, that Pāṇini was acquainted with Śaunaka's work, though the point has by no means been definitely settled. The Ṛik prātiśākhya is composed in mixed ślokas, or couplets of various metres, a form of composition for which Śaunaka seems to have had a special predilection. Besides the Prātiśākhya, and the Gṛihya-sūtra mentioned above, eight other works are ascribed to Śaunaka, viz. the *Bṛihaddevatā*,[10] an account, in epic ślokas, of the deities of the hymns, which supplies much valuable mythological information; the *Ṛig-vidhāna*,[11] a treatise, likewise in epic metre, on the magic effects of Vedic hymns and verses; the *Pāda-vidhāna*, a similar treatise, apparently no longer in existence; and five different indexes or catalogues (*anukramaṇī*) of the ṛishis, metres, deities, sections (*anuvāka*) and hymns of the Ṛigveda. It is, however, doubtful whether the existing version of the Bṛihaddevatā is the original one; and the Ṛigvidhāna would seem to be much more modern than Śaunaka's time. As regards the Anukramaṇīs, they seem all to have been composed in mixed ślokas; but, with the exception of the Anuvākānukramaṇī, they are only known from quotations, having been superseded by the *Sarvānukramaṇī*,[12] or complete index, of *Kātyāyana*. Both these indexes have been commented upon by Shaḍguruśishya, towards the end of the 12th century of our era.

B. *Sāma-veda*.—The term *sāman*, of uncertain derivation, denotes a solemn tune or melody to be sung or chanted to a *ṛich* or verse. The set chants (stotra) of the Soma sacrifice are as a rule performed in triplets, either actually consisting of three different verses, or of two verses which, by the repetition of certain parts, are made, as it were, to form three. The three verses are usually chanted to the same tune; but in certain cases two verses sung to the same tune had a different sāman enclosed between them. One and the same sāman or tune may thus be sung to many different verses; but, as in teaching and practising the tunes the same verse was invariably used for a certain tune, the term "sāman," as well as the special technical names of sāmans, are not infrequently applied to the verses themselves with which they were ordinarily connected, just as one would quote the beginning of the text of an English hymn, when the tune usually sung to that hymn is meant. For a specimen of the way in which sāmans are sung, see Burnell, *Ārsheyabrāhmaṇa*, p. xlv. seq.

Sāma-veda-saṃhita.

The Indian chant somewhat resembles the Gregorian or Plain Chant.[13] Each sāman is divided into five parts or phrases (*prastāva*, or prelude, &c.), the first four of which are distributed between the several chanters, while the finale (*nidhana*) is sung in unison by all of them.

In accordance with the distinction between *ṛich* or text and *sāman* or tune, the sāman-hymnal consists of two parts, viz. the *Sāmaveda-saṃhitā*, or collection of texts (ṛich) used for making up sāman-hymns, and the *Gāna*, or tune-books, song-books. The textual matter of the Saṃhitā consists of somewhat under 1600 different verses, selected from the Ṛik-saṃhitā, with the exception of some seventy-five verses, some of which have been taken from Khila hymns, whilst others which also occur in the Atharvan or Yajurveda, as well as such not otherwise found, may perhaps have formed part of some other recension of the Ṛik. The *Sāmaveda-saṃhitā* [14] is divided into two chief parts, the *pūrva-* (first) and the *uttara-* (second) *ārchika*. The second part contains the texts of the sāman-hymns, arranged in the order in which they are actually required for the stotras or chants of the various Soma sacrifices. The first part, on the other hand, contains the body of tune-verses, or verses used for practising the several sāmans or tunes upon the tunes themselves being given in the *Grāma-geya-gāna* (*i.e.* songs to be sung in the village), the tune-book specially belonging to the Pūrvārchika. Hence the latter includes all the first verses of those triplets of the second part which had special tunes peculiar to them, besides the texts of detached sāmans occasionally used outside the regular ceremonial, as well as such as were perhaps

[1] Edited and translated by Dr Röer, in the *Bibl. Ind.* The last chapter of the second book, not being commented upon by Sāyaṇa, is probably a later addition.

[2] Translated by A. B. Keith (1908), who has also published (as an appendix to his ed. of the Aitareyāraṇyaka) the text of adhy. 7-15; whilst W. F. Friedländer edited adhy. 1 and 2 (1900). Cf. Keith, *J.R.As.S.* (1908), p. 363 sqq., where the date of the first and more original portion (adhy. 1-8) is tentatively fixed at 600–550 B.C.

[3] Text, commentary and translation published by E. B. Cowell, in the *Bibl. Ind.* Also a translation by F. Max Müller in *S.B.E.* vol. i.

[4] Cf. A. Hillebrandt, "Ritual-Litteratur," in *Bühler's Grundriss* (1897).

[5] Both works have been published with the commentary of Gārgya Nārāyaṇa, by native scholars, in the *Bibl. Ind.* Also the text of the Gṛihya, with a German translation, by A. Stenzler.

[6] See A. Weber's analysis, *Ind. Studien*, ii. 288 seq. The work was edited by Hillebrandt, in *Bibl. Ind.*

[7] Edited, with a German translation, by H. Oldenberg (*Ind. Stud.* vol. xv.), who also gives an account of the Sāmbavya Gṛihya. An English translation in *S.B.E.* vol. xxix. by the same scholar, who would assign the two sūtra works to Sarvajna Śānkhāyana, whilst the Brāhmaṇa (and Āraṇyaka) seem to him to have been imparted by Kahola Kaushītaki to Guṇākhya Śānkhāyana.

[8] Text with Kṛishṇapaṇḍita's commentary, published at Benares; also critically edited by A. A. Führer (Bombay, 1883); translation by G. Bühler in *S.B.E.* vol. xiv.

[9] Edited, with a French translation, by A. Regnier, in the *Journal asiatique* (1856–1858); also, with a German translation, by M. Müller (1869).

[10] Edited, with translation, by A. A. Macdonell (2 vols.), in the Harvard Or. series (1904).

[11] Edited R. Meyer (Berlin, 1878).

[12] Edited, with commentary, by A. A. Macdonell (Oxford, 1886).

[13] Burnell, *Ārsheyabrāhmaṇa*, p. xli.

[14] Edited and translated by J. Stevenson (1843); a critical edition, with German translation and glossary, was published by Th. Benfey (1848); also an edition, with the Gānas and Sāyaṇa's commentary, by Satyavrata Sāmāśramī, in the *Bibl. Ind.* in 5 vols.; and Eng. trans. by R. H. T. Griffith (Benares, 1893).

no longer required but had been so used at one time or other. The verses of the Pūrvārchika are arranged on much the same plan as the family-books of the Ṛik-saṃhitā, viz. in three sections containing the verses addressed to Agni, Indra and Soma (*pavamāna*) respectively—each section (consisting of one, three, and one adhyāyas respectively) being again arranged according to the metres. Hence this part is also called *Chhandas-* (metre) *ārchika*. Over and above this natural arrangement of the two ārchikas, there is a purely formal division of the texts into six and nine prapāṭhakas respectively, each of which, in the first part, consists of ten decades (daśat) of verses. We have two recensions of the Saṃhitā, belonging to the Kāṇāyaniya and Kauthuma schools, the latter of which is but imperfectly known, but seems to have differed but slightly from the other. Besides the six prapāṭhakas (or five adhyāyas) of the Pūrvārchika, some schools have an additional "forest" chapter, called the *Āraṇyaka-saṃhitā*, the tunes of which—along with others apparently intended for being chanted by anchorites—are partly contained in the *Araṇya-gāna*. Besides the two tune-books belonging to the Pūrvārchika, there are two others, the *Ūha-gāna* ("modification-songs") and *Ūhya-gāna*, which follow the order of the Uttarārchika, giving the several sāman-hymns chanted at the Soma sacrifice, with the modifications the tunes undergo when applied to texts other than those for which they were originally composed. The Sāman hymnal, as it has come down to us, has evidently passed through a long course of development. The practice of chanting probably goes back to very early times; but the question whether any of the tunes, as given in the Gānas, and which of them, can lay claim to an exceptionally high antiquity will perhaps never receive a satisfactory answer.

Sāma-veda-brāh-maṇas.

The title of *Brāhmaṇa* is bestowed by the Chhandogas, or followers of the Sāmaveda, on a considerable number of treatises. In accordance with the statements of some later writers, their number was usually fixed at eight; but within the last few years one new Brāhmaṇa has been recovered, while at least two others which are found quoted may yet be brought to light in India. The majority of the Sāmaveda-brāhmaṇas present, however, none of the characteristic features of other works of that class; but they are rather of the nature of sūtras and kindred treatises, with which they probably belong to the same period of literature. Moreover, the contents of these works—as might indeed be expected from the nature of the duties of the priests for whom they were intended—are of an extremely arid and technical character, though they all are doubtless of some importance, either for the textual criticism of the Saṃhitā or on account of the legendary and other information they supply. These works are as follows: (1) the *Tāṇḍya-mahā-* (or *Praudha-*) *brāhmaṇa*,[1] or "great" Brāhmaṇa—usually called *Panchaviṃśa-brāhmaṇa* from its "consisting of twenty-five" adhyāyas—which treats of the duties of the udgātars generally, and especially of the various kinds of chants; (2) the *Shadviṃśa*,[2] or "twenty-sixth," being a supplement to the preceding work—its last chapter, which also bears the title of *Adbhuta-brāhmaṇa*,[3] or "book of marvels," is rather interesting, as it treats of all manner of portents and evil influences, which it teaches how to avert by certain rites and charms; (3) the *Sāmavidhāna*,[4] analogous to the Ṛigvidhāna, descanting on the magic effects of the various sāmans; (4) the *Ārsheya-brāhmaṇa*, a mere catalogue of the technical names of the sāmans in the order of the Pūrvārchika, known in two different recensions; (5) the *Devatādhyāya*, which treats of the deities of the sāmans; (6) the *Chhāndogya-brāhmaṇa*, the last eight adhyāyas (3–10) of which constitute the important Chhāndogyopanishad;[5] (7) the *Saṃhitopanishad-brāhmaṇa*, treating of various subjects connected with chants; (8) the *Vaṃśa-brāhmaṇa*, a mere list of the Sāmaveda teachers. To these works has to be added the *Jaiminīya-* or *Talavakāra-brāhmaṇa*, which, though as yet only known by extracts,[6] seems to stand much on a level with the Brāhmaṇas of the Ṛik and Yajurveda. A portion of it is the well-known *Kena-* (or *Talavakāra-*) *upanishad*,[7] on the nature of Brahman, as the supreme of deities.

Sāma-veda-sūtras.

If the Sāmaveda has thus its ample share of Brāhmaṇa-literature, though in part of a somewhat questionable character, it is not less richly supplied with sūtra-treatises, some of which probably belong to the oldest works of that class. There are three Śrauta-sūtras, which attach themselves more or less closely to the Panchaviṃśa-brāhmaṇa: Maśaka's *Ārsheya-kalpa*, which gives the beginnings of the sāmans in their sacrificial order, thus supplementing the Ārsheya-brāhmaṇa, which enumerates their technical names; and the Śrauta-sūtras of *Lāṭyāyana*[8] and *Drāhyāyaṇa*, of the Kauthuma and Rāṇāyanīya schools respectively, which differ but little from each other, and form complete manuals of the duties of the udgātars. Another sūtra, of an exegetic character, the *Anupada-sūtra*, likewise follows the Panchaviṃśa, the difficult passages of which it explains. Besides these, there are a considerable number of sūtras and kindred technical treatises bearing on the prosody and phonetics of the sāma-texts. The more important of them are—the *Ṛiktantra*,[9] apparently intended to serve as a Prātiśākhya of the Sāmaveda; the *Nidāna-sūtra*,[10] a treatise on prosody; the *Pushpa-* or *Phulla-sūtra*, ascribed either to Gobhila or to Vararuchi, and treating of the phonetic modifications of the ṛich in the sāmans; and the *Sāmatantra*, a treatise on chants of a very technical nature. Further, two *Gṛihya-sūtras*, belonging to the Śāmaveda, are hitherto known, viz. the *Drāhyāyaṇa-gṛihya*, ascribed to Khādira, and that of Gobhila[11] (who is also said to have composed a śrauta-sūtra), with a supplement, entitled *Karmapradīpa*, by Kātyāyana. To the Sāmaveda seems further to belong the *Gautama-dharmaśāstra*,[12] composed in sūtras, and apparently the oldest existing compendium of Hindu law.

Saṃhitās of Black Yajurveda.

C. *Yajur-veda.*—This, the sacrificial Veda of the Adhvaryu priests, divides itself into an older and a younger branch, or, as they are usually called, the Black (*kṛishṇa*) and the White (*śukla*) Yajurveda. Tradition ascribes the foundation of the Yajurveda to the sage Vaiśampāyana. Of his disciples three are specially named, viz. Kaṭha, Kalāpin and Yāska Paingi, the last of whom again is stated to have communicated the sacrificial science to Tittiri. How far this genealogy of teachers may be authentic cannot now be determined; but certain it is that in accordance therewith we have three old collections of Yajus-texts, viz. the *Kāṭhaka*,[13] the *Kālāpaka* or *Maitrāyaṇi Saṃhitā*,[14] and the *Taittirīya-saṃhitā*.[15] The Kāṭhaka and Kālāpaka are frequently mentioned together; and the author of the "great commentary" on Pāṇini once remarks that these works were taught in every village. The Kaṭhas and Kālāpas are often referred to under the collective name of Charakas, which apparently means "wayfarers" or itinerant scholars; but according to a later writer (Hemachandra) Charaka is no other than Vaiśampāyana himself, after whom his followers would have been thus called. From the Kaṭhas proper two or three schools seem early to have branched off, the Prāchya- (eastern) Kathas and the Kapishṭhala-Kaṭhas, the text-recension of the latter of whom has recently been discovered in the *Kapishṭhala-kaṭha-saṃhitā*, and probably also the Chārāyaṇīya-Kaṭhas. The Kālāpas also soon became subdivided into numerous different schools. Thus from one of Kalāpin's immediate disciples, Haridru, the Hāridravīyas took their origin, whose text-recension, the *Hāridravika*, is quoted together with the Kāṭhaka as early as in Yāska's Nirukta; but we do not know whether it differed much from the original Kālāpa texts. As regards the Taittirīya-saṃhitā, that collection, too, in course of time gave rise to a number of different schools, the text handed down being that of the Āpastambas; while the contents of another recension, that of the Ātreyas, are known from their Anukramaṇī, which has been preserved.

The four collections of old Yajus texts, so far known to us, while differing more or less considerably in arrangement and verbal points, have the main mass of their textual matter in common. This common matter consists of both sacrificial prayers (yajus) in verse and prose, and exegetic or illustrative prose portions (brāhmaṇa). A prominent feature of the old Yajus texts, as compared with the other Vedas, is the constant intermixture of textual and exegetic portions. The Charakas and Taittirīyas thus do not recognize the distinction between Saṃhitā and Brāhmaṇa in the sense of two separate collections of texts, but they have only a Saṃhitā, or collection, which includes likewise the exegetic or Brāhmaṇa portions. The Taittirīyas seem at last to have been impressed with their want of a separate Brāhmaṇa and to have set about supplying the deficiency in rather an awkward fashion: instead of separating from each other the textual and exegetic portions of their Saṃhitā, they merely added to the latter a supplement (in three books), which shows the same mixed condition, and applied to it the title of *Taittirīya-brāhmaṇa*.[16] But, though the main body of

[1] Edited, with Sāyaṇa's commentary by Ānandachandra Vedāntavāgīśa, in the *Bibl. Ind.* (1869–1874).

[2] Ed. J. Vidyāsāgara (1881); also, with German translation, K. Klemm (1894).

[3] A. Weber, "Omina et Portenta," *Abhandlungen* of Berlin Royal Academy of Sciences (1858).

[4] The works enumerated under (3), (4), (5), (7), (8) have been edited by A. Burnell; (8) also previously by A. Weber, *Ind. St.* vol. iv.; whilst 7 was translated by Sten Konow (Halle, 1893).

[5] Edited and translated by Dr Röer, *Bibl. Ind.*; also translated by M. Müller, *S.B.E.* vol. i., text, with German translation, by O. v. Böhtlingk (1889).

[6] Given by Burnell (1878), and (with translation) by H. Oertel, *J. Am. Or. S.* vol. xvi. See also Whitney's account of the work, *Proceedings of Am. Or. Soc.* (May 1883).

[7] Transl. by F. M. Müller, *S.B.E.* vol. i.

[8] Ārsheyakalpa, ed. W. Caland (1908); Lāṭyāyana-sūtra, with Agnisvamin's commentary and the *vv. ll.* of the Drāhyāyaṇa-sūtra, by Ānandachandra Vedāntavāgīśa, *Bibl. Ind.* (1872).

[9] Ed. and trans., A. Burnell (Mangalore, 1879).

[10] Two chapters published by A. Weber, *Ind. St.* vol. viii.

[11] Edited, with a commentary, by Chandrakānta Tarkālankāra, *Bibl. Ind.* (1880); also ed. and trans. by F. Knauer (1884–1887); Eng. trans. by H. Oldenberg, *S.B.E.* vol. xxx.

[12] Edited by A. Stenzler; translated by G. Bühler, *S.B.E.* vol. ii.

[13] Books I., II., ed. by L. v. Schröder (Leipzig, 1900, 1909).

[14] Ed. by L. v. Schröder (Leipzig, 1881–1886).

[15] With Sāyaṇa's commentary, by E. Röer, E. B. Cowell, &c., in *Bibl. Ind.*; also, in Roman character, by A. Weber, *Ind. Stud.* xi., xii.

[16] Edited, with Sāyaṇa's commentary, by Rājendralāla Mitra, *Bibl. Ind.*; N. Godabole, Ānand. Ser. (1898).

this work is manifestly of a supplementary nature, a portion of it may perhaps be old, and may once have formed part of the Saṃhitā, considering that the latter consists of seven ashṭakas, instead of eight, as this term requires, and that certain essential parts of the ceremonial handled in the Brāhmaṇa are entirely wanting in the Saṃhitā. Attached to this work is the *Taittirīya-āraṇyaka*,[1] in ten books, the first six of which are of a ritualistic nature, while of the remaining books the first three (7-9) form the *Taittirīyopanishad*[2] (consisting of three parts, viz. the Sikshāvallī or Saṃhitopanishad, and the Ānandavallī and Bhṛiguvallī, also called together the Vāruṇī-upanishad), and the last book forms the Nārāyaṇīya- (or Yājñiki-) upanishad.

The *Maitrāyaṇī Saṃhitā*, the identity of which with the original Kālāpaka has been proved pretty conclusively by Dr L. v. Schröder, who attributes the change of name of the Kālāpa-Maitrāyaṇīyas to Buddhist influences, consists of four books, attached to which is the *Maitri-* (or *Maitrāyaṇī*) *upanishad*.[3] The *Kāthaka*, on the other hand, consists of five parts, the last two of which, however, are perhaps later additions, containing merely the prayers of the hotar priest, and those used at the horse-sacrifice. There is, moreover, the beautiful *Kaṭha-* or *Kāṭhaka-upanishad*,[4] which is also, and more usually, ascribed to the Atharvaveda, and which seems to show a decided leaning towards Sānkhya-Yoga notions.

The defective arrangement of the Yajus texts was at last remedied by a different school of Adhvaryus, the Vājasaneyins. The reputed originator of this school and its text-recension is Yājñavalkya Vājasaneya (son of Vājasani). The result of the rearrangement of the texts was a collection of sacrificial mantras, the *Vājasaneyi-saṃhitā*, and a Brāhmaṇa, the *Śatapatha*. On account of the greater lucidity of this arrangement, the Vājasaneyins called their texts the White (or clear) Yajurveda—the name of Black (or obscure) Yajus being for opposite reasons applied to the Charaka texts. Both the Saṃhitā and Brāhmaṇa of the Vājasaneyins have come down to us in two different recensions, viz. those of the *Mādhyandina* and *Kāṇva* schools; and we find besides a considerable number of quotations from a Vājasaneyaka, from which we cannot doubt that there must have been at least one other recension of the Śatapatha-brāhmaṇa. The difference between the two extant recensions is, on the whole, but slight as regards the subject-matter; but in point of diction it is quite sufficient to make a comparison especially interesting from a philological point of view. Which of the two versions may be the more original cannot as yet be determined; but the phonetic and grammatical differences will probably have to be accounted for by a geographical separation of the two schools rather than by a difference of age. In several points of difference the Kāṇva recension agrees with the practice of the Ṛik-saṃhitā, and there probably was some connexion between the Yajus school of Kāṇvas and the famous family of rishis of that name to which the eighth maṇḍala of the Ṛik is attributed.

Saṃhitā of White Yajurveda.

The *Vājasaneyi-saṃhitā*[5] consists of forty adhyāyas, the first eighteen of which contain the formulas of the ordinary sacrifices. The last fifteen adhyāyas are doubtless a later addition—as may also be the case as regards the preceding seven chapters. The last adhyāya is commonly known under the title of Vājasaneyi-saṃhitā (or Īśāvāsya-) upanishad.[6] Its object seems to be to point out the fruitlessness of mere works, and to insist on the necessity of man's acquiring a knowledge of the supreme spirit. The sacrificial texts of the Adhvaryus consist, in about equal parts, of verses (ṛich) and prose formulas (yajus). The majority of the former occur likewise in the Ṛik-saṃhitā, from which they were doubtless extracted. Not infrequently, however, they show considerable discrepancies of reading, which may be explained partly from a difference of recension and partly as the result of the adaptation of these verses to their special sacrificial purpose. As regards the prose formulas, though only a few of them are actually referred to in the Ṛik, it is quite possible that many of them may be of high antiquity.

The *Śatapatha-brāhmaṇa*,[7] or Brāhmaṇa of a hundred paths, derives its name from the fact of its consisting of 100 lectures (adhyāya), which are divided by the Mādhyandinas into fourteen, by the Kāṇvas into seventeen books (kāṇḍa). The first nine books of the former, corresponding to the first eleven of the Kāṇvas, and consisting of sixty adhyāyas, form a kind of running commentary on the first eighteen books of the Vāj.-Saṃhitā; and it has been plausibly suggested by Professor Weber that this portion of the Brāhmaṇa may be referred to in the Mahābhāshya on Pāṇ. iv. 2, 60, where a Śatapatha and a Shashṭi-patha (*i.e.* "consisting of 60 paths") are mentioned together as objects of study, and that consequently it may at one time have formed an independent work. This view is also supported by the circumstance that of the remaining five books (10-14) of the Mādhyandinas the third is called the middle one (*madhyama*); while the Kāṇvas apply the same epithet to the middlemost of the five books (12-16) preceding their last one. This last book would thus seem to be treated by them as a second supplement, and not without reason, as it is of the Upanishad order, and bears the special title of *Bṛihad-* (great) *āraṇyaka*;[8] the last six chapters of which are the Bṛihadāraṇyaka-upanishad,[9] the most important of all Upanishads. Except in books 6-10 (M.), which treat of the construction of fire-altars, and recognize the sage Śāṇḍilya as their chief authority, Yājñavalkya's opinion is frequently referred to in the Śatapatha as authoritative. This is especially the case in the later books, part of the Bṛihad-āraṇyaka being even called Yājñavalkīya-kāṇḍa. As regards the age of the Śatapatha, the probability is that the main body of the work is considerably older than the time of Pāṇini, but that some of its latter parts were considered by Pāṇini's critic Kātyāyana to be of about the same age as, or not much older than, Pāṇini. Even those portions had probably been long in existence before they obtained recognition as part of the canon of the White Yajus.

Brāhmaṇa of White Yajurveda.

The contemptuous manner in which the doctrines of the Charaka-adhvaryus are repeatedly animadverted upon in the Śatapatha betrays not a little of the *odium theologicum* on the part of the divines of the Vājasaneyins towards their brethren of the older schools. Nor was their animosity confined to mere literary warfare, but they seem to have striven by every means to gain ascendancy over their rivals. The consolidation of the Brāhmanical hierarchy and the institution of a common system of ritual worship, which called forth the liturgical Vedic collections, were doubtless consummated in the so-called Madhya-deśa, or "midland," lying between the Sarasvatī and the confluence of the Yamunā and Gangā; and more especially in its western part, the Kuru-kshetra, or land of the Kurus, with the adjoining territory of the Panchālas, between the Yamunā and Gangā. From thence the original schools of Vaidik ritualism gradually extended their sphere over the adjacent parts. The Charakas seem for a long time to have held sway in the western and north-western regions; while the Taittirīyas in course of time spread over the whole of the peninsula south of the Narmadā (Nerbudda), where their ritual has remained pre-eminently the object of study till comparatively recent times. The Vājasaneyins, on the other hand, having first gained a footing in the lands on the lower Ganges, chiefly, it would seem, through the patronage of King Janaka of Videha, thence gradually worked their way westwards, and eventually succeeded in superseding the older schools north of the Vindhya, with the exception of some isolated places where even now families of Brāhmans are met with which profess to follow the old Saṃhitās.

In *Kalpa-sūtras* the Black Yajurveda is particularly rich; but, owing to the circumstances just indicated, they are almost entirely confined to the Taittirīya school. The only Śrauta-sūtra of a Charaka school which has hitherto been recovered is that of the Mānavas, a subdivision of the Maitrāyaṇīyas. The *Mānava-śrauta-sūtra*[10] seems to consist of eleven books, the first nine of which treat of the sacrificial ritual, while the tenth contains the Śulva-sūtra; and the eleventh is made up of a number of supplements (*pari-śishṭa*). The *Mānava-gṛihya-sūtra*[11] is likewise in existence; but so far nothing is known, save one or two quotations, of a *Mānava-dharma-sūtra*, the discovery of which might be expected to solve some important questions regarding the development of Indian law. Of sūtra-works belonging to the Kaṭhas, a single treatise, the (*Chārāyaṇīya-*) *Kāṭhaka-gṛihya-sūtra*, is known; while Dr Jolly considers the *Vishṇu-smṛiti*,[12] a compendium of law, composed in mixed sūtras and ślokas, to be nothing but a Vaishṇava recast of the Kāṭhaka-dharma-sūtra, which, in its original form, seems no longer to exist. As regards the Taittirīyas, the Kalpa-sūtra most widely accepted among them was that of Āpastamba, to whose school, as we have seen, was also due our existing recension of the Taittirīya-saṃhitā. The *Āpastamba-kalpa-sūtra* consists of thirty *praśna* (questions); the first twenty-five of these constitute the Śrauta-sūtra;[13] 26 and 27 the Gṛihya-sūtra;[14] 28 and 29 the Dharma-sūtra;[15] and the last the Śulva-sūtra. Professor Bühler has tried to fix the date of this work somewhere between the 5th and 3rd centuries B.C.; but it can hardly yet be considered as definitely settled. Considerably more ancient than this work are the

Sūtras of Yajurveda.

[1] Ed. R. Mitra, *Bibl. Ind.*; H. N. Apte, Ānand. Ser. (1898).

[2] Trans. by F. M. Müller, *S.B.E.* vol. xv.

[3] Text and translation published by E. B. Cowell, *Bibl. Ind.* Also trans. by F. M. Müller, *S.B.E.* vol. xv.

[4] Text, commentary and translation published by E. Röer, *Bibl. Ind.*; also translation by F. M. Müller, *S.B.E.* vol. xv., and others.

[5] Edited in the Mādhyandina recension, with the commentary of Mahīdhara, and the *vv. ll.* of the Kāṇva text, by A. Weber (1849); trans. by R. H. T. Griffith (Benares, 1899).

[6] Translation by E. Röer, *Bibl. Ind.*; by F. M. Müller, *S.B.E.* vol. i.

[7] Edited by A. Weber, who also translated the first chapter into German. English translation (5 vols.) by J. Eggeling, in *S.B.E.*

[8] The text, with Śankara's commentary, and an English translation, published by E. Röer, *Bibl. Ind.*

[9] Trans. by F. M. Müller, *S.B.E.* vol. xv., and others.

[10] See P. v. Bradke, *Z.D.M.G.* vol. xxxvi. A MS. of a portion of the Śrauta-sūtra, with the commentary of the famous Mīmāmsist Kumārila, has been photo-lithographed by the India Office, under Goldstücker's supervision.

[11] Edited by F. Knauer (Leipzig, 1897).

[12] Edited and translated by J. Jolly.

[13] Edited by R. Garbe, in *Bibl. Ind.*

[14] Ed. M. Winternitz (Vienna, 1887); trans. H. Oldenberg, *S.B.E.* vol. xxx.

[15] G. Bühler has published the text with extracts from Haradatta's commentary, Bombay Sansk. Ser.; also a trans. in *S.B.E.*

Baudhāyana-kalpa-sūtra,[1] which consists of the same principal divisions, and the *Bhāradvāja-sūtra*, of which, however, only a few portions have as yet been discovered. The *Hiraṇyakeśi-sūtra*,[2] which is more modern than that of Āpastamba, from which it differs but little, is likewise fragmentary, as is also the Vaikhānasa-sūtra;[3] while several other Kalpa-sūtras, especially that of Laugākshi, are found quoted. The recognized compendium of the White Yajus ritual is the *Śrauta-sūtra* of Kātyāyana,[4] in twenty-six adhyāyas. This work is supplemented by a large number of secondary treatises, likewise attributed to Kātyāyana, among which may be mentioned the *Charaṇa-vyūha*,[5] a statistical account of the Vedic schools, which unfortunately has come down to us in a very unsatisfactory state of preservation. A manual of domestic rites, closely connected with Kātyāyana's work, is the *Kātīya-gṛihya-sūtra*,[6] ascribed to Pāraskara. To Kātyāyana we further owe the *Vājasaneyi-prātiśākhya*,[7] and a catalogue (*anukramaṇī*) of the White Yajus texts. As regards the former work, it is still doubtful whether (with Weber) we have to consider it as older than Pāṇini, or whether (with Goldstücker and M. Müller) we are to identify its author with Pāṇini's critic. The only existing Prātiśākhya[8] of the Black Yajus belongs to the Taittirīyas. Its author is unknown, and it confines itself entirely to the Taittirīya-saṃhitā, to the exclusion of the Brāhmaṇa and Āraṇyaka.

D. *Atharva-veda*.—The Atharvan was the latest of Vedic collections to be recognized as part of the sacred canon. That it is also the youngest Veda is proved by its language, which both from a lexical and a grammatical point of view, marks an intermediate stage between the main body of the Ṛik and the Brāhmaṇa period. In regard also to the nature of its contents, and the spirit which pervades them, this Vedic collection occupies a position apart from the others. Whilst the older Vedas seem clearly to reflect the recognized religious notions and practices of the upper, and so to speak, respectable classes of the Āryan tribes, as jealously watched over by a priesthood deeply interested in the undiminished maintenance of the traditional observances, the fourth Veda, on the other hand, deals mainly with all manner of superstitious practices such as have at all times found a fertile soil in the lower strata of primitive and less advanced peoples, and are even apt, below the surface, to maintain their tenacious hold on the popular mind in comparatively civilized communities. Though the constant intermingling with the aboriginal tribes may well be believed to have exercised a deteriorating influence on the Vedic people in this respect, it can scarcely be doubted that superstitious practices of the kind revealed by the Atharvan and the tenth book of the Ṛik must at all times have obtained amongst the Āryan people, and that they only came to the surface when they received the stamp of recognized forms of popular belief by the admission of these collections of spells and incantations into the sacred canon. If in this phase of superstitious belief the old gods still find a place, their character has visibly changed so as to be more in accordance with those mystic rites and magic performances and the part they are called upon to play in them, as the promoters of the votary's cabalistic practices and the averters of the malicious designs of mortal enemies and the demoniac influences to which he would ascribe his fears and failures as well as his bodily ailments. The fourth Veda may thus be said to supplement in a remarkable manner the picture of the domestic life of the Vedic Āryan as presented in the Gṛihya-sūtras or house-rules; for whilst these deal only with the orderly aspects of the daily duties and periodic observances in the life of the respectable householder, the Atharvaveda allows us a deep insight into "the obscurer relations and emotions of human life"; and, it may with truth be said that "the literary diligence of the Hindus has in this instance preserved a document of priceless value for the institutional history of early India as well as for the ethnological history of the human race" (M. Bloomfield). It is worthy of note that the Atharvaveda is practically unknown in the south of India.[9]

Atharva-veda-saṃhitā.

This body of spells and hymns is traditionally associated with two old mythic priestly families, the Atharvans and Angiras, their names, in the plural, serving either singly or combined (Atharvāngirasas) as the oldest appellation of the collection. The two families or classes of priests are by tradition connected with the service of the sacred fire; but whilst the Atharvans seem to have devoted themselves to the auspicious aspects of the fire-cult and the performance of propitiatory rites, the Angiras, on the other hand, are represented as having been mainly engaged in the uncanny practices of sorcery and exorcism. Instead of the Atharvans, another mythic family, the Bhṛigus, are similarly connected with the Angiras (Bhṛigvangirasas) as the depositaries of this mystic science. In course of time the lore of the Atharvans came also to have applied to it the title of *Brahmaveda*; a designation which was apparently meant to be understood both in the sense of the Veda of the Brahman priest or superintendent of the sacrifice, and in that of the lore of the Brahma or sacred (magic) word, and the supreme deity it is supposed to embody. The current text of the *Atharva-saṃhitā*[10]—apparently the recension of the Śaunaka school—consists of some 750 different pieces, about five-sixths of which is in various metres, the remaining portion being in prose. The whole mass is divided into twenty books. The principle of distribution is for the most part a merely formal one, in books i.-xiii. pieces of the same or about the same number of verses being placed together in the same book. The next five books, xiv.-xviii., have each its own special subject: xiv. treats of marriage and sexual union; xv., in prose, of the Vrātya, or religious vagrant; xvi. consists chiefly of prose formulas of conjuration; xvii. of a lengthy mystic hymn; and xviii. contains all that relates to death and funeral rites. Of the last two books no account is taken in the Atharva-prātiśākhya, and they indeed stand clearly in the relation of supplements to the original collection. The nineteenth book evidently was the result of a subsequent gleaning of pieces similar to those of the earlier books, which had probably escaped the collectors' attention; while the last book, consisting almost entirely of hymns to Indra, taken from the Ṛik-saṃhitā, is nothing more than a liturgical manual of recitations and chants required at the Soma sacrifice; its only original portion being the ten so-called *kuntāpa* hymns (127-130), consisting partly of laudatory recitals of generous patrons of sacrificial priests and partly of riddles and didactic subjects.

The Atharvan has come down to us in a much less satisfactory state of preservation than any of the other Saṃhitās, and its interpretation, which offers considerable difficulties on account of numerous popular and out-of-the-way expressions, has so far received comparatively little aid from native sources. Less help, in this respect, than might have been expected, is afforded by a recently published commentary professing to have been composed by Sāyaṇa Āchārya; serious doubts have indeed been thrown on the authenticity of its ascription to the famous Vedic exegetic. Of very considerable importance, on the other hand, was the discovery in Kashmir of a second recension of the Atharva-saṃhitā, contained in a single birch-bark MS., written in the Śāradā character, and lately made available by an excellent chromo-photographic reproduction. This new recension,[11] ascribed in the colophons of the MS. to the Paippalāda school, consists likewise of twenty books (kāṇḍa), but both in textual matter and in its arrangement it differs very much from the current text. A considerable portion of the latter, including the whole of the eighteenth book, is wanting; while the hymns of the nineteenth book are for the most part found also in this text, though not as a separate book, but scattered over the whole collection. The twentieth book is wanting, with the exception of a few of the verses not taken from the Ṛik. As a set-off to these shortcomings the new version offers, however, a good deal of fresh matter, amounting to about one-sixth of the whole. From the Mahābhāshya and other works quoting as the beginning of the Atharva-saṃhitā a verse that coincides with the first verse of the sixth hymn of the current text, it has long been known that at least one other recension must have existed; but the first leaf of the Kashmir MS. having been lost, it cannot be determined whether the new recension (as seems all but certain) corresponds to the one referred to in those works.

The only Brāhmaṇa of the Atharvan, the *Gopatha-brāhmaṇa*,[12] is doubtless one of the most modern and least important works of its class. It consists of two parts, the first of which contains cosmogonic speculations, interspersed with legends, mostly adapted from other Brāhmaṇas, and general instructions on religious duties and observances; while the second part treats, in a very desultory manner, of various points of the sacrificial ceremonial.

Atharva-veda-brāhmaṇa.

[1] The Śulva-sūtra has been published, with the commentary of Kapardisvāmin, and a translation by G. Thibaut, in the *Benares Pandit* (1875). The Dharma-sūtra has been edited by E. Hultzsch (Leipzig, 1884), and translated by G. Bühler, *S.B.E.* xiv.

[2] The H. Gṛihya-sūtra, ed. J. Kirste (Vienna, 1889); trans. H. Oldenberg, *S.B.E.* vol. xxx.

[3] An account of the Vaikh. Dharmasūtra given by T. Bloch (Vienna, 1896).

[4] Edited by A. Weber, 1858.

[5] Weber, *Ind. Stud.* iii.

[6] Text and German translation by A. Stenzler.

[7] Edited, with Uvaṭa's commentary, and a German translation, by A. Weber, *Ind. Stud.* iv.; another ed. in Benares Sansk. Ser. (1888).

[8] The work has been published by W. D. Whitney, with a translation and a commentary by an unknown author, called Tribhāshyaratna, *i.e.* "jewel of the three commentaries," it being founded on three older commentaries by Vararuchi (? Kātyāyana), Māhisheya and Ātreya.

[9] A. Burnell, *Classif. Index of Tanjore Sansk. MSS.* p. 37.

[10] Edited by Professors Roth and Whitney (1856); with Sāyaṇa's commentary, by Shankar P. Pandit (4 vols., Bombay, 1895–1898). Index verborum, by Whitney, in *J. Am. Or. S.* vol. xii., Eng. trans. by R. H. T. Griffith (in verse) (2 vols., Benares, 1897); by W. D. Whitney (with a critical and exegetical commentary), revised and edited by Ch. R. Lanman (2 vols., Harvard Or. Ser., 1905); and (with some omissions) by M. Bloomfield, *S.B.E.* vol. xlii.; cf. also Bloomfield, "The Atharvaveda," in *Bühler's Encycl.* (1899).

[11] The first account of a copy of it was given by Professor R. v. Roth, in his academic dissertation, "Der Atharvaveda in Kaschmir" (1875). The reproduction on 544 plates, edited by M. Bloomfield and R. Garbe (Baltimore, 1901).

[12] Edited in the *Bibl. Ind.* by Rājendralāla Mitra.

The Kalpa-sūtras belonging to this Veda comprise both a manual of śrauta rites, the *Vaitāna-sūtra*,[1] and a manual of domestic rites, the *Kauśika-sūtra*.[2] The latter treatise is not only the more interesting of the two, but also the more ancient, being actually quoted in the other. The teacher Kauśika is repeatedly referred to in the work on points of ceremonial doctrine. Connected with this Sūtra are upwards of seventy *Pariśishtas*,[3] or supplementary treatises, mostly in metrical form, on various subjects bearing on the performance of grihya rites. The last sūtra-work to be noticed in connexion with this Veda is the *Śaunakiyā Chaturādhyāyikā*,[4] being a Prātiśākhya of the Atharva-saṃhitā, so called from its consisting of four lectures (adhyāya). Although Śaunaka can hardly be credited with being the actual author of the work, considering that his opinion is rejected in the only rule where his name appears, there is no reason to doubt that it chiefly embodies the phonetic theories of that teacher, which were afterwards perfected by members of his school. Whether this Śaunaka is identical with the writer of that name to whom the final redaction of the Śākalaprātiśākhya of the Ṛik is ascribed is not known; but it is worthy of note that on at least two points where Śākalya is quoted by Pāṇini, the Chaturādhyāyikā seems to be referred to rather than the Ṛik-prātiśākhya. Śaunaka is quoted once in the Vājasaneyi-prātiśākhya; and it is possible that Kātyāyana had the Chaturādhyāyikā in view, though his reference does not quite tally with the respective rule of that work.

Atharva-veda-sūtras.

Another class of writings already alluded to as traditionally connected with the Atharvaveda are the numerous *Upanishads*[5] which do not specially attach themselves to one or other of the Saṃhitās or Brāhmaṇas of the other Vedas. The Ātharvaṇa-upanishads, mostly composed in ślokas, may be roughly divided into two classes, viz. those of a purely speculative or general pantheistic character, treating chiefly of the nature of the supreme spirit, and the means of attaining to union therewith, and those of a sectarian tendency. Of the former category, a limited number—such as the Praśna, Muṇḍaka, and Māṇḍūkya-upanishads—have probably to be assigned to the later period of Vedic literature; whilst the others presuppose more or less distinctly the existence of some fully developed system of philosophy, especially the Vedānta or the Yoga. The sectarian Upanishads, on the other hand—identifying the supreme spirit either with one of the forms of Vishṇu (such as the Nārāyaṇa, Nṛisiṃha-tāpanīya, Rāma-tāpanīya, Gopāla-tāpanīya Upanishads), or with Śiva (*e.g.* the Rudropanishad), or with some other deity—belong to post-Vedic times.

Upani-shads.

2. The Classical Period

The *Classical Literature of India* is almost entirely a product of artificial growth, in the sense that its vehicle was not the language of the general body of the people, but of a small and educated class. It would scarcely be possible, even approximately, to fix the time when the literary idiom ceased to be understood by the common people. We only know that in the 3rd century B.C. there existed several dialects in different parts of northern India which differed considerably from the Sanskrit; and Buddhist tradition states that Gautama Śākyamuni himself, in the 6th century B.C., used the local dialect of Magadha (Behar) for preaching his new doctrine. Not unlikely, indeed, popular dialects, differing perhaps but slightly from one another, may have existed as early as the time of the Vedic hymns, when the Indo-Aryans, divided into clans and tribes, occupied the Land of the Seven Rivers; but such dialects must have sprung up after the extension of the Aryan sway and language over the whole breadth of northern India. But there is no reason why, even with the existence of local dialects, the literary language should not have kept in touch with the people in India, as elsewhere, save for the fact that from a certain time that language remained altogether stationary, allowing the vernacular dialects more and more to diverge from it. Although linguistic research had been successfully carried on in India for centuries, the actual grammatical fixation of Sanskrit seems to have taken place about contemporaneously with the first spread of Buddhism; and indeed that popular religious movement undoubtedly exercised a powerful influence on the linguistic development of India.

A. *Poetical Literature.*

1. *Epic Poems.*—The Hindus, like the Greeks, possess two great national epics, the *Mahābhārata* and the *Rāmāyaṇa*. The *Mahābhārata*,[6] *i.e.* "the great (poem or tale) of the Bhāratas," is not so much a uniform epic poem as a miscellaneous collection of poetry, consisting of a heterogeneous mass of legendary and didactic matter, worked into and round a central heroic narrative. The authorship of this work is aptly attributed to Vyāsa, "the arranger," the personification of Indian diaskeuasis. Only the bare outline of the leading story can here be given.

The national epics.

In the royal line of Hastināpura (the ancient Delhi)—claiming descent from the moon, and hence called the Lunar race (soma-vaṃśa), and counting among its ancestors King Bharata, after whom India is called Bhārata-varsha (land of the Bhāratas)—the succession lay between two brothers, when Dhṛitarāshṭra, the elder, being blind, had to make way for his brother Pāṇḍu. After a time the latter retired to the forest to pass the remainder of his life in hunting; and Dhṛitarāshṭra assumed the government, assisted by his uncle Bhīshma, the Nestor of the poem. After some years Pāṇḍu died, leaving five sons, viz. Yudhishṭhira, Bhīma and Arjuna by his chief wife Kuntī, and the twins Nakula and Sahadeva by Mādrī. The latter having burnt herself along with her dead husband, Kuntī returned with the five princes to Hastināpura, and was well received by the king, who offered to have his nephews brought up together with his own sons, of whom he had a hundred, Duryodhana being the eldest. From their great-grandfather Kuru both families are called *Kauravas*; but for distinction that name is more usually applied to the sons of Dhṛitarāshṭra, while their cousins, as the younger line, are named, after their father, *Pāṇḍavas*. The rivalry and varying fortunes of these two houses form the main plot of the great epopee. The Pāṇḍu princes soon proved themselves greatly superior to their cousins; and Yudhishṭhira, the eldest of them all, was to be appointed heir-apparent. But, by his son's advice, the king, good-natured but weak, induced his nephews for a time to retire from court and reside at a house where the unscrupulous Duryodhana meant to destroy them. They escaped, however, and passed some time in the forest with their mother. Here Draupadī, daughter of King Drupada of Panchāla, won by Arjuna in open contest, became the wife of the five brothers. On that occasion they also met their cousin, Kuntī's nephew, the famous Yādava prince Krishṇa of Dvārakā, who ever afterwards remained their faithful friend and confidential adviser. Dhṛitarāshṭra now resolved to divide the kingdom between the two houses; whereupon the Pāṇḍavas built for themselves the city of Indraprastha (on the site of the modern Delhi). After a time of great prosperity, Yudhishṭhira, in a game of dice, lost everything to Duryodhana, when it was settled that the Pāṇḍavas should retire to the forest for twelve years, but should afterwards be restored to their kingdom if they succeeded in passing an additional year in disguise, without being recognized by any one. During their forest-life they met with many adventures, among which may be mentioned their encounter with King Jayadratha of Chedi, who had carried off Draupadī from their hermitage. After the twelfth year had expired they leave the forest, and, assuming various disguises, take service at the court of King Virāṭa of Matsya. Here all goes well for a time till the queen's brother Kīchaka, a great warrior and commander of the royal forces, falls in love with Draupadī, and is slain by Bhīma. The Kauravas, profiting by Kīchaka's death, now invade the Matsyan kingdom, when the Pāṇḍavas side with King Virāṭa, and there ensues, on the field of Kurukshetra, during eighteen days, a series of fierce battles, ending in the annihilation of the Kauravas. Yudhishṭhira now at last becomes yuva-rāja, and eventually king—Dhṛitarāshṭra having resigned and retired with his wife and Kuntī to the forest, where they soon after perish in a conflagration. Learning also the death of Krishṇa, Yudhishṭhira himself at last becomes tired of life and resigns his crown; and the five princes, with their faithful wife, and a dog that joins them, set out for Mount Meru, to seek admission to Indra's heaven. On the way one by one drops off, till Yudhishṭhira alone, with the dog, reaches the gate of heaven; but, the dog being refused admittance, the king declines entering

[1] Text and a German translation published by R. Garbe (1878); German trans. by W. Caland (1910).

[2] This difficult treatise has been published with extracts from commentaries by Professor Bloomfield. Two sections of it had been printed and translated by A. Weber, "Omina et Portenta" (1859).

[3] These tracts have been edited by G. M. Bolling and J. v. Negelein, part i. (1909).

[4] Edited and translated by W. D. Whitney.

[5] For a full list of existing translations of and essays on the Upanishads, see Introd. to Max Müller's "Upanishads," *S.B.E.* i. Cf. also P. Deussen, *Sechzig Upanishads* (1897).

[6] Three complete Indian editions, the handiest in 4 vols., including the Harivaṃśa (Calcutta, 1834–1839); a Bombay edition, with Nīlakaṇṭha's commentary (1863); and a third, in Telugu characters, containing the Southern recension (Madras, 1855–1860). Another Southern edition, in Nāgarī, is now appearing at Bombay, edited by Krishnacharya and Vyasacharya of Kumbakonam. An English translation has been brought out at Calcutta by Pratap Chundra Roy (1883–1894); and another by M. N. Dutt (5 vols., Calcutta, 1896); whilst numerous episodes have been printed and translated by European scholars. For a critical analysis of this epic consult A. Holtzmann, *Das Mahābhārata* (4 vols., Kiel, 1892–1895); W. Hopkins, *The Great Epic of India* (New York, 1902).

without it, when the dog turns out to be no other than the god of Justice himself, having assumed that form to test Yudhishṭhira's constancy. But, finding neither his wife nor his brothers in heaven, and being told that they are in the nether world to expiate their sins, the king insists on sharing their fate, when this, too, proves a trial, and they are all reunited to enjoy perpetual bliss.

The complete work consists of upwards of 100,000 couplets—its contents thus being nearly eight times the bulk of the *Iliad* and *Odyssey* combined. It is divided into eighteen books, and a supplement, entitled Harivaṃśa, or genealogy of the god Hari (Kṛishṇa-Vishṇu). In the introduction, Vyāsa, being about to dictate the poem, is made to say (i. 81) that so far he and some of his disciples knew 8800 couplets; and farther on (i. 101) he is said to have composed the collection relating to the Bhāratas (*bhārata-saṃhitā*), and called the *Bhāratam*, which, not including the episodes, consisted of 24,000 ślokas. Now, as a matter of fact, the portion relating to the feud of the rival houses constitutes somewhere between a fourth and a fifth of the work; and it is by no means improbable that this portion once formed a separate poem, called the *Bhārata*. But, whether the former statement is to be understood as implying the existence, at a still earlier time, of a yet shorter version of about one-third of the present extent of the leading narrative, cannot now be determined. While some of the episodes are so loosely connected with the story as to be readily severed from it, others are so closely interwoven with it that their removal would seriously injure the very texture of the work. This, however, only shows that the original poem must have undergone some kind of revision, or perhaps repeated revisions. That such has indeed taken place, at the hand of Brāhmans, for sectarian and caste purposes, cannot be doubted. According to Lassen's opinion,[1] which has been very generally accepted by scholars, the main story of the poem would be based on historical events, viz. on a destructive war waged between the two neighbouring peoples of the Kurus and Pañchālas, who occupied the western and eastern parts of the Madhyadeśa (or "middle land" between the Ganges and Jumna) respectively, and ending in the overthrow of the Kuru dynasty. On the original accounts of these events—perhaps handed down in the form of lays or sagas—the Pāṇḍava element would subsequently have been grafted as calculated to promote the class interests of the Brāhmanical revisers. It is certainly a strange coincidence that the five Pāṇḍava princes should have taken to wife the daughter of the king of the Pañchālas, and thus have linked their fortunes to a people which is represented, in accordance with its name, to have consisted of five (pancha) tribes.

The earliest direct information regarding the existence of epic poetry in India is contained in a passage of Dion Chrysostom (*c.* A.D. 80), according to which "even among the Indians, they say, Homer's poetry is sung, having been translated by them into their own dialect and tongue"; and "the Indians are well acquainted with the sufferings of Priam, the lamentations and wails of Andromache and Hecuba, and the prowess of Achilles and Hector." Now, although these allusions would suit either poem, they seem to correspond best to certain incidents in the *Mahābhārata*, especially as no direct mention is made of a warlike expedition to a remote island for the rescue of an abducted woman, the resemblance of which to the Trojan expedition would naturally have struck a Greek becoming acquainted with the general outline of the *Rāmāyaṇa*. Whence Dion derived his information is not known; but as many leading names of the Mahābhārata and even the name of the poem itself[2] are mentioned in Pāṇini's grammatical rules, not only must the Bhārata legend have been current in his time (? *c.* 400 B.C.), but most probably it existed already in poetical form, as undoubtedly it did at the time of Patanjali, the author of the "great commentary" on Pāṇini (*c.* 150 B.C.). The great epic is also mentioned, both as *Bhārata* and *Mahābhārata*, in the *Gṛihya-sūtra* of Āśvalāyana, whom Lassen supposes to have lived about 350 B.C. Nevertheless it must remain uncertain whether the poem was then already in the form in which we now have it, at least as far as the leading story and perhaps some of the episodes are concerned, a large portion of the episodical matter being clearly of later origin. It cannot, however, be doubted that long before that time heroic song had been diligently cultivated in India at the courts of princes and among Kshatriyas, the knightly order, generally. In the *Mahābhārata* itself the transmission of epic legend is in some way connected with the Sūtas, a social class which, in the caste-system, is defined as resulting from the union of Kshatriya men with Brāhmaṇa women, and which supplied the office of charioteers and heralds, as well as (along with the Māgadhas) that of professional minstrels. Be this as it may, there is reason to believe that, as Hellas had her ἀοιδοί who sang the κλέα ἀνδρῶν, and Iceland her skalds who recited favourite sagas, so India had from olden times her professional bards, who delighted to sing the praises of kings and inspire the knights with warlike feelings. If in this way a stock of heroic poetry had gradually accumulated which reflected an earlier state of society and manners, we can well understand why, after the Brāhmanical order of things had been definitely established, the priests should have deemed it desirable to subject these traditional memorials of Kshatriya chivalry and prestige to their own censorship, and adapt them to their own canons of religious and civil law. Such a revision would doubtless require considerable skill and tact; and if in the present version of the work much remains that seems contrary to the Brāhmanical code and pretensions—*e.g.* the polyandric union of Draupadī and the Pāṇḍu princes—the reason probably is that such features were too firmly rooted in the popular tradition to be readily eliminated; and all the revisers could do was to explain them away as best they could. Thus Draupadī's abnormal position is actually accounted for in five different ways, one of these representing it as an act of duty and filial obedience on the part of Arjuna who, on bringing home his fair prize and announcing it to his mother, is told by her, before seeing what it is, to share it with his brothers. Nay, it has even been seriously argued that the Brāhmanical editors have completely changed the traditional relations of the leading characters of the story. For, although the Pāṇḍavas and their cousin Kṛishṇa are constantly extolled as models of virtue and goodness, while the Kauravas and their friend Karṇa—a son of the sun-god, borne by Kuntī before her marriage with Pāṇḍu, and brought up secretly as the son of a Sūta—are decried as monsters of depravity, these estimates of the heroes' characters are not unfrequently belied by their actions—especially the honest Karṇa and the brave Duryodhana (*i.e.* "the bad fighter," but formerly called Suyodhana, "the good fighter") contrasting not unfavourably with the wily Kṛishṇa and the cautious and somewhat effeminate Yudhishṭhira. These considerations, coupled with certain peculiarities on the part of the Kauravas, apparently suggestive of an original connexion of the latter with Buddhist institutions, have led Dr Holtzmann to devise an ingenious theory, viz. that the traditional stock of legends was first worked up into a connected narrative by some Buddhist poet—most likely at the time of the emperor Aśoka (*c.* 250 B.C.), whom the Kaurava hero Suyodhana might even seem to have been intended to represent—and that this poem, showing a decided predilection for the Kuru party as the representatives of Buddhist principles, was afterwards revised in a contrary sense, at the time of the Brāhmanical reaction, by votaries of Vishṇu, when the Buddhist features were generally modified into Śaivite tendencies, and prominence was given to the divine nature of Kṛishṇa, as an incarnation of Vishṇu. As this theory would, however, seem to involve the Brāhmanical revision of the poem having taken place subsequent to the decline of Buddhist predominance, it would shift the completion of the work to a considerably later date than would be consistent with other evidence. From inscriptions we know that by the end of the 5th century A.D. the Mahābhārata was appealed to as an authority on matters of law, and that its extent was practically what it now is, including its supplement, the Harivaṃśa. Indeed, everything seems to point to the probability of the work having been complete by about A.D. 200. But, whilst Bhārata and Kuru heroic lays may, and probably

[1] Lassen, *Indische Altertumskunde*, i. 733 sqq.

[2] Viz. as an adj., apparently with "war" or "poem" understood.

do, go back to a much earlier age, it seems hardly possible to assume that the Pāṇḍava epic in its present form can have been composed before the Greek invasion of India, or about 300 B.C. Moreover, it is by no means impossible that the epic narrative was originally composed—as some other portions of the works are—in prose, either continuous or mixed with snatches of verse. Nay, in the opinion of some scholars, this poem (as well as the Rāmāyaṇa) may even have been originally composed in some popular dialect, which would certainly best account for the irregular and apparently prākritic or dialectic forms in which these works abound. The leading position occupied in the existing epic by Kṛishṇa (whence it is actually called *kārshṇa veda*, or the veda of Kṛishṇa), and the Vaishṇava spirit pervading it, make it very probable that it assumed its final form under the influence of the Bhāgavata sect with whom Vāsudeva (Kṛishṇa), originally apparently a venerated local hero, came to be regarded as a veritable god, and incarnation of Vishṇu. Its culminating point this sectarian feature attains in the *Bhagavad-gītā* (*i.e.* the upanishad), "sung by the holy one" -the famous theosophic episode, in which Kṛishṇa, in lofty and highly poetic language, expounds the doctrine of faith (bhakti) and claims adoration as the incarnation of the supreme spirit. Of the purely legendary matter incorporated with the leading story of the poem, not a little, doubtless, is at least as old as the latter itself. Some of these episodes—especially the well-known story of Nala and Damayantī, and the touching legend of Sāvitrī—form themselves little epic gems of considerable poetic value.

The *Rāmāyaṇa*, *i.e.* poem "relating to Rāma," is ascribed to the poet Vālmīki; and, allowance being made for some later additions, the poem indeed presents the appearance of being the work of an individual genius. In its present form it consists of some 24,000 ślokas, or 48,000 lines of sixteen syllables, divided into seven books.

(I.) King Daśaratha of Kośala, reigning at Ayodhyā (Oudh), has four sons borne him by three wives, viz. Rāma, Bharata and the twins Lakshmaṇa and Śatrughna. Rāma, by being able to bend an enormous bow, formerly the dreaded weapon of the god Rudra, wins for a wife Sītā, daughter of Janaka, king of Videha (Tirhut). (II.) On his return to Ayodhyā he is to be appointed heir-apparent (yuva-rāja, *i.e.* juvenis rex); but Bharata's mother persuades the king to banish his eldest son for fourteen years to the wilderness, and appoint her son instead. Separation from his favourite son soon breaks the king's heart; whereupon the ministers call on Bharata to assume the reins of government. He refuses, however, and, betaking himself to Rāma's retreat on the Chitrakūṭa mountain (in Bundelkhund), implores him to return; but, unable to shake Rāma's resolve to complete his term of exile, he consents to take charge of the kingdom in the meantime. (III.) After a ten years' residence in the forest, Rāma attracts the attention of a female demon (rākshasī); and, infuriated by the rejection of her advances, and by the wounds inflicted on her by Lakshmaṇa, who keeps Rāma company, she inspires her brother Rāvaṇa, demon-king of Ceylon, with love for Sītā, in consequence of which the latter is carried off by him to his capital Lankā. While she resolutely rejects the Rākshasa's addresses, Rāma sets out with his brother to her rescue. (IV.) After numerous adventures they enter into an alliance with Sugrīva, king of the monkeys; and, with the assistance of the monkey-general Hanumān, and Rāvaṇa's own brother Vibhīshaṇa, they prepare to assault Lankā. (V.) The monkeys, tearing up rocks and trees, construct a passage across the straits—the so-called Adam's Bridge, still designated Rāma's Bridge in India. (VI.) Having crossed over with his allies, Rāma, after many hot encounters and miraculous deeds, slays the demon and captures the stronghold; whereupon he places Vibhīshaṇa on the throne of Lankā. To allay Rāma's misgivings as to any taint she might have incurred through contact with the demon, Sītā now successfully undergoes an ordeal by fire; after which they return to Ayodhyā, where, after a triumphal entry, Rāma is installed. (VII.) Rāma, however, seeing that the people are not yet satisfied of Sītā's purity, resolves to put her away; whereupon, in the forest, she falls in with Vālmīki himself, and at his hermitage gives birth to two sons. While growing up there, they are taught by the sage the use of the bow, as well as the Vedas, and the Rāmāyaṇa as far as the capture of Lankā and the royal entry into Ayodhyā. Ultimately Rāma discovers and recognizes them by their wonderful deeds and their likeness to himself, and takes his wife and sons back with him.

The last book, as will be noticed from this bare outline, presents a somewhat strange appearance. There can be little doubt that it is a later addition to the work; and the same is apparently the case as regards the first book, with the exception of certain portions which would seem to have formed the beginning of the original poem. In these two books the character of Rāma appears changed: he has become deified and identified with the god Vishṇu, whilst in the body of the poem his character is simply that of a perfect man and model hero. As regards the general idea underlying the leading story, whilst the first part of the narrative can hardly be said to differ materially from other historical and knightly romances, the second part—the expedition to Lankā—on the other hand has called forth different theories, without, however, any general agreement having so far been arrived at. Whilst Lassen and Weber would see in this warlike expedition a poetical representation of the spread of Aryan rule and civilization over southern India, Talboys Wheeler took the demons of Lankā, against whom Rāma's campaign is directed, to be intended for the Buddhists of Ceylon. More recently, again, Professor Jacobi [1] of Bonn has endeavoured to prove that the poem has neither an allegorical nor a religious tendency, but that its background is a purely mythological one—Rāma representing the god Indra, and Sītā—in accordance with the meaning of the name—the personified "Furrow," as which she is already invoked in the Ṛigveda, and hence is a tutelary spirit of the tilled earth, wedded to Indra, the Jupiter Pluvius. Moreover, from a comparison of the narrative of the poem with a popular version of it, contained in one of the Pāli "birth-stories," the Daśaratha-jātaka, which lacks the second part of the story, Professor Weber tried to show that the expedition of Lankā cannot have formed part of the original epic, but was probably based on some general acquaintance with the Troy legend of Greek poetry.

A remarkable feature of this poem is the great variation of its textual condition in different parts of the country, amounting in fact to at least three different recensions. The text most widely prevalent both in the north and south has been printed repeatedly, with commentary, at Bombay, and was taken by Mr R. T. H. Griffith as the basis for his beautiful poetical translation.[2] The so-called Gauḍa or Bengal recension, on the other hand, which differs most of all, has been edited, with an Italian prose translation, by G. Gorresio;[3] whilst the third recension, recognized chiefly in Kashmir and western India, is so far known only from manuscripts. The mutual relation of these versions will appear from the fact that about one-third of the matter of each recension is not found in the other two; whilst in the common portions, too, there are great variations both in regard to the order of verses and to textual readings. To account for this extraordinary textual diversity, it has been suggested that the poem was most likely originally composed in a popular dialect, and was thence turned into Sanskrit by different hands trying to improve on one another; whilst Professor Jacobi would rather ascribe the difference to the fact that the poem was for a long time handed down orally in Sanskrit by rhapsodists, or professional minstrels, when such variations might naturally arise in different parts of the country. Yet another version of the same story, with, however, many important variations of details, forms an episode of the *Mahābhārata*, the *Rāmopākhyāna*, the relation of which to Vālmīki's work is still a matter of uncertainty. In respect of both versification and diction the Rāmāyaṇa is of a distinctly more refined character than the larger poem; and, indeed, Vālmīki is seen already to cultivate some of that artistic style of poetry which was carried to excess in the later artificial Kāvyas, whence the title of *ādi-kavi*, or first poet, is commonly applied to him. Though the political conditions reflected in the older parts of the Rāmāyaṇa seem to correspond best to those of pre-Buddhistic times, this might after all only apply to the poetic material handed down orally and eventually cast into its present form. To characterize the Indian epics in a single word: though often disfigured by grotesque fancies and wild exaggerations, they are yet noble works, abounding in passages of remarkable descriptive power,

[1] *Das Rāmāyaṇa* (Bonn, 1893).

[2] London, 1870–1874; there is also an English prose translation by M. N. Dutt (Calcutta, 1894); and a condensed version in English verse by Romesh Dutt (London, 1899).

[3] Turin, 1843–1867.

intense pathos, and high poetic grace and beauty; and while, as works of art, they are far inferior to the Greek epics, in some respects they appeal far more strongly to the romantic mind of Europe, namely, by their loving appreciation of natural beauty, their exquisite delineation of womanly love and devotion, and their tender sentiment of mercy and forgiveness.

2. *Purāṇas and Tantras.*—The *Purāṇas* [1] are partly legendary partly speculative histories of the universe, compiled for the purpose of promoting some special, locally prevalent form of Brāhmanical belief. They are sometimes styled a fifth Veda, and may indeed in a certain sense be looked upon as the scriptures of Brāhmanical India. The term *purāṇa*, signifying "old," applied originally to prehistoric, especially cosmogonic, legends, and then to collections of ancient traditions generally. The existing works of this class, though recognizing the Brāhmanical doctrine of the Trimūrti, or triple manifestation of the deity (in its creative, preservative and destructive activity), are all of a sectarian tendency, being intended to establish, on quasi-historic grounds, the claims of some special god, or holy place, on the devotion of the people. For this purpose the compilers have pressed into their service a mass of extraneous didactic matter on all manner of subjects, whereby these works have become a kind of popular encyclopaedias of useful knowledge. It is evident, however, from a comparatively early definition given of the typical Purāṇa, as well as from numerous coincidences of the existing works, that they are based on, or enlarged from, older works of this kind, more limited in their scope and probably of a more decidedly tritheistic tendency of belief. Thus none of the Purāṇas, as now extant, is probably much above a thousand years old, though a considerable proportion of their materials is doubtless much older, and may perhaps in part go back to several centuries before the Christian era.

Purāṇas.

In legendary matter the Purāṇas have a good deal in common with the epics, especially the *Mahābhārata*— the compilers or revisers of both classes of works having evidently drawn their materials from the same fluctuating mass of popular traditions. They are almost entirely composed in the epic couplet, and indeed in much the same easy flowing style as the epic poems, to which they are, however, as a rule greatly inferior in poetic value.

According to the traditional classification of these works, there are said to be eighteen (*Mahā-*, or great) *Purāṇas*, and as many *Upa-purāṇas*, or subordinate Purāṇas. The former are by some authorities divided into three groups of six, according as one or other of the three primary qualities of external existence—goodness, darkness (ignorance), and passion—is supposed to prevail in them, viz. the *Vishṇu, Nāradīya, Bhāgavata, Garuḍa, Padma, Varāha*—*Matsya, Kūrma, Linga, Śiva, Skanda, Agni*—*Brahmāṇḍa, Brahmavaivarta, Mārkaṇḍeya, Bhavishya, Vāmana* and *Brahma-Purāṇas*. In accordance with the nature of the several forms of the Trimūrti, the first two groups chiefly devote themselves to the commendation of Vishṇu and Śiva respectively, whilst the third group, which would properly belong to Brahman, has been largely appropriated for the promotion of the claims of other deities, viz. Vishṇu in his sensuous form of Kṛishṇa, Devī, Gaṇeśa, and Sūrya. As Professor Banerjea has shown in his preface to the *Mārkaṇḍeya*, this seems to have been chiefly effected by later additions and interpolations. The insufficiency of the above classification, however, appears even from the fact that it omits the *Vāyu-purāṇa*, probably one of the oldest of all, though some MSS. substitute it for one or other name of the second group. The eighteen principal Purāṇas are said to consist of together 400,000 couplets. In northern India the Vaishṇava Purāṇas, especially the *Bhāgavata* and *Vishṇu*,[2] are by far the most popular. The Bhāgavata was formerly supposed to have been composed by Vopadeva, the grammarian, who lived in the 13th century. It has, however, been shown [3] that what he wrote was a synopsis of the Purāṇa, and that the latter is already quoted in a work by Ballāla Sena of Bengal, in the 11th century. It is certainly held in the highest estimation, and, especially through the vernacular versions of its tenth book, treating of the story of Kṛishṇa, has powerfully influenced the religious belief of India.

From the little we know regarding the Upa-purāṇas, their character does not seem to differ very much from that of the principal sectarian Purāṇas. Besides these two classes of works there is a large number of so-called *Sthala-purāṇas*, or chronicles recounting the history and merits of some holy "place" or shrine, where their recitation usually forms an important part of the daily service. Of much the same nature are the numerous *Māhātmyas* (literally "relating to the great spirit"), which usually profess to be sections of one or other Purāṇa. Thus the *Devī-māhātmya*, which celebrates the victories of the great "goddess" over the Asuras, and is daily read at the temples of that deity, forms a section, though doubtless an interpolated one, of the Mārkaṇḍeya-purāṇa. Similarly the *Adhyātma-Rāmāyaṇa*, a kind of spiritualized version of Vālmīkī's poem, forms part of the *Brahmāṇḍa-purāṇa* which (like the Skanda) seems hardly to exist in an independent form, but to be made up of a large number of Māhātmyas.

The *Tantras* [4] have to be considered as partly a collateral and partly a later development of the sectarian Purāṇas; though, unlike these, they can hardly lay claim to any intrinsic poetic value. These works are looked upon as their sacred writings by the numerous *Śāktas*, or worshippers of the female energy (*śakti*) of some god, especially the wife of Śiva, in one of her many forms (Pārvatī, Devī, Kālī, Bhavānī, Durgā, &c.). This worship of a female representation of the divine power appears already in some of the Purāṇas; but in the Tantras it assumes quite a peculiar character, being largely intermixed with magic performances and mystic rites, partly, indeed, of a grossly immoral nature (see Hinduism). Of this class of writings no specimen would appear to have as yet been in existence at the time of Amarasiṃha (6th century), though they are mentioned in some of the Purāṇas. They are usually in the form of a dialogue between Śiva and his wife. The number of original Tantras is fixed at sixty-four, but they still await a critical examination at the hands of scholars. Among the best known may be mentioned the *Rudrayāmala*, *Kulārṇava*, *Śyāmā-rahasya* and *Kālikā-tantra*.

3. *Artificial Epics and Romances.*— In the early centuries of the Christian era a new class of epic poems begins to make its appearance, differing widely in character from those that had preceded it. The great national epics, composed though they were in a language different from the ordinary vernaculars, had at least been drawn from the living stream of popular tradition, and were doubtless readily understood and enjoyed by at least the educated classes of the people. The later productions, on the other hand, are of a decidedly artificial character, and must necessarily have been beyond the reach of any but the highly cultivated. They are, on the whole, singularly deficient in incident and invention, their subject matter being almost entirely derived from the old epics. Nevertheless, these works are by no means devoid of merit and interest; and a number of them display considerable descriptive power and a wealth of genuine poetic sentiment, though unfortunately often clothed in language that deprives it of half its value. The simple heroic couplet has mostly been discarded for various more or less elaborate metres; and in accordance with this change of form the diction becomes gradually more complicated—a growing taste for unwieldy compounds, a jingling kind of alliteration, or rather agnomination, and an abuse of similes marking the increasing artificiality of these productions.

Modern epics.

The generic appellation of such works is *kāvya*, which, meaning "poem," or the work of an individual poet (*kavi*), is, as we have seen, already applied to the *Rāmāyaṇa*. Six poems of this kind are singled out by native rhetoricians as standard works, under the title of *Mahākāvya*, or great poems. Two of these are ascribed to the famous dramatist Kālidāsa, the most prominent figure of this period of Indian literature and truly a master of the poetic art. In a comparatively modern couplet he is represented as having been one of nine literary "gems" at the court of a king Vikramāditya, who was supposed to have originated the so-called Vikrama era, dating from 56–57 B.C. Recent research has, however, shown that this name was only applied to the era from about A.D. 800, and that the latter was already used in inscriptions of the 5th century under the name of the Mālava era. Hence also Fergusson's theory that it was founded by King Vikramāditya Harsha of Ujjayinī (Ujjain or

[1] Cf. H. H. Wilson, *Essays on the Religion of the Hindus*, ii. pp. 67 sqq.

[2] There are several Indian editions of these two works. The Bhāgavata has been partly printed, in an *édition de luxe*, with a French translation at Paris, in 3 vols., by E. Burnouf, and a fourth by M. Hauvette-Besnault. Of the Vishṇu, there is a translation by H. H. Wilson, 2nd ed., enriched with valuable notes by F. Hall. This and most other Purāṇas have been printed in India, especially in the *Bibl. Ind.* and the "Ānand. series."

[3] Rājendralāla Mitra, *Notices of Sansk. MSS.* ii. 47.

[4] Cf. H. H. Wilson, *Essays on the Religion of the Hindus*, ii. pp. 77 sqq.

Oujein) in A.D. 544 and ante-dated by 600 years, falls to the ground; and with it Max Müller's theory[1] of an Indian Renaissance inaugurated during the reign of that king. Though Kālidāsa's date thus remains still uncertain, the probability is that he flourished at Ujjayinī about 440–448 A.D. Of the principal poets of this class, whose works have come down to us, he appears to be one of the earliest; but there can be little doubt that he was preceded in this as in other departments of poetic composition by many lesser lights, eclipsed by the sun of his fame, and forgotten. Thus the recently discovered *Buddhacharita*,[2] a Sanskrit poem on the life of the reformer, which was translated into Chinese about A.D. 420, and the author of which, Aśvaghosha, is placed by Buddhist tradition as early as the time of Kanishka (who began to reign in A.D. 78), calls itself, not without reason, a "mahākāvya"; and the panegyrics contained in some of the inscriptions of the 4th century[3] likewise display, both in verse and ornate prose, many of the characteristic features of the kāvya style of composition. Indeed, a number of quotations in the Mahābhāshya,[4] the commentary on Pāṇini, go far to show that the kāvya style was already cultivated at the time of Patanjali, whose date can hardly be placed later than the 1st century of the Christian era, though it may, and probably does, go back to the 2nd century B.C.

Of the six universally recognized "great poems" here enumerated the first two, and doubtless the two finest, are those attributed to Kālidāsa. (1) The *Raghuvaṃśa*,[5] or "race of Raghu," celebrates the ancestry and deeds of Rāma. The work, consisting of nineteen cantos, is manifestly incomplete; but hitherto no copy has been discovered of the six additional cantos which are supposed to have completed it. (2) The *Kumāra-sambhava*,[6] or "the birth of (the war-god) Kumāra" (or Skanda), the son of Śiva and Pārvatī, consists of seventeen cantos, the last ten of which were, however, not commented upon by Mallinātha, and are usually omitted in the MSS.; whence they are still looked upon as spurious by many scholars, though they may only have been set aside on account of their amorous character rendering them unsuitable for educational purposes, for which the works of Kālidāsa are extensively used in India; the 8th canto, at any rate, being quoted by Vāmana (*c.* A.D. 700). Another poem of this class, the *Nalodaya*,[7] or "rise of Nala"—describing the restoration of that king, after having lost his kingdom through gambling—is wrongly ascribed to Kālidāsa, being far inferior to the other works, and of a much more artificial character. (3) The *Kirātārjunīya*,[8] or combat between the Pāṇḍava prince Arjuna and the god Śiva, in the guise of a Kirāta or wild mountaineer, is a poem in eighteen cantos, by Bhāravi, who is mentioned together with Kālidāsa in an inscription dated A.D. 634. (4) The *Śiśupāla-badha*, or slaying of Śiśupāla, who, being a prince of Chedi, reviled Krishṇa, who had carried off his intended wife, and was killed by him at the inauguration sacrifice of Yudhishṭhira, is a poem consisting of twenty cantos, attributed to Māgha,[9] whence it is also called *Māghakāvya*. (5) The *Rāvaṇabadha*, or "slaying of Rāvaṇa," more commonly called *Bhaṭṭikāvya*, to distinguish it from other poems (especially one by Pravarasena), likewise bearing the former title, was composed for the practical purpose of illustrating the less common grammatical forms and the figures of rhetoric and poetry. In its closing couplet it professes to have been written at Vallabhī, under Śrīdharasena, but, several princes of that name being mentioned in inscriptions as having ruled there in the 6th and 7th centuries, its exact date is still uncertain. Bhaṭṭi, apparently the author's name, is usually identified with the well-known grammarian Bhartṛihari, whose death Professor M. Müller, from a Chinese statement, fixes at A.D. 650, while others make him Bhartrihari's son. (6) The *Naishadhīya*, or *Naishadha-charita*, the life of Nala, king of Nishadha, is ascribed to Śrī-Harsha (son of Hīra), who is supposed to have lived in the latter part of the 12th century. A small portion of the simple and noble episode of the *Mahābhārata* is here retold in highly elaborate and polished stanzas, and with a degree of lasciviousness which (unless it be chiefly due to the poet's exuberance of fancy) gives a truly appalling picture of social corruption. Another highly esteemed poem, the *Rāghava-pāṇḍaviya*, composed by Kavirāja ("king of poets")—whose date is uncertain, some scholars placing him about A.D. 800, others later than the 10th century—is characteristic of the trifling uses to which the poet's art was put. The well-turned stanzas are so ambiguously worded that the poem may be interpreted as relating to the leading story of either the *Rāmāyaṇa* or the *Mahābhārata*. Less ambitious in composition, though styling itself a mahākāvya, is the *Vikramānkadevacharita*,[10] a panegyric written about A.D. 1085 by the Kashmir poet Bilhaṇa, in honour of his patron the Chālukya king Vikramāditya of Kalyāṇa, regarding the history of whose dynasty it supplies some valuable information.

In this place may also be mentioned, as composed in accordance with the Hindu poetic canon, the *Rājatarangiṇī*,[11] or "river of kings," being a chronicle of the kings of Kashmir, and the only important historical work in the Sanskrit language, though even here considerable allowance has to be made for poetic licence and fancy. The work was composed by the Kashmirian poet Kalhaṇa about 1150, and was afterwards continued by three successive supplements, bringing down the history of Kashmir to the time of the emperor Akbar. Worthy of mention, in this place, are also two works on the life of Buddha, which may go back to the 1st century of the Christian era, viz. the *Lalitavistara*[12] and the *Mahāvastu*,[13] written in fairly correct Sanskrit prose mixed with stanzas (gāthā) composed in a hybrid, half Prākrit, half Sanskrit form of language.

Under the general term "kāvya" Indian critics include, however, not only compositions in verse, but also certain kinds of prose works composed in choice diction richly embellished with flowers of rhetoric. The feature generally regarded by writers on poetics as the chief mark of excellence in this ornate prose style is the frequency and length of its compounds; whilst for metrical compositions the use of long compounds is expressly discouraged by some schools of rhetoric. Moreover, the best specimens of this class of prose writing are not devoid of a certain musical cadence adapting itself to the nature of the subject treated. Amongst the works of this class the most interesting are four so-called *kathās* (tales) or *ākhyāyikās* (novels). The oldest of these is the *Daśakumāracharita*,[14] or "adventures of the ten princes"—a vivid, though probably exaggerated, picture of low-class city life—by Daṇḍin, the author of an excellent manual of poetics, the Kāvyādarśa, who most likely lived in the 6th century. Probably early in the 7th century, Subandhu composed his tale *Vāsavadattā*,[15] taking its name from a princess of Ujjayinī (Oujein), who in a dream fell in love with Udayana, king of Vatsa, and, on the latter being decoyed to that city and kept in captivity by her father, was carried off by him from a rival suitor. The remaining two works were composed by Bāṇa, the court poet of King Harshavardhana of Ṭhānesar and Kanauj—who ruled over the whole of northern India, A.D. 606–648, and at whose court the Chinese pilgrim Hiuen Thsang resided for some time during his sojourn in India (630–646)—viz. the Kādambarī,[16] a romantic tale of a princess of that name; and the apparently never completed *Harshacharita*,[17] intended as an historical novel, but practically a panegyric (*praśasti*) in favour of the poet's patron, supplying, however, a valuable picture of the life of the time. Whilst these tales have occasionally stanzas introduced into them, this feature of mixed (miśra) verse and prose is especially prominent in another popular class of romances, the so-called *Champūs*. Of such works, which seem to have been rather numerous, it must suffice to mention two specimens, viz. the *Bhārata-champū*, in twelve cantos, by Ananta Bhaṭṭa; and the *Champū-rāmāyaṇa*, or *Bhoja-champū*, in seven books, the first five of which are attributed, doubtless by way of compliment, to King Bhojarāja of Dhārā.

4. *The Drama.*[18]—The early history of the Indian drama is enveloped in obscurity. The Hindus themselves ascribe the origin of dramatic representation to the sage Bharata, who is fabled to have lived in remote antiquity, and to have received this science directly from the god Brahman, by whom it was extracted from the Veda. The term *bharata*—(?) *i.e.* one who is kept, or one who sustains (a part)—also signifies "an actor"; but it is doubtful which of the two is the earlier— **Drama.**

[1] Propounded in Note G of his *India, What can it Teach Us?*

[2] Ed. by E. B. Cowell (Oxford, 1893); trans. by the same, *S.B.E.*

[3] See G. Bühler, "Die indischen Inschriften und das Alter der indischen Kunstpoesie," in *Sitzungsber. Imp. Ac.* (Vienna, 1890).

[4] Collected by F. Kielhorn, *Ind. Ant.* vol. 16.

[5] Edited with a Latin trans. by F. Stenzler; also text, with commentary, by S. P. Pandit; also repeatedly in India with and without translation.

[6] Text and Latin trans. of cantos 1-7 published by F. Stenzler; an English trans. by R. T. H. Griffith; also several Indian editions, with comm.

[7] Text with comm. and Latin trans., edited by F. Benary; with Eng. trans., in verse, by W. Yates; also repeatedly ed. in India.

[8] Editions of this and the three following poems have been published in India.

[9] Māgha probably lived in the 9th century, though Bháo Dáji, in his paper on Kālidāsa, would make him "a contemporary of the Bhoja of the 11th century."

[10] Edited by G. Bühler.

[11] The Calcutta edition (1835) and that of A. Troyer, with a French trans., based on insufficient material, have been superseded by M. A. Stein's ed. (Bombay, 1892), trans. by Y. C. Datta (Calcutta, 1898).

[12] Ed. and trans. Rāj. Mitra, *Bibl. Ind.*; trans. S. Lefmann.

[13] Ed. E. Senart.

[14] Ed. H. H. Wilson; again (*Bombay Skt. Ser.*) pt. i., G. Bühler; ii., P. Peterson; freely trans. by P. W. Jacob.

[15] Ed. Fitzedw. Hall (*Bibl. Ind.*); with comm. J. Vidyāsāgara (Calcutta, 1874).

[16] Ed. P. Peterson (*Bomb. S.S.*); with comm. M. R. Kale (1896); trans. with some omissions, C. M. Ridding.

[17] Ed. J. Vidyāsāgara (Calcutta, 1883); with comm. (Jammu, 1879; Bombay, 1892); trans. E. B. Cowell and F. W. Thomas (1897).

[18] Cf. H. H. Wilson, *Select Specimens of the Theatre of the Hindus* (3rd ed., 2 vols., 1871); Sylvain Lévi, *Le Théâtre indien* (Paris, 1890).

the appellative use of the word, or the notion of an old teacher of the dramatic art bearing that name. There still exists an extensive work, in epic verse, on rhetoric and dramaturgy, entitled *Nāṭya-śāstra*,[1] and ascribed to Bharata. Though this is probably the oldest theoretic work on the subject that has come down to us, it can hardly be referred to an earlier period than several centuries after the Christian era. Not improbably, however, this work, which presupposes a fully developed scenic art, had an origin similar to that of some of the metrical law-books, which are generally supposed to be popular and improved editions of older sutra-works. We know that such treatises existed at the time of Pāṇini, as he mentions two authors of *Naṭa-sūtras*, or "rules for actors," viz. Śilālin and Kṛiśāśva. Now, the words *naṭa* and *nāṭya*—as well as *nāṭaka*, the common term for "drama"—being derived (like the modern vernacular "Nautch" = *nṛitya*) from the root *naṭ* (*nṛt*) "to dance," seem to point to a pantomimic or choral origin of the dramatic art. It might appear doubtful, therefore, in the absence of any clearer definition in Pāṇini's grammar, whether the "actors' rules" he mentions did not refer to mere pantomimic performances. Fortunately, however, Patanjali, in his "great commentary," speaks of the actor as singing, and of people going "to hear the actor." Nay, he even mentions two subjects, taken from the cycle of Vishṇu legends—viz. the slaying of Kaṃsa (by Kṛishṇa) and the binding of Bali (by Vishṇu)—which were represented on the stage both by mimic action and declamation. Judging from these allusions, theatrical entertainments in those days seem to have been very much on a level with the old religious spectacles or mysteries of Europe, though there may already have been some simple kinds of secular plays which Patanjali had no occasion to mention. It is not, however, till some five or six centuries later that we meet with the first real dramas, which mark at the same time the very culminating point of Indian dramatic composition. In this, as in other departments of literature, the earlier works have had to make way for later and more perfect productions; and no trace now remains of the intermediate phases of development. Thus we know of at least five predecessors of Kālidāsa from whom nothing but a few quotations have been preserved.

Here, however, the problem presents itself as to whether the existing dramatic literature has naturally grown out of such popular religious performances as are alluded to by Patanjali, or whether some foreign influence has intervened at some time or other and given a different direction to dramatic composition. The question has been argued both for and against the probability of Greek influence; but it must still be considered as *sub judice*; the latest investigator, M. Sylvain Lévi, having given a decided opinion against outside influence. There are doubtless some curious points of resemblance between the Indian drama and the Modern Attic (and Roman) comedy, viz. the prologue, the occasional occurrence of a token of recognition, and a certain correspondence of characteristic stage figures—especially the Vidūshaka, or jocose companion of the hero, presenting a certain analogy to the servus of the Roman stage, as does the Viṭa, the hero's dissolute, though accomplished, boon-companion, of some plays, to the Roman parasite—for which the assumption of some acquaintance with the Greek comedy on the part of the earlier Hindu writers would afford a ready explanation. On the other hand, the differences between the Indian and Greek plays are perhaps even greater than their coincidences, which, moreover, are scarcely close enough to warrant our calling in question the originality of the Hindus in this respect. Certain, however, it is that, if the Indian poets were indebted to Greek playwrights for the first impulse in dramatic composition, in the higher sense, they have known admirably how to adapt the Hellenic muse to the national genius, and have produced a dramatic literature worthy to be ranked side by side with both the classical and our own romantic drama. It is to the latter especially that the general character of the Indian play presents a striking resemblance, much more so than to the classical drama. The Hindu dramatist has little regard for the "unities" of the classical stage, though he is hardly ever guilty of extravagance in his disregard of them. Unlike the Greek dramatic theory, it is an invariable rule of Indian dramaturgy, that every play, however much of the tragic element it may contain, must have a happy ending. The dialogue is invariably carried on in prose, plentifully interspersed with those neatly turned lyrical stanzas in which the Indian poet delights to depict some natural scene, or some temporary physical or mental condition. The most striking feature of the Hindu play, however, is the mixed nature of its language. While the hero and leading male characters speak Sanskrit, women and inferior male characters use various Prākrit dialects. As regards these dialectic varieties, it can hardly be doubted that at the time when they were first employed in this way they were local vernacular dialects; but in the course of the development of the scenic art they became permanently fixed for special dramatic purposes, just as the Sanskrit had, long before that time, become fixed for general literary purposes. Thus it would happen that these Prākrit dialects, having once become stationary, soon diverged from the spoken vernaculars, until the difference between them was as great as between the Sanskrit and the Prākrits. As regards the general character of the dramatic Prākrits, they are somewhat more removed from the Sanskrit type than the Pāli, the language of the Buddhist canon, which again is in a rather more advanced state than the language of the Aśoka inscriptions (*c.* 250 B.C.). And, as the Buddhist sacred books were committed to writing about 80 B.C., the state of their language is attested for that period at latest; while the grammatical fixation of the scenic Prākrits has probably to be referred to the early centuries of the Christian era.

The existing dramatic literature is not very extensive. The number of plays of all kinds of any literary value will scarcely amount to fifty. The reason for this paucity of dramatic productions doubtless is that they appealed to the tastes of only a limited class of highly cultivated persons, and were in consequence but seldom acted. As regards the theatrical entertainments of the common people, their standard seems never to have risen much above the level of the religious spectacles mentioned by Patanjali. Such at least is evidently the case as regards the modern Bengālī *jātrās* (Skt. *yātrās*)—described by Wilson as exhibitions of some incidents in the youthful life of Kṛishṇa, maintained in extempore dialogue, interspersed with popular songs—as well as the similar *rāsas* of the western provinces, and the rough and ready performances of the *bhanrs*, or professional buffoons. Of the religious drama Sanskrit literature offers but one example, viz. the famous *Gīta-govinda*,[2] composed by Jayadeva in the 12th century. It is rather a mytho-lyrical poem, which, however, in the opinion of Lassen, may be considered as a modern and refined specimen of the early form of dramatic composition. The subject of the poem is as follows: Kṛishṇa, while leading a cowherd's life in Vṛindāvana, is in love with Rādhā, the milkmaid, but has been faithless to her for a while. Presently, however, he returns to her "whose image has all the while lingered in his breast," and after much earnest entreaty obtains her forgiveness. The emotions appropriate to these situations are expressed by the two lovers and a friend of Rādhā in melodious and passionate, if voluptuous, stanzas of great poetic beauty. Like the Song of Solomon, the Gītagovinda, moreover, is supposed by the Hindu commentators to admit of a mystic interpretation; for, "as Kṛishṇa, faithless for a time, discovers the vanity of all other loves, and returns with sorrow and longing to his own darling Rādhā, so the human soul, after a brief and frantic attachment to objects of sense, burns to return to the God from whence it came" (Griffith).

The *Mṛichchhakaṭikā*,[3] or "little clay cart," has been usually placed at the head of the existing dramas; but, though a certain clumsiness of construction might seem to justify this distinction, the question of its relative antiquity remains far from being definitively settled. Indeed, the fact that neither Kālidāsa, who mentions three predecessors of his, nor Bāṇa, in reviewing his literary precursors, makes any allusion to the author of this play, as well as other points, seem rather to tell against the latter's priority. But seeing that Vāmana quotes from the Mṛichchhakaṭikā, this play must at any rate have been in existence in the latter part of the 8th century. According to several stanzas in the prologue, the play was composed by a king Śūdraka, who is there stated to have, through Śiva's

[1] Ed., in *Kāvyamālā* (Bombay, 1894); by Grosset (Lyons, 1897).

[2] Edited, with a Latin translation, by C. Lassen; English translation by E. Arnold.

[3] Edited by F. Stenzler; with commentary, by K. P. Parab (Bombay), and several times at Calcutta; translated by H. H. Wilson; also into English prose and verse by A. W. Ryder (*Harvard Or. Ser.*, 1905); German by O. Böhtlingh and L. Fritze; French by P. Regnaud

favour, recovered his eyesight, and, after seeing his son as king, to have died at the ripe age of a hundred years and ten days. According to the same stanzas, the piece was enacted after the king's death; but it is probable that they were added for a subsequent performance. In Bāṇa's novel *Kādambarī* (*c.* A.D. 630), a king Sūdraka is represented as having resided at Bidiśā (Bhilsa)—some 130 m. east of Ujjayinī (Ujjain), where the scene of the play is laid. Chārudatta, a Brāhman merchant, reduced to poverty, and Vasantasenā, an accomplished courtezan, meet and fall in love with each other. This forms the main plot, which is interwoven with a political underplot, resulting in a change of dynasty. The connexion between the two plots is effected by means of the king's rascally brother-in-law, who pursues Vasantasenā with his addresses, as well as by the part of the rebellious cowherd Āryaka, who, having escaped from prison, finds shelter in the hero's house. The wicked prince, on being rejected, strangles Vasantasenā, and accuses Chārudatta of having murdered her; but, just as the latter is about to be executed, his lady love appears again on the scene. Meanwhile Āryaka has succeeded in deposing the king, and, having himself mounted the throne of Ujjain, he raises Vasantasenā to the position of an honest woman, to enable her to become the wife of Chārudatta. The play is one of the longest, consisting of not less than ten acts, some of which, however, are very short. The interest of the action is, on the whole, well sustained; and, altogether, the piece presents a vivid picture of the social manners of the time, whilst the author shows himself imbued with a keen sense of humour, and a master in the delineation of character.

Śūdraka.

In Kālidāsa the dramatic art attained its highest point of perfection. From this accomplished poet we have three well-constructed plays, abounding in stanzas of exquisite tenderness and fine descriptive passages, viz. the two well-known mytho-pastoral dramas, *Śakuntalā* in seven and *Vikramorvaśī* [1] in five acts, and a piece of court intrigue, distinctly inferior to the other two, entitled *Mālavikāgnimitra* [2] in five acts. King Agnimitra, who has two wives, falls in love with Mālavikā, maid to the first queen. His wives endeavour to frustrate their affection for each other, but in the end Mālavikā turns out to be a princess by birth, and is accepted by the queens as their sister.

Kālidāsa.

Śrī-Harshadeva—identical with the king (Śīlāditya) Harshavardhana of Kānyakubja (Kanauj), mentioned above, who ruled in the first half of the 7th century—has three plays attributed to him; though possibly only dedicated to him by poets patronized by him. This at least commentators state to have been the case as regards the *Ratnāvalī*, the authorship of which they assign to Bāṇa. Indeed, had they been the king's own productions, one might have expected the Chinese pilgrims (especially I-tsing, who saw one of the plays performed) to mention the fact. The *Ratnāvalī*,[3] "the pearl necklace," is a graceful comedy of genteel domestic manners, in four acts, of no great originality of invention; the author having been largely indebted to Kālidāsa's plays. A decided merit of the poet's art is the simplicity and clearness of his style. Ratnāvalī, a Ceylon princess, is sent by her father to the court of King Udayana of Vatsa to become his second wife. She suffers shipwreck, but is rescued and received into Udayana's palace under the name of Sāgarikā, as one of Queen Vāsavadattā's attendants. The king falls in love with her, and the queen tries to keep them apart from each other; but, on learning the maiden's origin, she becomes reconciled, and recognizes her as a "sister." According to H. H. Wilson, "the manners depictured are not influenced by lofty principle or profound reflection, but they are mild, affectionate and elegant. It may be doubted whether the harems of other eastern nations, either in ancient or modern times, would afford materials for as favourable a delineation." Very similar in construction, but distinctly inferior, is the *Priyadarśikā*, in four acts, having for its plot another amour of the same king. The scene of the third play, the *Nāgānanda*,[4] or "joy of the serpents" (in five acts), on the other hand, is laid in semi-divine regions. Jīmūtavāhana, a prince of the Vidyādharas, imbued with Buddhist principles, weds Malayavatī, daughter of the king of the Siddhas, a votary of Gaurī (Śiva's wife). But, learning that Garuḍa, the mythic bird, is in the habit of consuming one snake daily, he resolves to offer himself to the bird as a victim, and finally succeeds in converting Garuḍa to the principle of ahiṃsā, or abstention from doing injury to living beings; but he himself is about to succumb from the wounds he has received, when, through the timely intervention of the goddess Gaurī, he is restored to his former condition. The piece seems to have been intended as a compromise between Brāhmanical (Śaiva) and Buddhist doctrines, being thus in keeping with the religious views of king Harsha, who, as we know from Hiuen Thsang, favoured Buddhism, but was very tolerant to Brāhmans. It begins with a benedictory stanza to Buddha, and concludes with one to Gaurī. The author is generally believed to have been a Buddhist, but it is more likely that he was a Śaiva Brāhman, possibly Bāṇa himself. Nay, one might almost feel inclined to take the hero's self-sacrifice in favour of a Nāga as a travesty of Buddhist principles. In spite of its shortcomings of construction the Nāgānanda is a play of considerable merit, the characters being drawn with a sure hand, and the humorous element introduced into it of a very respectable order.

Śrī-Harshadeva.

Bhavabhūti, surnamed Śrī-kaṇṭha, "he in whose throat there is beauty (eloquence)," [5] was a native of Padmapura in the Vidarbha country (the Berars), being the son of the Brāhman Nīlakaṇṭha and his wife Jātūkarṇī. He passed his literary life chiefly at the court of Yaśovarman of Kanauj, who must have reigned in the latter part of the 7th century, seeing that, after a successful reign, he suffered defeat at the hands of Lalāditya of Kashmir, who had mounted his throne in A.D. 695. Bhavabhūti was the author of three plays, two of which, the *Mahāviracharita* [6] ("life of the great hero") and the *Uttararāmacharita* [7] ("later life of Rāma"), in seven acts each, form together a dramatized version of the story of the *Rāmāyaṇa*. The third, the *Mālatīmādhava*,[8] is a domestic drama in ten acts, representing the fortunes of Mādhava and Mālatī, the son and daughter of two ministers of neighbouring kings, who from childhood have been destined for each other, but, by the resolution of the maiden's royal master to marry her to an old and ugly favourite of his, are for a while threatened with permanent separation. The action of the play is full of life, and abounds in stirring, though sometimes improbable, incidents. The poet is considered by native critics to be not only not inferior to Kālidāsa, but even to have surpassed him in his *Uttararāmacharita*, which certainly contains many fine poetic passages instinct with pathos and genuine feeling. But, though he ranks deservedly high as a lyric poet, he is far inferior to Kālidāsa as a dramatic artist. Whilst the latter delights in depicting the gentler feelings and tender emotions of the human heart and the peaceful scenes of rural life, the younger poet finds a peculiar attraction in the sterner and more imposing aspects of nature and the human character. Bhavabhūti's language, though polished and felicitous, is elaborate and artificial compared with that of Kālidāsa, and his genius is sorely shackled by a slavish adherence to the arbitrary rules of dramatic theorists.

Bhavabhūti.

Bhaṭṭa Nārāyaṇa, surnamed Mṛigarāja or Siṃha, "the lion," the author of the *Veṇisaṃhāra* [9] ("the binding up of the braid of hair"), is a poet of uncertain date. Tradition makes him one of the five Kanauj Brāhmans whom king Ādisūra of Bengal, desirous of establishing the pure Vaishṇava doctrine, invited to his court, and from whom the modern Bengalī Brāhmans are supposed to be descended. But be this as it may, a copperplate grant was issued to our poet in A.D. 840; and, besides, he is quoted in Ānandavardhana's *Dhvanyāloka*, written in the latter part of the 9th century. The play, consisting of six acts, takes its title from an incident in the story of the *Mahābharāta* when Draupadī, having been lost at dice by Yudhishṭhira, has her braid of hair unloosened, and is dragged by the hair before the assembly by one of the Kauravas; this insult being subsequently avenged by Bhīma slaying the offender, whereupon Draupadī's braid is tied up again, as beseems a married woman. The piece is composed in a style similar to that of Bhavabhūti's plays, but is inferior to them in dramatic construction and poetic merit, though valued by critics for its strict adherence to the rules of the dramatic theory.

Bhaṭṭa Nārāyaṇa.

The *Hanuman-nāṭaka* [10] is a dramatized version of the story of Rāma, interspersed with numerous purely descriptive poetic passages. It consists of fourteen acts, and on account of its length is also called the *Mahā-nāṭaka*, or great drama. Contrary to the general practice, it has no prologue, and Sanskrit alone is employed in it. Tradition relates that it was composed by Hanumān, the monkey general, and inscribed on rocks; but, Vālmīki, the author of the *Rāmāyaṇa*,

[1] Both these plays are known in different recensions in different parts of India. The Bengali recension of the *Śakuntalā* was translated by Sir W. Jones, and into French, with the text, by Chézy, and again edited by R. Pischel, who has also advocated its greater antiquity. Editions and translations of the western (Devanāgarī) recension have been published by O. Böhtlingk and Mon. Williams. The *Vikramorvaśī* has been edited critically by S. P. Pandit, and the southern text by R. Pischel. It has been translated by H. H. Wilson and E. B. Cowell.

[2] Edited critically by S. P. Pandit; translated by C. H. Tawney (1875), and into German by A. Weber (1856), and L. Fritze (1881).

[3] Edited by Tārānātha Tarkavāchaspati, and by C. Cappeller in Böhtlingk's *Sanskrit-Chrestomathie*; with commentary (Bombay, 1895); translated by H. H. Wilson.

[4] Edited by Mādhava Chandra Ghosha and translated by P. Boyd, with a preface by E. B. Cowell.

[5] This is the commentator's explanation of the name, whilst M. Lévi would render it by "the divine throat."

[6] Edited by F. H. Trithen (1848); with commentary, A. Barooah (Calcutta, 1877) and Parab (Bombay, 1892); translated by J. Pickford (1871).

[7] Edited with commentary and translation (Nagpur, 1895); with commentary, Aiyar and Parab (1899); translation by H. H. Wilson and C. H. Tawney.

[8] Edited by R. G. Bhandarkar (1876); translated by H. H. Wilson. Whether, as M. S. Lévi suggests, the fact of the play consisting of ten acts points to its having been composed in imitation of the *Mṛichchhakaṭikā* must remain uncertain.

[9] Edited by J. Grill (1871); twice with commentary (Bombay); English translation by S. M. Tagore (Calcutta).

[10] Printed with Mohanadāsa's commentary (Bombay, 1861).

being afraid lest it might throw his own poem into the shade, Hanumān allowed him to cast his verses into the sea. Thence fragments were ultimately picked up by a merchant, and brought to King Bhoja, who directed the poet Dāmodara Miśra to put them together and fill up the lacunae; whence the present composition originated. Whatever particle of truth there may be in this story, the "great drama" seems certainly to be the production of different hands. "The language," as Wilson remarks, "is in general very harmonious, but the work is after all a most disjointed and non-descript composition, and the patchwork is very glaringly and clumsily put together." It is nevertheless a work of some interest, as compositions of mixed dramatic and declamatory passages of this kind may have been common in the early stages of the dramatic art. The connexion of the poet with King Bhoja, also confirmed by the *Bhoja-prabandha*, would bring the composition, or final redaction, down to about the 10th or 11th century. A *Mahānāṭaka* is, however, already referred to by Ānandavardhana (9th century); and, besides, there are two different recensions of the work, a shorter one commented upon by Mohanadāsa, and a longer one arranged by Madhusūdana. A Dāmodara Gupta is mentioned as having lived under Jayāpīḍa of Kashmir (755–786); but this can scarcely be the same as the writer connected with this work.

The *Mudrārākshasa*,[1] or "Rākshasa (the minister) with the signet," is a drama of political intrigue, in seven acts, partly based on historical events, the plot turning on the reconciliation of Rākshasa, the minister of the murdered king Nanda, with the hostile party, consisting of Prince Chandragupta (the Greek Sandrocottus, 315-291 B.C.), who succeeded Nanda, and his minister Chāṇakya. The plot is developed with considerable dramatic skill, in vigorous, if not particularly elegant, language. The play was composed by Viśākhadatta, prior, at any rate, to the 11th century, whilst Professor Jacobi infers from astronomical indications that it was written in A.D. 860.

The *Prabodha-chandrodaya*,[2] or "the moon-rise of intelligence," composed by Kṛishṇamiśra about the 12th century, is an allegorical play, in six acts, the *dramatis personae* of which consist entirely of abstract ideas, divided into two conflicting hosts.

Of numerous inferior dramatic compositions we may mention as the best—the *Anarghya-rāghava*, by Murāri; the *Bāla-rāmāyaṇa*, one of six plays (four of which are known) by Rājaśekhara,[3] and the *Prasanna-rāghava*,[4] by Jayadeva, the author of the rhetorical treatise *Chandrāloka*. Abstracts of a number of other pieces are given in H. H. Wilson's *Hindu Theatre*, the standard work on this subject. The dramatic genius of the Hindus may be said to have exhausted itself about the 14th century.

5. *Lyrical, Descriptive and Didactic Poetry.*—Allusion has already been made to the marked predilection of the medieval Indian poet for depicting in a single stanza some peculiar physical or mental situation. The profane lyrical poetry consists chiefly of such little poetic pictures, which form a prominent feature of dramatic compositions. Numerous poets and poetesses are only known to us through such detached stanzas, preserved in native anthologies or manuals of rhetoric, and enshrining a vast amount of descriptive and contemplative poetry. Thus the *Saduktikarṇāmṛita*,[5] or "ear-ambrosia of good sayings," an anthology compiled by Śrīdhara Dāsa in 1205, contains verses by 446 different writers; while the *Śārngadharapaddhati*,[6] of the 14th century, contains some 6000 verses culled from 264 different writers and works; and Vallabhadeva's *Subhāshitāvalī*,[7] another such anthology, consists of some 3500 verses ascribed to some 350 poets. These verses are either of a purely descriptive or of an erotic character; or they have a didactic tendency, being intended to convey, in an attractive and easily remembered form, some moral truth or useful counsel. An excellent specimen of a longer poem, of a partly descriptive, partly erotic character, is Kālidāsa's *Megha-dūta*,[8] or "cloud messenger," in which a banished Yaksha (demi-god) sends a love-message across India to his wife in the Himālaya, and describes, in verse-pictures of the stately mandākrāntā metre the various places and objects over which the messenger, a cloud, will have to sail in his airy voyage. This little masterpiece has called forth a number of more or less successful imitations, such as Lakshmīdāsa's *Śuka-sandeśa*, or "parrot-message," lately edited by the mahārāja of Travancore. Another much-admired descriptive poem by Kālidāsa is the *Ṛitu-saṃhāra*,[9] or "collection of the seasons," in which the attractive features of the six seasons are successively set forth.

Lyric poetry.

As regards religious lyrics, the fruit of sectarian fervour, a large collection of hymns and detached stanzas, extolling some special deity, might be made from Purāṇas and other works. Of independent productions of this kind only a few of the more important can be mentioned here. Śankara Āchārya, the great Vedāntist, who seems to have flourished about A.D. 800, is credited with several devotional poems, especially the *Ānanda-laharī*, or "wave of joy," a hymn of 103 stanzas, in praise of the goddess Pārvatī. The *Sūrya-śataka*, or century of stanzas in praise of Sūrya, the sun, is ascribed to Mayūra, the contemporary (and, according to a tradition, the father-in-law) of Bāṇa (in the early part of the 7th century). The latter poet himself composed the *Chaṇḍikāstotra*, a hymn of 102 stanzas, extolling Śiva's consort. The *Khaṇḍaprāśasti*, a poem celebrating the ten avatāras of Vishṇu, is ascribed to no other than Hanumān, the monkey general, himself. Jayadeva's beautiful poem *Gītagovinda*, which, like most productions concerning Kṛishṇa, is of a very sensuous character, has already been referred to.

Didactic poetry.

The particular branch of didactic poetry in which India is especially rich is that of moral maxims, expressed in single stanzas or couplets, and forming the chief vehicle of the *Nīti-śāstra* or ethic science. Excellent collections of such aphorisms have been published—in Sanskrit and German by O. v. Böhtlingk, and in English by John Muir. Probably the oldest original collection of this kind is that ascribed to Chāṇakya,—and entitled *Rājanītisamuchchaya*,[10] "collection on the conduct of kings"—traditionally connected with the Machiavellian minister of Chandragupta, but (in its present form) doubtless much later—of which there are several recensions, especially a shorter one of one hundred couplets, and a larger one of some three hundred. Another old collection is the *Kāmandakīya-Nītisāra*,[11] ascribed to Kāmandaki, who is said to have been the disciple of Chāṇakya. Under the name of Bhartṛihari have been handed down three centuries of sententious couplets,[12] one of which, the *nīti-śataka*, relates to ethics, whilst the other two, the *śṛingāra-* and *vairāgya-śatakas*, consist of amatory and devotional verses respectively. The *Nīti-pradīpa*, or "lamp of conduct," consisting of sixteen stanzas, is ascribed to Vetālabhaṭṭa who is mentioned as one of "nine gems." The *Amarū-śataka*,[13] consisting of a hundred stanzas, ascribed to a King Amaru (sometimes wrongly to Śankara); the *Bhāminī-vilāsa*,[14] or "dalliance of a fair woman," by Jagannātha; and the *Chaura-suratapanchāśikā*,[15] by Bilhaṇa (11th century), are of an entirely erotic character.

Fables and narratives.

6. *Fables and Narratives.*—For purposes of popular instruction stanzas of an ethical import were early worked up with existing prose fables and popular stories, probably in imitation of the Buddhist *jātakas*, or birth-stories. A collection of this kind, intended as a manual for the guidance of princes (*in usum delphini*), was translated into Pahlavī in the reign of the Persian king Chosru Nushirvan, A.D. 531–579;

[1] Edited (Bombay, 1884, 1893) by K. T. Telang, who discusses the date of the work in his preface; transl. H. H. Wilson; German, L. Fritze; French, Victor Hehn.

[2] Translated by J. Taylor (1810); by T. Goldstücker into German (1842). Edited by H. Brockhaus (1845); also Bombay (1898).

[3] Another play, composed entirely in Prākṛit, by Rājaśekhara (*c.* A.D. 900), the *Karpūramanjarī*, has been critically edited by Sten Konow, with English translation by Ch. R. Lanman, Harvard Or. Ser. (1901).

[4] Ed. Shivarāma Raoji Khopakar (Bombay, 1894).

[5] Rājendralāla Mitra, *Notices*, iii. p. 134.

[6] Ed. P. Peterson (Bombay, 1888).

[7] Ed. P. Peterson and Durgāprasāda (Bombay, 1886).

[8] Text and translation by H. H. Wilson; with vocabulary by S. Johnson; with German vocabulary by Stenzler (1874); often, with commentary, in India.

[9] The first Sanskrit book published (by Sir W. Jones), 1792. Text and Latin translation by P. v. Bohlen, edited, with notes and translation, by S. Ayyar (Bombay, 1897); partly translated, in verse, by R. T. H. Griffith, *Specimens of Old Indian Poetry*.

[10] Ed. Klatt (1873); German transl. O. Kressler (1906).

[11] Edited by Rājendralāla Mitra, *Bibl. Ind.*; with translation and notes (Madras, 1895).

[12] Translation, in English verse, by C. H. Tawney.

[13] Ed. R. Simon (1893).

[14] Edited, with French translation, by A. Bergaigne (1872); with English translation, by *Sheshādri Iyar* (Bombay, 1894).

[15] Edited by P. v. Bohlen (1833); with German translation. W. Solf (1886); English translation by Edwin Arnold (1896).

but neither this translation nor the original is any longer extant. A Syriac translation, however, made from the Pahlavī in the same century, under the title of "Qalilag and Dimnag"—from the Sanskrit "Karataka and Damanaka," two jackals who play an important part as the lion's counsellors—has been discovered and published. The Sanskrit original, which probably consisted of fourteen chapters, was afterwards recast—the result being the *Panchatantra*,[1] or "five books" (or headings), of which several recensions exist. A popular summary of this work, in four books, the *Hitopadeśa*,[2] or "Salutary Counsel," has been shown by Peterson to have been composed by one Nārāyaṇa. Other highly popular collections of stories and fairy tales, interspersed with sententious verses, are: the *Vetāla-panchaviṃśati*,[3] or "twenty-five (stories) of the Vetāla" (the original of the Baitāl Pachīsī), ascribed either to Jambhala Datta, or to Śivadāsa (while Professor Weber suggests that Vetāla-bhaṭṭa may have been the author), and at all events older than the 11th century, since both Kshemendra and Somadeva have used it; the *Śuka-saptati*,[4] or "seventy (stories related) by the parrot," the author and age of which are unknown; and the *Siṃhāsana-dvātriṃśikā*,[5] or "thirty-two (tales) of the throne," being laudatory stories regarding Vikramāditya of Avantī, related by thirty-two statues, standing round the old throne of that famous monarch, to King Bhoja of Dhārā to discourage him from sitting down on it. This work is ascribed to Kshemankara, and was probably composed in the time of Bhoja (who died in 1053) from older stories in the Mahārāshṭra dialect. The original text has, however, undergone many modifications, and is now known in several different recensions. Of about the same date are two great store-houses of fairy tales, composed entirely in ślokas, viz. the rather wooden and careless *Bṛihat-kathā-manjarī*,[6] or "great cluster of story," by Kshemendra, also called Kshemankara, who wrote, *c.* 1020–1040, under King Ananta of Kashmir; and the far superior and truly poetical *Kathā-sarit-sāgara*,[7] or "ocean of the streams of story," composed in some 21,500 couplets by Somadeva, early in the 12th century, for the recreation of Ananta's widow, Sūryavatī, grandmother of King Harshadeva. Both these works are based on an apparently lost work, viz. Guṇādhya's *Bṛihat-kathā*, or "great story," which was composed in some popular dialect, perhaps as early as the 1st or 2nd century of our era, and which must have rivalled the Mahābhārata in extent, seeing that it is stated to have consisted of 100,000 ślokas (of 32 syllables each).

B. Scientific and Technical Literature

I. Law (*Dharma*).[8]—Among the technical treatises of the later Vedic period, certain portions of the Kalpa-sūtras, or manuals of ceremonial, peculiar to particular schools, were referred to as the earliest attempts at a systematic treatment of law subjects. These are the *Dharma-sūtras*, or "rules of (religious) law," also called *Sāmayāchārika-sūtras*, or "rules of conventional usage (samaya-āchāra)." It is doubtful whether such treatises were at any time quite as numerous as the Gṛihyasūtras, or rules of domestic or family rites, to which they are closely allied, and of which indeed they may originally have been an outgrowth. That the number of those actually extant is comparatively small is, however, chiefly due to the fact that this class of works was supplanted by another of a more popular kind, which covered the same ground. The Dharmasūtras consist chiefly of strings of terse rules, containing the essentials of the science, and intended to be committed to memory, and to be expounded orally by the teacher—thus forming, as it were, epitomes of class lectures. These rules are interspersed with stanzas or "gāthās," in various metres, either composed by the author himself or quoted from elsewhere, which generally give the substance of the preceding rules. One can well understand why such couplets should gradually have become more popular, and should ultimately have led to the appearance of works entirely composed in verse. Such metrical law-books did spring up in large numbers, not all at once, but over a long period of time, extending probably from about the beginning of our era, or even earlier, down to well-nigh the Mahommedan conquest; and, as at the time of their first appearance the epic impulse was particularly strong, other metres were entirely discarded for the epic śloka. These works are the metrical *Dharma-śāstras*, or, as they are usually called, the *Smṛiti*, "recollection, tradition,"—a term which, as we have seen, belonged to the whole body of Sūtras (as opposed to the *Śruti*, or revelation), but which has become the almost exclusive title of the versified institutes of law (and the few Dharmasūtras still extant). Of metrical Smṛitis about forty are hitherto known to exist, but their total number probably amounted to at least double that figure, though some of these, it is true, are but short and insignificant tracts, while others are only different recensions of one and the same work.

Law.

With the exception of a few of these works—such as the *Agni-*, *Yama-* and *Vishṇu-Smṛitis*—which are ascribed to the respective gods, the authorship of the Smṛitis is attributed to old ṛishis, such as Atri, Kaṇva, Vyāsa, Śāṇḍilya, Bharadvāja. *Manu.* It is, however, extremely doubtful whether in most cases this attribution is not altogether fanciful, or whether, as a rule, there really existed a traditional connexion between these works and their alleged authors or schools named after them. The idea, which early suggested itself to Sanskrit scholars, that Smṛitis which passed by the names of old Vedic teachers and their schools might simply be metrical recasts of the Dharma- (or Gṛihya-) sūtras of these schools, was a very natural one, and, indeed, is still a very probable one, though the loss of the original Sūtras, and the modifications and additions which the Smṛitis doubtless underwent in course of time, make it very difficult to prove this point. One could, however, scarcely account for the disappearance of the Dharmasūtras of some of the most important schools except on the ground that they were given up in favour of other works; and it is not very likely that this should have been done, unless there was some guarantee that the new works, upon the whole, embodied the doctrines of the old authorities of the respective schools. Thus, as regards the most important of the Smṛitis, the *Mānava-Dharmaśāstra*,[9] there exist both a Śrauta- and a Gṛihya-sūtra of the Mānava school of the Black Yajus, but no such Dharmasūtra has hitherto been discovered, though the former existence of such a work has been made all but certain by Professor Bühler's discovery of quotations from a Mānavam, consisting partly of prose rules, and partly of couplets, some of which occur literally in the Manusmṛiti, whilst others have been slightly altered there to suit later doctrines, or have been changed from the original triṣhṭubh into the epic metre. The idea of an old law-giver Manu Svāyambhuva—"sprung from the self-existent (svayam-bhū)" god Brahman (m.)—reaches far back into Vedic antiquity: he is mentioned as such in early texts; and in Yāska's *Nirukta* a śloka occurs giving his opinion on a point of inheritance. But whether or not the Mānava-Dharmasūtra embodied what were supposed to be the authoritative precepts of this sage on questions of sacred law we do not know; nor can it as yet be shown that the Manusmṛiti, which seems itself to have undergone considerable modifications, is the lineal descendant of that Dharmasūtra. It is, however, worthy of note that a very close connexion exists between the Manusmṛiti and the Vishṇuśāstra; and, as the latter is most likely a modern, only partially remodelled, edition of the Sūtras of the Black Yajus school of the Kaṭhas, the close relation between the two works would be easily understood, if it could be shown that the Manusmṛiti is a modern development of the Sūtras of another school of the Charaka division of the Black Yajurveda.

The Mānava Dharmaśāstra consists of twelve books, the first and last of which, treating of creation, transmigration and final beatitude, are, however, generally regarded as later additions. In them the legendary sage Bhṛigu, here called a Mānava, is introduced as Manu's disciple, through whom the great teacher has his work promulgated. Why this intermediate agent should have been considered necessary is by no means clear. Except in these two books the work shows no special relation to Manu, for, though he is occasionally referred to in it, the same is done in other Smṛitis. The question as to the probable date of the final redaction of the work cannot as yet be answered. Dr Burnell has tried to show that it was probably composed under the Chālukya king Pulakeśi, about A.D. 500, but his argumentation is anything but convincing. From several ślokas quoted from Manu by Varāhamihira, in the 6th century, it would appear that the text which the great astronomer had before him differed very considerably from our Manusmṛiti. It is, however, possible that he referred either to the *Bṛihat-Manu* (Great

[1] Edited by Kosegarten, by G. Bühler and F. Kielhorn; translated by Th. Benfey, E. Lancereau, L. Fritze; edited in Pūrṇabhadra's recension by J. Hertel, in Harv. Or. Ser. (1908).

[2] Ed. and transl. F. Johnson, ed. P. Peterson and others in India.

[3] Ed. H. Uhle (Leipzig, 1881); cf. R. F. Burton, *Vikram and the Vampire* (new ed., 1893).

[4] Edited, with German translation, R. Schmidt (Leipzig, 1893), and translation of some stories of a larger recension (1896).

[5] German translation, with introduction, A. Weber, *Ind. Stud.* xv.

[6] Edited, with translation and notes, by L. v. Mankowski (Leipzig, 1892); chapters 1-8 edited and translated by Sylvain Lévi, *Journ. As.* (1886); cf. F. Lacôte, *Essai sur Guṇādhya et la Bṛihatkathā* (1909), where part of a Nepalese version is given.

[7] Edited by H. Brockhaus (1839–1862); by Durgāpratāpa (Bombay, 1889); translated by C. H. Tawney, *Bibl. Ind.* (1880–1886).

[8] Cf. J. Jolly's exhaustive treatise, *Recht und Sitte*, in Bühler's *Grundriss* (1896).

[9] The standard edition is by G. C. Haughton, with Sir W. Jones's translation (1825); the latest translations by A. Burnell and G. Bühler. There is also a critical essay on the work by F. Johäntgen. On the relation between the Dharmasūtras and Smṛitis see especially West and Bühler, *Digest of Hindu Law* (3rd ed.), i. p. 37 seq.

M.) or the *Vṛiddha-Manu* (Old M.), who are often found quoted, and apparently represent one, if not two, larger recensions of this Smṛiti. The oldest existing commentary on the *Mānava-Dharmaśāstra* is by Medhātithi, who is first quoted in 1200, and is usually supposed to have lived in the 9th or 10th century. He had, however, several predecessors to whom he refers as *pūrve*, "the former ones." The most esteemed of the commentaries is that of Kullūka Bhaṭṭa, composed at Benares in the 15th century.

Yājñavalkya.

Next in importance among Smṛitis ranks the *Yājñavalkya Dharmaśāstra*.[1] Its origin and date are not less uncertain—except that, in the opinion of Professor Stenzler, which has never been questioned, it is based on the Manusmṛiti, and represents a more advanced stage of legal theory and definition than that work. Yājñavalkya, as we have seen, is looked upon as the founder of the Vājasaneyins or White Yajus, and the author of the Śatapatha-brāhmaṇa. In the latter work he is represented as having passed some time at the court of King Janaka of Videha (Tirhut); and in accordance therewith he is stated, in the introductory couplets of the Dharmaśāstra, to have propounded his legal doctrines to the sages, while staying at Mithilā (the capital of Videha). Hence, if the connexion between the metrical Smṛitis and the old Vedic schools be a real one and not one of name merely, we should expect to find in the Yājñavalkya-smṛiti special coincidences of doctrine with the Kātiya-sūtra, the principal Sūtra of the Vājasaneyins. Now, some sufficiently striking coincidences between this Smṛiti and Pāraskara's *Kāt.ya-Gṛihyasūtra* have indeed been pointed out; and if there ever existed a Dharmasūtra belonging to the same school, of which no trace has hitherto been found, the points of agreement between this and the Dharmaśāstra might be expected to be even more numerous. A connexion between this Smṛiti and the Mānava-gṛihyasūtra seems, however, likewise evident. As in the case of Manu, ślokas are quoted in various works from a *Bṛihat-* and a *Vṛiddha-Yājñavalkya*. The Yājñavalkya-smṛiti consists of three books, corresponding to the three great divisions of the Indian theory of law: *āchāra*, rule of conduct (social and caste duties); *vyavahāra*, civil and criminal law; and *prāyaśchitta*, penance or expiation. There are two important commentaries on the work: the famous *Mitākharā*,[2] by Vijñāneśvara, who lived under the Chālukya king Vikramāditya of Kalyāṇa (1076–1127); and another by Aparārka or Aparāditya, a petty Śilāra prince of the latter half of the 12th century.

Nāradasmṛiti.

The *Nāradiya-Dharmaśāstra*, or *Nāradasmṛiti*,[3] is a work of a more practical kind; indeed, it is probably the most systematic and business-like of all the Smṛitis. It does not concern itself with religious and moral precepts, but is strictly confined to law. Of this work again there are at least two different recensions. Besides the text translated by Dr Jolly, a portion of a larger recension has come to light in India. This version has been commented upon by Asahāya, "the peerless"—a very esteemed writer on law who is supposed to have lived before Medhātithi (? 9th century)—and it may therefore be considered as the older recension of the two. But, as it has been found to contain the word *dināra*, an adaptation of the Roman *denarius*, it cannot, at any rate, be older than the 2nd century; indeed, its date is probably several centuries later.

Parāśara.

The *Parāśara-smṛiti*[4] contains no chapter on jurisprudence, but treats only of religious duties and expiations in 12 adhyāyas. The deficiency was, however, supplied by the famous exegete Mādhava (in the latter half of the 14th century), who made use of Parāśara's text for the compilation of a large digest of religious law, usually called *Pārāśara-mādhaviyam*, to which he added a third chapter on vyavahāra, or law proper. Besides the ordinary text of the Parāśara-smṛiti, consisting of rather less than 600 couplets, there is also extant a *Bṛihat-Parāśarasmṛiti*, probably an amplification of the former, containing not less than 2980 (according to others even 3300) ślokas.

Whether any of the Dharmaśāstras were ever used in India as actual "codes of law" for the practical administration of justice is very doubtful; indeed, so far as the most prominent works of this class are concerned, it is highly improbable.[5] No doubt these works were held to be of the highest authority as laying down the principles of religious and civil duty; but it was not so much any single text as the whole body of the Smṛiti that was looked upon as the embodiment of the divine law. Hence, the moment the actual work of codification begins in the 11th century, we find the jurists engaged in practically showing how the Smṛitis confirm and supplement each other, and in reconciling seeming contradictions between them. This new phase of Indian jurisprudence commences with Vijñāneśvara's *Mitākharā*, which, though primarily a commentary on Yājñavalkya, is so rich in original matter and illustrations from other Smṛitis that it is far more adapted to serve as a code of law than the work it professes to explain. This treatise is held in high esteem all over India, with the exception of the Bengal or Gauṛiya school of law, which recognizes as its chief authority the digest of its founder, Jīmūtavāhana, especially the chapter on succession, entitled *Dāyabhāga*.[6] Based on the Mitākharā are the *Smṛiti-chandrikā*,[7] a work of great common-sense, written by Devaṇḍa Bhaṭṭa, in the 13th century, and highly esteemed in Southern India; and the *Vīramitrodaya*, a compilation consisting of two chapters, on āchāra and vyavahāra, made in the first half of the 17th century by Mitramiśra, for Rājā Vīrasimha, or Bīrsinh Deo of Orchhā, who murdered Abul Fazl, the minister of the emperor Akbar, and author of the *Āin i Akbarī*. There is no need here to enumerate any more of the vast number of treatises on special points of law, of greater or less merit, the more important of which will be found mentioned in English digests of Hindu law.

II. Philosophy.[8]—The contemplative Indian mind shows at all times a strong disposition for metaphysical speculation. In the old religious lyrics this may be detected from the very first. Not to speak of the abstract nature of some even of the oldest Vedic deities, this propensity betrays itself in a certain mystic symbolism, tending to refine and spiritualize the original purely physical character and activity of some of the more prominent gods, and to impart a deep and subtle import to the rites of the sacrifice. The primitive worship of more or less isolated elemental forces and phenomena had evidently ceased to satisfy the religious wants of the more thoughtful minds. Various syncretist tendencies show the drift of religious thought towards some kind of unity of the divine powers, be it in the direction of the pantheistic idea, or in that of an organized polytheism, or even towards monotheism. In the latter age of the hymns the pantheistic idea is rapidly gaining ground, and finds vent in various cosmogonic speculations; and in the Brāhmaṇa period we see it fully developed. The fundamental conception of this doctrine finds its expression in the two synonymous terms *brahman* (neutr.), probably originally "mystic effusion, devotional utterance,"[9] then "holy impulse," and *ātman*[10] (masc.), "breath, self, soul."

The recognition of the essential sameness of the individual souls, emanating all alike (whether really or imaginarily) from the ultimate spiritual essence (*parama-brahman*) "as sparks issue from the fire," and destined to return thither, involved some important problems. Considering the infinite diversity of individual souls of the animal and vegetable world, exhibiting various degrees of perfection, is it conceivable that each of them is the immediate efflux of the Supreme Being, the All-perfect, and that each, from the lowest to the highest, could re-unite therewith directly at the close of its mundane existence? The difficulty implied in the latter question was at first met by the assumption of an intermediate state of expiation and purification, a kind of purgatory; but the whole problem found at last a more comprehensive solution in the doctrine of transmigration (*saṃsāra*). Some scholars have suggested[11] that metempsychosis may have been the prevalent belief among the aboriginal tribes of India, and may have been taken over from them by the Indo-Aryans. This, no doubt, is possible; but in the absence of any positive proof it would be idle to speculate on its probability; the more so as the pantheistic notion of a universal spiritual essence would probably of itself sufficiently account for the spontaneous growth of such a belief. In any case, however, we can only assume that speculative minds seized upon it as offering the most satisfactory (if not the only possible) explanation of the great problem of phenomenal existence with its unequal distribution of weal and woe. It is certainly a significant fact that, once established in Indian thought, the doctrine of metempsychosis is never again called in question—that, like the fundamental idea on which it rests, viz. the essential sameness of the immaterial element of all sentient beings, the notion of *saṃsāra* has become an axiom, a universally conceded principle of Indian philosophy. Thus the latter has never quite risen to the heights of pure thought; its object is indeed *jijñāsā*, the search for knowledge; but it is an inquiry (*mīmāṃsā*) into the nature of things undertaken not solely for the attainment of the truth, but with a view to a specific object—the discontinuance of saṃsāra, the cessation of mundane existence after the present life. Every sentient being, through ignorance, being liable to sin, and destined after each existence to be born again in some new form, dependent on the actions committed during the immediately preceding life, all mundane existence thus is the source of ever-renewed suffering; and the task of the philosopher is to discover the means of attaining *moksha*, "release" from the bondage of material existence, and union with the Supreme Self—in fact, salvation. It is with a view to this,

[1] Edited, with a German translation, by F. Stenzler.

[2] Translated by H. T. Colebrooke.

[3] Ed. (*Bibl. Ind.*, 1885) J. Jolly, trsl. *S.B.E.* xxxiii.

[4] Edited in Bombay Sansk. Ser. (1893); translated *Bibl. Ind.* (1887). The chapter on inheritance (dāya-vibhāga) translated by A. C. Burnell (1868).

[5] See West and Bühler, *Digest*, i. p. 55. A different view is expressed by A. Burnell, *Dāyavibhāga*, p. xiii.

[6] Translated by H. C. Colebrooke (1810).

[7] The section on inheritance has been translated by T. Kristnasawmy Iyer (1866).

[8] Cf. F. Max Müller, *Six Systems of Indian Philosophy* (1899); R. Garbe, *Philosophy of Ancient India* (Chicago, 1897).

[9] The etymological connexion of *brahman* (from root *varh*, *vardh*) with Latin *verbum*, English *word* (corresponding to a Sanskrit *vardha*), assumed by some scholars, though doubtful, is not impossible. The development of its meaning would be somewhat like that of λόγος.

[10] The derivation of *ātman* (Ger. *Atem*) from root *an*, to breathe (or perhaps *av*, to blow) seems still the most likely. A recent attempt to connect it with *αὐτός* can scarcely commend itself.

[11] See, *e.g.* A. E. Gough, *The Philosophy of the Upanishads*, p. 24; A. A. Macdonell, *Hist. of Sanskrit Lit.* p. 387.

and to this only, that the Indian metaphysician takes up the great problems of life—the origin of man and the universe, and the relation between mind and matter.

It is not likely that these speculations were viewed with much favour by the great body of Brāhmans engaged in ritualistic practices. Not that the metaphysicians actually discountenanced the ceremonial worship of the old mythological gods as vain and nugatory. On the contrary, they expressly admitted the propriety of sacrifices, and commended them as the most meritorious of human acts, by which man could raise himself to the highest degrees of mundane existence, to the worlds of the Fathers and Devas. But, on the other hand, metaphysical speculation itself had gradually succeeded in profoundly modifying the original character of the sacrificial ritual: an allegorical meaning had come to be attached to every item of the ceremonial, in accordance with the strange monotheistic-pantheistic theory of the Brāhmaṇas which makes the performance of the sacrifice represent the building up of Prajāpati, the Purusha or "world man," and thus the creation or reproduction of the universe. In the *Śatap. Br.* (vii. 3, 4, 41) he is said to be the whole Brahman (n.), and (vii. 1, 2, 7; xi. 1, 6, 17) he is represented as the breath or vital air (prāṇa), and the air being his self (ātman). It needed but the identification of the Ātman, or individual self, with the Brahman or Paramātman (supreme self), to show that the final goal lay far beyond the worlds hitherto striven after through sacrifice, a goal unattainable through aught but a perfect knowledge of the soul's nature and its identity with the Divine Spirit. "Know ye that one Self," exhorts one of those old idealists,[1] "and have done with other words; for that (knowledge) is the bridge to immortality!" Intense self-contemplation being, moreover, the only way of attaining the all-important knowledge, this doctrine left little or no room for those mediatorial offices of the priest, so indispensable in ceremonial worship; and indeed we actually read of Brāhman sages resorting to Kshatriya princes[2] to hear them expound the true doctrine of salvation. But, in spite of their anti-hierarchical tendency, these speculations continued to gain ground; and in the end the body of treatises propounding the pantheistic doctrine, the Upanishads, were admitted into the sacred canon, as appendages to the ceremonial writings, the Brāhmaṇas. The Upanishads[3] thus form literally "the end of the Veda," the *Vedānta*; but their adherents claim this title for their doctrines in a metaphorical rather than in a material sense, as "the ultimate aim and consummation of the Veda." In later times the radical distinction between these speculative appendages and the bulk of the Vedic writings was strongly accentuated in a new classification of the sacred scriptures. According to this scheme they were supposed to consist of two great divisions—the *Karma-kāṇḍa, i.e.* "the work-section," or practical ceremonial (exoteric) part, consisting of the Saṃhitās and Brāhmaṇas (including the ritual portions of the Āraṇyakas), and the *Jñānakāṇḍa*, "the knowledge-section," or speculative (esoteric) part. These two divisions are also called respectively the *Pūrva-* ("former") and *Uttara-* ("latter," or higher[4]) *kāṇḍa*; and when the speculative tenets of the Upanishads came to be formulated into a regular system it was deemed desirable that there should also be a special system corresponding to the older and larger portion of the Vedic writings. Thus arose the two systems—the *Pūrva-* (or *Karma-*) *mīmāṃsā*, or "prior (practical) speculation," and the *Uttara-* (or *Brahma-*) *mīmāṃsā*, or higher inquiry (into the nature of the godhead), usually called the Vedānta philosophy.

Philosophical systems.

It is not yet possible to determine, even approximately, the time when the so-called *Darśanas* (literally "demonstrations"), or systems of philosophy which subsequently arose, were first formulated. And, though they have certainly developed from the tenets enunciated in the Upanishads, there is some doubt as to the exact order in which these systems succeeded each other. Of all the systems the Vedānta has indeed remained most closely in touch with the speculations of the Upanishads, which it has further developed and systematized. The authoritative *exposés* of the systems have, however, apparently passed through several redactions; and, in their present form, these sūtra-works[5] evidently belong to a comparatively recent period, none of them being probably older than the early centuries of our era. By far the ablest general review of the philosophical systems (except the Vedānta) produced by a native scholar is the *Sarva-darśana-saṅgraha*[6] ("summary of all the Darśanas"), composed in the 14th century, from a Vedāntist point of view, by the great exegete Mādhava Āchārya.

Among the different systems, six are generally recognized as orthodox, as being (either wholly or for the most part) consistent with the Vedic religion—two and two of which are again more closely related to each other than to the rest, viz.:

(1) *Pūrva-mīmāṃsā* (*Mīmāṃsā*), and (2) *Uttara-mīmāṃsā* (*Vedānta*);
(3) *Sāṅkhya*, and (4) *Yoga*;
(5) *Nyāya*, and (6) *Vaiśeshika*.

Mīmāṃsā.

1. The (*Pūrva-*) *Mīmāṃsā* is not a system of philosophy in the proper sense of the word, but rather a system of dogmatic criticism and scriptural interpretation. It maintains the eternal existence of the Veda, the different parts of which are minutely classified. Its principal object, however, is to ascertain the religious (chiefly ceremonial) duties enjoined in the Veda, and to show how these duties must be performed, and what are the special merits and rewards attaching to them. Hence arises the necessity of determining the principles for rightly interpreting the Vedic texts, as also of what forms its only claim to being classed among speculative systems, viz. a philosophical examination of the means of, and the proper method for, arriving at accurate knowledge. The foundation of this school, as well as the composition of the Sūtras or aphorisms, the *Mīmāṃsā-darśana*,[7] which constitute its chief doctrinal authority, is ascribed to Jaimini. The Sūtras were commented on by Śabara Svāmin; and further annotations (*vārttika*) thereon were supplied by the great theologian Kumārila Bhaṭṭa, who is supposed to have lived about A.D. 700 and to have worked hard for the re-establishment of Brāhmanism. The most approved general introduction to the study of the Mīmāṃsā is the metrical *Jaiminīya-Nyāya-mālā-vistara*,[8] with a prose commentary, both by Mādhava Āchārya. This distinguished writer, who has already been mentioned several times, was formerly supposed, from frequent statements in MSS., to have been the brother of Sāyaṇa, the well-known interpreter of the Vedas. The late Dr Burnell[9] has, however, made it very probable that these two are one and the same person, Sāyaṇa being his Telugu and Mādhavāchārya his Brāhmanical name. In 1331 he became the *jagadguru*, or spiritual head, of the Smārtas (a Vedāntist sect founded by Śaṅkarāchārya) at the Math of Śringeri, where, under the patronage of Bukka, king of Vidyānagara, he composed his numerous works. He sometimes passes under a third name, Vidyāraṇya-svāmin, adopted by him on becoming a *sannyāsin*, or religious mendicant.

Vedānta.

2. The *Vedānta* philosophy, in the comparatively primitive form in which it presents itself in most of the older Upanishads, constitutes the earliest phase of sustained metaphysical speculation. In its essential features it remains to this day the prevalent belief of Indian thinkers, and enters largely into the religious life and convictions of the people. It is an idealistic monism, which derives the universe from an ultimate conscious spiritual principle, the one and only existent from eternity—the *Ātman*, the Self, or the *Purusha*, the Person, the *Brahman*. It is this primordial essence or Self that pervades all things, and gives life and light to them, "without being sullied by the visible outward impurities or the miseries of the world, being itself apart"—and into which all things will, through knowledge, ultimately resolve themselves. "The wise who perceive him as being within their own Self, to them belongs eternal peace, not to others."[10] But, while the commentators never hesitate to interpret the Upanishads as being in perfect agreement with the Vedāntic system, as elaborated in later times, there is often considerable difficulty in accepting their explanations. In these treatises only the leading features of the pantheistic theory find utterance, generally in vague and mystic, though often in singularly powerful and poetical language, from which it is not always possible to extract the author's real idea on fundamental points, such as the relation between the Supreme Spirit and the phenomenal world—whether the latter was actually evolved from the former by a power inherent in him, or whether the process is altogether a fiction, an illusion of the individual self. Thus the Kaṭha-upanishad[11] offers the following summary: "Beyond the senses [there are the objects; beyond the objects] there is the mind (manas); beyond the mind there is the intellect (buddhi); beyond the intellect there is the Great Self. Beyond the Great One there is the Highest Undeveloped (avyaktam); beyond

[1] Muṇḍaka-upanishad, ii. 2, 5.

[2] From such allusions, or statements, in the Upanishads, some scholars have actually gone the length of claiming the origin of this cardinal doctrine of Vedānta philosophy for the Kshatriyas. It seems to us, however, very much more likely that these anecdotes were introduced by the Brahmanical sages of set purpose to win over their worldly patrons from their materialistic tendencies to their own idealistic views. Kapila, the author of the materialistic Sāṅkhya, is supposed to have been a Kshatriya, and so, we know, was the Śākya Muni.

[3] Cf. P. Deussen, *The Philosophy of the Upanishads* (Edinburgh, 1906).

[4] Cf. Muṇḍaka-upanishad, i. 4, 5, where these two divisions are called "the lower (*apara*) and the higher (*para*) knowledge."

[5] These works have all been printed with commentaries in India; and they have been partly translated by J. Ballantyne and by K. M. Banerjea. The best general view of the systems is to be obtained from H. C. Colebrooke's account, *Misc. Essays*, i. (2nd ed.), with Professor Cowell's notes. Compare also the brief abstract given in Goldstücker's *Literary Remains*, vol. i. A very useful classified index of philosophical works was published by F. Hall (1859).

[6] Edited in the *Bibl. Ind.*; translated by E. B. Cowell and A. E. Gough (1882).

[7] Text and Commentary, *Bibl. Ind.*

[8] Edited by Th. Goldstücker, completed by E. B. Cowell; also ed. *Ānand-Ser.* (Bombay, 1892).

[9] *Vaṃśa-brāhmaṇa*, Introd.

[10] Kaṭha-upanishad, ii. 5, 12.

[11] Kaṭha-up., i. 3, 10; ii. 6, 7.

the Undeveloped there is the Person (purusha), the all-pervading, characterless (alinga). Whatsoever knows him is liberated, and attains immortality." Here the Vedāntist commentator assures us that the Great Undeveloped, which the Sānkhyas would claim as their own primary material principle (pradhāna, prakriti), is in reality *Māyā*, illusion (otherwise called Avidyā, ignorance, or Śakti, power), the fictitious energy which in conjunction with the Highest Self (Ātman, Purusha) produces or constitutes the Īśvara, the Lord, or Cosmic Soul, the first emanation of the Ātman, and himself the (fictitious) cause of all that seems to exist. It must remain doubtful, however, whether the author of the Upanishad really meant this, or whether he regarded the Great Undeveloped as an actual material principle or substratum evolved from out of the Purusha, though not, as the Sānkhyas hold, coexisting with him from eternity. Besides passages such as these which seem to indicate realistic or materialistic tendencies of thought, which may well have developed into the dualistic Sānkhya and kindred systems, there are others which indicate the existence even of nihilist theories, such as the Bauddhas—the *śūnya-vādins*, or affirmers of a void or primordial nothingness—profess. Thus we read in the Chhāndogya-upanishad:[1] "The existent alone, my son, was here in the beginning, one only, without a second. Others say, there was the non-existent alone here in the beginning, one only, without a second—and from the non-existent the existent was born. But how could this be, my son? How could the existent be born from the non-existent? No, my son, only the existent was here in the beginning, one only, without a second."

The foundation of the Vedānta system, as "the completion of the Veda," is naturally ascribed to Vyāsa, the mythic arranger of the Vedas, who is said to be identical with Bādarāyaṇa the reputed author of the *Brahma-* (or *Śārīraka-*) *sūtra*, the authoritative, though highly obscure, summary of the system. The most distinguished interpreter of these aphorisms is the famous Malabar theologian Śankara Āchārya,[2] who also commented on the principal Upanishads and the Bhagavadgītā, and is said to have spent the greater part of his life in wandering all over India, as far as Kashmir, and engaging in disputations with teachers—whether of the Śaiva, or Vaishṇava, or less orthodox persuasions—with the view of rooting out heresy and re-establishing the doctrine of the Upanishads. His controversial triumphs (doubtless largely mythical) are related in a number of treatises current in South India, the two most important of which are the *Śankara-dig-vijaya* ("Śankara's world-conquest"), ascribed to his own disciple Ānandagiri, and the *Śankara-vijaya*, by Mādhavāchārya. In Śankara's philosophy[3] the theory that the material world has no real existence, but is a mere illusion of the individual soul wrapt in ignorance,—that, therefore, it has only a practical or conventional (*vyāvahārika*) but not a transcendental or true (*pāramārthika*) reality,—is strictly enforced. In accordance with this distinction, a higher (*parā*) and a lower (*aparā*) form of knowledge is recognized; the former being concerned with the Brahman (n.), whilst the latter deals with the personal Brahmā, the Īśvara, or lord and creator, who, however, is a mere illusory form of the divine spirit, resulting from ignorance of the human soul. To the question why the Supreme Self (or rather his fictitious development, the Highest Lord) should have sent forth this phantasmagory this great thinker (with the author of the Sūtras[4]) can return no better answer than that it must have been done for sport (*līlā*), without any special motive—since to ascribe such a motive to the Supreme Lord would be limiting his self-sufficiency—and that the process of creation has been going on from all eternity. Śankara's *Śāriraka-mīmāṃsā-bhāshya*[5] has given rise to a large number of exegetic treatises, of which Vāchaspati-miśra's[6] exposition, entitled *Bhāmatī*,[7] is the most esteemed. Of numerous other commentaries on the Brahma-sūtras, the *Śrī-bhāshya*, by Rāmānuja, the founder of the Śrī-Vaishṇava sect, is the most noteworthy. This religious teacher, who flourished in the first half of the 12th century, caused a schism in the Vedānta school. Instead of adhering to Śankara's orthodox *advaita*, or non-duality, doctrine, he interpreted the obscure Sūtras in accordance with his theory of *viśishṭādvaita*, *i.e.* non-duality of the (two) distinct (principles), or, as it is more commonly explained, non-duality of that which is qualified (by attributes). According to this theory the Brahman is neither devoid of form and quality, nor is it all things; but it is endowed with all good qualities, and matter is distinct from it; whilst bodies consist of souls (*chit*) and matter (*achit*); and God is the soul. On the religious side, Rāmānuja adopts the tenets of the ancient Vishnuite Pāncharātra sect, and, identifying the Brahman with Vishṇu, combines with his theory the ordinary Vaishṇava doctrine of periodical descents (*avatāra*) of the deity, in various forms, for the benefit of creatures; and allowing considerable play to the doctrine that faith (*bhakti*), not knowledge (*vidyā*), is the means of final emancipation. This phase of Indian religious belief, which has attached itself to the Vedānta theory more closely than to any other, makes its appearance very prominently in the *Bhagavadgītā*, the episode of the *Mahābhārata*, already referred to—where, however, it attaches itself to Sānkhya-yoga rather than to Vedānta tenets—and is even more fully developed in some of the Purāṇas, especially the Bhāgavata. Some scholars would attribute this doctrine of fervid devotion to Christian influence, but it is already alluded to by Pāṇini and in the *Mahābhāshya*. In the *Śāṇḍilya-* (*Bhakti-*) *sūtra*,[8] the author and date of which are unknown, the doctrine is systematically propounded in one hundred aphorisms. According to this doctrine mundane existence is due to want of faith, not to ignorance; and the final liberation of the individual soul can only be effected by faith. Knowledge only contributes to this end by removing the mind's foulness, unbelief. Its highest phase of development this doctrine probably reached in the Vaishṇava sect founded, towards the end of the 15th century, by Chaitanya, whose followers subsequently grafted the Vedānta speculations on his doctrine. In opposition both to Śankara's theory of absolute unity, and to Rāmānuja's doctrine of qualified unity—though leaning more towards the latter—Madhva Āchārya, or Pūrṇaprajna (A.D. 1118–1198), started his *dvaita*, or duality doctrine, according to which there is a difference between God and the human soul (*jīva*), as well as between God and nature; whilst the individual souls, which are innumerable, eternal, and indestructible, are likewise different from one another; but, though distinct, are yet united with God, like tree and sap, in an indissoluble union. This doctrine also identifies the Brahman with Vishṇu, by the side of whom, likewise infinite, is the goddess Lakshmī, as Prakriti (nature), from whom inert matter (*jaḍa*) derives its energy. Here also *bhakti*, devotion to God, is the saving element. A popular summary of the Vedānta doctrine is the *Vedānta-sāra* by Sadānanda, which has been frequently printed and translated.[9]

3. The *Sānkhya*[10] system seems to derive its name from its systematic enumeration (*sankhyā*) of the twenty-five principles (*tattva*) it recognizes—consisting of twenty-four material and an independent immaterial principle. In opposition to the Vedānta school, which maintains the eternal coexistence of a spiritual principle of reality and an unspiritual principle of unreality, the Sānkhya assumes the eternal coexistence of a material first cause, which it calls either *mūla-Prakriti* (fem.), "prime Originant" (Nature), or *Pradhāna*, "the principal" cause, and a plurality of spiritual elements or Selves, *Purusha*. The system recognizes no intelligent creator (such as the *Īśvara*, or demiurgus, of the Vedānta)—whence it is called *nirīśvara*, godless; but it conceives the Material First Cause, itself unintelligent, to have become developed, by a gradual process of evolution, into all the actual forms of the phenomenal universe, excepting the souls. Its first emanation is *buddhi*, intelligence; whence springs *ahaṃkāra*, consciousness (or "conscious mind-matter," Davies); thence the subtle elements of material forms, viz. five elementary particles (*tanmātra*) and eleven organs of sense; and finally, from the elementary particles, five elements. The souls have from all eternity been connected with Nature,—having in the first place become invested with a subtle frame (*linga-*, or *sūkshma-*, *śarīra*), consisting of seventeen principles, viz. intelligence, consciousness, elementary particles, and organs of sense and action, including mind. To account for the spontaneous development of matter, the system assumes the latter to consist of three constituents (*guṇa*) which are possessed of different qualities, viz. *sattva*, of pleasing qualities, such as "goodness," lightness, luminosity; *rajas*, of pain-giving qualities, such as "gloom," passion, activity; and *tamas*, of deadening qualities, such as "darkness," rigidity, dullness, and which, if not in a state of equipoise, cause unrest and development. Through all this course of development, the soul itself remains perfectly indifferent, its sole properties being those of purity and intelligence, and the functions usually regarded as "psychic" being due to the mechanical processes of the internal organs themselves evolved out of inanimate matter. Invested with its subtle frame, which accompanies it through the cycle of transmigration, the soul, for the sake of fruition, connects itself ever anew with Nature, thus, as it were, creating for itself ever new forms of material existence; and it is only on his attaining perfect knowledge, whereby the ever-changing modes of intelligence cease to be reflected on him, that the Purusha is liberated from the miseries of Saṃsāra, and continues to exist in a state of absolute unconsciousness and detachment from matter. The existence of God, on the other hand, is denied by this theory, or rather considered as incapable of proof; the existence of evil and misery, for one thing, being thought incompatible with the notion of a divine origin of the world.

The reputed originator of this school is the sage Kapila, to whom tradition ascribes the composition of the fundamental text-book,

[1] vi. 2. 1.

[2] *Die Sûtras des Vedânta*, text and commentary translated by P. Deussen (Leipzig, 1887); English translation by G. Thibaut, *S.B.E.*

[3] P. Deussen, *Das System des Vedânta* (1883). A. E. Gough, *The Philosophy of the Upanishads*, also follows chiefly Śankara's interpretation.

[4] *Brahmasūtra*, iii. 1. 32-34.

[5] Translated by G. Thibaut, *S.B.E.*; German, P. Deussen.

[6] Professor Cowell assigns him to about the 10th century.

[7] *Bibl. Ind.*

[8] Text, with Svapneśvara's commentary, edited by J. R. Ballantyne; translated by E. B. Cowell.

[9] Last by G. A. Jacob.

[10] E. Röer, *Lecture on the Sānkhya Philosophy* (Calcutta, 1854); B. St Hilaire, *Mémoire sur le Sānkhya* (1852); R. Garbe, *Sānkhya Philosophie* (Leipzig, 1894); *Sānkhya and Yoga* (Strassburg, 1896).

the (*Sānkhya-sūtra*, or) *Sānkhya-pravachana*,[1] as well as the *Tattva-samāsa*, a mere catalogue of the principles. But, though the founder would seem to have promulgated his system, in some form or other, at a very early period, these works, in their present form, have been shown to be quite modern productions, going probably not farther back than the 14th century of our era. Probably the oldest existing work is Iśvarakṛishṇa's excellent *Sānkhya-kārikā*,[2] which gives, in the narrow compass of sixty-nine ślokas, a lucid and complete sketch of the system. Though nothing certain is known regarding its author,[3] this work must be of tolerable antiquity, considering that it was commented upon by Gauḍapāda,[4] the preceptor of Govinda, who, on his part, is said to have been the teacher of Śankarāchārya. Of the commentaries on the Sūtras, the most approved are those of Aniruddha[5] and Vijñāna Bhikshu,[6] a writer probably of the latter part of the 16th century, who also wrote an independent treatise, the *Sānkhya-sāra*,[7] consisting of a prose and a verse part, which is probably the most useful compendium of Sānkhya doctrines.

4. The *Yoga* system is merely a schismatic branch of the preceding school, holding the same opinions on most points treated in common in their Sūtras, with the exception of one important point, the existence of God. To the twenty-five principles (*tattva*) of the Nirīśvara Sānkhya, the last of which was the *Purusha*, the Yoga adds, as the twenty-sixth, the *Nirguṇa Purusha*, or Self devoid of qualities, the Supreme God of the system. Hence the Yoga is called the *Seśvara* (theistical) *Sānkhya*. But over and above the purely speculative part of its doctrine, which it has adopted from the sister school, the theistic Sānkhya has developed a complete system of mortification of the senses — by means of prolonged apathy and abstraction, protracted rigidity of posture, and similar practices,—many of which are already alluded to in the Upanishads, —with the view of attaining to complete concentration (*yoga*) on, and an ecstatic vision of, the Deity, and the acquisition of miraculous powers. It is from this portion of the system that the school derives the name by which it is more generally known. The authoritative Sūtras of the Yoga, bearing the same title as those of the sister school, viz. *Sānkhya-pravachana*, but more commonly called *Yoga-śāstra*, are ascribed to Patañjali, who is perhaps identical with the author of the "great commentary" on Pāṇini. The oldest commentary on the Sūtras, the *Pātañjala-bhāshya*, is attributed to no other than Vyāsa, the mythic arranger of the Veda and founder of the Vedānta. Both works have again been commented upon by Vāchaspati-miśra, Vijñāna-bhikshu, and other writers.

Yoga.

5, 6. The *Nyāya*[8] and *Vaiśeshika* are but separate branches of one and the same school, which supplement each other and the doctrines of which have virtually become amalgamated into a single system of philosophy. The special part taken by each of the two branches in the elaboration of the system may be briefly stated in Dr Röer's words:— "To the Nyāya belong the logical doctrines of the forms of syllogisms, terms and propositions; to the Vaiśeshikas the systematical explanation of the categories (the simplest metaphysical ideas) of the metaphysical, physical and psychical notions — which notions are hardly touched upon in the Nyāya-sūtras. They differ in their statement of the several modes of proof—the Nyāya asserting four modes of proof (from perception, inference, analogy and verbal communication), the Vaśeshikas admitting only the two first ones." The term Nyāya (*ni-āya*, "in-going," entering), though properly meaning "analytical investigation," as applied to philosophical inquiry generally, has come to be taken more commonly in the narrower sense of "logic," because this school has entered more thoroughly than any other into the laws and processes of thought, and has worked out a formal system of reasoning which forms the Hindu standard of logic.

Nyāya and Vaiśeshika.

Logic.

The followers of these schools generally recognize seven categories (*padārtha*): substance (*dravya*), quality (*guṇa*), action (*karma*), generality (*sāmānya*), particularity (*viśesha*), intimate relation (*samavāya*) and non-existence or negation (*abhāva*). Substances, forming the substrata of qualities and actions, are of two kinds: eternal (without a cause), viz. space, time, ether, soul and the atoms of mind, earth, water, fire and air; and non-eternal, comprising all compounds, or the things we perceive, and which must have a cause of their existence. Causality is of three kinds: that of intimate relation (material cause); that of non-intimate relation (between parts of a compound); and instrumental causality (effecting the union of component parts). Material things are thus composed of atoms (*anu*), *i.e.* ultimate simple substances, or units of space, eternal, unchangeable and without dimension, characterized only by "particularity (*viśesha*)." It is from this predication of ultimate "particulars" that the Vaiśeshikas, the originators of the atomistic doctrine, derive their name. The Nyāya draws a clear line between matter and spirit, and has worked out a careful and ingenious system of psychology. It distinguishes between individual or living souls (*jīvātman*), which are numerous, infinite and eternal, and the Supreme Soul (*Paramātman*), which is one only, the seat of eternal knowledge, and the maker and ruler (*Īśvara*) of all things. It is by his will and agency that the unconscious living souls (soul-atoms, in fact) enter into union with the (material) atoms of mind, &c., and thus partake of the pleasures and sufferings of mundane existence. On the Hindu syllogism compare Professor Cowell's notes to Colebrooke's *Essays*, 2nd ed., i. p. 314.

The original collection of *Nyāya-sūtras* is ascribed to Gotama, and that of the *Vaiśeshika-sūtras* to Kaṇāda. The etymological meaning of the latter name seems to be "little-eater, particle-eater," whence in works of hostile critics the synonymous terms *Kaṇa-bhuj* or *Kaṇa-bhaksha* are sometimes derisively applied to him, doubtless in allusion to his theory of atoms. He is also occasionally referred to under the name of Kāśyapa. Both sūtra-works have been interpreted and supplemented by a number of writers, the commentary of Viśvanātha on the Nyāya and that of Śankara-miśra on the Vaiśeshika-sūtras being most generally used. There are, moreover, a vast number of separate works on the doctrines of these schools, especially on logic. Of favourite elementary treatises on the subject may be mentioned Keśava-miśra's *Tarka-bhāshā*, the *Tarka-sangraha*[9] and the *Bhāshā-parichchheda*.[10] A large and important book on logic is Gangeśa's *Chintāmani*, which formed the text-book of the celebrated Nuddea school of Bengal, founded by Raghunātha-śiromaṇi about the beginning of the 16th century. An interesting little treatise is the *Kusumāñjali*,[11] in which the author, Udayana Āchārya (about the 12th century, according to Professor Cowell), attempts, in 72 couplets, to prove the existence of a Supreme Being on the principles of the Nyāya system.

As regards the different heretical systems of Hindu philosophy, there is no occasion, in a sketch of Sanskrit literature, to enter into the tenets of the two great anti-Brāhmanical sects, the Jainas and Buddhists. While the original works of the former are written mostly in a popular (the Ardha-māgadhī) dialect, the northern Buddhists, it is true, have produced a considerable body of literature,[12] composed in a kind of hybrid Sanskrit, but only a few of their sacred books have as yet been published;[13] and it is, moreover, admitted on all hands that for the pure and authentic Bauddha doctrines we have rather to look to the Pāli scriptures of the southern branch. Nor can we do more here than briefly allude to the theories of a few of the less prominent heterodox systems, however interesting they may be for a history of human thought.

Heretical Systems.

The *Chārvākas*, an ancient sect of undisguised materialism, who deny the existence of the soul, and consider the human person (*purusha*) to be an organic body endowed with sensibility and with thought, resulting from a modification of the component material elements, ascribe their origin to Bṛihaspati; but their authoritative text-book, the *Bārhaspatya-sūtra*, is only known so far from a few quotations.

The *Pāñcharātras*, or *Bhāgavatas*, are an early Vaishṇava sect, in which the doctrine of faith, already alluded to, is strongly developed. Hence their tenets are defended by Rāmānuja, though they are partly condemned as heretical in the Brahma-sūtras. Their recognized text-book is the *Nārada-Pāñcharātra*,[14] whilst the *Bhagavadgītā* is also supposed to have had some connexion with this sect. According to their theory the Supreme Being (Bhagavat, Vāsudeva, Vishṇu) became four separate persons by successive production. While the Supreme Being himself is indued with the six qualities of knowledge, power, strength, absolute sway, vigour and energy, the three divine persons successively emanating from him and from one another represent the living soul, mind and consciousness respectively.

The *Pāśupatas*, one of several Śaiva (Māheśvara) sects, hold the Supreme Being (*Īśvara*), whom they identify with Śiva (as *paśu-pati*, or "lord of beasts"), to be the creator and ruler of the world, but not its material cause. With the Sānkhyas they admit the notion of a plastic material cause, the *Pradhāna*; while they follow Patañjali in maintaining the existence of a Supreme God.

III. GRAMMAR (*Vyākaraṇa*).—We found this subject enumerated as one of the six "limbs of the Veda," or auxiliary sciences, the study

[1] Translated by J. R. Ballantyne; 2nd ed. by F. Hall.

[2] Edited by C. Lassen (1832). Translations by H. T. Colebrooke and J. Davies.

[3] A writer makes him the pupil of Panchaśikha, whilst another even identifies him with Kālidāsa; cf. F. Hall, *Sānkhyasāra*, p. 29.

[4] Translated by H. H. Wilson. A Chinese translation of a commentary resembling that of Gauḍapāda is said (M. Müller, *India*, p. 300) to have been made during the Ch'en dynasty (A.D. 557–583).

[5] Translated by R. Garbe, *Bibl. Ind.*

[6] Edited by Garbe (Harvard, 1895); translated (Leipzig, 1889).

[7] Edited by F. Hall.

[8] Besides Colebrooke's *Essay*, with Cowell's notes, see Ballantyne's translation of the *Tarka-sangraha* and the introduction to Röer's translation of the *Bhāshāparichheda*, and his article, *Z.D.M.G.* xxi.

[9] Edited and translated by J. R. Ballantyne.

[10] Edited and translated, with commentary, by E. Röer.

[11] Edited and translated, with commentary, by E. B. Cowell.

[12] See B. H. Hodgson, *The Languages, Literature and Religion of Nepal and Tibet.*

[13] *Lalita-vistara*, ed. and partly transl. Rājendralāla Mitra; ed. S. Lefmann (1908); *Mahāvastu*, edited E. Senart; *Vajra-parichchheda*, edited M. Müller; *Saddharma-puṇḍarīka*, translated by E. Burnouf ("Lotus de la bonne loi"); and H. Kern, *Sacred Books of the East.*

[14] It consists of six Saṃhitās, one of which has been edited by K. M. Banerjea, *Bibl. Ind.*

of which was deemed necessary for a correct interpretation of the sacred Mantras, and the proper performance of Vedic rites. **Grammar.** Linguistic inquiry, phonetic as well as grammatical, was indeed early resorted to both for the purpose of elucidating the meaning of the Veda and with the view of settling its textual form. The particular work which came ultimately to be looked upon as the "vedānga" representative of grammatical science, and has **Pāṇini.** ever since remained the standard authority on Sanskrit grammar in India, is Pāṇini's *Ashṭādhyāyī*,[1] so called from its "consisting of eight lectures (*adhyāya*)," of four *pādas* each. For a comprehensive grasp of linguistic facts, and a penetrating insight into the structure of the vernacular language, this work stands probably unrivalled in the literature of any nation—though few other languages, it is true, afford such facilities as the Sanskrit for a scientific analysis. Pāṇini's system of arrangement differs entirely from that usually adopted in our grammars, viz. according to the so-called parts of speech. As the work is composed in aphorisms intended to be learnt by heart, economy of memory-matter was the author's paramount consideration. His object was chiefly attained by the grouping together of all cases exhibiting the same phonetic or formative feature, no matter whether or not they belonged to the same part of speech. For this purpose he also makes use of a highly artificial and ingenious system of algebraic symbols, consisting of technical letters (*anubandha*), used chiefly with suffixes, and indicative of the changes which the roots or stems have to undergo in word-formation.

It is self-evident that so complicated and complete a system of linguistic analysis and nomenclature could not have sprung up all at once and in the infancy of grammatical science, but that many generations of scholars must have helped to bring it to that degree of perfection which it exhibits in Pāṇini's work. Accordingly we find Pāṇini himself making reference in various places to ten different grammarians, besides two schools, which he calls the "eastern (*prāchchas*)" and "northern (*udañchas*)" grammarians. Perhaps the most important of his predecessors was Śākaṭāyana,[2] also mentioned by Yāska—the author of the Nirukta, who is likewise supposed to have preceded Pāṇini—as the only grammarian (*vaiyākaraṇa*) who held with the etymologists (*nairukta*) that all nouns are derived from verbal roots. Unfortunately there is little hope of the recovery of his grammar, which would probably have enabled us to determine somewhat more exactly to what extent Pāṇini was indebted to the labours of his predecessors. There exists indeed a grammar in South Indian MSS., entitled *Śabdānuśāsana*, which is ascribed to one Śākaṭāyana;[3] but this has been proved[4] to be the production of a modern Jaina writer, which, however, seems to be partly based on the original work, and partly on Pāṇini and others. Pāṇini is also called Dākṣhīputra, after his mother Dākshī. As his birthplace the village Śālātura is mentioned, which was situated some few miles north-west of the Indus, in the country of the Gandhāras, whence later writers also call him Śālāturīya, the formation of which name he himself explains in his grammar. Another name sometimes applied to him is Śālanki. In the *Kathā-sarits*ā*gara*, a modern collection of popular tales mentioned above, Pāṇini is said to have been the pupil of Varsha, a teacher at Pāṭaliputra, under the reign of Nanda, the father (?) of Chandragupta (315–291 B.C.). The real date of the great grammarian is, however, still a matter of uncertainty. While Goldstücker[5] attempted to put his date back to ante-Buddhist times (about the 7th century B.C.), Professor Weber held that Pāṇini's grammar cannot have been composed till some time after the invasion of Alexander the Great. This opinion is chiefly based on the occurrence in one of the Sūtras of the word *yavanānī*, in the sense of "the writing of the Yavanas (Ionians)," thus implying, it would seem, such an acquaintance with the Greek alphabet as it would be impossible to assume for any period prior to Alexander's Indian campaign (326 B.C.). But, as it is by no means certain[6] that this term really applies to the Greek alphabet, it is scarcely expedient to make the word the corner-stone of the argument regarding Pāṇini's age. If Patañjali's "great commentary" was written, as seems most likely, about the middle of the 2nd century B.C., it is hardly possible to assign to Pāṇini a later date than about 400 B.C. Though this grammarian registers numerous words and formations as peculiar to the Vedic hymns, his chief concern is with the ordinary speech (*bhāshā*) of his period and its literature; and it is noteworthy, in this respect, that the rules he lays down on some important points of syntax (as pointed out by Professors Bhandarkar and Kielhorn) are in accord with the practice of the Brāhmaṇas rather than with that of the later classical literature.

Pāṇini's Sūtras continued for ages after to form the centre of grammatical activity. But, as his own work had superseded those of his predecessors, so many of the scholars who devoted themselves to the task of perfecting his system have sunk into oblivion. The earliest of his successors whose work has come down to us (though perhaps not in a separate form) is Kātyāyana, the author of a large collection of concise critical notes, called **Kātyāyana.** *Vārttika*, intended to supplement and correct the Sūtras, or give them greater precision. The exact date of this writer is likewise unknown; but there can be little doubt that he lived at least a century after Pāṇini. During the interval a new body of literature seems to have sprung up[7]—accompanied with considerable changes of language—and the geographical knowledge of India extended over large tracts towards the south. Whether this is the same Kātyāyana to whom the Vājasaneyi-prātiśākhya (as well as the Sarvānukrama) is attributed, is still doubted by some scholars.[8] Kātyāyana being properly a family or tribal name, meaning "the descendant of Kātya," later works usually assign a second name Vararuchi to the writers (for there are at least two) who bear it. The Kathāsaritsāgara makes the author of the Vārttikas a fellow-student of Pāṇini, and afterwards the minister of king Nanda; but, though this date might have fitted Kātyāyana well enough, it is impossible to place any reliance on the statements derived from such a source. Kātyāyana was succeeded again, doubtless after a considerable interval, by Patañjali, the author of **Patañjali.** the (*Vyākaraṇa-*) *Mahā-bhāshya*,[9] or Great Commentary. For the great variety of information it incidentally supplies regarding the literature and manners of the period, this is, from an historical and antiquarian point of view, one of the most important works of the classical Sanskrit literature. Fortunately the author's date has been fairly settled by synchronisms implied in two passages of his work. In one of them the use of the imperfect—as the tense referring to an event, known to people generally, not witnessed by the speaker, and yet capable of being witnessed by him—is illustrated by the statement, "The Yavana besieged Sāketa," which there is reason to believe can only refer to the Indo-Bactrian king Menander (144–*c.* 124 B.C.), who, according to Strabo, extended his rule as far as the Yamunā.[10] In the other passage the use of the present is illustrated by the sentence, "We are sacrificing for Pushpamitra"—this prince (178–*c.* 142 B.C.), the founder of the Śunga dynasty, being known to have fought against the Greeks.[10] We thus get the years 144–142 B.C. as the probable time when the work, or part of it, was composed. Although Patañjali probably gives not a few traditional grammatical examples mechanically repeated from his predecessors, those here mentioned are fortunately such as, from the very nature of the case, must have been made by himself. The Mahābhāshya is not a continuous commentary on Pāṇini's grammar, but deals only with those Sūtras (some 1720 out of a total of nearly 4000) on which Kātyāyana had proposed any Vārttikas, the critical discussion of which, in connexion with the respective Sūtras, and with the views of other grammarians expressed thereon, is the sole object of Patañjali's commentatorial remarks. Though doubts have been raised as to the textual condition of the work, Professor Kielhorn has clearly shown that it has probably been handed down in as good a state of preservation as any other classical Sanskrit work. Patañjali is also called Gonardīya—which name Professor Bhandarkar takes to mean "a native of Gonarda," a place, according to the same scholar, probably identical with Goṇḍa, a town some 20 m. north-west of Oudh—and Goṇikāputra, or son of Goṇikā. Whether there is any connexion between this writer and the reputed author of the Yoga-śāstra is doubtful. The Mahābhāshya has been commented upon by Kaiyaṭa, in his *Bhāshyapradīpa*, and the latter again by Nāgojī-bhaṭṭa, a distinguished grammarian of the earlier part of the 18th century, in his *Bhāshya-pradīpoddyota*.

Of running commentaries on Pāṇini's Sūtras, the oldest extant and most important is the *Kāśikā Vṛitti*,[11] or "comment of Kāśi (Benares)," the joint production of two Jaina writers of **Kāśikā Vṛittī.** probably the first half of the 7th century, viz. Jayāditya and Vāmana, each of whom composed one half (four adhyāyas) of the work. The chief commentaries on this work are Haradatta Miśra's *Padamañjarī*, which also embodies the substance of the Mahābhāshya, and Jinendra-buddhi's *Nyāsa*.[12]

Educational requirements in course of time led to the appearance of grammars, chiefly of an elementary character, constructed

[1] Printed, with a commentary, at Calcutta; also, with notes, indexes and an instructive introduction, by O. Böhtlingk (1839–1840); and again with a German translation (1887).

[2] *I.e.* son of Śakaṭa, whence he is also called Śakaṭāṅgaja.

[3] Compare G. Bühler's paper, *Orient und Occident*, p. 691 seq.

[4] A. Burnell, *On the Aindra School of Sanskrit Grammarians*.

[5] *Pāṇini, his Place in Sanskrit Literature* (1861).

[6] See Lassen, *Ind. Alt.* i. p. 723; M. Müller, *Hist. of A.S. Lit.* p. 521; A. Weber, *Ind. Stud.* v. p. 2 seq.

[7] F. Kielhorn, *Kātvāyana und Patañjali* (1876). The *Sangraha*, a huge metrical work on grammar, by Vyāḍi, which is frequently referred to, doubtless belonged to this period.

[8] *E.g.* A. Weber. Goldstücker and M. Müller take the opposite view.

[9] Part of this work was first printed by Ballantyne; followed by a lithographed edition, by two Benares pandits (1871); and a photo-lithographic edition of the text and commentaries, published by the India Office, under Goldstücker's supervision (1874); finally, a critical edition by F. Kielhorn. For a review of the literary and antiquarian data supplied by the work, see A. Weber, *Ind. Stud.* xiii. 293 seq. The author's date has been frequently discussed, most thoroughly and successfully, by R. G. Bhandarkar in several papers. See also A. Weber, *Hist. of I.L.* p. 223.

[10] Lassen, *Ind. Alt.* ii. 341, 362.

[11] Edited by Pandit Bāla Śāstrī (Benares, 1876–1878).

[12] As it is quoted by Vopadeva it cannot be later than the 12th century.

on a more practical system of arrangement—the principal heads under which the grammatical matter was distributed usually being: rules of euphony (*sandhi*); inflection of nouns (*nāman*), generally including composition and secondary derivatives; the verb (*ākhyāta*); and primary (*kṛt-anta*) derivatives. In this way a number of grammatical schools[1] sprang up at different times, each recognizing a special set of Sūtras, round which gradually gathered a more or less numerous body of commentatorial and subsidiary treatises. As regards the grammatical material itself, these later grammars supply comparatively little that is not already contained in the older works—the difference being mainly one of method, and partly of terminology, including modifications of the system of technical letters (*anubandha*). Of the grammars of this description hitherto known, the *Chāndra-vyākaraṇa* is probably the oldest—its author Chandra Āchārya having flourished under King Abhimanyu of Kashmir, who is supposed to have lived towards the end of the 2nd century,[2] and in whose reign that grammarian is stated, along with others, to have revived the study of the Mahābhāshya in Kashmir. Only portions of this grammar, with a commentary by Ānandadatta, have, however, as yet been recovered. ***Modern grammars.*** ***Chandra.***

The *Kātantra*,[3] or *Kālāpa*, is ascribed to Kumāra, the god of war, whence this school is also sometimes called *Kaumāra*. The real author probably was Sarva-varman, who also wrote the original commentary (*vritti*), which was afterwards recast by Durgasiṃha, and again commented upon by the same writer, and subsequently by Trilochana-dāsa. The date of the Kātantra is unknown, but it will probably have to be assigned to about the 6th or 7th century. It is still used in many parts of India, especially in Bengal and Kashmir. Other grammars are—the *Sārasvatī Prakriyā*, by Anubhūti Svarūpāchārya; the *Sankshipta-sāra*, composed by Kramadīśvara, and corrected by Jumara-nandin, whence it is also called *Jaumara*; the *Haima-vyākaraṇa*,[4] by the Jaina writer Hemachandra (1088–1172, according to Dr Bhāo Dājī); the *Mugdha-bodha*,[5] composed, in the latter part of the 13th century, by Vopadeva, the court paṇḍit of King Mahādeva (Rāmarāja) of Devagiri (or Deoghar); the *Siddhānta-kaumudī*, the favourite text-book of Indian students, by Bhaṭṭoji Dīkshita (17th century); and a clever abridgment of it, the *Laghu-* (*Siddhānta-*) *kaumudī*,[6] by Varadarāja. ***Kātantra.*** ***Hema-chandra, &c.***

Several subsidiary grammatical treatises remain to be noticed. The *Paribhāshās* are general maxims of interpretation presupposed by the Sūtras. Those handed down as applicable to Pāṇini's system have been interpreted most ably by Nāgojībhaṭṭa, in his *Paribāshenduśekhara*.[7] In the case of rules applying to whole groups of words, the complete lists (*gaṇa*) of these words are given in the *Gaṇapāṭha*, and only referred to in the Sūtras. Vardhamāna's *Gaṇaratna-mahodadhi*,[8] a comparatively modern recension of these lists (A.D. 1140), is valuable as offering the only available commentary on the Gaṇas which contain many words of unknown meaning. The *Dhātupāṭhas* are complete lists of the roots (*dhātu*) of the language, with their general meanings. The lists handed down under this title,[9] as apparently arranged by Pāṇini himself, have been commented upon, amongst others, by Māḍhava. The *Uṇādi-sūtras* are rules on the formation of irregular derivatives. The oldest work of this kind, commented upon by Ujjvaladatta,[10] is by some writers ascribed to Kātyāyana Vararuchi, by others even to Śākaṭāyana. The oldest known treatise on the philosophy of grammar and syntax is the *Vākya-padīya*,[11] composed in verse, by Bhartṛihari (? 7th century), whence it is also called *Harikārikā*. Of later works on this subject, the *Vaiyākaraṇa-bhūshaṇa*, by Koṇḍabhaṭṭa, and the *Vaiyākaraṇa-siddhānta-mañjūshā*, by Nāgojībhaṭṭa, are the most important. ***Subsidiary grammatical treatises.***

IV. LEXICOGRAPHY.—Sanskrit dictionaries (*kosha*), invariably composed in verse, are either homonymous or synonymous, or partly the one and partly the other. Of those hitherto published, Śāśvata's *Anekārtha-samuchchaya*,[12] or "collection of homonyms," is probably the oldest. While in the later homonymic vocabularies the words are usually arranged according to the alphabetical order of the final (or sometimes the initial) letter, and then according to the number of syllables, Śāśvata's principle of arrangement—viz. the number of meanings assignable to a word—seems to be the more primitive. The work probably next in time is the famous *Amara-kosha*[13] ("immortal treasury") by Amara-siṃha, one of "the nine gems," who probably lived early in the 6th century. This dictionary consists of a synonymous and a short homonymous part; whilst in the former the words are distributed in sections according to subjects, as heaven and the gods, time and seasons, &c., in the latter they are arranged according to their final letter, without regard to the number of syllables. This Kosha has found many commentators, the oldest of those known being Kshīrasvāmin.[14] Among the works quoted by commentators as Amara's sources are the *Trikāṇḍa* and *Utpalini-koshas*, and the glossaries of Rabhasa, Vyāḍi, Kātyāyana, and Vararuchi. A Kosha ascribed to Vararuchi—whom tradition makes likewise one of the nine literary "gems"—consisting of ninety short sections, has been printed at Benares (1865) in a collection of twelve Koshas. The *Abhidhāna-ratnamālā*,[15] by Halāyudha; the *Viśvaprakāśa*, by Maheśvara (1111); and the *Abhidhāna-chintāmaṇi*[16] (or *Haima-kosha*), by the Jaina Hemachandra, seem all three to belong to the 12th century. Somewhat earlier than these probably is Ajaya Pāla, the author of the (homonymous) *Nānārtha-sangraha*, being quoted by Vardhamāna (A.D. 1140). Of more uncertain date is Purushottama Deva, who wrote the *Trikāṇḍa-śesha*, a supplement to the Amarakosha, besides the *Hārāvalī*, a collection of uncommon words, and two other short glossaries. Of numerous other works of this class the most important is the *Medinī*, a dictionary of homonyms, arranged in the first place according to the finals and the syllabic length, and then alphabetically. Two important dictionaries, compiled by native scholars of the last century, are the *Śabdakalpadruma* by Rādhākānta Deva, and the *Vāchaspatya*, by Tārānātha Tarka-vāchaspati. A full account of Sanskrit dictionaries is contained in the preface to the first edition of H. H. Wilson's *Dictionary*, reprinted in his *Essays on Sanskrit Literature*, vol. iii. ***Dictionaries.***

V. PROSODY (*Chhandas*).—The oldest treatises on prosody have already been referred to in the account of the technical branches of the later Vedic literature. Among more modern treatises the most important are the *Mṛita-sanjīvanī*, a commentary on Pingala's Sūtra, by Halāyudha (perhaps identical with the author of the glossary above referred to); the *Vṛitta-ratnākara*, or "jewel-mine of metres," in six chapters, composed before the 13th century by Kedāra Bhaṭṭa, with several commentaries; and the *Chhando-mañjarī*, likewise in six chapters, by Gangādāsa. The *Śrutabodha*, ascribed, probably wrongly, to the great Kālidāsa, is a comparatively insignificant treatise which deals only with the more common metres, in such a way that each stanza forms a specimen of the metre it describes. The *Vṛitta-darpaṇa* treats chiefly of Prākrit metres. Sanskrit prosody, which is probably not surpassed by any other either in variety of metre or in harmoniousness of rhythm, recognizes two classes of metres, viz. such as consist of a certain number of syllables of fixed quantity, and such as are regulated by groups of breves or metrical instants, this latter class being again of two kinds, according as it is or is not bound by a fixed order of feet. A pleasant account of Sanskrit poetics is given in Colebrooke's *Essays*, vol. ii.; a more complete and systematic one by Professor Weber, *Ind. Stud.* vol. viii. ***Prosody.***

VI. MUSIC (*Sangita*).—The musical art has been practised in India from early times. The theoretic treatises on profane music now extant are, however, quite modern productions. The two most highly esteemed works are the *Sangita-ratnākara* ("jewel-mine of music"), by Śārngadeva, and the *Sangita-darpaṇa* ("mirror of music"), by Dāmodara. Each of these works consists of seven chapters, treating respectively of—(1) sound and musical notes (*svara*); (2) melodies (*rāga*); (3) music in connexion with the human voice (*prakīrṇaka*); (4) musical compositions (*prabandha*); (5) time and measure (*tāla*); (6) musical instruments and instrumental music (*vādya*); (7) dancing and acting (*nritta* or *nritya*). The Indian octave consists like our own of seven chief notes (*svara*); but, while with us it is subdivided into twelve semitones, the Hindu theory distinguishes twenty-two intervals (*śruti*, audible sound). There is, however, some doubt as to whether these *śrutis* are quite equal to one another—in which case the intervals between the chief notes would be unequal, since they consist of either two or three or four *śrutis*,—or whether, if the intervals between the chief notes be equal, the *śrutis* themselves vary in duration between quarter-, third-, and semi-tones. There are three scales (*grāma*), differing from each other in the nature of the chief intervals (either as regards actual duration, or the number of śrutis or sub-tones). Indian music consists almost entirely in melody, instrumental accompaniment being performed in unison, and any attempt at harmony being confined to the continuation of the key-note. A ***Music.***

[1] Dr Burnell, in his *Aindra School*, proposes to apply this term to all grammars arranged on this plan.

[2] Professor Bhandarkar, *Early History of the Dekhan*, p. 20, proposes to fix him about the end of the 3rd century.

[3] Edited, with commentary, by J. Eggeling.

[4] The Prākṛit part edited and translated by R. Pischel.

[5] Edited by O. Böhtlingk (1847).

[6] Edited and translated by J. R. Ballantyne. For other modern grammars see Colebrooke, *Essays*, ii. p. 44; Rājendralāla Mitra, *Descriptive Catalogue*, i., Grammar.

[7] Edited and translated by F. Kielhorn.

[8] Edited by J. Eggeling.

[9] Edited by N. L. Westergaard; also given in Böhtlingk's edition of Pāṇini.

[10] Text and commentary, edited by Th. Aufrecht.

[11] Edited, with commentaries, at Benares.

[12] Edited by Th. Zachariae.

[13] Edited by H. T. Colebrooke (1808), and by L. Dealongchamps (1839–1845).

[14] A grammarian of this name is mentioned as the tutor of King Jayāpiḍa of Kashmir (A.D. 755–786); but Kshīra, the commentator on Amara, is placed by Professor Aufrecht between the 11th and 12th centuries, because he quotes the Śabdānuśāsana ascribed to Bhojarāja.

[15] Edited by Th. Aufrecht (1861).

[16] Edited by O. Böhtlingk and C. Rieu (1847).

number of papers, by various writers, have been reprinted with additional remarks on the subject, in Sourindro Mohun Tagore's *Hindu Music* (Calcutta, 1875). Compare also Bh. A. Pingle, *Indian Music*, 2nd ed. (Bombay 1898).

VII. RHETORIC (*Alankāra-śāstra*).—Treatises on the theory of literary composition are very numerous. Indeed, a subject of this description—involving such nice distinctions as regards the various kinds of poetic composition, the particular subjects and characters adapted for them, and the different sentiments or mental conditions capable of being both depictured and called forth by them—could not but be congenial to the Indian mind. H. H. Wilson, in his *Theatre of the Hindus*, has given a detailed account of these theoretic distinctions with special reference to the drama, which, as the most perfect and varied kind of poetic production, usually takes an important place in the theory of literary composition. The *Bharata-śāstra* has already been alluded to as probably the oldest extant work in this department of literature. Another comparatively ancient treatise is the *Kāvyādarśa*,[1] or "mirror of poetry," in three chapters, by Daṇḍin, the author of the novel *Daśakumāracharita*, who probably flourished towards the end of the 6th century. The work consists of three chapters, treating—(1) of two different local styles (*rīti*) of poetry, the Gauḍī or eastern and the Vaidarbhī or southern (to which later critics add four others, the Pāñchālī, Māgadhī, Lāṭī, and Āvantikā); (2) of the graces and ornaments of style, as tropes, figures, similes; (3) of alliteration, literary puzzles and twelve kinds of faults to be avoided in composing poems. Another treatise on rhetoric, in Sūtras, with a commentary entitled *Kāvyālankāra-vṛitti*,[2] is ascribed to Vāmana of probably the 8th century. The *Kāvyālankāra*, by the Kashmirian Rudraṭa, was probably composed in the 9th century, a gloss on it (by Nami), which professes to be based on older commentaries, having been written in 1068. Dhananjaya, the author of the *Daśarūpa*,[3] or "ten forms (of plays)," the favourite compendium of dramaturgy, appears to have flourished in the 10th century. In the concluding stanza he is stated to have composed his work at the court of King Muñja, who is probably identical with the well-known Mālava prince, the uncle and predecessor of King Bhoja of Dhārā. The Daśarūpa was early commented upon by Dhanika, possibly the author's own brother, their father's name being the same (Vishṇu). Dhanika quotes Rājaśekhara, who is supposed to have flourished about A.D. 1000,[4] but may after all have to be put somewhat earlier. The *Sarasvatī-kaṇṭhābharaṇa*, "the neck-ornament of Sarasvatī (the goddess of eloquence)," a treatise, in five chapters, on poetics generally, remarkable for its wealth of quotations, is ascribed to King Bhoja himself (11th century), probably as a compliment by some writer patronized by him. The *Kāvya-prakāśa*,[5] "the lustre of poetry," another esteemed work of the same class, in ten sections, was probably composed in the 12th century—the author, Mammaṭa, a Kashmirian, having been the maternal uncle of Śrī-Harsha, the author of the Naishadhīya. The *Sāhitya-darpaṇa*,[6] or "mirror of composition," the standard work on literary criticism, was composed in the 15th century, on the banks of the Brahmaputra, by Viśvanātha Kavirāja. The work consists of ten chapters, treating of the following subjects:—(1) the nature of poetry; (2) the sentence; (3) poetic flavour (*rasa*); (4) the divisions of poetry; (5) the functions of literary suggestion; (6) visible and audible poetry (chiefly on dramatic art); (7) faults of style; (8) merits of style; (9) distinction of styles; (10) ornaments of style.

Rhetoric.

VIII. MEDICINE (*Āyur-veda*, *Vaidya-śāstra*).—Though the early cultivation of the healing art is amply attested by frequent allusions in the Vedic writings, it was doubtless not till a much later period that the medical practice advanced beyond a certain degree of empirical skill and pharmaceutic routine. From the simultaneous mention of the three humours (wind, bile, phlegm) in a *vārttika* to Pāṇini (v. 1, 38), some kind of humoral pathology would, however, seem to have been prevalent among Indian physicians several centuries before our era. The oldest existing work is supposed to be the *Charaka-saṃhitā*,[7] a bulky cyclopaedia in ślokas, mixed with prose sections, which consists of eight chapters, and was probably composed for the most part in the early centuries of our era. Whether the Chinese tradition which makes Charaka the court physician of King Kanishka (*c.* A.D. 100) rests on fact is very doubtful. Of equal authority, but doubtless somewhat more modern, is the *Suśruta* (*-saṃhitā*),[8] which Suśruta is said to have received from Dhanvantari, the Indian Aesculapius, whose name, however, appears also among the "nine gems." It consists of six chapters, and is likewise composed in mixed verse and prose—the greater simplicity of arrangement, as well as some slight attention paid in it to surgery, betokening an advance upon Charaka. Both works are, however, characterized by great prolixity, and contain much matter which has little connexion with medicine. The late Professor E. Haas, in two very suggestive papers,[9] tried to show that the work of Suśruta (identified by him with Socrates, so often confounded in the middle ages with Hippocrates) was probably not composed till after the Mohammedan conquest, and that, so far from the Arabs (as they themselves declare) having derived some of their knowledge of medical science from Indian authorities, the Indian Vaidyaśāstra was nothing but a poor copy of Greek medicine, as transmitted by the Arabs. But even though Greek influence may be traced in this as in other branches of Indian science, there can be no doubt,[10] at any rate, that both Charaka and Suśruta were known to the Arab Rāzī (*c.* A.D. 932), and to the author of the Fihrist (completed A.D. 987), and that their works must therefore have existed, in some form or other, at least as early as the 9th century. Among the numerous later medical works published and greatly esteemed in India, the most important general compendiums are Vāgbhaṭa's *Aṣhṭāṅga-hṛidaya*, "the heart of the eight-limbed (body of medical science)," supposed to have been written in the 9th century, or still earlier; and Bhāva Miśra's *Bhāva-prakāśa*, probably of the early part of the 16th century; while of special treatises may be mentioned Mādhava's system of pathology, the *Rugviniśchaya*, or *Mādhava-Nidāna*, of the 8th or 9th century; and Śārṅgadhara's compendium of therapeutics, the *Śārṅgadhara-saṃhitā*, composed before 1300, having been commented upon by Vopadeva. Materia medica, with which India is so lavishly endowed by nature, is a favourite subject with Hindu medical writers, the oldest treatise being apparently the *Dhanvantari-nighaṇṭu*, of uncertain, but not very high, age; besides which may be mentioned Madanapāla's *Madanavinoda*, written A.D. 1374; the more modern *Rāja-nighaṇṭu*, by the Kashmirian Narahari; besides other, still more recent esteemed works of this class, to which may be added the valuable medical dictionary *Vaidyakaśabdasindhu* by Umeśachandra Gupta. A useful general view of this branch of Indian science is contained in T. A. Wise's *Commentary on Hindu Medicine* (1845), and in his *History of Medicine*, vol. i. (1867); but the subject has since then been treated in a much fuller and more critical way in Professor J. Jolly's "Medicin" in Bühler's *Grundriss der indo-arischen Philologie*.

Medicine.

IX. ASTRONOMY AND MATHEMATICS.—Hindu astronomy may be broadly divided into a pre-scientific and a scientific period. While the latter clearly presupposes a knowledge of the researches of Hipparchus and other Greek astronomers, it is still doubtful whether the earlier astronomical and astrological theories of Indian writers were entirely of home growth or partly derived from foreign sources. From very ancient (probably Indo-European) times chronological calculations were based on the synodical revolutions of the moon—the difference between twelve such revolutions (making together 354 days) and the solar year being adjusted by the insertion, at the time of the winter solstice, of twelve additional days. Besides this primitive mode the Ṛigveda also alludes to the method prevalent in post-Vedic times, according to which the year is divided into twelve (*sāvana* or solar) months of thirty days, with a thirteenth month intercalated every fifth year. This quinquennial cycle (*yuga*), is explained in the *Jyotisha*, regarded as the oldest astronomical treatise. An institution which occupies an important part in those early speculations is the theory of the so-called lunar zodiac, or system of lunar mansions, by which the planetary path, in accordance with the duration of the moon's rotation, is divided into twenty-seven or twenty-eight different stations, named after certain constellations (*nakshatra*) which are found alongside of the ecliptic, and with which the moon (masc.) was supposed to dwell successively during his circuit. The same institution is found in China and Arabia; but it is still doubtful[11] whether the Hindus, as some scholars hold, or the Chaldaeans, as Professor Weber thinks, are to be credited with the invention of this theory. Professor G. Thibaut,[12] who has again thoroughly investigated the problem, comes to the conclusion that it is improbable that the nakshatra-theory arose independently in India, but that it is still doubtful whence the Hindus derived it. The principal works of this period are hitherto known from quotations only, viz. the *Gārgī Saṃhitā*, which Professor Kern would fix at *c.* 50 B.C., the *Nāradī Saṃhitā* and others.

The new era, which the same scholar dates from *c.* A.D. 250, is marked by the appearance of the five original Siddhāntas (partly extant in revised redactions and in quotations), the very names of two of which suggest Western influence, viz. the *Paitāmaha-*, *Sūrya-*,[13] *Vasishṭha-*, *Romaka-* (*i.e.* Roman) and *Pauliśa-siddhāntas*. Based

Astronomy and Mathematics.

[1] Edited, with commentary, by Premachandra Tarkabāgīsa, *Bibl. Ind.*; with German translation by O. v. Böhtlingk (1890).

[2] Edited by Capeller (1875).

[3] Edited by Fitzedw. Hall, *Bibl. Ind.* (1865); with commentary (Bombay, 1897).

[4] R. Pischel, *Gött. Gel. A.* (1883); G. Bühler, *Ind. Ant.* (1884), p. 29.

[5] Edited by Maheśa Chandra Nyāyaratna (1866).

[6] Text and translation in *Bibl. Ind.*; edited by Jibananda Vidyasagara (1897).

[7] Edited by Jibananda Vidyasagara (Calcutta, 1877). Cf. A. F. R. Hoernle, "Studies in Anc. Indian Medicine" (*J. Roy. As. S.* 1906-9).

[8] Edited by Madhusūdana Gupta (1835-1837), and by Jibananda Vidyasagara (1873).

[9] *Z.D.M.G.* (1876), p. 617 seq.; (1877), p. 647 seq.

[10] See Professor Aug. Müller's paper, *Z.D.M.G.* (1880), p. 465.

[11] See especially Professor Whitney's essay on the Lunar Zodiac, in his *Oriental and Linguistic Studies*.

[12] G. Thibaut, "Astronomie, Astrologie und Mathematik," in Bühler's *Grundriss*.

[13] The *Sūrya-siddhānta*, translated by W. D. Whitney and E. Burgess (1860).

on these are the works of the most distinguished Indian astronomers, viz. Āryabhaṭa,[1] probably born in 476; Varāha-mihira,[2] probably 505–587; Brahma-gupta, who completed his *Brahma-siddhānta* in 628; Bhaṭṭa Utpala (10th century), distinguished especially as commentator of Varāha-mihira; and Bhāskara Āchārya, who, born in 1114, finished his great course of astronomy, the *Siddhānta-śiromaṇi*, in 1150. In the works of several of these writers, from Āryabhaṭa onwards, special attention is paid to mathematical (especially arithmetical and algebraic) computations; and the respective chapters of Bhāskara's compendium, viz. the *Līlāvatī* and *Vīja-gaṇita*,[3] still form favourite text-books of these subjects. The question whether Āryabhaṭa was acquainted with the researches of the Greek algebraist Diophantus (*c.* A.D. 360) remains still unsettled; but, even if this was the case, algebraic science seems to have been carried by him beyond the point attained by the Greeks.

On Sanskrit literature generally may be consulted Max Muller, *History of Ancient Sanskrit Literature*; A. Weber, *History of Indian Literature*; A. A. Macdonell, *History of Sanskrit Literature*. (J. E.)

SANSON, CHARLES HENRI (b. 1739), public executioner of Paris from 1788 to 1795, was the son of Charles Sanson or Longval, who received in 1688 the office of *exécuteur des hautes œuvres de Paris*, which became hereditary in his family. Sanson's brothers exercised the same trade in other towns. In the last days of 1789 Gorsas in the *Courrier de Paris* accused Sanson of harbouring a Royalist press in his house. Sanson was brought to trial, but acquitted, and Gorsas withdrew the accusation. After the execution of Louis XVI., a statement by Sanson was inserted in the *Thermomètre politique* (13th February 1793) in contradiction of the false statements made in respect of the king's behaviour when confronted with death. He surrendered his office in 1795 to his son Henri, who had been his deputy for some time, and held his father's office till his death in 1840. There is no record of the elder Sanson's death. Henri's son Clément Henri was the last of the family to hold the office.

The romantic tales told of C. H. Sanson have their origin in the apocryphal *Mémoires pour servir à l'histoire de la Révolution Française par Sanson* (2 vols., 1829; another ed., 1831), of which a few pages of introduction emanate from Balzac, and some other matter from Lhéritier de l'Ain. Other *Mémoires* of Sanson, edited by A. Grégoire (ps. for V. Lombard) in 1830, and by M. d'Olbreuze (6 vols., 1862–1863) are equally fictitious. The few facts definitely ascertainable are collected by G. Lenôtre in *La Guillotine pendant la Révolution* (1893). Cf. M. Tourneux, *Bibliographie de l'histoire de Paris . . .* (1890, &c.), vol. i. Nos. 3963-3965, and vol. iv., *s.v.* "Sanson."

SANSON, NICOLAS (1600–1667), French cartographer, wrongly termed by some the creator of French geography, was born of an old Picardy family of Scottish descent, at Abbeville, on the 20th (or 31st) of December 1600, and was educated by the Jesuits at Amiens. In 1627 he attracted the attention of Richelieu by a map of Gaul which he had constructed (or at least begun) while only eighteen. He gave lessons in geography both to Louis XIII. and to Louis XIV.; and when Louis XIII., it is said, came to Abbeville, he preferred to be the guest of Sanson (then employed on the fortifications), instead of occupying the lodgings provided by the town. At the conclusion of this visit the king made Sanson a councillor of state. In 1647 Sanson accused the Jesuit Labbe of plagiarizing him in his *Pharus Galliae Antiquae*; in 1648 he lost his eldest son Nicolas, killed during the Fronde. Among the friends of his later years was the great Condé. He died at Paris on the 7th of July 1667. Two younger sons, Adrien (d. 1708) and Guillaume (d. 1703), succeeded him as geographers to the king.

Sanson's principal works are: *Galliae antiquae descriptio geographica* (1627); *Graeciae antiquae descriptio* (1636); *L'Empire romain* (1637); *Britannia, ou recherches de l'antiquité d'Abbeville* (1638), in which he seeks to identify Strabo's *Britannia* with Abbeville; *La France* (1644); *Tables méthodiques pour les divisions des Gaules . . .* (1644); *L'Angleterre, l'Espagne, l'Italie et l'Allemagne* (1644); *Le Cours du Rhin* (1646); *In Pharum Galliae antiquae Philippi Labbe disquisitiones* (1647–1648); *Remarques sur la carte de l'ancienne Gaule de Cèsar* (1651); *L'Asie* (1652); *Index geographicus* (1653); *Geographia sacra* (1653); *L'Afrique* (1656). In 1692 Hubert Jaillot collected Sanson's maps in an *Atlas nouveau*. See also Niceron, *Mémoires*, vols. xiii. and xx.; the 18th-century editions of some of Sanson's works by Delamarche under the titles of *Atlas de géographie ancienne* and *Atlas britannique*; and the *Catalogue des cartes et livres de géographie de Sanson* (1702).

SANSOVINO, ANDREA CONTUCCI DEL MONTE (1460–1529), Florentine sculptor, was the son of a shepherd called Niccolo di Domenico Contucci, and was born at Monte Sansavino near Arezzo, whence he took his name, which is usually softened to Sansovino. He was a pupil of Antonio Pollaiuolo, and at first worked in the purer style of 15th-century Florence. Hence his early works are by far the best, such as the terra-cotta altarpiece in Santa Chiara at Monte Sansavino, and the marble reliefs of the "Annunciation," the "Coronation of the Virgin," a "Pietà," the "Last Supper," and various statuettes in the Corbinelli chapel of S. Spirito at Florence, all executed between the years 1488 and 1492. From 1491 to 1500 Andrea worked in Portugal for the king, and some pieces of sculpture by him still exist in the monastic church of Coimbra. (See Raczinski, *Les Arts en Portugal*, Paris, 1846, p. 344.) These early reliefs show strongly the influence of Donatello. The beginning of a more pagan style is shown in the statues of "St John baptizing Christ" over the east door of the Florentine baptistery. This group was, however, finished by the weaker hand of Vincenzo Danti. In 1502 he executed the marble font at Volterra, with good reliefs of the "Four Virtues" and the "Baptism of Christ." In 1505 Sansovino was invited to Rome by Julius II. to make the monuments of Cardinal Ascanio Maria Sforza and Cardinal Girolamo della Rovere for the retro-choir of S. Maria del Popolo. The architectural parts of these monuments and their sculptured foliage are extremely graceful and executed with the most minute delicacy, but the recumbent effigies show the beginning of a serious decline in taste. These tombs became models which for many years were copied by most later sculptors with increasing exaggerations of their defects. In 1512, while still in Rome, Sansovino executed a very beautiful group of the "Madonna and Child with St Anne," now over one of the side altars in the church of S. Agostino. From 1513 to 1528 he was at Loreto, where he cased the outside of the Santa Casa in white marble, covered with reliefs and statuettes in niches between engaged columns; a small part of this sculpture was the work of Andrea, but the greater part was executed by Montelupo, Tribolo and others of his assistants and pupils. Though the general effect is rich and magnificent, the individual pieces of sculpture are both dull and feeble. The earlier reliefs, those by Sansovino himself, are the best.

SANSOVINO, JACOPO (1477–1570), Italian sculptor, was called Sansovino after his master Andrea, his family name being Tatti. He became a pupil of Andrea in 1500, and in 1510 accompanied him to Rome, devoting himself there to the study of antique sculpture. Julius II. employed him to restore damaged statues, and he made a full-sized copy of the Laocoon group, which was afterwards cast in bronze, and is now in the Uffizi at Florence. In 1511 he returned to Florence, and began the statue of St James the Elder, which is now in a niche in one of the great piers of the Duomo. He carved a nude figure of "Bacchus and Pan," now in the Bargello, near the "Bacchus" of Michelangelo, from the contrast with which it suffers much. Soon afterwards Jacopo returned to Rome, and designed for his fellow-citizens the grand church of S. Giovanni dei Fiorentini, which was carried out by Antonio Sangallo the younger. A marble group of the "Madonna and Child," heavy in style, now at the west of S. Agostino, was his next important work. In 1527 Jacopo fled from the sack of Rome to Venice, where he was welcomed by Titian and Pietro Aretino; henceforth till his death he was occupied in adorning Venice with magnificent buildings and many second-rate pieces of sculpture. Among the latter Jacopo's poorest works are the colossal statues of "Neptune" and "Mars" on the grand staircase of the ducal palace. His best are the bronze doors of the sacristy of St Mark, cast in 1562; inferior to these are the series of six bronze reliefs round the choir of the same church. In 1565 he completed a small bronze gate with a graceful relief of "Christ surrounded by Angels"; this gate shuts off the altar of the Reserved Host in the choir of St Mark's.

[1] The *Āryabhaṭīya*, edited by H. Kern (1874).

[2] The *Bṛihat-samhitā* and *Yogayātrā*, edited and translated by H. Kern; the *Laghu-jātaka*, edited by A. Weber and H. Jacobi.

[3] A translation of both treatises, as well as of the respective chapters of Brahma-gupta's work, was published (1817) by H. T. Colebrooke, with an important "Dissertation on the Algebra of the Hindus," reprinted in the *Misc. Essays*, ii. pp. 375 seq.

Jacopo's chief claim to distinction rests upon the numerous fine Venetian buildings which he designed, such as the public library, the mint, the Scuola della Misericordia, the Palazzo de' Cornari and the Palazzo Delfino, with its magnificent staircase—the last two both on the grand canal. Among his ecclesiastical works the chief were the church of S. Fantino, that of S. Martino, near the arsenal, the Scuola di S. Giovanni degli Schiavoni and, finest of all, the church, now destroyed (see VENICE), of S. Geminiano, a very good specimen of the Tuscan and Composite orders used with the graceful freedom of the Renaissance.

In 1545 the roof of the public library, which he was then constructing, fell in; on this account he was imprisoned, fined and dismissed from the office of chief architect of the cathedral, to which he had been appointed by a decree of the signoria on the 7th of April 1529. Owing to the intervention of Titian, Pietro Aretino and others, he was soon set at liberty, and in 1549 he was restored to his post. He did good service for St Mark's by encircling its failing domes with bands of iron. Sansovino's architectural works have much beauty of proportion and grace of ornament, a little marred in some cases by an excess of sculptured decoration, though the carving itself is always beautiful, both in design and execution. He used the classic orders with great freedom and tasteful invention. His numerous pupils were mostly men of but little talent.

SANTA ANA, a city and the county-seat of Orange county, southern California, U.S.A., 34 m. S.E. of Los Angeles. Pop. (1900) 4933, of whom 506 were foreign-born. It is served by the Atchison, Topeka & Santa Fé, the Southern Pacific and the Pacific Electric railways. The city is situated about 10 m. from the ocean, in the lower western foothills of the Santa Ana mountains. There are numerous artesian wells in the surrounding region, and there is a good irrigation system. (For a description of the irrigation canal see AQUEDUCT.) Santa Ana is in the orange, lemon and walnut region of southern California, and in the only important celery-growing district of the state; the celery is grown in great quantities in the large district known as the "Peatlands" (about 9 m. from the city), which is underlaid by a deposit of peat from 1 to 100 ft. deep. Other important products of the county are petroleum, barley, sugar beets, apricots and lima beans. Santa Ana was first platted in 1869 and was incorporated in 1888. Its growth since 1900 has been rapid.

SANTA ANA, the capital of the department of Santa Ana, Salvador, 50 m. by rail N.W. of San Salvador. Pop. (1905) about 48,000. It is situated about 2100 ft. above sea-level, in a valley surrounded by high mountains, which are covered by coffee and sugar plantations and woods. It is the second city of the republic in size, and has broad shady streets and fine open squares. The municipal offices, hospital, literary institute and barracks are noteworthy buildings, and the parish church, Doric in style, is generally regarded as one of the finest in Central America. Cigars, pottery, starch, spirits, sugar and various textiles are manufactured, and the export trade in coffee and sugar has developed rapidly since the opening in 1900 of a railway to San Salvador and the Pacific port of Acajutla.

SANTA-ANNA, ANTONIO LOPEZ DE (1795–1876), Mexican soldier and politician, was born at Jalapa in the province of Vera Cruz on the 21st of February 1795. He was neither a general nor a statesman, nor even an honest man, but he was the most conspicuous and continuously active of the military adventurers who filled Spanish America with violence during the first two generations of its independence. He entered the colonial army of Spain as a cadet in 1810, and served as one of the Creole supporters of the Spanish government till 1821. In that year Mexico fell away from the mother country. Iturbide, who was master of the country for the time, made Santa-Anna brigadier and governor of La Vera Cruz. Till about 1835 he pursued the policy of keeping his hold on his native province of Vera Cruz, and influencing the rest of the country by alternately supporting and upsetting the central government. He first helped to ruin Iturbide, who wished to make himself emperor. He proclaimed the Republic, and was then a supporter of the successful federal party. Federalism suited him very well since it left him in command of Vera Cruz. In 1829 he defeated a foolish attempt of the Spaniards to reassert their authority in Mexico. He kept himself in reserve till events gave him a chance to upset the president of the day, Bustamente, whom he defeated at Casas Blancas on the 12th of November 1832. He could now have become president himself, but preferred to rule through dummies. Now that he saw an opportunity to become master he became reactionary and abolished the federal constitution. This led to the revolt of Texas, which was full of settlers from the United States. Santa-Anna invaded Texas and gained some successes, but was surprised and taken prisoner at San Jacinto on the 21st of April 1836. The Texans had a good excuse for shooting him, as he conducted war in a ferocious way. They preferred to let him save his life by ordering his troops to evacuate the country. He was released in February 1837, and had for a time to "retire to his estates" in Vera Cruz. In 1838 the French government made an attack on the town, and Santa-Anna, by a display of his redeeming virtue of personal courage, lost a leg but regained his influence. He became military dictator in 1841, and governed by violence till he was driven into exile by mutiny in 1845. He fled to Cuba, but was recalled to command against the invading army from the United States in 1846. The Americans beat him, and once more (1848) he went into exile. In 1853 he was recalled and named president for life, with the title of Serene Highness. In less than two years he was again overthrown and had to go abroad in August 1855. For the rest of his life Santa-Anna was hanging on the outskirts of Mexico, endeavouring to find an opening to renew his old adventures. He tried the emperor Maximilian, the French and the United States to see if they would serve his turn. But he had outlived his time. The empty title of grand-marshal given by Maximilian was all he gained. When in 1867 he attempted to head a rising, he was captured and condemned to death, but spared on the ground that he was in his dotage. At last, worn out by age, he accepted an amnesty and returned to the city of Mexico, where he died in obscurity on the 20th of June 1876.

See H. H. Bancroft, *History of the Pacific States of North America*, vols. viii. and ix. (San Francisco, 1882–1890).

SANTA BARBARA, a city and the county-seat of Santa Barbara county, in southern California, U.S.A., on the coast-plain on the southern slope of the Santa Ynez Mountains. Pop. (1900) 6587, of whom 1143 were foreign-born. It is served by the Coast Line of the Southern Pacific railway system. With picturesque surroundings, excellent bathing beach and ideal climate, Santa Barbara is one of the most popular of the health and pleasure resorts of California. The monthly average of the mean temperatures for 23 years (1881–1903 inclusive) varied from 53° in January to 67° in August. Nowhere in California is plant life more varied and beautiful; in the vicinity are walnut, olive, lemon and orange groves. North-west of the city are the valuable oil fields of Santa Barbara county, notably the Santa Maria field, 6 m. S. of Santa Maria, and the region between Lompoc and Santa Maria, first developed in 1903. A *presidio* (Spanish military post) was established here in 1782, and a Franciscan mission, by Junipero Serra, about four years later. The mission building is well preserved, and is probably the greatest single attraction of Santa Barbara. It is now the Franciscan headquarters of the Pacific coast, and near it is a Franciscan college. Immediately behind it is the picturesque Mission Canyon. Santa Barbara took part in the revolution of 1829, and in the sectional struggles following leaned to the side of Monterey and the North. It was occupied by the Americans in August 1846, then (without bloodshed) by the Californians in October, and again definitively by the American forces on the 27th of November 1846. In 1850 it was incorporated as a city, though already long a Mexican "ciudad." It remained off the railway route until 1887.

SANTA BARBARA, a town of Iloilo province, island of Panay, Philippine Islands, on the S.E. coast, on the Jalaur river, a few miles N. of Iloilo, the capital of the province. Pop. (1903), after the annexation of Zárraga, Lucena, Pavía and Leganés,

37,621; subsequently Pavía (pop. in 1903, 5700) was annexed to Jaro. There are 87 barrios or villages in the town, three oynl of these had a population in 1903 exceeding 1000. The language is Visayan. The principal industries are the cultivation of sugar cane, Indian corn, rice, cacao, coco-nut palm and tobacco, and the raising of cattle.

SANTA CATHARINA, a southern maritime state of Brazil, bounded N. by Paraná, E. by the Atlantic, S. by Rio Grande do Sul, and W. by Rio Grande do Sul and the Misiones territory of Argentina. Pop. (1900) 320,289; area 28,633 sq. m. The Serra do Mar rises not far from the coast and leaves only a narrow coast zone, and the plateau above is much broken with irregular ranges of mountains. The coast region, though in the temperate zone, is hot and humid. It is densely forested, is broken by swamps and lagoons, and is crossed by numerous short streams from the wooded slopes of the serras. The plateau is less densely wooded, but has some highly fertile plains, the open *campos* being partly devoted to stock raising. Except in the malarious coast zone, the climate is temperate, bracing and exceptionally healthy. The drainage is westward to the Paraná, the rivers being tributaries of the Iguassú, which forms its northern boundary, and of the Uruguay, which forms its southern boundary. A number of prosperous German colonies—the largest and best known of which are Blumenau, Dona Francisca, Joinville, Itajahy, Brusque, Dom Pedro and São Bento—are devoted chiefly to agriculture. There is no cultivation on a large scale, as in São Paulo and the northern provinces. Coffee is produced to a limited extent. Indian corn, beans, onions, fruit and mandioca are the principal products. A prominent industry is the gathering and preparation of *maté* or Paraguayan tea (*Ilex paraguayensis*), which is an article of export. The mineral resources include coal, iron, silver, gold and petroleum, the first alone is mined. The only railway of the state, the Dona Thereza Christina, runs from Laguna, at the mouth of a lagoon of that name on the southern coast, northward to the port of Imbituba (about 4 m.) and thence westward up the valley of the Rio Tubarão to the coal fields of that name (69 m.). The coal is of inferior quality and the development of the mines, which were discovered in 1841, has not been a success. A later investigation shows that there are beds of better coal at a greater depth extending from Rio Grande do Sul to São Paulo. The capital of the state is Florianopolis (*q.v.*) also called Santa Catharina and Desterro, and its other towns are Blumenau, Lages (9356), Laguna (7282), Joinville (13,996), Itajahy (8875), Brusque (8094), São José (11,820), opposite Florianopolis, Tubarão (5495) and São Francisco (5583), a good port in the northern part of the state in direct communication with a majority of the German colonies.

SANTA CLARA (or VILLA-CLARA), the capital of Santa Clara province, Cuba, about 185 m. (by rail) E.S.E. of Havana. Pop. (1907) 16,702. It is situated near the centre of the island, on a plateau, between two small streams, and is served by the United Railways of Havana and by the Cuba and the Cuba Central railways, the last connecting the east and west lines with the north and south coasts. The streets are straight and wide, and there are many fine buildings. The oldest church is of the last third of the 18th century. The city is surrounded by fertile plains, which are cultivated in cane or devoted to grazing. Santa Clara was founded in 1689 by a band of schismatics from Remedios.

SANTA CRUZ, ÁLVARO DE BAZAN, 1ST MARQUIS OF (1526–1588), Spanish admiral, was born at Granada on the 12th of December 1526, of an ancient family originally settled in the valley of Baztan in Navarre, from which they are said to have taken their name. His grandfather, Álvaro de Bazan, took part in the conquest of Granada from the Moors in 1492, and his father, who had the same Christian name, was distinguished in the service of Charles V., by whom he was made general of the galleys—or commander-in-chief of the naval forces of the crown of Spain in the Mediterranean. The future admiral followed his father in his youth, and was early employed in high commands. He was a member of the military order of St Iago. In 1564 he aided in the capture of Velez de Gomera, commanded the division of galleys employed to blockade Tetuan, and to suppress the piracy carried on from that port. The service is said to have been successfully performed. Bazan certainly earned the confidence of Philip II., by whom he was appointed to command the galleys of Naples in 1568. This post brought him into close relations with Don John of Austria, when the Holy League was formed against the Turks in 1570. During the operations which preceded and followed the battle of Lepanto (7th of October 1571), Bazan was always in favour of the more energetic course. In the battle he commanded the reserve division, and his prompt energy averted a disaster when Uluch Ali, who commanded the left wing of the Turks, outmanœuvred the commander of the Christian right, Giovanni Andrea Doria, and broke the allied line. He accompanied Don John of Austria at the taking of Tunis in the following year. When Philip II. enforced his claim as heir to the crown of Portugal in 1580–1581, Santa Cruz held a naval command. The prior of Crato,[1] an illegitimate representative of the Portuguese royal family, who conducted the popular resistance to the annexation of the country by Philip, continued, however, to hold the island possessions of Portugal in the Atlantic. He was supported by a number of French adventurers under Philip Strozzi, a Florentine exile in the service of France. Santa Cruz was sent as admiral of the Ocean to drive the pretender and his friends away in 1583. His victory off Terceira over the Portuguese, and a loose confederation of adventurers and semi-pirates, French and English, decided the struggle in favour of Spain. Santa Cruz, who recognized that England was the most formidable opponent of Spain, became the zealous advocate of war. A letter written by him to King Philip from Angla in Terceira, on the 9th of August 1583, contains the first definite suggestion of the Armada. Santa Cruz himself was to have commanded. His plans, schemes and estimates occupy a conspicuous place in the documents concerning the Armada collected by Don Cesáreo Duro. The hesitating character of the king, and his many embarrassments, political and financial, caused many delays, and left Santa Cruz unable to act with effect. He was at Lisbon without the means of fitting out his fleet, when Drake burnt the Spanish ships at Cadiz in 1587. The independence of judgment shown by Santa Cruz ended by offending the king, and he was held responsible for the failures and delays which were the result of the bad management of his master. His death, which occurred on the 9th of February 1588 at Lisbon, was said to have been hastened by the unjustified reproaches of the king. The marquis de Santa Cruz was the designer of the great galleons which were employed to carry the trade between Cadiz and Vera Cruz in Mexico.

The documents relating to the Armada have been collected by Don Cesáreo Duro in *La Armada Invencible*, and he gives a biography of the marquis in his *Conquista de las Islas Azores*. A separate life has been published by Don Ángel de Altolaguirre. There are various notices of Santa Cruz in Sir W. Stirling Maxwell's *Don John of Austria*. (D. H.)

SANTA CRUZ, an eastern department of Bolivia, bounded N. by El Beni, E. by Brazil, S. by Chuquisaca and W. by Chuquisaca and Cochabamba. Area 141,368 sq. m. Pop. (1900) 209,592; (1906 estimated) 234,743. It is only partly explored. It consists of a great plain extending eastward from the base of the Andes to the frontiers of Brazil, broken by occasional isolated hills, and in the N.E. by a detached group of low sierras known collectively under the name Chiquitos, which belong to the Brazilian highlands rather than to the Andes. On the western side of the department is an upland zone belonging to the eastern slope of the Andes, and here the Bolivian settlements are chiefly concentrated. The Chiquitos contain a number of old missions, now occupied almost exclusively by Indians. The great plains, whose general elevation is about 900 ft. above the sea, are so level that the drainage does not carry off the water in the rainy season, and immense areas are flooded for months at a time. Extensive areas are permanently swampy. There are forests in the N. and W., but the larger part of the department consists of open grassy plains, suitable for grazing. The Llanos

[1] A priory of the Maltese knights of St John of Jerusalem.

de Chiquitos, adjacent to the sierras of that name, have long been used for this purpose. There are two river systems, one belonging to the Amazon and the other to the La Plata basins. The first includes the Guapay or Rio Grande, Piray or Sara, Yapacani and Maracó, upper tributaries of the Mamoré, and the San Miguel, Blanco, Baures and Paragua, tributaries of the Guaporé—both draining the western and northern parts of the department. In the extreme east a number of streams flow eastward into the Paraguay, the largest of which is the Otuquis; their channels are partly hidden in swamps and lagoons. The climate of the plains is hot and malarial, and the rainfall heavy. On the Andean slopes the temperature is more agreeable. Stock-raising is followed to some extent on the plains. Other products of the western districts are sugar, rum, cacao, rice, cotton, coffee and indigo. Rubber and medicinal products are also exported. The Guapay is navigable for small boats in high water, and also the lower courses of the other rivers named, but they are of little service except in the transport of rubber. The principal markets for Santa Cruz products are in the Bolivian cities of the Andes where sugar, rum, cacao and coffee find a ready sale. There is a trade route across the plains from Santa Cruz de la Sierra to Puerto Suarez, on the Paraguay, and the Bolivian government contracted in 1908 for a railway between these two points (about 497 m.) but the traffic is inconsiderable.

The capital and only large town of the department is SANTA CRUZ DE LA SIERRA (pop., in 1900, 15,874; in 1906, estimated, 20,535), on the Piray, a tributary of the Mamoré, 1450 ft. above sea-level, about 160 m. in a straight line N.E. of Sucre. It is situated on a lower terrace of the Andean slope in a highly fertile district, devoted to sugar-cane and stock-raising. It is a dusty, straggling, frontier town with rough habitations and a half-civilized population, chiefly Indians and mestizos. It is the seat of a bishop and has a partly finished cathedral, seminary and mission station for the Indians. It has also a national college. There are flour mills, sugar mills, distilleries, tanneries and leather manufactories. The original site of Santa Cruz de la Sierra was in the uplands, but it was removed to its present site about 1590, the phrase "de la Sierra" being kept. It has been used as a centre for missionary work among the Indians and as a centre of trade. Expeditions to the Brazilian frontier or to the Chiquitos missions are fitted out here, and it is the objective point for expeditions entering Bolivia from Matto Grosso, Brazil, and Paraguay.

SANTA CRUZ, a city and the county-seat of Santa Cruz county, California, U.S.A., on the northern headland of the Bay of Monterey, about 75 m. S. of San Francisco. Pop. (1900) 5659, of whom 1123 were foreign-born. It is served by the Southern Pacific railway. Santa Cruz is a popular seaside resort. The site of the city, which spreads back over bluffs and terraces to the foothills of the mountains (2000-3800 ft. in altitude), is very picturesque, and the scenery in the environs beautiful. Hills nearly enclose the city, protecting it from the ocean fogs. Monterey Bay has a remarkable variety of fish; and there is a large fish hatchery near the city. Fruits in great variety are grown in the valley and foothills. The mountains are covered with one of the noblest redwood forests of the state—the only one south of San Francisco; two groves, the Sempervirens Park (4000 acres) and the Fremont Grove of Big Trees, 5 m. from Santa Cruz, have been permanently preserved by the state. A Franciscan mission was established at Santa Cruz in 1791 and secularized in 1834, but was later destroyed. A pueblo or villa called Branciforte, one of the least important of the Spanish settlements (now a suburb of Santa Cruz), was founded in the vicinity in 1797, and before the American conquest was merged with the settlement that had grown up about the mission. The flag of the United States was raised over Santa Cruz in July 1846. The city was chartered in 1876.

SANTA CRUZ, an archipelago of the Pacific Ocean, in the division of Melanesia, belonging to Great Britain. It is a scattered group of small volcanic islands, irregularly disposed from N.W. to S.E. between 8° 31′ and 11° 40′ S., 165° 38′ and 168° E. The total land area is 380 sq. m., and the population is estimated at 5000.

At the north-western extremity, separated by a deep channel from the Solomon Islands, the following islands are clustered: the Duff and Matema or Swallow groups, Analogo, Tinakula or Volcano Island and others; from these a single chain curves S.E. and then E., consisting of Nitendi or Santa Cruz, the largest island, Tupua or Edgecombe, Vanikoro (Recherche), Tucopia, Anuda (Cherry) and Fataka (Mitie). In Vanikoro there are volcanic mountains up to 3030 ft. in height, and Tinakula is a constantly active volcano of 2200 ft. Nitendi is of less elevation (1215 ft. at the highest). Coral reefs are not extensive, excepting those surrounding Vanikoro. The islands are densely wooded, and have a flora akin to that of New Guinea. The land fauna is very scanty; that of the sea extremely rich and valuable to the natives, who are skilled fishermen and navigators. The climate is hot and humid, and storms are frequent. The natives are of Papuan stock, with an intermixture of other blood; but an exception is found in the Duff group, Tucopia and Anuda, which are inhabited by pure Polynesians. The natives live in villages (sometimes fortified). In the past they have proved treacherous, and cannibalism is not extinct. The work of missionaries, however, has borne good fruit. The islands are included in the British protectorate of the Southern Solomons. Some trade in copra is carried on.

The islands were discovered by the Spaniard Alvaro Mendaña in 1595, in which year he attempted to found a colony on Nitendi, but died there on the 18th of October. In 1767 Philip Carteret visited the archipelago, and called it the Queen Charlotte Islands, a name still sometimes used. During the next century, owing to the practice of kidnapping them as labourers, the natives became so much embittered against foreigners that in 1871 they murdered Bishop John Coleridge Patteson on Nukapu, one of the Swallow group. In 1875 James Graham Goodenough, commodore of the Australian station, was shot with a poisoned arrow on Nitendi during a cruise, and died of his wound. Patteson's murder, however, had roused public feeling in England; steps were taken to regulate the labour traffic, and subsequently Bishop John Selwyn was able to establish friendly relations with the natives. He erected the cross which commemorates his predecessor on Nukapu. The British protectorate was declared in 1898.

SANTA CRUZ, chief town and capital of the province of La Laguna, Luzon, Philippine Islands, on the S.E. shore of Laguna de Bay, about 35 m. S.E. of Manila. Pop. of the municipality (1903) 12,747. Santa Cruz has numerous fine buildings and a large trade with Manila by way of the lake and Pasig river. Agriculture and manufacturing are important pursuits, the town being noted for its manufacture of palm wine. The language is Tagalog.

SANTA CRUZ DE TENERIFE, or DE SANTIAGO, a seaport and the capital of Teneriffe and of the Canary Islands; in 28° 28′ N. and 16° 15′ W., on the east coast. Pop. (1900) 38,419. Santa Cruz is the residence of the governor-general of the Canaries, the civil lieutenant-governor of the Teneriffe district, and the military governor of the island. It occupies a small plain bounded by rugged volcanic rocks, and seamed by watercourses which are dry almost throughout the year. Scarcely any vegetation, except cactuses and euphorbias, is to be seen in the neighbourhood. Almost the entire town was rebuilt in the 19th century, when its population more than trebled. The houses are generally low, with flat roofs; those of the better class are large, with a courtyard in the middle, planted with shrubs in the Spanish fashion. There are many good public buildings, including a school of navigation, technical institute, library, natural history museum and hospital. An aqueduct 5 m. long brings pure water from the mountains of the interior. Dromedaries from the adjacent islands of Lanzarote and Fuerteventura are used to convey merchandise and in agricultural operations. The town is defended by modern forts, but its ancient batteries have also been preserved. It was bombarded by the British fleet under Blake in 1657, and by Nelson, who lost his arm during the attack, in 1797. Some British flags lost on that occasion hang in one of the churches. The anchorage is good, and a mole facilitates landing. Santa Cruz is an important coaling station and commercial centre. (See CANARY ISLANDS.)

SANTA FÉ, the capital of New Mexico, U.S.A., and the county-seat of Santa Fé county, about 20 m. E. of the Rio Grande, and 339 m. N. of El Paso, Texas. Pop. (1900) 5603 (256 being foreign-

born and 466 Indians); (1910) 5072. Santa Fé is served by the Atchison, Topeka & Santa Fé, the Denver and Rio Grande, and the New Mexico Central railways. The city lies about 7000 ft. above the sea, at the foot of the southern extremity of the Rocky Mountains, in the Sangre de Cristo range. Its climate is dry, equable and healthy; the mean annual temperature is 49° F., and the mean annual rainfall 14·2 in. The hills surrounding the city on all sides shelter it from the sandstorms which afflict some parts of New Mexico, and its pleasant climate, attractive mountain scenery and historical interest make it a favourite resort.

Santa Fé is built round a plaza or square. Crooked streets, bordered with low adobe houses, are characteristic of the older part of the city and give an impression of antiquity. Around the plaza and elsewhere in the city, however, the Mexican style of architecture has given way to the American. The plaza itself had been converted from a barren, sandy square into a well-shaded park, through the efforts of the Woman's Board of Trade, an unique institution, which also controls the public library, housed in a brick and stone building (1907) in the Mission style of architecture. Within the plaza are a monument to the soldiers who fell in New Mexico during the Civil War and the Indian wars, a stone marking the spot where the first American flag was raised by General Kearny in 1846, and a bronze drinking fountain erected as a memorial to John Baptist Lamy (1814–1888), the first Roman Catholic bishop (1853) and archbishop (1875) of Santa Fé. Facing the plaza is the old Governor's Palace, a low, spreading, adobe structure, erected early in the 17th century, but partially destroyed in the Pueblo revolt of 1680 and later restored. It was occupied continuously by the Spanish, Mexican and American governors of New Mexico until 1909, and houses the historical museum of the Historical Society of New Mexico (founded in 1859, incorporated in 1880), the School of American Archaeology and the New Mexico Museum of Archaeology. In this building General Lew Wallace (governor 1878–1881) wrote the concluding chapters to *Ben Hur*. San Miguel chapel was built probably in the middle of the 17th century, was destroyed in 1680, and was rebuilt in 1710, but has been greatly altered in recent times. The church of Nuestra Señora de Guadalupe (modernized with a shingle roof and a wooden steeple) contains interesting paintings and antique wood-carvings. The cathedral of San Francisco, though not completed, has been used as a place of worship since about 1880. In its walls is incorporated part of a church erected, it is thought, in 1627. Also of interest are the Rosario chapel; the ruined earthworks of Fort Marcy, north of the city, constructed by General Kearny in 1846; the ruins of the Garita, an old Spanish fortification used as a custom house under the Mexican government; the so-called "oldest house," a dilapidated adobe structure claimed to be the oldest building, continuously inhabited, in the United States; the state library; and the national cemetery, in which 1022 American soldiers are buried.

Among the public buildings and institutions are the state capitol, the executive mansion (1909), the Federal building (in front of which is a monument to Kit Carson), the county court house, a National Guard armoury, a Federal industrial boarding school for Indians (with 300 pupils in 1908) and Saint Catherine's Industrial School for Indians (Roman Catholic). About 7 m. east of the city is the Pecos Forest Reserve, across which the Territory undertook the building, with convict labour, of a "scenic highway" from Santa Fé to Las Vegas. In Pajarito Park, 20 m. west of Santa Fé, are many prehistoric cave, cliff and communal dwellings, and near the city are several prehistoric mounds.

The chief manufactures of Santa Fé are brick, pottery (made by Pueblo Indians), and filigree jewelry (made by Mexican artisans). The surrounding country is devoted to agriculture and mining, chiefly for coal.

Santa Fé is considered the oldest city save one (St Augustine, Florida) in the United States. A settlement, known as San Gabriel, was planted at the junction of the Rio Chama and the Rio Grande by Juan de Oñate in 1598, and about 1605,[1] some 30 m. S.E., Santa Fé, officially the Villa Real de Santa Fé de San Francisco, was founded on the site of a deserted Indian pueblo and became the seat of the government of New Mexico. In 1630 it contained a population of 250 Spaniards, 700 Indians and about 50 half-breeds. In August 1680 the Pueblo Indians, embittered by the exactions of the civil and ecclesiastical authorities, revolted (see NEW MEXICO: *History*). Four hundred Spaniards were massacred, and the remainder took refuge in Santa Fé, where they were closely besieged. On the 21st of August, while the Indians were demoralized by a sortie from the garrison, the town was evacuated, and the inhabitants made a six weeks' journey down the Rio Grande to the mission of Guadalupe, near the modern El Paso, Texas. The Indians then took possession, destroyed the crops, churches and archives, and revived their pagan ceremonies. Several unsuccessful attempts were made to regain the town, but finally, in September 1692, Diego de Vargas quietly secured the fresh submission of the Indians. In December 1693 a new Spanish colony of about 800 persons arrived. There were two other Indian revolts, in 1694 and in 1696. During the 18th century a considerable trade in sheep, wool, wine and pelts developed, chiefly with Chihuahua and with the Indians of the plains. After the independence of Mexico Santa Fé became the centre of a growing commerce with the United States, conducted at first by pack animals, and later by wagon trains over the old Santa Fé Trail leading south-west from Independence, Kansas City, and, in earlier years, other places in Missouri, to Santa Fé. On the 18th of August 1846, soon after the outbreak of the war between the United States and Mexico, Santa Fé was occupied by an American force under General S. W. Kearny. The Mexicans revolted a few months later, and the newly appointed governor, Charles Bent, and a number of American sympathizers were assassinated; but the rising was quickly suppressed. In 1847 the first English newspaper in New Mexico was established at Santa Fé, and an English school was founded in 1848. Santa Fé remained the capital when a Territorial government was inaugurated in 1851. The arrival of the first railway train, on the 9th of February 1880, marked a new epoch in the history of Santa Fé, which until then had remained essentially a Mexican town; but with the discontinuance of the wagon caravans over the old trail, it lost its importance as the entrepôt for the commerce of the South-west.

See the sketch by F. W. Hodge in *Historic Towns of the Western States* (New York, 1901), edited by Lyman P. Powell; H. H. Bancroft, *History of Arizona and New Mexico* (San Francisco, 1884); and Henry Inman, *The Old Santa Fé Trail* (New York, 1897).

SANTA FÉ, a central province of Argentina, bounded N. by the Chaco territory, E. by Entre Rios and Corrientes, S. by Buenos Aires, and W. by Cordoba and Santiago del Estero. Area 50,916 sq. m. Pop. (1895) 397,188, (1904 estimated) 640,755. Santa Fé belongs to the great pampa region of Argentina, and has no wooded districts in the south except on the river courses. In the N. which is borderland to the Gran Chaco region, there are extensive forests, intermingled with grassy campos. The surface is a level alluvial plain, with a saline substratum at no great depth. Salt is found on the surface over large areas, and throughout the province the water is brackish 15 to 20 ft. below the surface. The soil, however, produces wheat, corn, alfalfa, linseed and other crops in abundance. Stock-raising (cattle, horses, sheep and swine) is also an important industry, with the related industries of butter and cheese-making, meat-curing and lard-refining. Many colonies have been made, especially near the provincial capital. It is one of the most productive provinces in the republic, in spite of notorious misgovernment. The Paraná forms its eastern boundary for about 435 m., and provides unfailing transport facilities. The great river is broken into many channels, forming islands and sand bars which are constantly changing their outlines. It receives two large tributaries flowing across the province—the Salado, the upper course of which is called the Pasage and Juramento (the last given to commemorate the circumstance that the oath to wrest their independence from Spain was sworn on its banks in 1816), and which enters the Santa Fé channel of the Paraná near the capital; and the Carcarañá, or Carcarañal, whose sources are in the Cordoba sierras. The northern districts are well watered by numerous tributaries of the Salado. The railway communications of the province are good, comprising the trunk lines of the Buenos Aires and Rosario railway with its extension to Tucuman, which crosses the province from S.E. to N.W.; the Central Argentine from Rosario to Cordoba, and to Buenos Aires; the Cordoba Central; Santa Fé to Tucuman; and the Provincia de Santa Fé; a network of small lines connects all the important towns; and the Buenos Aires and Pacific which crosses near its southern boundary. The river

[1] The exact date of the founding of Santa Fé is not known, but the best opinion has fixed the date between 1604 and 1608, and favours the year 1605.

ports having railway connexions are Reconquista, Santa Fé, Colastiné, Coronda, Puerto Gomez, San Lorenzo, Rosario and Villa Constitución. The capital is Santa Fé, and other important towns are Rosario, Esperanza (pop. 1904 estimated 10,000), San Lorenzo (7000), Rafaela, Ocampo, Galvez, Cañada de Gomez and Villa Casilda.

SANTA FÉ, a city of Argentina and capital of the province of that name, on the Santa Fé channel of the Paraná near the mouth of the Salado, about 299 m. N.W. of Buenos Aires. Pop. (1895) 24,755, (1904 estimated) 33,200. It is built on a sandy plain little above the river level. It is regularly laid out and contains a cathedral, bishop's palace, Jesuits' college and church dating from 1654, the cabildo or town hall facing on the principal square and provincial government buildings. The town is less modern in appearance than Rosario, and has a number of old residences and educational and charitable institutions. It is a port of call for small river steamers and is in ferry communication with Paraná on the opposite bank of the Paraná. Its shipping port for larger steamers is at Colastiné, on a deeper channel, with which it is connected by rail. Santa Fé also has railway communication with Rosario, Cordoba, Tucuman and the frontier of the Chaco.

Santa Fé was founded by Juan de Garay in 1573, and was designed to secure Spanish communications between Asunción and the mouth of the La Plata. It has been the centre of much political intrigue, but its growth has been very slow. In 1852 a constituent congress met there, and in 1860 a national convention for the revision of the constitution.

SANTAL (or SONTHAL) **PARGANAS, THE,** a district of British India, in the Bhagalpur division of Bengal. Area 5470 sq. m.

In the east a sharply defined belt of hills stretches for about 100 m. from the Ganges to the river Naubil; west of this a rolling tract of long ridges with intervening depressions covers about 2500 sq. m.; while there is a narrow strip of alluvial country about 170 m. long, lying for the most part along the loop line of the East Indian railway. The Rajmahal hills occupy an area of 1366 sq. m.; they nowhere exceed 2000 ft. There are several other hill ranges which with few exceptions are covered almost to their summits with dense jungle; they are all difficult of access. There are, however, numerous passes through all the ranges. Coal and iron are found in almost all parts, but of inferior quality. The alluvial tract has the damp heat and moist soil characteristic of Bengal, while the undulating and hilly portions are swept by the hot westerly winds of Behar, and are very cool in the winter months. The annual rainfall averages 52 in. In 1901 the population was 1,809,737, showing an increase of 3 % in the decade.

The Santals, who give their name to the district, are the most numerous aboriginal tribe in Bengal: they work the coal-mines of Raniganj and Karharbari and migrate to the tea-gardens of Assam. In 1832 officials were deputed to demarcate with solid masonry pillars the present area of the Daman-i-Koh, or "skirts of the hills." The permission to Santals to settle in the valleys and on the lower slopes stimulated Santal immigration to an enormous extent. The Hindu money-lender soon made his appearance among them, and caused the rebellion of 1855–56. The insurrection led to the establishment of a form of administration congenial to the immigrants; and a land settlement has since been carried out on conditions favourable to the occupants of the soil. The Church Missionary Society and the Scandinavian Home Mission have been very successful, especially in promoting education. The district is traversed by both the chord and loop lines of the East Indian railway. It contains the old Mahommedan city of Rajmahal and the modern commercial mart of Sahibganj, both on the Ganges; and also the Hindu place of pilgrimage of Deogarh, which is important enough to have a branch railway. The administrative headquarters are at Dumka, or Naya Dumka: pop. (1901) 5326.

See F. B. Bradley-Birt, *The Story of the Indian Upland* (1905).

SANTALS, an aboriginal tribe of Bengal, who have given their name to the Santal Parganas (*q.v.*). Their early history is unknown; but it is certain that they have not occupied their present home for longer than a century, having migrated from Hazaribagh, and they are still moving on into Northern Bengal. Their total number in all India is nearly two millions. They speak a language of the Munda or Kolarian family.

The Santals as a race care little for permanent homes. They are not true nomads, but they like to be "on the move." In the lowlands they are agriculturists; in the jungles and on the mountains they are skilful hunters, bows and arrows being their chief weapons; on the highlands they are cattle breeders. But if fond of change the Santals like comfort, and their villages are neat, clean and well built, usually in an isolated position. Their social arrangements are patriarchal. In every village is a headman supposed to be a descendant of the founder of the village. A deputy looks after details; a special officer has charge of the children's morals, and there is a watchman. Physically the Santals are not prepossessing. The face is round and blubbery; the cheekbones moderately prominent; eyes full and straight, nose broad and depressed, mouth large and lips full, hair straight, black and coarse. The general appearance approximates to the negroid type. They are somewhat below the average height of the Hindus. They are divided into twelve tribes. In character they are a bright, joy-loving people, hospitable and seizing every chance of a feast. "They have neither the sullen disposition nor the unconquerable laziness of the very old hill-tribes of central India," writes Sir W. W. Hunter in *Annals of Rural Bengal* (1868). "They have carried with them from the plains a love of order, a genial humanity, with a certain degree of civilization and agricultural habits. Their very vices are the vices of an oppressed and driven-out people who have lapsed from a higher state, rather than those of savages who have never known better things." Each village has its priest who has lands assigned to him; out of the profits he must twice a year feast the people. At the Sohrai feast—the "harvest-home"—in December, the headman entertains the villagers, and the cattle are anointed and daubed with vermilion and a share of the rice-beer is given to each animal. The Santals have many gods whose attributes are ill-defined, but whose festivals are strictly observed. Marang Buru, the great spirit, is the deity to whom sacrifices are made at the Sohrai. Among some Santals, *e.g.* in Chota Nagpur, Sing Bonga, the sun, is the supreme deity to whom sacrifices are made. Generally there is no definite idea of a beneficent god, but countless demons and evil spirits are propitiated, and ancestors are worshipped at the Sohrai festival. There is a vague idea of a future life where the spirits of the dead are employed in the ceaseless toil of grinding the bones of past generations into a dust from which the gods may recreate children. In some villages the Santals join with the Hindus in celebrating the Durga Puja festival. In the eastern districts the tiger is worshipped. For a Santal to be sworn on a tiger-skin is the most solemn of oaths. The Santals are omnivorous, but they will not touch rice cooked by a Hindu. Santal parents undergo purification five days after childbirth. Santals have adopted as a rite the tonsure of children. Child marriage is not practised, and the young people make love matches, but the septs are exogamous as a rule. Santals seldom have more than one wife and she is always treated kindly. An open space in front of the headman's house is set apart for dancing, which is very elaborate and excellent. The flute, upon which they play well, is the chief Santal instrument. The Santals burn their dead, and the few charred bones remaining are taken by the next of kin in a basket to the Damodar, the sacred river of the Santals in Hazaribagh district, and left where the current is strongest to be carried to the ocean, the traditional origin and resting place of the Santal race.

See E. Tuite Dalton, *Descriptive Ethnology of Bengal* (Calcutta, 1872); F. B. Bradley-Birt, *The Story of an Indian Upland* (1905).

SANTA MARIA (DA BOCCA DO MONTE), an inland town of Brazil, in Rio Grande do Sul, 162 m. by rail W. of Margem do Taquary, the railway terminus for Porto Alegre (1908), about 80 m. by water N.W. of that city. Pop. (1900) 13,628. Santa Maria, which lies 382 ft. above the sea, is the commercial centre of a rich district on the slopes of short mountain ranges, one of which, the Serra do Pinhal, forms the water parting between the eastern and western river systems of the state. There are prosperous colonies in its vicinity, including one founded by the Jewish Colonisation Association under the provisions of the Hirsch Fund. The industries of this region include the cultivation of wheat, Indian corn, rice, mandioca, beans, grapes (for wine), nuts, olives and tobacco, and stock-raising. The town derives its chief importance, however, from its becoming the junction of the Porto Alegre to Uruguayana, and the Santa Maria to Passo Fundo railways. In 1905 the national and state governments leased to the "Compagnie Auxiliaire de Chemin de Fer au Brésil" the Rio Grande to Bagé, the Porto Alegre to Uruguayana, the Santa Maria to Passo Fundo, and the Porto Alegre to Nova Hamburgo railways, with their branches and connexions, and it was decided to establish the general administration offices for the whole system at Santa Maria. The shops and offices of the Porto Alegre to Uruguayana line had been removed to that place in 1902.

SANTA MARIA DI LICODIA, a village of Sicily, in the province of Catania, 18 m. N.W. of Catania by rail, on the S.W. slopes of Mount Etna. Pop. (1901) 4101. It is believed to occupy the site of the ancient Aetna, a settlement founded by the colonists whom Hiero I. had placed at Catania after their expulsion by the original inhabitants in 461 B.C., which absorbed or incorporated an already existing Sicel town named Inessa. Its subsequent history is uneventful, though it suffered from the exactions of Verres; and its inscriptions are unimportant. A large hoard of coins was found here in 1891. Near it, in a district called Civita, is a large elliptical area of about 1300 by 380 yds., enclosed by a wall of masses of lava, which is about 28 ft. wide at the base, and 11 ft. high. The ground is covered with fragments of tiles and pottery of the classical period, and it is probably a hastily built encampment of historic times rather than a primitive fortification, as there are no prehistoric traces (Orsi in *Notizie degli scavi*, 1903, 442).

See Casagrandi, *Su due antiche città sicule Vessa ed Inessa* (Acireale, 1892).

SANTA MARTA, a city and port of Colombia and the capital of a department of the same name, on a small bay 40 m. E.N.E. of the mouth of the Magdalena river. Pop. (1908) about 6500. It is built partly on the beach and partly on the slopes of the Sierra Nevada de Santa Marta towards the S.E. Though small, the harbour is one of the best and safest on the coast, as no river flows into it to fill its anchorage with silt. The depth ranges from 18 to 19 fathoms at the entrance to 4½ fathoms along the inner shore line. The city is an episcopal see and has a cathedral. A railway (23 m.) runs southward a little beyond Cienaga (on a large lagoon of the same name), connects with steamers running to Barranquilla (50 m. farther) by way of the lagoon and inland channels, and is to be extended to San Carlos, farther S., as the fruit-growing industry of this region is developed.

Santa Marta was founded by Rodrigo de Bastidas in 1525, and became an important port and centre of trade during the Spanish colonial era. It was also a base of operations in the exploration and conquest of the interior.

SANTA MAURA, or LEUCADIA (Λευκάδα, ancient Λευκάς), one of the Ionian Islands, with an area of 110 sq. m. and a population of about 30,000. It lies off the coast of Acarnania (Greece), immediately south of the entrance to the Gulf of Arta. The shallow strait separating it from the mainland is liable to be blocked by sand-banks; a canal was cut through these in the 7th century B.C. by the Corinthians, and was again after a long period of disuse opened up by the Romans.

During the British occupation a canal for boats of 4 to 5 ft. draught was formed from Fort Santa Maura to the town, but the 16 ft. deep ship canal which it was proposed (1844) to carry right across the lagoon or submerged isthmus to Fort Alexander was only partially excavated. In 1903, however, a canal was completed rendering navigable the channel between the island and the mainland. Its breadth is 50 ft. and its depth 17 ft. Santa Maura, measuring about 20 m. from north to south and 5 to 8 m. in breadth, is a rugged mass of limestone and bituminous shales (partly Tertiary), rising in its principal ridges to heights of 2000 and 3000 ft. and presenting very limited areas of level ground. The grain crop suffices only for a few months' local consumption; but considerable quantities of olive oil of good quality are produced. The vineyards (in the west especially) yield much red wine (bought mainly by Rouen, Cette, Trieste and Venice); the currant, introduced about 1859, has gradually come to be the principal source of wealth (the crop averaging 2,500,000 lb); and small quantities of cotton, flax, tobacco, valonia, &c., are also grown. The salt trade, formerly of importance, has suffered from Greek customs regulations. The chief town (5900 inhabitants), properly called Amaxikhi or Hamaxichi but more usually Santa Maura, after the neighbouring fort, is situated at the N.E. end of the island opposite the lagoon. In the S.W. is the village of Vasiliki, whence the currant crop is exported.

Remains of Cyclopean and polygonal walls exist at Kaligoni (south of Amaxikhi), probably the site of the ancient acropolis of Neritus (or Nericus), and of the later and lower Corinthian settlement of Leucas. From this point a Roman bridge seems to have crossed to the mainland. Between the town and Fort Santa Maura extends a remarkably fine Turkish aqueduct partly destroyed along with the town by the earthquake of 1825. Forts Alexander and Constantine commanding the bridge are relics of the Russian occupation; the other forts are of Turko-Venetian origin. The magnificent cliff, some 2000 ft. high, which forms the southern termination of the modern island still bears the substructions of the temple of Apollo Leucatas (hence the modern name Capo Ducato). At the annual festival of Apollo a criminal was obliged to plunge from the summit into the sea, where, however, an effort was made to pick him up; and it was by the same heroic leap that Sappho and Artemisia, daughter of Lygdamis, are said to have ended their lives.

A theory has been proposed by Professor Dörpfeld that Leucas is the island described in the *Odyssey* under the name of Ithaca; in support of this theory he quotes the fact that the Homeric description of the island and its position, and also the identification of such sites as the palace of Odysseus, the harbour of Phorcys, the grotto of the Nymphs and the island Asteris, where the suitors lay in wait for Telemachus, suit Leucas far better than the island called Ithaca in classical and modern times.

See under CORFU; also P. Goessler, *Leukas-Ithaka* (Stuttgart, 1904).

SANTANDER, a maritime province of northern Spain, bounded N. by the Bay of Biscay, E. by the province of Biscay, S. by Burgos and Palencia, and W. by Leon and Oviedo. Pop. (1900) 276,003; area 2108 sq. m. The province is traversed from east to west by the Cantabrian Mountains (*q.v.*), which in the Peñas de Europa reach a height of over 8600 ft., and send off numerous branches to the sea. On the north side of the range the streams are all short, the principal being the Ason, the Miera, the Pas, the Besaya, the Saja and the Nansa, which flow into the Bay of Biscay; part of the province lies south of the watershed, and is drained by the upper Ebro (*q.v.*). The province is traversed from north to south by the railway and high road from Santander by Palencia to Madrid; the highest point on the railway (Venta de Pazozal) is 3229 ft. above the sea. Other railways connect Santander with Bilbao on the east and with Cabezona de la Sal on the west; there are also many good state, provincial and municipal roads, besides several narrow-gauge mining railways.

Santander was part of the Roman province of Cantabria, which, after passing under the empire of the Goths, became the principality of Asturias (*q.v.*). The portion called Asturia de Santa Juliana, or Santillana, was included in the kingdom of Old Castile, and, on the subdivision of the old provinces of Spain in 1833, became the province of Santander.

SANTANDER (ancient *Portus Blendium* or *Fanum S. Andreae*), the capital of the Spanish province of Santander, the seat of a bishop and one of the chief seaports of Spain; 316 m. by rail N. of Madrid, in 43° 27′ N. and 3° 47′ W., on the Bay of Santander, an inlet of the Bay of Biscay. Pop. (1900) 54,564. It is situated on the inside of a rocky peninsula, Cabo Mayor, which shelters a magnificent harbour from 2 to 3 m. wide and 4 m. long. The entrance is at the eastern extremity of the promontory, and is deep, broad, and illuminated by lighthouses on Cabo Mayor and the rocky islet of Mouro. Santander is the terminus of railways from Valladolid and Bilbao, of a branch line from Cabezona de la Sal, and of several mining railways. It is divided into an upper and a lower town. The cathedral, originally Gothic of the 13th century, has been so altered that little of the old work remains. In the crypt, or Capilla del Cristo de Abajo, is an interesting font of Moorish workmanship. The castle of San Felice contains a prison, which was one of the first examples of the radiating system of construction. The city is essentially modern; its principal buildings are the markets, barracks, theatre, bull-ring, clubs, civil and military governors' residences, custom house, hospitals, nautical school, ecclesiastical seminary, and training school for teachers. Many of the houses on the bay front and public buildings were restored after the catastrophe of the 3rd of November 1893, when the steamer "Cabo Machichaco," laden with 1700 cases of dynamite, blew up near the quay. The harbour was greatly improved during the second half of the 19th century. In the same period the population nearly trebled, and there was a corresponding development of commerce and manufactures.

The port was in 1753 made one of the *puertos habilitados*, or ports privileged to trade with America, and in 1755 it received the title of city. Charles V. landed here in 1522 when he came to take possession of the Spanish crown, and from this port Charles I. of England embarked on his return from his visit in search of a wife (1623). The city was sacked by the French under Soult in 1808.

SANTAREM, the capital of the district of Santarem, Portugal; on the right bank of the river Tagus, 51 m. by rail N.E. of Lisbon. Pop. (1900) 8628. The older part of the city is built on high ground overlooking the Tagus; it contains the ruined castle of Alcaçova, famous in the middle ages as a royal residence, and is partly enclosed by ruined walls. Below is Ribeira de Santarem, a comparatively modern river-port, and on the opposite bank is Almeirim, a village which was also a royal residence until 1755, when it was almost entirely destroyed by earthquake. Santarem has some trade in fish and agricultural produce, including wine and olive oil. Its chief buildings are an ecclesiastical seminary, the largest in Portugal; the late Gothic church of the Convento da Graça, which contains the tomb of Pedro Alvares Cabral, the first Portuguese to visit South America (1502); the Igreja do Milagro, an early Renaissance church; the chapel of Santa Rita, with a painting by Ignatius Xavier, who was born here in 1724; the church of Santa Maria, built in 1244, but with Manoellian additions made early in the 16th century; the secularized 13th-century church of San Francisco; the church of São João, which has a Moorish minaret for a belfry, and has been converted into an archaeological museum; and the church of Santa Iría (St Irene), from which the name of the city is derived. There is a fine bridge across the Tagus.

Santarem is the Roman *Scallabis*, renamed *Praesidium Julium* by Julius Caesar. From its position in the Tagus valley it became an important fortress during the wars between the Moors, Portuguese and Spaniards. Alphonso VI. of Castile first took it from the Moors in 1093, but it was recaptured and occupied by them until 1147, when Alphonso I. of Portugal recovered it. The Almohades endeavoured to win it back in 1184, but were defeated. At Santarem King Diniz died in 1325; the murderers of Inez de Castro (*q.v.*) were executed in 1357; and Prince Alphonso, only son of John II., was drowned in 1491. Here the 15th-century navigator John of Santarem was born, and here the Cardinal-King Henry (1512–1580) was born, abdicated and died. The Miguelites were defeated here in 1834 (see PORTUGAL: *History*). In 1868 Santarem was raised to the rank of a city.

The administrative district of Santarem coincides with the eastern part of the ancient province of Estremadura (*q.v.*); pop. (1900) 283,154; area 2555 sq. m.

SANTAREM, a city of Brazil in the state of Pará, on the right bank of the Tapajos, near its entrance into the Amazon. Pop. (1890) of the town and municipio, 12,062. It is one of the most important towns of the Amazon between Pará and Manáos, and is a port of call for all river steamers, and a station on the Amazon cable line. The national government has made it a station in its system of wireless telegraphy in the Amazon Valley. Seen from the river the town is attractive in appearance, and consists of a European (white) and an Indian quarter, the latter of palm-thatched huts. Ruins remain of a fort built in colonial times to protect the population against hostile Indians. Its principal public buildings are a municipal hall and tribunal, a large municipal warehouse, a market (1897), theatre and two churches. The productions of the neighbourhood are cacao, Brazil nuts, rubber, tobacco, sugar-cane and cattle; and the rivers furnish an abundance of fish, which are cured here at the season of low-water, when turtle eggs are gathered up stream for the manufacture of oil and butter. The Tapajos is navigable for steamers to the rapids, 170 m. above Santarem, and for small boats nearly to Diamantino, Matto Grosso, and a considerable trade comes from Matto Grosso and the settlements along its banks. After the American Civil War a colony of Americans settled in the vicinity, but were unsuccessful in founding a permanent colony. Santarem was founded by a Jesuit missionary in 1661 as an Indian *aldeia*, and became a city in 1848.

SANTAROSA, ANNIBALE SANTORRE DI ROSSI DE POMAROLO, COUNT OF (1783–1825), Piedmontese insurgent, and leader in the revival (Resorgimento) of Italy, was born at Savigliano near Coni on the 18th of November 1783. He was the son of a general officer in the Sardinian army who was killed at the battle of Mondovi in 1796. The family had been recently ennobled and was not rich. Santarosa entered the service of Napoleon during the annexation of Piedmont to France, and was sub-prefect of Spezia from 1812 to 1814. He remained, however, loyal in sentiment to the house of Savoy, and, after the restoration of the king of Sardinia in 1814, he continued in the public service. During the brief campaign of the Sardinian army on the south-eastern frontier of France in 1815 he served as captain of grenadiers, and was afterwards employed in the ministry of war. The revolutionary and imperial epoch had seen a great development of Italian patriotism, and Santarosa was aggrieved by the great extension given to the Austrian power in Italy in 1815, which reduced his own country to a position of inferiority. The revolutionary outbreak of 1820, which extended from Spain to Naples, seemed to afford the patriots an opportunity to secure the independence of Italy. When in 1821 the Austrian army was moved south to coerce the Neapolitans, Santarosa entered into a conspiracy to obtain the intervention of the Piedmontese in favour of the Neapolitans by an attack on the Austrian lines of communication. The conspirators endeavoured to obtain the co-operation of the prince of Carignano, afterwards King Charles Albert, who was known to share their patriotic aspirations. On the 6th of March 1821 Santarosa and three associates had an interview with the prince, and on the 10th they carried out the military "pronunciamiento" which proclaimed the Spanish constitution. The movement had no real popular support, and very soon collapsed. During the brief predominance of his party Santarosa showed great decision of character. He was arrested and would have died on the scaffold if sympathisers had not rescued him. He fled to France, and lived for a time in Paris under the name of Conti. Here he wrote in French and published in 1822 his *La revolution piémontaise*, which attracted the notice of Victor Cousin, by whom he was aided and concealed. The French government discovered his hiding-place, and he was imprisoned and expelled from Paris. After a short stay first at Alençon and then in Bourges, he passed over to England, where he found refuge in London with Ugo Foscolo, and made a few English friends. He went to Nottingham, in the hope of being able to support himself by teaching French and Italian. The miseries of exile rather than any hope of advantage led him to accompany his countryman Giacinto Collegno to Greece in November 1824. The Italians were ill-treated by the Greeks and were not well looked on by the Philhellene committees, who thought that their presence would offend the powers. Santarosa was killed, apparently because he was too miserable and desperate to care to save his life, when the Egyptian troops attacked the island of Sphacteria, near Navarino, on the 8th of May 1825.

See Atto Vannucci, *I Martiri della libertà italiana* (Milan, 1877), and vol. ix. of the series called *I Contemporanei italiani* (Turin), in which there is a life by Angelo Degubernatis. Santarosa's correspondence was edited by Signor Bianchi, *Lettere di Santorre Santarosa* (Turin, 1877). A personal description of him by Victor Cousin will be found in the *Revue des deux mondes* for the 1st of March 1840. Cousin dedicated to him the fourth volume of his translation of Plato, and the long dedication is a compressed biography.

SANTA ROSA, a city and the county-seat of Sonoma county, California, U.S.A., situated in a broad valley (altitude about 180 ft.) among the Coast Ranges, about 52 m. N. of San Francisco. Pop. (1900) 6673, of whom 1029 were foreign-born. It is served by the North-Western Pacific and the Southern Pacific railways. Santa Rosa is in a region admirably adapted to the growing of hops—the city is an important hop market—and of fruit and grain, and the handling of these products is a leading industry. Poultry and dairying interests are also important. It was the home of Luther Burbank (b. 1849), the originator of many new flowers, fruits and vegetables, including the Burbank potato, the pineapple quince, and the stoneless prune. Santa Rosa was first settled about 1838, was laid out and incorporated in 1853, replaced Sonoma as the county-seat in 1854,

and was chartered as a city in 1867. In the earthquake of the 18th of April 1906 it suffered severely.

SANTERRE, ANTOINE JOSEPH (1752–1809), French revolutionist, was born in Paris on the 16th of March 1752. Like his father, he was a brewer, and gained great popularity in faubourg St Antoine by his beneficence. In 1789 he was given the command of a battalion of the National Guard, and took part in the storming of the Bastille. After the affair of the Champ de Mars (July 17th, 1791) a warrant was issued for his arrest, and he went into hiding. He emerged again in the following year, and took part in the events of the 20th of June and the 10th of August 1792, when he led the people of the faubourg St Antoine to the assault of the Tuileries. He, however, protected the royal family against the violence of the mob and, on the 7th of August, even attempted to bring about a reconciliation, but his efforts were frustrated by Marie Antoinette. He was made commander-in-chief of the National Guard, and appointed by the Convention warder to the king, in which position he did all in his power to alleviate Louis's captivity. He notified Louis of the sentence of death, and was present at the execution. Accounts differ as to his conduct at the execution, some stating that he ordered a roll of drums to drown the king's voice. The family tradition, however, is that he silenced the drums to enable Louis to speak to the people, and that General J. F. Berruyer, who was in sole command, ordered the drums to beat and thus drowned the last words of the king's speech. Santerre was appointed *maréchal de camp* on the 23rd of October 1792, and subsequently general of division. In May 1793 he was temporarily replaced as commander of the National Guard in Paris, so that he might take command of a force which he had organized to operate in La Vendée. As a military commander he was not a conspicuous success, his début being signalized by the defeat of the republicans at Saumur. He was variously reported to have been wounded and killed in this affair, and the wits of the reactionary party circulated his epitaph:

Ci-gît le général Santerre
Qui n'eut de Mars que la bière.

He was scarcely more popular among the *sans-culottes* of his army. Wounded soldiers, returned to Paris, reported that he was living *là-bas*, "in Oriental luxury," and complained that, since their defeat had been due either to his treason or his incompetence, he should have been either guillotined "like other generals" or superseded. He was, however, not in supreme command, and therefore not responsible for the ill conduct of the war; he distinguished himself in various actions; and when, in October, he returned to Paris his popularity in the faubourg St Antoine was undiminished. But his report on this expedition, in which he drew attention to the evil plight of the republican arms in the Vendée, aroused suspicion. He was accused of "Orleanism" and imprisoned, and was not released until after the fall of Robespierre. He then gave in his resignation as general, and returned to commerce; but his brewery was ruined, and after many vicissitudes of fortune he died in poverty in Paris on the 6th of February 1809.

See A. Carro, *Santerre général de la république française* (Paris, 1847), compiled from Santerre's MS. notes; P. Robiquet, *Le Personnel municipal de Paris pendant la Révolution* (Paris, 1890); C. L. Chassin, *La Vendée et la Chouannerie* (Paris, 1892 seq.); "L'État des services de Santerre dressé par lui-même," in the third volume of *Souvenirs et mémoires* (1899), published by Paul Bonnefon.

SANTERRE, JEAN BAPTISTE (1650–1717), French painter, was born at Magny, near Pontoise, and was a pupil of Bon Boulogne. He began life as a portrait-painter, and enjoyed for half a century a great reputation as a painter of the nude. He died at Paris on the 21st of November 1717. His "Portrait of a Lady in Venetian Costume" (Louvre), and his "Susanna at the Bath" (Louvre, engraved by Porporati), the diploma work executed by him in 1704, when he was received into the Academy, give a good impression of Santerre's taste and of his elaborate and careful method.

SANTIAGO, or SANTIAGO DE CHILE, a city of Chile, capital of the republic and chief town of a province of the same name, on the Mapocho river, a small tributary of the Maipú or Maipo, 115 m. W. of Valparaiso, in 33° 26′ 42″ S., 70° 40′ 36″ W. Pop. (1895) 256,413, (1900) 269,886, (1902, estimated) 322,059. It is built on a wide, beautiful plain about 1860 ft. above sea-level, between the main range of the Andes and the less elevated heights of Cuesta del Prado. In the centre of the city rises the rocky hill of Santa Lucia, once forming its citadel, but now converted into a pleasure-ground, with winding walks, picturesque views, theatres, restaurants and monuments. Immediately N.N.W. and N.E. are other hills, known as Colina, Renca and San Cristóbal, and overshadowing all are the snow-clad Andean peaks of La Chapa and Los Amarillos, visible from all parts of the city. The Mapocho, once the cause of destructive inundations (especially in 1609 and 1783), was enclosed with solid embankments during the administration of Ambrosio O'Higgins, and is now crossed by several handsome bridges; the oldest (1767–1779) of these has eleven arches. Santiago is laid out with great regularity, and its comparatively broad straight streets form parallelograms and enclose several handsome public squares, the Plaza de la Independencia, the Campo de Marte and others. The principal streets have been repaved with asphalt instead of the old cobblestone and Belgian block pavements; water is brought in through an aqueduct (1865) 5 m. long; and there are tramway lines on all the principal streets.

The cathedral, facing on the Plaza de la Independencia, is the oldest of the churches. Originally erected by Pedro de Valdivia, it was rebuilt by García Hurtado de Mendoza, was destroyed by the earthquake of 1647 and was rebuilt on a new plan subsequent to 1748. It is 351 ft. long and 92 ft. wide, has only one tower and is not striking in appearance. Its interior decorations, however, are rich and in good taste. Among the other ecclesiastical buildings are the church of San Augustin, erected in 1595 by Cristóbal de Vera, and in modern times adorned with a pillared portico; the churches of San Francisco, La Merced and Santo Domingo, dating from the 18th century; the church of the Reformed Dominicans, rich in monolithic marble columns; the Carmen Alto, or church of the Carmelite nunnery, an elegant little Gothic structure; the Augustine nunnery, founded by Bishop Medellin in 1576; the episcopal palace; and the chapel erected in 1852 to the memory of Pedro de Valdivia next to the house in which he is reputed to have lived. There are two fine cemeteries—one exclusively Roman Catholic and the other secularized. Mural interment is the custom in Santiago.

Among the secular buildings the more noteworthy are the Capitol, with its rows of massive columns and surrounded with beautiful gardens; the Moneda, or executive residence, which contains the offices of the cabinet ministers also; the municipal palace; the courts, or palace of justice; the post office and telegraph department; the exposition palace in the Quinta Normal, which houses the national museum; the university of Chile, dating from 1842; the national library with over 100,000 volumes; the School of Arts and Trades (Lyceo de Artes y Oficios); the national conservatory of music; the medical school; the astronomical observatory; the national institute; the mint; and a municipal theatre. There are also a military school, a school of agriculture, mining school, normal schools and a number of charitable institutions. The old Universidad de San Felipe, founded in 1747, was closed in 1839, and was succeeded three years later by the present national university. Facing the Capitol, which includes the two halls of Congress, is a small park and commemorative shaft, marking the spot where stood the Jesuits' church, burned down on the night of the 8th of December 1868, and with it "two thousand victims, more or less," chiefly women.

There is railway communication with Valparaiso, with Los Andes and the international tunnel and with the provincial capitals of the south.

Santiago was founded in 1541 by Pedro de Valdivia, who was engaged in the conquest of Chile, and it received the title of Santiago del Nuevo Estremo. It has suffered from earthquakes and from political disorder. After the defeat of the royalists at Chacabuco (Feb. 12th, 1817), it was occupied by the revolutionary forces under General José de San Martin. Though the scene of many revolutionary outbreaks, it has never been subjected to a regular siege.

The province of Santiago, bounded N. by Aconcagua, W. by Mendoza, S. by O'Higgins and Colchagua and W. by Valparaiso and the Pacific, has an area of 5665 sq. m. and a population (1895) of 415,636. It forms part of the "Vale of Chile," celebrated for its fertility and fine climate.

SANTIAGO DE COMPOSTELA, or SANTIAGO (formerly written in English *St Jago de Compostella* and sometimes *Compostello*),

a city of N.W. Spain, in the province of Corunna; at the northern terminus of a railway from Tuy, near the confluence of the Sar and Sarela rivers, and 32 m. S. by W. of the city of Corunna. Pop. (1900) 24,120. Santiago is built on the eastern slope of Monte Pedroso, surrounded by the mountains which draw down the incessant rain that gives the granite buildings of its deserted streets an extra tint of melancholy and decay. Its annual rainfall is 66 in., a total rarely exceeded on the mainland of Europe. The city was formerly the capital of Galicia; it gives its name to one of the four military orders of Spain, which rank as follows: Compostela, Calatrava, Alcantara and Montesa; and it is still the seat of a university and of an archbishopric, which long disputed the claim of Toledo to the primacy of all Spain. In the middle ages its shrine, which contained the body of St James the Great, was one of the most famous in Europe; so numerous were the pilgrims that the popular Spanish name for the Milky Way is *El Camiño de Santiago*, or "The Santiago Road." The city became, in fact, the focus of all the art and chivalry of neighbouring Christendom, and a spot where conflicting interests could meet on neutral ground. The Congregation of Rites declared in 1884 that the cathedral still enshrines the veritable body of the apostle, and few places of pilgrimage in Europe are more frequented. The city contains many hospitals and other charitable institutions, which are open to the pilgrims. In 1900 its ecclesiastical buildings numbered forty-six. Its chief industries, apart from agriculture, are brewing, distillation of spirits and the manufacture of linen, paper, soap, chocolate and matches. The city has also been long celebrated for its silversmiths' work.

The belief that St James had preached in Spain was certainly current before A.D. 400. The relics of the saint were said, though the tradition cannot be traced back farther than to the 12th century, to have been discovered in 835 by Theodomir, bishop of Iria, who was guided to the spot by a star. Hence *Compostela* is regarded by some authorities as a corruption of *Campus Stellae*, "Plain of the Star"; others derive it from *San Jacome Apostol*. According to the legend a chapel was forthwith erected, and the bishopric was transferred thither by a special bull of Pope Leo III. A more substantial building was begun in 868, but was totally destroyed in 997 by the Moors, who, however, respected the sacred relics. On the reconquest of the city by Bermudo III. the roads were improved, and pilgrims began to flock to the shrine, which fast grew in reputation.

In 1078 the erection of the present cathedral was begun during the episcopate of Diego Pelaez, and was continued until 1188, when the western doorway was completed. Minor additions prolonged the work until 1211, when the cathedral was consecrated. It is a cruciform Romanesque building, and keeps its original form in the interior, but is disfigured externally by much poor late work. Besides the classic dome and clock-tower, the two western towers have been raised to a height of 220 ft. and crowned with cupolas, and between them has been erected a classic portico, above which is a niche containing a statue of St James. The façade was the work of Fernando Casas y Noboa in 1738, and the statue was by Ventura Rodriguez in 1764. The design is mediocre, and gains its chief effect from forming part of an extended architectural composition on the Plaza Mayor, a grand square surrounded by public buildings. The ground rises to the cathedral, which is reached by a magnificent quadruple flight of steps, flanked by statues of David and Solomon. Access to the staircase is through some fine wrought-iron gates, and in the centre, on the level of the Plaza, is the entrance to a Romanesque chapel, La Iglesia Baja, constructed under the portico and contemporary with the cathedral. To the north and south, and in a line with the west front, are dependent buildings of the 18th century, grouping well with it. Those to the south contain a light and elegant arcade to the upper windows, and serve as a screen to the cloisters, built in 1533 by Fonseca, afterwards archbishop of Toledo. They are said to be the largest in Spain, and are a fair example of the latest Gothic. The delicate sculpture over the heads of the windows and along the wall of the cloister is very noticeable. On the north of the cathedral is the Plazuela S. Juan, where the peasants collect to do their marketing. Here is the convent of S. Martin, built in 1636, which, after serving as a barrack, is now used as an ecclesiastical seminary, restored to the church. It has a tolerable cloister and bell-tower. The north side of the cathedral is much overlaid by the ugly and extravagant ornamentation styled, after its chief Spanish exponent Churriguera (d. 1715), *Churrigueresque* work. The same treatment has been applied to the east end, where is the Puerta Santa; this gate is kept closed, except in jubilee years, when it is opened by the archbishop. The corner of the south transept on the Plaza de los Plateros has been mutilated by the erection of the clock-tower, but the façade is intact. Perhaps the chief beauty of the cathedral, however, is the Portico de la Gloria, behind the western classic portal. It is a work of the 12th century, and probably the utmost development of which round-arched Gothic is capable. The shafts, tympana and archivolts of the three doorways which open on to the nave and aisles are a mass of strong and nervous sculpture. The design is a general representation of the Last Judgment, and the subjects are all treated with a quaint grace which shows the work of a real artist. Faint traces of colour remain and give a tone to the whole work. It is probable that, until the erection of the present grand staircase, the portico could not be reached from the Plaza, but stood open to the air. There are no marks of doors in the jambs, and the entrance to the chapel beneath would have been blocked by any staircase which differed much in plan from the present one. The interior of the church is one of the purest and best examples of Romanesque work to be met with in Spain. The absence of a clerestory throws an impressive gloom over the barrel-vaulted roof, which makes the building seem larger than it is. A passage leads from the north transept to the Parroquia of San Juan, or La Corticela, a small but interesting portion of the original foundation. Many fine examples of metal work are in the cathedral, as, for instance, the two bronze ambos in the choir by Juan B. Celma of 1563, the gilt chandeliers of 1763 and the enamelled shrines of Sts Cucufato and Fructuoso. The great censer which hangs from the cathedral roof, and is swung by an iron chain, is about 6 ft. high. In the Capilla del Relicario are a gold crucifix, dated 874, containing a piece of the true cross, and a silver gilt custodia of 1544.

The Hospicio de los Reyes, on the north of the Plaza Mayor, for the reception of pilgrims, was begun in 1504 by Enrique de Egas under Ferdinand and Isabella. It consists of two Gothic and two classic courtyards with a chapel in the centre. The gateway is fine, and there is some vigorous carving in the courtyards, one of which contains a graceful fountain. The suppressed Colegio de Fonseca and the adjoining convent of S. Gerónimo have good Renaissance doorways. The university, which was created in 1504 by a bull of Pope Julius II., has a library containing 60,000 volumes and several MSS., many valuable and one dating from 788. Those of the Seminario (1777) have no merit. The chapel of the convent of S. Francisco, the cloisters of the half-ruined S. Augustin, the belfry of S. Domingo, the church of S. Feliz de Celorio, modernized 14th century, and the façades of several houses of the 12th and 13th centuries are also good examples of different architectural styles.

SANTIAGO DE CUBA, a city and seaport of Cuba, on the S. coast of the E. end of the island, capital of the province of Oriente, and next to Havana the most important city of the Republic. Pop. (1907) 45,470, of whom 56·7 % was coloured and 13·6 % was foreign-born. It is connected by the Cuba railway with Havana, 540 m. to the W.N.W.; short railways extend into the interior through gaps in the mountains northward; and there are steamer connexions with other Cuban ports and with New York and Europe.

Santiago is situated about 6 m. inland on a magnificent landlocked bay (6 m. long and 3 m. wide), connected with the Caribbean Sea by a long, narrow, winding channel with rocky escarpment walls, in places less than 200 yds. apart. The largest vessels have ready entrance to the harbour—which has a periphery of 15 m. or more in length—but direct access to the wharves is impossible for those of more than moderate draft (about 14 ft.). Smith Key, an island used as a watering-place, divides it into an outer and an inner basin. To the E. of the sea portal stand the Morro, a picturesque fort (built 1633 seq.), on a jutting point 200 ft. above the water, and the Estrella; and to the W. the Socapa. West of the harbour are low hills, to the E. precipitous cliffs, and N. and N.E., below the superb background of the Sierra Maestra, is an amphitheatre of hills, over which the city straggles in tortuous streets. The houses are almost all of one storey, built in the quaint style of southern Spain, with red-tile roofs, and the better ones with verandas and court gardens. There is a promenade along the harbour and a botanical garden. Facing the Plaza de Cespedes (once Plaza de la Reina and then Plaza de Armas) are hotels and clubs, the large municipal building—formerly the governor's palace (1855 seq.)—and the cathedral. In the cathedral, which is in better taste than the cathedral of Havana, Diego Velazquez (*c.* 1460–1524), conqueror of Cuba, was buried. It has suffered much from earthquakes and has been extensively repaired. Probably the oldest building in Cuba is the convent of San Francisco (a church since the secularization of the religious orders in 1841), which dates in part from the first half of the 16th century. The 18th-century Filarmonia theatre is now dilapidated. The other public buildings are hardly noteworthy. Great improvements have been made in the city since the end of colonial rule, especially as regards the streets, the water-supply and other public works, and sanitation. On a hill overlooking the city is a beautiful school-house of native limestone, erected by the American military government as a model for the rest of the island. Santiago is the hottest city of Cuba (mean temperature in winter

about 82° F., in summer about 88°), owing mainly to the mountains that shut off the breezes from the E. There is superb mountain scenery on the roads to El Caney and San Luis (pop. 1907, 3441), in the thickly populated valley of the Cauto. In the barren mountainous country surrounding the city are valuable mines of iron, copper and manganese. On these the prosperity of the province largely depends. There are also foundries, soap-works, tan-yards and cigar factories. The city has an important trade with the interior, with other Cuban ports, and to a less extent with New York and European ports. Mineral ores, tobacco and cigars, coffee, cacao, sugar and rum and cabinet-woods are the main articles of export. Copper ore was once exported in as great quantities as 25,000 tons annually, but the best days of the mines were in the middle of the 19th century. The mines of Cobre, a few miles W. of Santiago, have an interesting history. They were first worked for the government by slaves, which were freed in 1799.

History.—Santiago is less important politically under the Republic than it was when Cuba was a Spanish dependency. The place was founded in 1514 by Diego Velazquez, and the capital of the island was removed thither from Baracoa. Its splendid bay, and easy communication with the capital of Santo Domingo, then the seat of government of the Indies, determined its original importance. From Santiago in 1518-1519 departed the historic expeditions of Juan de Grijalva, Hernán Cortés and Pámfilo de Narvaez—the last of 18 vessels and 1100 men of arms, excluding sailors. So important already was the city that its ayuntamiento had the powers of a Spanish city of the second class. In 1522 it received the arms and title of *ciudad*, and its church was made the cathedral of the island (Baracoa losing the honour). But before 1550 the drain of military expeditions to the continent, the quarrels of civil, military and ecclesiastical powers, and of citizens, and the emigration of colonists to the Main (not in small part due to the abolition of the *encomiendas* of the Indians), produced a fatal decadence. In 1543 Havana became the capital. Santiago was occupied and plundered by French corsairs in 1553, and again by a British military force from Jamaica in 1662. The capture of that island had caused an immigration of Spanish refugees to Santiago that greatly increased its importance; and the illicit trade to the same island—mainly in hides and cattle—that flourished from this time onward was a main prop of prosperity. From 1607 to 1826 the island was divided into two departments, with Santiago as the capital of the E. department—under a governor who until 1801 in political matters received orders direct from the crown. After 1826 Santiago was simply the capital of a province. In July 1741 a British squadron from Jamaica under Admiral Edward Vernon and General Thomas Wentworth landed at Guantánamo (which they named Cumberland Bay) and during four months operated unsuccessfully against Santiago. The climate made great ravages among the British, who lost perhaps 2000 out of 5000 men. The bishopric became an archbishopric in 1788, when a suffragan bishopric was established at Havana. J. B. Vaillant (governor in 1788–1796) and J. N. Quintana (governor in 1796–1799) did much to improve the city and encourage literature. After the cession of Santo Domingo to France, and after the French evacuation of that island, thousands of refugees settled in and about Santiago. They founded coffee and sugar plantations and gave a great impulse to trade. The population in 1827 was about 27,000. There were destructive earthquakes in 1675, 1679, 1766 and 1852. Dr Francesco Antommarchi (1780–1838), the physician who attended Napoleon in his last illness, died in Santiago, and a monument in the cemetery commemorates his benefactions to the poor. In the 19th century some striking historical events are associated with Santiago. One was the "Virginius" affair. The "Virginius" was a blockade-runner in the Civil War; it became a prize of the Federal government, by which it was sold in 1870 to an American, J. F. Patterson, who immediately registered it in the New York Custom House. It later appeared that Patterson was merely acting for a number of Cuban insurgents. On the 31st of October, then commanded by Joseph Fry, a former officer of the Federal and Confederate navies, and having a crew of fifty-two (chiefly Americans and Englishmen) and 103 passengers (mostly Cubans), she was captured off Morant Bay, Jamaica, by the Spanish vessel "Tornado," and was taken to Santiago, where, after a summary court-martial, 53 of the crew and passengers, including Fry and some Americans and Englishmen, were executed on the 4th, 7th and 8th of November. Relations beween Spain and the United States became strained, and war seemed imminent; but on the 8th of December the Spanish government agreed to surrender the "Virginius" on the 16th, to deliver the survivors of the crew and passengers to an American war-ship at Santiago, and to salute the American flag at Santiago on the 25th if it should not be proved before that date that the "Virginius" was not entitled to sail under American colours. The "Virginius" foundered off Cape Hatteras as she was being brought to the United States. The Attorney-General of the United States decided before the 25th that the "Virginius" was the property of General Quesada and other Cubans, and had had no right to carry the American flag. Under an agreement of the 27th of February 1875, the Spanish government paid to the United States an indemnity of $80,000 for the execution of the Americans, and an indemnity was also paid to the British government.[1] The most notable military and naval events (in Cuba) of the Spanish-American War (*q.v.*) of 1898 took place at and near Santiago. Monuments commemorate the actions at El Caney and San Juan Hill.

SANTIAGO DE LAS VEGAS, an inland city of Havana province, Cuba, about 12 m. S. of Havana. Pop. (1907) 6462. Tobacco is the principal industry. An agricultural experiment station is maintained here by the Cuban government. The town dates from 1688, when a church was built for a colony of tobacco cultivators of the neighbourhood. In 1721 it received the title and privileges of a *villa*, and in 1824 those of a *ciudad*.

SANTIAGO DEL ESTERO, a province of Argentina, bounded N. by Salta and the Chaco territory, E. by the Chaco and Santa Fé, S. by Cordoba, and W. by Catamarca, Tucuman and Salta. Area 39,764 sq. m.; pop. (1895) 161,502; (1904, estimated) 186,205, chiefly Christianized Indians. The surface of the province is flat and low, chiefly open plains thinly covered with grass. There are forests in the W. and N., extensive swamps along the river courses and large saline areas, especially in the S.W. The Salado (called Pasage, and Juramento in Salta) crosses the province from N.W. to S.E. and empties into the Paraná, and the Dulce, or Saladillo, which has its sources in the Sierra de Aconquija, crosses the province in the same general direction, and is lost in the great saline swamps of Porongos, on the Cordoba frontier. The climate is extremely hot, the maximum temperature being 111° (Mulhall), minimum 32°, and the mean annual 71°, with an annual rainfall of 25 in. Sugar, wheat, alfalfa, Indian corn, tobacco and hides are the principal products, and cotton, which was grown here under the Incas, is still produced. The province is traversed by the Tucuman extension of the Buenos Aires and Rosario railway, by a French line from Santa Fé to Tucuman, and by a branch of the Central Northern (Cordoba section) railway.

The provincial capital, SANTIAGO DEL ESTERO, is on the left bank of the Rio Dulce, 745 m. N.W. of Buenos Aires, with which it is connected by rail. Pop. (1904, estimated) 12,000, chiefly of Indian descent. The city stands on a level open plain, 520 ft. above sea-level, and in the vicinity of large swamps (*esteros*) bordering the Rio Dulce, from which its name is derived. There are a number of interesting old buildings in the city—a government house, several churches, a Jesuit college, a Franciscan convent and a girls' orphanage. The city was founded in 1553 by Francisco de Aguirre and was the first capital of the province of Tucuman, the earliest settled of the La Plata provinces. In 1615 the cathedral was accidentally burnt and the bishop removed to Cordoba. The city has suffered much through inundations from the Rio Dulce, and from frequent local revolutions caused by misgovernment and the struggles of rival factions. In 1663 an inundation carried away half the capital, and the population was so reduced that in 1680 the seat of government was removed to San Miguel, now Tucuman. In 1820 Santiago del Estero became a separate province.

[1] See F. E. Chadwick, *The Relations between the United States and Spain: Diplomacy* (New York, 1909).

SANTILLANA, IÑIGO LOPEZ DE MENDOZA, MARQUIS OF (1398–1458), Castilian poet, was born at Carrión de los Condes in Old Castile on the 19th of August 1398. His father, Diego Hurtado de Mendoza, grand admiral of Castile, having died in 1405, the boy was educated under the eye of his mother, Doña Leonor de la Vega, a woman of great strength of character. From his eighteenth year onwards he became an increasingly prominent figure at the court of Juan II. of Castile, distinguishing himself in both civil and military service; he was created marqués de Santillana and conde del Real de Manzanares for the part he took in the battle of Olmedo (19th of May 1455). In the struggle of the Castilian nobles against the influence of the constable Álvaro de Luna he showed great moderation, but in 1452 he joined the combination which effected the fall of the favourite in the following year. From the death of Juan II. in 1454 Mendoza took little part in public affairs, devoting himself mainly to the pursuits of literature and to pious meditation. He died at Guadalajara on the 25th of March 1458.

Mendoza shares with Juan de Villalpando the distinction of introducing the sonnet into Castile, but his productions in this class are conventional metrical exercises. He was much more successful in the *serranilla* and *vaqueira*—highland pastorals after the Provençal manner. His rhymed collection of *Proverbios de gloriosa doctrina é fructuosa enseñanza* was prepared for the use of Don Enrique, the heir-apparent. To the same didactic category belong the hundred and eighty stanzas entitled *Diálogo de Bias contra Fortuna*, while the *Doctrinal de Privados* is a bitter denunciation of Álvaro de Luna. The *Comedieta de Ponza* is a Dantesque dream-dialogue, in octave stanzas (*de arte mayor*), founded on the disastrous sea-fight off Ponza in 1425, when the kings of Aragon and Navarre and the Infante Enrique were taken prisoners by the Genoese. The three last-named compositions are the best of Santillana's more ambitious poems, but they are deficient in the elegant simplicity of the *serranillas*. These unpretentious songs are in every Spanish anthology, and are familiar even to uneducated Spaniards.

BIBLIOGRAPHY.—*Obras*, edited by José Amador de los Ríos (Madrid, 1852); M. Menéndez y Pelayo, *Antología de poetas líricas castellanos* (Madrid, 1894), vol. v. pp. 78-144; B. Sanvisenti, *I Primi Influssi di Dante, del Petrarca e del Boccaccio sulla letteratura spagnuola* (Milan, 1902), pp. 127-186.

SANTINI, GIOVANNI (1787–1877), Italian astronomer, was born on the 30th of January 1787 at Caprese, in the province of Arezzo. He was from 1813 professor of astronomy at the university and director of the observatory at Padua. He wrote *Elementi di astronomia* (2 vols. 1820, 2nd ed. 1830), *Teoria degli stromenti ottici* (2 vols. 1828), and many scientific memoirs and notices, among which are five catalogues of telescopic stars between $+10°$ and $-15°$ declination, from observations made at the Padua observatory. He died on the 26th of June 1877.

See *Astronomische Nachrichten*, No. 90; *Month. Not. Roy. Astr. Soc.*, No. 38.

SANTLEY, SIR CHARLES (1834–), English vocalist, son of an organist at Liverpool, was born on the 28th of February 1834. He was given a thorough musical education, and having determined to adopt the career of a singer, he went in 1855 to Milan and studied under Gaetano Nava. He had a fine baritone voice, and while in Italy he began singing small parts in opera. In 1857 he returned to London, and on 16th November made his first appearance in the part of Adam in *The Creation* at St Martin's Hall. In 1858, after appearing in January in *The Creation*, he sang the title-part in *Elijah* in March, both at Exeter Hall. In 1859 he sang at Covent Garden as Hoel in the opera *Dinorah*, and in 1862 he appeared in Italian opera in *Il Trovatore*. He was then engaged by Mapleson for Her Majesty's, and his regular connexion with the English operatic stage only ceased in 1870, when he sang as Vanderdecken in *The Flying Dutchman*. His last appearance in opera was in the same part with the Carl Rosa Company at the Lyceum Theatre in 1876. Meanwhile, in 1861 he sang *Elijah* at the Birmingham Festival, and in 1862 was engaged for the Handel Festival at the Crystal Palace. At the musical festivals and on the concert stage his success was immense. In such songs as "To Anthea," "Simon the Cellarer" or "Maid of Athens," he was unapproachable, and his oratorio singing carried on the finest traditions of his art. He was knighted in 1907. In 1858 Santley married Gertrude Kemble, and their daughter, Edith Santley, had a great success as a concert singer.

SANTO DOMINGO [SAN DOMINGO, DOMINICAN REPUBLIC, or officially REPUBLICA DOMINICANA], a state in the West Indies. It occupies two-thirds of the island of Haiti (*q.v.*) and has an area of about 18,045 sq. m. The administration is in the hands of three co-ordinate "powers"—the executive, the legislative and the judicial. Under the constitution of 1844, modified in 1879, 1880, 1881, 1887, 1896, and 1908, the president is the head of the executive. He is chosen by an electoral college and serves for six years, and he is assisted by a cabinet of seven ministers. The legislature, called the National Congress, consists of a Senate of 12 members, and a Chamber of Deputies of 24 members elected for four years by a limited suffrage. The Supreme Court comprises a chief-justice, six justices appointed by the Congress, and one justice appointed by the president. The republic is divided into six provinces and six maritime districts. Each province and district is administered by a governor appointed by the Cabinet. There is a small army, most of which is stationed at the City of Santo Domingo, and military service is compulsory in the event of foreign war. The navy consists of one small gun-boat. Primary education is free and compulsory: elementary schools are supported largely by the local authorities, and the higher, technical and normal schools by the government. There is a professional school with the character and functions of a university. The Roman Catholic is the state religion, but all others are allowed under certain restrictions. The monetary unit is a silver coin of the value of a franc, called the *dominicano*, but in 1897 the United States gold dollar was adopted as the standard of value. The roads in the interior are primitive, but the government encourages the construction of railways. A line runs between Sanchez and La Vega, and another between Santiago and Porto Plata. The republic joined the Postal Union in 1880. The exports include tobacco, coffee, cacao, sugar, mahogany, logwood, cedar, satinwood, hides, honey, gum and wax. The collection of the customs and other revenues specially assigned to the securance of bonds was in the hands of an American company until 1899, when this defaulted in the payment of interest and the government took over the collection. In 1905, to forestall foreign intervention for securing payment of the State debt, President Roosevelt made an agreement with Santo Domingo, under which the United States undertook to adjust the republic's foreign obligations, and to assume charge of the customs houses. A treaty was ratified by the United States Senate in 1907, and an American citizen is temporarily receiver of customs. In June 1907 the debts amounted to $17,000,000.

Santo Domingo has the finest sugar lands in the West Indies; tobacco and cacao flourish; the mountain regions are especially suited to the culture of coffee, and tropical fruits will grow anywhere with a minimum of attention. During the earlier years of the Spanish occupation gold to the value of £90,000 was sent annually to Spain, besides much silver. Platinum, manganese, iron, copper, tin, antimony, opals and chalcedony are also found. In the Neyba valley there are two remarkable hills, composed of pure rock salt. Only an influx of capital and an energetic population are needed to develop these resources.

Santo Domingo, the capital of the republic, is situated on the south coast. At a distance of 45 m. N. lies the town of Azua (pop. 1500) founded in 1504 by Diego Columbus. It stands in a plain, rich in salt and asphalt, which was the scene of the first planting of sugar in the West Indies. Santiago (pop. 12,000), the capital of the Vega Real, stands on the banks of the Yaqui river, 160 m. N.W. of the capital, in the richest agricultural district in the state. It controls the tobacco trade which is chiefly in German and Dutch hands. Its port, Porto Plata (pop. 15,000), is the outlet of the entire Vega Real district. La Vega, perhaps the most beautiful city of Santo Domingo, lies in the midst of a lovely savanna, or plain, surrounded by well-wooded hills, and has a magnificent old cathedral. Six miles away is the Cerro Santo, a hill 787 ft. in height, rising abruptly from the plain, on the summit of which Columbus planted a great cross on his first visit in 1493. Seybo (5000), Monti Cristi (3000) and Samana (1500) are the only other towns of any size. The population of the republic is about 500,000. The people are mainly mulattoes of Spanish descent, but there are a considerable number of negroes and whites of both Creole and European origin. Politically the

whites have the predominating influence. The people, on the whole, are quiet, lazy and shiftless, but subject at times to great political excitement. They are Spanish in their mode of life and habits of thought. Spanish too is the common language, though both French and English are spoken in the towns.

History.—After the downfall of Toussaint l'Ouverture (see HAITI) there followed the initiation of the black Haitian Empire under Jean Jacques Dessalines in 1803. Spain, however, established herself anew on the eastern end of the island in 1806, Haiti remaining independent. Santo Domingo continued thus a Spanish possession until 1821, when, under the authority and flag of Colombia, a republic was proclaimed, and the Spaniards withdrew. In the following year the Haitian president Boyer invaded Santo Domingo, joined it to Haiti and ruled the entire island till his fall in 1843. The Spanish part of the island again became independent of Haiti in 1844, when the Dominican Republic was founded, and since that time the two political divisions have been maintained, and their respective inhabitants have grown more and more estranged. The earlier years of the new republic were marked by the struggles between Pedro Santana and Buenaventura Bäez, who with the exception of a few months under Jiminez, occupied the presidency in turn until 1861. In that year Santana, with the consent of the people, proclaimed the annexation of Santo Domingo by Spain. The Spaniards, however, did not long enjoy their sovereignty, for the harshness of their rule provoked a successful revolution under José Maria Cabral in 1864; and in the following year they withdrew all claim to the country. Bäez was again chosen president, but was driven out by Cabral after a year of power.

From 1868 to 1873 Bäez was once again in office, and during this term overtures were made to the United States with a view to annexation. General O. E. Babcock was despatched by President Grant to report on the condition and resources of Santo Domingo, and while there, in 1869, he negotiated a treaty by which the republic was to become part of the United States. Although ratified by the Dominican Senate, this treaty was opposed in the United States Senate, under the leadership of Charles Sumner, and was finally rejected. In 1871 three commissioners were appointed by President Grant to report further, but although their report was favourable to annexation, no action was taken.

Bäez was succeeded by Gonzalez (1873–1879), under whom the country enjoyed a period of tranquillity. Great political agitation followed, which terminated in 1882 with the election of Ulises Heureaux, a negro, and capable statesman. Under his despotic rule of nearly 17 years, the republic enjoyed greater prosperity and tranquillity than it had ever known. He was assassinated in July 1899, and was succeeded by Jiminez, who was driven out by General Vasquez in 1902. Vasquez, in turn, was deposed by a revolution headed by General Wos y Gil, who became president in 1903, but was overthrown by Jiminez in November of that year. In 1904 Jiminez was expelled and C. F. Morales became president. Ramon Caceres was installed in 1906, and in 1908 a new constitution was proclaimed and Caceres was elected for the term 1908-1914.

BIBLIOGRAPHY.—B. Edwards, *Hist. Survey of the Island of Santo Domingo* (London, 1801); Monte y Tejada, *Historia de Santo Domingo* (Havana, 1853); J. de Marles, *Hist. descript. et pittor. de Saint Domnique* (Paris, 1869); S. Hazard, *Santo Domingo, Past and Present* (London, 1873); J. G. Garcia, *Compendio de la Historia de Santo Domingo* (Santo Domingo, 1879); F. A. Leal, *La République Dominicane* (Paris, 1888); H. Thomasset, *La République Dominicane en 1890* (Santo Domingo, 1890); J. R. Abad, *La Republica Dominicana* (Santo Domingo, 1889); El Padre Merino, *Elementos de geografia fisica, politica, e historica de la Republica Dominicana* (Santo Domingo, 1889); Bureau of American Republics, Bulletin No. 52, 1892. (See also HAITI.)

SANTO DOMINGO, the capital of the republic of the same name, in the island of Haiti, West Indies. Pop. about 25,000. It is situated on the S. coast, at the mouth of the river Ozama. Founded in 1496, it is the oldest existing settlement of white men in the New World, and perhaps the most perfect example of a Spanish colonial town of the 16th century. It is surrounded by ancient walls with bastions. The streets are straight, narrow, and intersect at right angles. The massive houses are built of stone with coloured walls pierced with huge doors and windows. The cathedral, in the Spanish Renaissance style, dates from 1512, and contains the reputed tomb of Columbus (*q.v.*). The cell in which he and his brother were confined by order of Bobadilla is still shown in the old fortress. The city is the seat of an archbishop. It has a small and rather poor harbour, but the river is navigable for 4 m. from its mouth. The climate is healthy and cool.

SANTONIN, a drug used in the U.S.P. and B.P., consisting of colourless flat prisms, turning slightly yellow from the action of light and soluble in alcohol, chloroform and boiling water. It is derived from santonica which is the unexpanded flower-heads of *Artemisia maritima*. The dose is 2 to 5 grs. The only B.P. preparation is the *trochiscus santonini*, but the preparation *sodii santoninas* is official in the U.S.P. Santonin is an anthelmintic used to poison the round worm *Ascaris lumbricoides*. It has no influence on tape-worms. It must be administered fasting and be followed by a purgative in order to expel the worm. The most convenient mode of administration is in capsules. For thread worms which infest the anus of young children, a suppository containing 2 to 3 grs. of santonin and used on alternate nights for three nights is effective. The U.S. preparation sodii santoninas is useless as a vermifuge and is used in diseased conditions of the optic nerve. Even small doses of santonin cause disturbances of vision, usually yellow vision or perhaps green (xanthopsia or chromatopsia). The urine also turns yellow and finally purple or red. These effects usually pass off in a few days. Large doses, however, produce toxic effects, aphasia, muscular tremors and epileptiform convulsions, and the disturbances of vision may go on to total blindness.

SANTORIN (corruption of St Irene; anc. THERA), a volcanic island in the Aegean Sea, the southernmost of the Sporades. In shape Santorin forms a crescent, and encloses a bay on the north, east and south, while on the western side lies the smaller island of Therasia. The encircling wall thus formed, which is elliptical in shape and 18 m. round in its inner rim, is broken in two places—towards the north-west by a strait a mile in breadth, where the water is not less than 1100 ft. deep, and towards the south-west by an aperture about 3 m. wide, where the water is shallow, and an island called Aspronisi or White Island lies in the middle. The cliffs rise perpendicularly from the bay, in some places to the height of 1000 ft.; but towards the open sea, both in Santorin and Therasia, the ground slopes gradually away, and has been converted into broad level terraces, everywhere covered with tufaceous agglomerate, which, though bare and ashen, produces the famous Santorin wine. Towards the south-east rises the limestone peak of Mount Elias, the highest point of the island (1910 ft.); this existed before the volcano was formed. In the middle of the basin lie three small islands, which are the centre of volcanic activity, and are called Palaea, Mikra and Nea Kaumene, or the Old, the Little and the New Burnt Island; the highest of these, Nea Kaumene, is 351 ft. above the sea. Owing to the depth of the water there is no anchorage, and vessels have to be moored to the shore, except at one point in the neighbourhood of the modern town, where there is a slight rim of shallow bottom. The cliffs of Santorin and Therasia are marked in horizontal bands by black lava, white porous tufa, and other volcanic strata, some parts of which are coloured dark red. The modern town of Thera (or Phera, as it is more commonly pronounced) is built at the edge of these, overlooking the middle of the bay at a height of 900 ft. above the water, and the foundations of the houses and in some cases their sides also, are excavated in the tufa, so that occasionally they are hardly traceable except by their chimneys. Owing to the absence of timber—for, except the fig, cactus and palm, there are hardly any trees in the island—they are roofed with barrel vaults of stone and cement. Both wood and water have occasionally to be imported from the neighbouring islands, for there are no wells, and the rain water, collected in cisterns, does not always suffice. The largest of the other villages is Apanomeria, near the northern entrance, which is crowded

together in a white mass, while the rocks below it are the reddest in the island.

Santorin is closely connected with the earthquake movements to which the countries in the neighbourhood of the Aegean are subject. It is hardly accurate to speak of the basin which forms the harbour as a crater, for most geologists support the view that the whole of this space was once covered by a single volcanic cone, the incline of which is represented by the outward slope of Santorin and Therasia, while the position of the crater was that now occupied by the Kaumene Islands; and that owing to a volcanic explosion and the subsidence of the strata the basin was formed. The Kaumene Islands arose subsequently, and that of Palaea Kaumene is considered to have been prehistoric. The principal eruptions that have taken place within historic times are that of 196 B.C., when, as we learn from Strabo (i. 3, § 16, p. 57), flames rose from the water halfway between Thera and Therasia for four days; that of A.D. 726, during the reign of the Emperor Leo the Isaurian (on both these occasions islands were thrown up, but it is supposed that they afterwards disappeared); that of 1570, when Mikra Kaumene arose; that of 1050, which destroyed many lives by noxious exhalations, and ended in the upheaval of an island in the sea to the north-east of Santorin, which afterwards subsided and became a reef below sea-level; that of 1707, when Nea Kaumene arose; and that of 1866, when Nea Kaumene was extended towards the south and enlarged threefold.

In the southern parts both of Santorin and Therasia prehistoric dwellings have been found at some height above the sea, and there is no doubt that these date from a period antecedent to the formation of the bay. This is proved by their position underneath the layer of tufa which covers the islands, and by these layers of tufa being broken off precipitously, in the same way as the lava-rocks, a fact which can only be explained by the supposition that they all fell in together. The foundations of the dwellings rested, not on the tufa, but on the lava below it; and here and there between the stones branches of wild olive were found, according to a mode of building that still prevails in the island, in order to resist the shocks of earthquakes. Very few implements of metal were found. Some of the vases found were Cretan ware which had been imported; and the correspondence between these and various specimens of the native pottery proves that to some extent this primitive art was derived from Crete.

In Greek legend the island of Thera was connected with the story of the Argonauts, for it was represented as sprung from a clod of earth which was presented to those heroes by Triton (Apollon. *Argonaut.* iv. 1551 sq., 1731 sq.). According to Herodotus (iv. 147), a Phoenician colony was established there by Cadmus. Subsequently a colony from Sparta, including some of the Minyae, was led thither by Theras, who gave the island his own name, in place of that of Calliste which it had borne before. But the one event which gave importance to Thera in ancient history was the planting of its famous colony of Cyrene on the north coast of Africa by Battus in 631 B.C., in accordance with a command of the Delphic oracle.

The ancient capital, which bore the same name as the island, occupied a site on the eastern coast now called Mesavouno, between Mount Elias and the sea. Since 1895 this place has been excavated by Baron Hiller von Gärtringen and other German explorers. There are extensive ancient cemeteries. A steep ascent leads from a Heroum of Artemidorus to the Agora; in its neighbourhood were the Stoa Basilice, a vast hall with a row of pillars; a temple of Dionysus and the Ptolemies, which at a later period was dedicated to the Caesars; and the barrack of the garrison of the Ptolemies and a gymnasium. The names which occur here remind us that Thera, as a member of the League of the Cyclades, was from B.C. 308 to 145 under the protectorate of the Ptolemies. The main street has narrow lanes diverging from it to right and left; one of these leads to the sanctuary of the Egyptian gods. Near the street there is a small theatre, beneath the seats of which a vast cistern was constructed, arranged so that rain-water should drain into it from the whole of the auditorium. The way then descends south-eastwards first to the temple of Ptolemy Euergetes III., and then to that of Apollo Carneius; finally, at the point where the rocks fall precipitously, there is a gymnasium of the Ephebi. Numerous rock-carvings and inscriptions have been discovered, as well as statues and vases of various periods. Near the western foot of Mount Elias is the temple of Thea Basileia, which, though very small, is perfect throughout even to the roof. It is now dedicated to St Nicolas Marmorites.

Tournefort mentions that in his time nine or ten chapels were dedicated to St Irene, the patron saint of the place; the name Santorin was given to the island after the fourth crusade, when the Byzantine empire was partitioned among the Latins, and the island formed a portion of the duchy of the Archipelago. Santorin is prosperous, for, in addition to the wine trade, there is a large export of *pozzolana*, which, when mixed with lime, forms a hard cement. Santorin (officially Thera) is a province in the department of the Cyclades. It is divided into 9 communes (see CYCLADES), with a total population of 19,597 in 1907.

BIBLIOGRAPHY.—L. Ross, *Inselreisen* (Stuttgart, 1840, vol. i.); C. Bursian, *Geographie von Griechenland* (Leipzig, 1872, vol. ii.); F. Fouqué, *Santorin et ses éruptions* (Paris, 1879); Neumann and Partsch, *Physicalische Geographie von Griechenland* (Breslau, 1885); J. Th. Bent, *The Cyclades* (London, 1885); H. F. Tozer, *The Islands of the Aegean* (Oxford, 1890); Hiller von Gärtringen, *Thera* (Berlin, 1899 foll.); Baedeker's *Greece*, 3rd Eng. ed. (1905).

(H. F. T.)

SANTOS, a city and seaport of Brazil, in the state of São Paulo, about 230 m. W.S.W. of Rio de Janeiro, and 49 m. by rail S.E. of São Paulo city. Pop. (1890) 13,012; (1902 estimate) 35,000. Santos covers an alluvial plain on the inner side of an island (called São Vicente) formed by an inland tidal channel sometimes called the Santos river. The commercial part of the city is some miles from the mouth of the channel, but the residential sections extend across the plain and line the beach facing the sea. The city is only a few feet above sea-level, the island is swampy, and deep, cement-lined channels drain the city. The Santos river is deep and free from obstructions, and in front of the city widens into a bay deep enough for the largest vessels. The water front, formerly beds of mud and slime, the source of many epidemics of fever, is now faced by a wall of stone and cement. Vessels moor alongside this quay, which is lined with warehouses and provided with railway tracks, &c. Formerly coffee was transported in carts from the railway station to the warehouses, thence loaded into lighters by porters, and from these transferred to vessels anchored in midstream. The improvements were planned by an American engineer, William Milnor Roberts (1810–1881). The thorough drainage of the city has made Santos comparatively healthy. The heavy rainfall (88½ in. per annum), neighbouring swamps, rank vegetation and great heat give rise to malarial and intestinal disorders, rheumatism and other diseases. Beri-beri and smallpox are also common, and bubonic plague has appeared since 1900. The temperature ranges from 41° to 101·3° F. in the shade.

The development of coffee production in the state of São Paulo during the closing years of the 19th century has made Santos the largest coffee shipping port in the world, the exports amounting to 5,849,114 bags, of 132 lb each, in 1900, and 8,940,144 bags in 1908. The other exports include sugar, rice, rum, fruit, hides and manufactured goods. Bananas are grown in the vicinity for the River Plate markets. The most popular suburb in the vicinity of Santos is the bathing resort of Guarujá. The São Paulo railway, an English double-track line, provides communication with the interior, ascending the steep wooded slopes of the Serra do Mar by a series of inclines up which the cars are drawn by stationary engines on the old line, and by a series of gradients on the new line.

The first settlement on the São Paulo coast was that of São Vicente in 1532, about 6 m. S. of Santos on the same island. Other settlements soon followed, among them that of Santos in 1543–1546, and later on the small fort at the entrance to its harbour, which was used for protection against Indian raids from the north. São Vicente did not prosper, and was succeeded (1681) by São Paulo as the capital and by Santos as the seaport of the colony. It was captured by the English privateer, Thomas Cavendish, in 1591, when São Vicente was burned. The growth of the town was slow down to the end of the 19th century, because of insanitary conditions and epidemics.

SANUTO (SANUDO), **MARINO,** the elder, of Torcello (*c.* 1260–1338), Venetian statesman, geographer, &c. He is best known

for his life-long attempts to revive the crusading spirit and movement; with this object he wrote his great work, the *Secreta* (or *Liber Secretorum*) *Fidelium Crucis*, otherwise called *Historia Hierosolymitana, Liber de expeditione Terrae Sanctae*, and *Opus Terrae Sanctae*, the last being perhaps the proper title of the whole treatise as completed in three parts or "books." This work has much to say of trade and trade-routes as well as of political and other history; and through its accompanying maps and plans it occupies an important place in the development of cartography. It was begun in March 1306, and finished (in its earliest form) in January 1307, when it was offered to Pope Clement V. as a manual for true Crusaders who desired the reconquest of the Holy Land. To this original *Liber Secretorum* Sanuto added largely; two other "books" were composed between December 1312 and September 1321, when the entire work was presented by the author to Pope John XXII., together with a map of the world, a map of Palestine, a chart of the Mediterranean, Black Sea and west European coasts, and plans of Jerusalem, Antioch and Acre. A copy was also offered to the king of France, to whom Sanuto desired to commit the military and political leadership of the new crusade. Marino himself tells us that he had spent the best part of his life in Romania, the lands of the Eastern empire; of the Morea he had especially intimate knowledge; he had also visited Cyprus, Rhodes, parts of the Syrian, Cilician and Egyptian coasts, France, Flanders and north Germany, both west and east of Denmark. He had been in Acre, Alexandria, Constantinople, Avignon, Bruges and Sluys, as well as (apparently) in Hamburg, Lübeck, Wismar, Rostock, Stralsund, Greifswald and Stettin. Among his friends and correspondents were Guglielmo Bernardi de Furvo, a Venetian nobleman who had travelled extensively in Moslem and Mongol lands (to Tabriz, Bagdad, Damascus and Cairo), Bishop Jerome of Kaffa, in the Crimea, who in 1312 had been sent to reinforce the Catholic mission in China, and perhaps Peter, the English-born bishop of Sevastopolis or Sukhum Kalé in western Caucasia, who makes an appeal for aid to the prelates of England in 1330. Marino Sanuto's ancestor, Marco, had founded the greatness of his family after the Fourth Crusade as duke of the Archipelago and conqueror of Naxos, Paros, &c. (from 1207); and his descendant wrote with a personal interest in the question of crushing Moslem power in the Levant.

The crusading plans of the *Secreta* are double: first, Egypt and the Moslem world on the side towards Europe (Syria, Asia Minor, the Barbary States, Granada, &c.) are to be ruined by the absolute stoppage of all Christian trade with the same. By such an interdict Sanuto hopes that Egypt, dependent on its European and other imports of metals, provisions, weapons, timber, pitch and slaves, would be fatally weakened, and the way thus prepared for the second part of the campaign—the armed attack of the crusading fleet and army on the Nile delta. With the aid of the Mongol Tatars of Asia, natural allies of western Christendom, and of the Nubian Christians, the conquest of the Delta and of all Egypt was to be followed by that of Palestine, invaded and held from Egypt. Sanuto deprecates any other route for the crusade, and unfolds his plan of campaign, his bases of supply, his sources for the supply of good seamen, with great detail. Not only Mediterranean seaports, but the lakes of North Italy and central Europe, and the Hanseatic ports, are enumerated as nurseries of crusading mariners and marine skill. Finally, after the conquest of Egypt, Marino designs the establishment of a Christian fleet in the Indian Ocean to dominate and subjugate its coasts and islands. He also gives a sketch of the trade-routes crossing Persia and Egypt, as well as of the course of Indian trade from Coromandel and Gujarat to Ormuz and the Persian Gulf, and to Aden and the Nile. The maps and plans which illustrate the *Secreta* are probably (in the main, at least) the work of the great portolano-draughtsman Pietro Vesconte: practically the whole of this map-work corresponds with what Vesconte has left under his own name; much of it is indistinguishable. Among the plans that of Acre is of peculiar interest, being the most complete representation known of the great crusading fortress on the eve of its destruction, with the quarters of all its contingents of defenders (Templars, &c.) indicated. The chart of the Mediterranean and Euxine and of the Atlantic coasts of Europe is composed of five map-sheets, which together form a good example of the earliest scientific design or *portolano*; in the world-map a *portolano* of the Mediterranean world is combined with work of pre-portolan type in remoter regions. Here the shore-lines of the countries well known to Italian mariners, from Flanders to Azov, are well laid down; the Caspian and the north German and Scandinavian coasts appear with an evident, though far slighter, relation to practical knowledge; and some idea is shown of the great continental rivers of the north, such as the Don, Volga, Vistula, Oxus and Syr Daria. Africa, away from the Mediterranean, is conventional, with its south-east projected, after the manner of Idrisi, so as to face Indian Asia, and with a western Nile traversing the continent to the Atlantic. Chinese and Indian Asia show little trace of the new knowledge which had been imparted by European pioneers from the Polos' time, and which appears so strikingly in the *Catalan Atlas* of 1375. Sanuto's Palestine map is remarkable for its space-defining network of lines, which roughly answer to a kind of scheme of latitude and longitude, though properly speaking they are not scientific at all. Of the *Secreta*, twenty-three MSS. exist, of which the chief are: (1) Florence, Riccardian Library, No. 237, 162 fols. (*Secreta* and *Letters*), with maps and plans on fols. 141, v.-144, r.; (2) London, British Museum, Addt. MSS., 27,376, 178 fols. with maps, &c. on fols. 180, v.-190, r.; (3) Paris, National Library, MSS. Lat. 4939, with maps, &c. on fols. 9, r.-11, r. 27, 98-99. All these are of the 14th century. The *Secreta* has only once been printed entire, by Bongars, in *Gesta Dei per Francos*, vol. ii. pp. 1-288 (Hanover, 1611).

See also Friedrich Kunstmann, "Studien über Marino Sanudo den älteren, mit einem Anhange seiner ungedruckten Briefe" in *Abhandlungen der historisch. Classe der Königl. Bayerisch. Akademie der Wissenschaften*, vol. vii. pp. 695-819 (Munich, 1855); Foscarini, *Letteratura Veneziana*; Tiraboschi, *Storia della Letteratura Italiana*, vol. v.; Postansque, *De Marino Sanuto* (Montpellier, 1856); C. R. Beazley, *Dawn of Modern Geography*, iii. 309-319, 391-392, 520-521, 549, 555. (C. R. B.)

SANUTO (or SANUDO), **MARINO**, the younger (1466–1533), Venetian historian, was the son of the senator, Leonardo Sanuto, and was born on the 22nd of May 1466. Left an orphan at the age of eight, he lost his fortune owing to the bad management of his guardian, and was for many years hampered by want of means. In 1483 he accompanied his cousin Mario, who was one of the three *sindici inquisitori* deputed to hear appeals from the decisions of the *rettori*, on a tour through Istria and the mainland provinces, and he wrote a minute account of his experiences in his diary. Wherever he went he sought out learned men, examined libraries, and copied inscriptions. The result of this journey was the publication of his *Itinerario in terra ferma* and a collection of Latin inscriptions. Sanuto was elected a member of the Maggior Consiglio when only twenty years old (the legal age was twenty-five) solely on account of his merit, and he became a senator in 1498; he noted down everything that was said and done in those assemblies and obtained permission to examine the secret archives of the state. He collected a fine library, which was especially rich in MSS. and chronicles both Venetian and foreign, including the famous Altino chronicle, the basis of early Venetian history, and became the friend of all the learned men of the day, Aldo Manuzio dedicating to him his editions of the works of Angelo Poliziano and of the poems of Ovid. It was a great grief to Sanuto when Andrea Navagero was appointed the official historian to continue the history of the republic from the point where Marco Antonio Sabellico left off, and a still greater mortification when, Navagero having died in 1529 without executing his task, Pietro Bembo was appointed to succeed him. Finally in 1531 the value of his work was recognized by the senate, which granted him a pension of 150 gold ducats per annum. He died in 1533.

His chief works are the following: *Itinerario in terra ferma*, published by M. Rawdon Brown in 1847; *I commentarii della guerra di Ferrara*, an account of the war between the Venetians and Ercole d'Este, published in Venice in 1829; *La Spedizione di Carlo VIII.* (MS. in the Louvre); *Le Vite dei Dogi*, published in vol. xxii. of Muratori's *Rerum Italicarum Scriptores* (1733); the *Diarii*, his most important work, which cover the period from the 1st of January 1496 to September 1533, and fill 58 volumes. The publication of these records was begun by Rinaldo Fulin, in collaboration with Federigo Stefani, Guglielmo Berchet, and Niccolò Barozzi; the last volume was published in Venice in 1903. Owing to the relations of the Venetian republic with the whole of Europe and the East it is practically a universal chronicle, and is an invaluable source of information for all writers on that period.

BIBLIOGRAPHY.—M. Rawdon Brown, *Ragguagli sulla vita e sulle opere di Marino Sanuto* (3 vols., Venice, 1837–1838); G. Tiraboschi, *Storia della Letteratura Italiana*, vol. vi. pt. ii.; R. Fulin, *Marin Sanudo* (Turin, 1880); Ricotti, *I Diarii di Marin Sanudo* (Turin, 1880); and Giuseppe de Leva, *Marin Sanudo* (Venice, 1888).

SAN VICENTE, the capital of the department of San Vicente, Salvador; 30 m. E. of San Salvador, on the river Acahuapa, a left-hand tributary of the Lempa. Pop. (1905) about 18,000.

San Vicente is situated in a volcanic region abounding in hot springs and geysers. The volcano of San Vicente, the highest in the department, reaches an altitude of more than 7000 ft. The city is surrounded by indigo and tobacco plantations, and has considerable commerce, a large portion of which is transacted at the All Saints' fair, held annually on the 1st of November. Shoes, hats, cloth, silk, spirits and cigars are manufactured here. San Vicente was founded in 1634 on the site of Tehuacan, an ancient Indian city. For one year (1839–1840) it was the capital of the republic.

SÃO FRANCISCO, a river of eastern Brazil rising in the S.W. part of the state of Minas Geraes, about 20° 30′ S., 46° 40′ W., near the narrow valley of the Rio Grande, a tributary of the Paraná, and within 240 m. of the coast W. of Rio de Janeiro. It flows in a general N.N.E. direction across the great central plateau of Brazil to about lat. 9° 30′ S., long. 42° W., where it turns N.E. and then S.E. in a great bend, entering the Atlantic in lat. 10° 29′ S. It has a total length of about 1800 m. and a fall of 2700-2800 ft. It is navigable from the Atlantic to Piranhas (148 m.) and is nearly 1 m. wide at Penedo, 22 m. from the sea. Above Piranhas, about 193 m. from its mouth, are the falls of Paulo Affonso where the river plunges through a narrow gorge—in one place only 51 ft. wide—and over three successive falls, all together 265 ft. The obstructed part of the river is about 190 m. long and consists of a series of rapids above the falls and a deep cañon with whirlpools for some distance below. The Brazilian government has built a railway around these falls from Piranhas (151 ft. elevation) to Jatobá (978 ft.) with an extension of 71 m. Above Jatobá there is another series of rapids called the Sobradinho nearly 90 m. above the lower rapids, which are navigable at high water, and above these an unobstructed channel for light-draught river boats up to Pirapora a little above the mouth of the Rio das Velhas, a distance of 984 m. Here the river runs through a barren, semi-arid region, sparsely settled. There are no tributaries of consequence along a large part of this region, and the few people living beside the river are dependent on its annual floods for the fertilization of its sandy shores on which their scanty plantations of Indian corn and beans are made. The rapids of Pirapora are 17 m. above the mouth of the Rio das Velhas, and this point, the head of navigation on the river, and 1742 ft. above sea-level, is the objective point of the Central do Brazil railway, the purpose being to create by rail and river a central route from Rio de Janeiro to the northern ports of Bahia and Recife. The principal tributaries of the São Francisco are: on the right, the Pará, Paraopeba, Velhas and Verde-Grande; on the left, the Indayá, Abaeté, Paracatú, Urucuya, Carinhanha, Corrente and Grande. Several of these tributaries are navigable for long distances by small boats—the aggregate being a little over 1000 m. Some authorities give the aggregate navigable channels of the São Francisco as 4350 m. The upper valley of the São Francisco is partly forested, has a temperate climate, with a mean annual temperature of 85° and a rainfall of 1637 millimetres. The rainy season is from December to March, but on the lower river the rainfall is light and the season much shorter, sometimes varied by droughts covering several years.

An admirable description of this great river is given by Richard Burton in *The Highlands of Brazil* (2 vols., London), and a more technical description by E. Liais in *Hydrographie du Haut San-Francisco et du Rio das Velhas* (Rio de Janeiro, 1865).

SÃO LEOPOLDO, a city of the state of Rio Grande do Sul, Brazil, on the left bank of the Rio dos Sinos, 20¼ m. by rail N. of Porto Alegre. It is the chief town of a *municipio* (commune) of the same name, having an area of about 347 sq. m. and inhabited chiefly by German colonists. Pop. (1900) of the city, 11,015; of the municipio, 32,600. São Leopoldo has river and railway communication with Porto Alegre. It is a prosperous industrial town, with broad straight streets and substantial buildings. It has good schools, and its Jesuits' college ranks high throughout northern Rio Grande. Among its manufactures are matches, hats, boots and shoes, soap, liqueurs and artificial drinks, leather and leather-work and earthenware. In the surrounding districts cattle and hogs are raised, and jerked beef, hides, pork, lard, potatoes, beans, *farinha de mandioca* (cassava flour), Indian corn, tobacco and a great variety of vegetables and fruits are produced.

The city was originally a German colony founded by the emperor Pedro I. in 1824 and established at a place known as the Feitoria Real de Canhamo (Royal flax factory). The first colonists (26 families and 17 unmarried persons, or 126 souls) arrived on the 25th of June 1825, and were followed a few months later by another party of 909 colonists. These were the first German colonists in Rio Grande do Sul. Up to 1830 the arrivals numbered 3701, but the civil war which broke out in 1835 checked further arrivals and nearly ruined the colony, its inhabitants being forced to serve in the contending forces and their property being seized. São Leopoldo was occupied by the revolutionists for some years and was practically ruined at the termination of the war in 1844. The introduction of colonists was immediately resumed, however, and the colony was soon as prosperous as ever. The early colonists were engaged in Germany by a representative of the Brazilian government, and were given free transportation, 130 acres of land each, farming implements, seeds, and a subsidy of 320 reis a day for the first year and half that for the second year. Subsequent settlers received less, but the system of assisting colonists and making contracts with companies and individuals for their introduction became the settled policy of the national and provincial governments.

SÃO LUIZ, or in full, SÃO LUIZ DE MARANHÃO (also spelt MARANHAM), a seaport of northern Brazil, capital of the state of Maranhão, on the W. side of an island of the same name, in 2° 30′ S., 44° 17′ W., about 300 m. E.S.E. of Belem (Pará). Pop. of the whole island (1890) 29,308; (1908, estimate) 32,000. An important part of the population is made up of the planters of the state, who live in town and leave their estates to the care of overseers. The island of Maranhão lies off the mouths of the rivers Mearim and Itapicurú, between the Bay of São Marcos on the W. and the Bay of São José on the E., and is separated from the mainland by a small channel called the Canal do Mosquito. It is irregular in outline, its greatest length from N.E. to S.W. being 34 m., and its greatest breadth 19 m. Its surface is broken by a number of low hills and short valleys. The city is built upon a tongue of land between two small estuaries, Anil and Bacanga, which unite and open upon the Bay of São Marcos. It covers two low hills and the intervening valley, the transverse streets sloping sharply to the estuary on either side. These slopes make it difficult to use vehicles in the streets, but they afford a natural surface drainage which makes São Luiz cleaner and more healthy than the coast towns of tropical Brazil usually are. The city is regularly laid out with comparatively wide longitudinal, and steep, narrow transverse streets, roughly paved and provided with sidewalks. The buildings are of the old Portuguese type, with massive walls of broken stone and mortar, having an outside finish of plaster or glazed tiles and roofs of red tiles. The principal public buildings are the cathedral, a large and severely plain structure, the episcopal palace, the Carmelite church, the government palace, town hall, custom-house, hospital, and a number of asylums, convents and charitable schools. An excellent lyceum and a church seminary are the most important educational institutions, and São Luiz long enjoyed a high reputation in Brazil for the culture of its inhabitants. The trade of São Luiz was once very important, but the commercial activity of Pará and Fortaleza, the decay of agricultural industry in the state, and the silting up of its harbour, have occasioned a decline in its commerce. Its exports comprise cotton, sugar and rice. Communication with the mainland and interior towns is by means of small steamers.

São Luiz was founded in 1612 by La Rivardière, a French officer commissioned by Henri IV. to establish a colony in this vicinity. The French colony was expelled in 1615 by the Portuguese, who, in turn, surrendered to the Dutch in 1641. In 1644 the Dutch abandoned the island, when the Portuguese resumed possession and held the city to the end of their colonial rule in Brazil. The city became the seat of a bishopric in 1679.

SAÔNE, a river of eastern France, rising in the Faucilles mountains (department of Vosges), 15 m. W.S.W. of Épinal at a height of 1300 ft. and uniting with the Rhone at Lyons. Length, 301 m.; drainage area, 11,400 sq. m. The oldest Celtic name of the river was *Arar*. In the 4th century another name appears, *Sauconna*, from which the modern name is derived. The Saône, moving slowly in a sinuous channel, has its course in the wide depression between the Plateau of Langres, the Côte d'Or and the mountains of Charolais and Beaujolais on the west and the western slopes of the Vosges and Jura and the plain of Bresse and the plateau of Dombes on the east. In the department of Saône-et-Loire, the Saône unites with the Doubs, an affluent rivalling the Saône in volume and exceeding it in length at this point. At the important town of Chalon-sur-Saône the river turns south, and passes Mâcon. Below Tréveux its valley, now narrower, winds past the Mont d'Or group and joins the Rhone just below the Perrache quarter of Lyons. The Saône is canalized from Corre to Lyons, a distance of 233 m., the normal depth of water being 6 ft. 6 in. At Corre (confluence with the Coney) it connects with the southern branch of the Eastern Canal, at Heuilley (below Gray) with the Saône-Marne Canal, at St Symphorien (above St Jean-de-Losne) with the Rhone-Rhine Canal, and at St Jean-de-Losne with the Canal de Bourgogne and at Chalon with the Canal du Centre.

SAÔNE-ET-LOIRE, a department of east-central France formed from the districts of Autunois, Brionnais, Chalonnais, Charollais and Mâconnais, previously belonging to Burgundy. It is bounded N. by the department of Côte d'Or, E. by that of Jura, S.E. by Ain, S. by Rhône and Loire, W. by Allier and Nièvre. Pop. (1906) 613,377. Area, 3330 sq. m. Of the two rivers from which the department takes its name the Loire forms its south-western boundary, and the Saône traverses its eastern region from north to south. On the left bank of the Saône the department forms part of the wide plain of Bresse; on its right bank the centre of the department is occupied by the northern Cévennes, here divided by the river Grosne into two parallel ranges—the mountains of Mâconnais to the east, and the mountains of Charollais to the west. The general direction of these ranges is from south, where their altitude is greatest, to north. The north-west region of Saône-et-Loire is occupied by the southern portion of Morvan, which includes the highest point in the department—the Bois du Roi (2959 ft.). South-east of the Morvan lies the hilly region of Autunois, consisting of the basin of the Arroux, a right affluent of the Loire, and divided from the Charollais mountains by the Bourbince, a tributary of the Arroux. Besides those mentioned, the chief rivers of the department are the Doubs, which joins the Saône in the extreme north-east, the Seille, also an affluent of the Saône, and the Arconce, a tributary of the Loire watering the Charollais. The average temperature at Mâcon (52° or 53° F.), the most temperate spot in the department, is slightly higher than at Paris, the winter being colder and the summer hotter. At the same town the yearly rainfall is about 33 in., but both the rigour of the climate and the amount of rain increases in the hilly districts, reaching their maximum in the mountains of Morvan.

Agriculture prospers in Saône-et-Loire. Wheat, oats and maize are the cereals most cultivated; potatoes, clover and other fodder, and mangold-wurzels are important crops, and beetroot, hemp, colza and rape are also grown. Excellent pasture is found in the valleys of the Saône and other rivers. The vine, one of the principal resources of the department, is cultivated chiefly in the neighbourhood of Chalon and Mâcon. Of the wines of Mâconnais, the vintage of Thorins is in high repute. The white Charollais oxen are one of the finest French breeds; horses, pigs and sheep are reared, and poultry farming is a thriving occupation in the Bresse. The industrial importance of the department is great, chiefly owing to its coal and iron mines; the chief coal mines are those in the vicinity of Creusot, Autun and Chapelle-sous-Dun. A pit at Épinac is over 2600 ft. in depth. Iron is mined at Mazenay and Change, and manganese is found at Romanèche and there are quarries of various kinds. There are well-known warm mineral springs containing chloride of sodium and iron at Bourbon-Lancy. The iron and engineering works of Schneider & Company at Le Creusot are the largest in France. The department also has numerous flour-mills and distilleries, together with potteries, porcelain-works (Digoin), tile-works, oil-works and glass factories, and carries on various branches of the textile, chemical, leather and wood-working industries. It exports coal, metals, machinery, wine, Charollais cattle, bricks, pottery, glass. Its commerce is facilitated by navigable streams—the Loire, Saône, Doubs and Seille,—the Canal du Centre, which unites Chalon-sur-Saône with Digoin on the Loire, and the canal from Roanne to Digoin and the lateral Loire Canal, both following the main river valley. The chief railway of the department is the Paris-Lyon-Mediterranée. Saône-et-Loire forms the diocese of Autun; it is part of the district of the VIII. army corps (Bourges); its educational centre is Lyons and its court of appeal that of Dijon. It is divided into 5 arrondissements Mâcon, Chalon-sur-Saone, Autun, Charolles, Louhans—50 cantons, and 589 communes.

Mâcon, Chalon, Autun, Le Creusot, Cluny, Montceau-les-Mines, Tournus, Paray-le-Monial, Louhans and Charolles are the most noteworthy towns in the department and receive separate treatment. Other places of interest are St Marcel-lès-Chalon, where there is a Romanesque church, once attached to an abbey where Abélard died; Anzy, which has a Romanesque church and other remains of an important monastery; St Bonnet-de-Joux and Sully, both of which have châteaus of the 16th century; and Semur-en-Brionnais and Varennes-l'Arconce, with fine Romanesque churches. Prehistoric remains of the stone age have been found at Solutré near Mâcon.

SÃO PAULO, a state of Brazil extending from 19° 54′ to 25° 15′ S. lat. and bounded N. by Matto Grosso and Minas Geraes, E. by Minas Geraes, Rio de Janeiro and the Atlantic, S. by the Atlantic and Paraná, and W. by Paraná and Matto Grosso. Pop. (1900) 2,282,279; area, 112,312 sq. m. The state has a coast-line 373 m. long, skirted closely by the Sierra do Mar, below which is a narrow coastal zone broken by lagoons, tidal channels and mountain spurs. Above is an extensive plateau (1500 to 2200 ft. above sea-level) with a mild temperate climate. The southern and eastern borders are broken by mountain chains, and isolated ranges of low elevation break the surface elsewhere, but in general the state may be described as a tableland with an undulating surface sloping westward to the Paraná. The extreme eastern part, however, has an eastward slope and belongs to the Parahyba basin. The state is traversed by a number of large rivers, tributaries of the Paraná, the largest of which are the Rio Grande, a part of the N. boundary, Dourados, Tieté, Aguapehy, Tigre, and, a part of the S. boundary, the Paranapanema. The Paraná forms the W. boundary of the state. The basins of the Pardo and the Tieté include some of the richest coffee estates of Brazil. The state is well wooded, especially on the slopes of the Serra do Mar, but there are extensive grassy *campos* (plains) on the plateau. A large part of western São Paulo is still unsettled. The coastal zone is hot and generally malarial, with heavy rainfall. On the plateau the rainfall is sufficiently abundant, but the air is drier and more bracing, the sun temperature being high and the nights cool. The open country is singularly healthy, but the river courses are generally malarial. Some of the cities have suffered from fever epidemics, due to bad drainage and insanitary conditions.

The great industries are agricultural, and the most conspicuous is coffee production. São Paulo produces more than one-half the total Brazilian crop and its one great port, Santos, is the largest coffee-shipping port in the world. The *terra roxa* (red earth) lands of the central and northern parts of the state, especially in the basins of the Tieté and Pardo, are peculiarly favourable. This soil is ferruginous, pasty, deep red in colour, and free from stone, and it covers the higher surface of the plateau with a thick layer. The best plantations are on the high divides between the river courses, and not in their eroded valleys. The Rio Pardo (Brown river) probably derives its name from this soil. For the crop-year (July to June) of 1895–1896 the production was 3,053,804 bags, and in 1905–1906 it was 6,977,175 bags—these figures being the deliveries at Santos for exportation and not including the reserves on the plantations and the home consumption. The crop for the last year mentioned was not a maximum, however, for the deliveries at Santos in 1901–1902 were 10,165,043 bags and in 1902 1903, 8,349,828 bags. These immense crops were produced in spite of appeals to producers not to increase production, and even of a special tax on new plantations imposed by the state in 1903. Over-production was keeping the price below a remunerative figure and threatened to ruin the industry. In 1906 the state entered into an accord, known as the "Convenio de Taubatá," with the states of Rio de Janeiro and Minas Geraes, to maintain the home selling price of Type No. 7 at 55 to 65 francs gold per bag of 60 kilogrammes (other types in proportion) for the first year, and then to increase this price to 70 francs, according to the state of the market; and to check as far as possible the exportation of coffees inferior to Type

No. 7, which was a grade largely exported to the United States for the roasted coffee package trade, although large quantities of inferior grades were used in the same trade. In addition to the suspension or limitation of the export of grades below Type No. 7, coffee was to be bought and stored until it could be sold through accredited agents abroad at a satisfactory price. To do this, the state of São Paulo was authorized to float a loan of £15,000,000. Failing to accomplish this by itself, the state secured the endorsement of the national congress in December 1908, guaranteeing the above loan, to meet the service of which a surtax of 5 francs per bag was decreed. The guarantee was to endure for ten years, during which time all the transactions of the combination, which undertook to limit the sales abroad to 500,000 bags in 1910, 600,000 bags in 1911, 700,000 bags in 1912, 800,000 bags in 1913 and 700,000 per annum thereafter, were to be subject to the approval of the national government. Another measure was the imposition of an additional tax of 20% on all exports for the year above 9,500,000 bags. At the time this guarantee was obtained the state of São Paulo already held nearly 7,000,000 bags of coffee, the larger part on storage in foreign markets, and had apparently reached the limit of its resources, as the foreign markets had failed to respond to its expectations. At the end of the following year this reserved stock had increased to 8,400,000 bags, and the position had become desperate. The loan of £15,000,000 was floated in 1909, and the pressure was relieved, but the situation was then further complicated by a movement among the coffee planters to have the 9,500,000 bags limit on annual sales removed, and the loan service tax of 5 francs a bag reduced. There had been some improvement in the commercial situation in 1909, but the influence of a reserve of over 8,000,000 bags, increasing crops, and the reckless purpose of planters to realize on their crops regardless of the effect on the government, all conspired to make the situation critical.

The other agricultural products of the state include sugar, cotton, rice, tobacco, Indian corn, beans, mandioca, grapes, bananas and other fruits, and many of the vegetables of the temperate zone. Cereals can be grown, but climatic conditions have been considered unfavourable. Sugar cane was the first exotic to be cultivated in São Paulo, and was its principal product in colonial times. Cotton was largely produced, especially during the American civil war, but the industry nearly disappeared, and now is again improving because of the demand for fibre by the national cotton factories. The cultivation of rice also is increasing, under the stimulus of protective duties. Although São Paulo is not classed as a pastoral region, the state possesses large herds of cattle, which are being improved by the importation of pure-bred stock from Europe. Butter and cheese are produced to a limited extent, and the supply of fresh milk to the cities is attracting some attention. Attention is also given, to a limited extent, to the breeding of horses and mules. The most general and profitable of the animal industries is the breeding of swine, which thrive remarkably on the plateau. The state has an excellent agricultural school and experiment station at Piracicaba, and there is also a zoötechnic station near the capital.

The principal manufactures are cotton and woollen textiles, jute bagging, *aramina* fabrics, furniture, iron and bronze, coffee machinery and agricultural implements, beer, artificial liquors, mineral waters, biscuits, macaroni, conserves, chocolate and other food products, glass bottles, glassware, earthenware, soap, gloves, boots and shoes, trunks and musical instruments. Steam power is generally used, though both electric and hydraulic power are employed. There are several large cotton factories, which are chiefly employed in the manufacture of the coarser grades of cloth for the working classes. The iron mines and works at Ypanema, near Sorocaba, are one of the oldest industries of the state, dating back to the first quarter of the 19th century. It is a government enterprise and has absorbed an immense sum of money, but has never reached a self-supporting stage.

São Paulo is well provided with railways, which include the pioneer line from Santos to Jundiahy (an English enterprise) which has a double track from Santos to the city of São Paulo, the Paulista lines which are a continuation of the English line into the interior, the Mogyana lines running northward from Campinas through rich coffee districts to Uberaba in Minas Geraes and farther on toward Goyaz, the Sorocabana running south-westward from São Paulo toward the Paraná frontier, the São Paulo branch of the Central do Brazil line which passes through the E. part of the state and provides communication with the national capital, and the São Paulo and Rio Grande which is designed to cross the states of Paraná and Santa Catharina to connect with the railways of Rio Grande do Sul. All these lines except the two last are tributary to the English line and the port of Santos. In addition to these many of the large plantations have private railways, of the Decauville type, for the transportation of produce and material to and from the nearest railway station, and all the large cities have tramway lines, many using electric traction. The ports of the state are Santos, which is visited by large steamers in the foreign trade, and Cananéa, Iguape, São Sebastião and Ubatuba which are engaged in the coasting trade only. Cananéa and Iguape are chiefly known for the rice grown in their vicinity. Ubatuba, near the E. end of the São Paulo coast, has a fine, almost landlocked bay, but is without good communication with the interior.

An important contributory element to the prosperity of the state is the large number of immigrants. Between 1827 and 1900 the arrivals numbered 969,230, of which seven-tenths were Italians. A considerable part of the immigrant movement consists of itinerant labourers who go to São Paulo for the coffee-picking, just as they go to Argentina for the wheat harvest.

The capital of the state is São Paulo (*q.v.*) and its principal port and second city in importance is Santos (*q.v.*). The chief cities and towns, with populations in 1890 where not otherwise stated, are as follows, the enumeration being for municipalities, or parishes, including large rural areas and sometimes including separate villages: Campinas (*q.v.*); Guaratinguetá (30,690; estimate 45,000 in 1906), on the Parahyba, 120 m. E.N.E. of São Paulo; Piracicaba (25,275), 85 m. N.W. of São Paulo; Limeira (21,605), in a fertile thickly-settled district; Rio Claro (20,843), 135 m. N.W. of Santos, on a branch of the Paulista railway, in a fertile coffee-producing region, 2030 ft. above the sea; Taubaté (20,773), one of the oldest cities of the state, on the Parahyba 80 m. E.N.E. of the capital, in a rich agricultural district, with works for refining oil from the petroleum-bearing shales in the vicinity; Braganza, or Bragança (19,787), 50 m. N. of São Paulo in a fertile country partly devoted to sugar production and stock; São José dos Campos (18,884); Tieté (18,878), on the Tieté river N.W. of S. Paulo; Pindamonhangaba (17,542; estimate 25,000 in 1906), on the Parahyba river and Central do Brazil railway 105 m. N.E. of São Paulo in a long settled district, 1770 ft. above the sea, producing coffee, sugar, rice, Indian corn, beans, rum and cattle; Sorocaba (17,068; estimate 30,000 in 1906), a prosperous manufacturing and commercial town on the Rio Sorocaba and Sorocabana railway, 50 m. W. of São Paulo; Itú, or Ytú (13,790) about 70 m. W.N.W. of São Paulo on the Tieté river and Ituana railway, with water power derived from the Salto (falls) de Itú, and with important manufactures; São Carlos do Pinhal (12,651); Casa Branca (13,482), in the N. coffee region; Parahybuna (13,395); Pirassununga (12,494); Batataes (12,438); Franca (12,425); Jacarehy (12,279); Botucatú (12,089); Jundiahy (12,051), 86 m. N. of Santos, an important manufacturing town and railway junction, 2320 ft. above sea-level; Ribeirão Preto (12,033), 197 m. N. of Campinas on the Mogyana railway in a fertile coffee-producing region; Iguape (11,888), a port on the southern coast of the state, on a tidewater channel of sufficient depth for coastwise steamers, with exports of rice and timber; Lorena (10,342), 130 m. N.E. of São Paulo, beautifully situated, 1760 ft. above the sea, a station on the Central do Brazil railway, and the junction of a branch railway to the Campos do Jordão where the national government has established a military sanatorium because of its dry, bracing climate; and Cruzeiro (8883).

São Paulo was settled in 1532 by the Portuguese under Martim Affonso de Souza, who established a colony near Santos, at São Vicente, now an unimportant village. It was originally called the *capitania* of São Vicente (organized 1534) and covered the whole of southern Brazil from Rio de Janeiro south. After the suppression of the captaincy grants, parts of this enormous territory were cut off from time to time to form other captaincies, from which developed the present states of Rio de Janeiro, Minas Geraes, Matto Grosso, Paraná, Santa Catharina and Rio Grande do Sul. In 1681 São Paulo succeeded São Vicente as the capital of the captaincy, and the original name of the latter gradually fell into disuse. The people of the state have always been distinguished for their energy and enterprise, especially during the colonial period. The early population was largely composed of half breeds, known as *Mamelucos*, and the exploration of the greater part of the interior of Brazil is due to them. Their exploring parties, called *bandeiras*, discovered the first gold mines of Minas Geraes and Matto Grosso, drove the Jesuit missions from Paraná, and traversed the interior northward into Piauhy, north-westward almost to Quito, westward into Bolivia and southward into Rio Grande and Paraguay. They were slave-hunters by profession, and were noted for cruelty as well as energy.

SÃO PAULO, a city of Brazil, capital of a state of the same name, and seat of a bishopric, on the Tieté river 49 m. by rail N.W. of the port of Santos and 308 m. by rail W. of Rio de Janeiro. Pop. (1890) 64,934; (1902, estimate) 332,000. São Paulo is connected with Santos, its port, by a double-track railway built, owned and worked by a British company (S. Paulo Railway Co.); with Rio de Janeiro, by the São Paulo branch of the Central do Brazil line; with Campinas and other inland cities by the São Paulo and Paulista railways; with the N.E. part of the state, Minas Geraes, and Goyaz by the Mogyana line starting from Campinas; and with Sorocaba and the southern parts of the state, Paraná, and with Santa Catharina and Rio Grande, by the Sorocabana line and the São Paulo and Rio

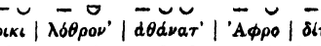
Grande line. In great part the city occupies an elevated open stretch of tableland commanding extensive views of the surrounding country; and a small part of it is in the low alluvial land bordering the Tieté. The upper part has several slight elevations forming healthy residential districts. The elevations above sea-level are 2382 ft. at the Central do Brazil railway station in the lower town, 2418 ft. at the São Paulo railway station, 2841 ft. in the Consolação suburb, and 2953 ft. in Villa Mariana. The city is just within the tropics, but its elevation above the sea gives it a temperate climate, bracing in the cool season and yet with high sun temperatures in summer. The broad eroded bed of the Tieté is swampy and is subject to extensive inundations causing malarial and intestinal disorders; otherwise the city is singularly healthy, though its sanitary condition is poor. The picturesqueness of the city is heightened by the ravine of a small stream passing through it and spanned by viaducts and bridges. The city squares are commonly open places with an occasional statue but without ornamental gardens. The Public Garden, near the São Paulo railway station in the Luz section, is a recreation ground embellished with tropical plants and an artificial lake. The streets are well paved and lighted with gas and electricity, and have electric tramways. Although there are still many old structures and residences to be seen in the old town, most of the public and business buildings and private residences are of the modern Italian and French type. Brick is used to some extent, but the building material most used is broken stone and mortar, plastered outside, and covered with stucco mouldings and ornaments. The private residences of the city are the finest in the republic. There is much wealth in the state, especially among the large coffee planters, and the city is their favourite residence. Some of their palatial dwellings are surrounded with beautiful gardens and parks. The water-supply is derived from the Cantareira hills, and there is a modern sewerage system, constructed by an English company. The more important public buildings are the new government palace, the palaces of agriculture, finance and justice, the executive residence, the immense Polytechnic School, the Normal School, the School of Agriculture, the public hospital called the Isolamento, the charity hospital, the São Paulo railway station with a beautiful stone tower, and the theatre, rivalling some of the best in Europe. Like other Brazilian cities São Paulo has a number of old religious buildings. There are also several excellent educational and scientific institutions which are in great part supported by the state, among which are the Mackenzie College, created through the gift of an American capitalist, a school of law, a Pasteur Institute, and a bacteriological institute. The police force of the state is a military organization and consists of a brigade of about 5000 men (infantry, cavalry, civic guards, firemen, and a body of hospital attendants for public emergency cases), under a colonel of the regular army. Manufactures include textiles, footwear, clothing, food products, beer, artificial liquors, furniture, domestic utensils, &c. The São Paulo Light and Power Co., whose works are situated at the falls of the Tieté a considerable distance N.W. of the city, supplies about 8000 horse-power to local industries in addition to what is needed for the electric railway (108 m.), the oldest enterprise of this character in Brazil. The city has a large Italian population and many Italian shops and industries.

São Paulo was founded by the Jesuits under Manoel de Nobrega in 1554 and at first bore the name of Piratininga. In 1681 it succeeded São Vicente as the capital of the captaincy. The declaration of Brazilian independence occurred on Sept. 7, 1822, on the plain of Ypiranga, near the city, where a monument commemorates the event.

SAP. (1) Juice, the circulating fluid of plants (see PLANTS, § *Physiology*). The word appears in Teutonic languages, cf. Ger. *Saft*, and may be connected ultimately with the root seen in Lat. *sapere*, taste, hence to know, cf. *sapientia*, wisdom, cf. Gr. σοφός, wise. On the other hand it may, like Fr. *sève*, Span. *saba*, have come direct from Lat. *sapa*, must, new wine, itself also from the same root. The Gr. ὀπός is represented in Lat. by *sucus*. (2) A military term for a trench dug by a besieging force for the purpose of approach to the point of attack when within range, hence "to sap," to undermine, dig away the foundations of a wall, &c. The word is derived through the Old Fr. from the Med. Lat. *sapa*, *sappa*, a spade, entrenching tool, Gr. σκαπάνη, σκάπτειν, to dig. (See FORTIFICATION AND SIEGE-CRAFT.)

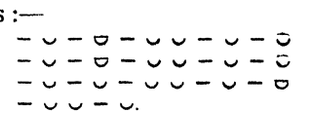
SAPAN WOOD (Malay *sapang*), a soluble red dyewood from a tree belonging to the leguminous genus *Caesalpinia*, a native of tropical Asia and the Indian Archipelago. The wood is somewhat lighter in colour than Brazil wood and its other allies, but the same tinctorial principle, brazilin, appears to be common to all.

SAPPHIC METRE, SAPPHICS, an ancient form of quantitative verse, named after the Aeolian poetess Sappho, who is supposed to have invented it, and who certainly used it with unequalled skill. A Sapphic line consists of five equal beats, of which the central one alone is of three syllables, while the others consist of two each. The original Greek sapphic was of this type:—



ποικι | λόθρον' | ἀθάνατ' | Ἀφρο | δίτα

The sapphic strophe consists of three of these lines followed by an adonic, thus:—



Horace adopted, and slightly adapted, this form of verse, for some of his most engaging metrical effects. The Greek poets had permitted the caesura to come where it would, but Horace, to give solidity to the form, introduced the practice of usually ending a word on the fifth syllable:

jam satis terris nivis atque dirae,

the second half of the sapphic leaping off, as it were, with a long syllable which connects it with the first half. This is a typical example of the Latin sapphic strophe:—

Inte|ger vi|tae sceler|isque | purus
non e|get Maur|is jacu|lis ne|que arcu,
nec ve|nena|tis gravi|da sa|gittis,
Fusce, phar|etra.

Before the days of Horace, Catullus had used this form in Latin, and afterwards sapphics were introduced by the pseudo-Seneca into his tragedies. In the middle ages the sapphic strophe was frequently employed in the Latin hymns, especially by Gregory the Great. Later on, considerable laxity was introduced, and a dactyl was frequently substituted for the first trochee; this quite destroys the true character of the measure. It makes it a more easy metre, however, for those who write modern accentuated verse. We see a loose but effective specimen of it in the famous

Needy knife | grinder! | whither | are you | going?
Rough is the | road, your | wheel is | out of | order.

But nearer to the effect of the antique verse would be:

Needy | grinder! | whither oh! | are you | going?
Rough the | road; your | destitute | wheel is | broken,

although this certainly does not suit English versification so well. English sapphics were written by the Elizabethan poet, Thomas Campion (*q.v.*), and by William Cowper. Mr Swinburne has attempted to create the effect of the ancient Aeolian metre in a daring and brilliant stanza. Sapphics have been written more successfully in German than in any other modern language. The earliest original German poem in the form is said to be an anonymous hymn to St Mary Magdalene, dated 1500. Voss kept strictly to the metrical scheme of the Latin in his famous translation of the *Odes* of Horace (1806), and among German poets who have cultivated sapphics are to be mentioned Klopstock, Platen, Hamerling and Geibel.

SAPPHIRE,[1] a blue transparent variety of corundum, or native alumina, much valued as a gem-stone. It is essentially the same mineral as ruby, from which it differs chiefly in colour. The colour of the normal sapphire varies from the palest blue to deep indigo, the most esteemed tint being that of the blue cornflower. Many of the crystals are parti-coloured, the blue being distributed in patches in a colourless or yellow stone; but by skilful cutting, the deep-coloured portion may be caused to impart colour to the entire gem. As the sapphire crystallizes in the hexagonal system it is dichroic, but in pale stones this character may not be well marked. In a deep-coloured stone the colour may be resolved, by the dichroscope, into an ultramarine

[1] Indirectly from Gr. σάπφειρος, but there seems no doubt that this term, like the Hebrew *sapir* of the Old Testament, was formerly applied to what is now called lapis lazuli; the modern sapphire was probably known as ὑάκινθος (*hyacinthus*).

blue and a bluish or yellowish green. In blue tourmaline and in iolite—stones sometimes mistaken for sapphire—the dichroism is much more distinct. The blue colour in sapphire has been variously referred to the presence of oxides of chromium, iron or titanium, whilst an organic origin has also been suggested. On exposure to a high temperature, the sapphire usually loses colour, but, unlike ruby, it does not regain it on cooling. A. Verneuil succeeded in imparting a sapphire-blue colour to artificial alumina by addition of 1·5 % of magnetic oxide of iron and 0·5 % of titanic acid (*Comptes rendus*, Jan. 17, 1910). According to F. Bordas, the blue colour of sapphire exposed to the action of radium changes to green and then to yellow.

Under artificial illumination many sapphires appear dark and inky, whilst in some cases the blue changes to a violet, so that the sapphire seems to be transformed to an amethyst. According to lapidaries the hardness of sapphire slightly exceeds that of ruby, and it is also rather denser. Notwithstanding its hardness it has been sometimes engraved as a gem.

Ceylon has for ages been famous for sapphires. They occur, with many other gem-stones, as pebbles or rolled crystals in alluvial deposits of sand and gravel; the gem-gravel being known locally as *illam*. The principal localities are Ratnapura, Rakwana in the province of Sabara Gamawa and Matara. Some of the slightly-cloudy Ceylon sapphires, usually of greyish-blue colour, display when cut with a convex face a chatoyant luminosity, sometimes forming a luminous star of six rays, whence they are called "star-sapphires" (see ASTERIA). The asterism seems due to the presence of microscopic tubular cavities, or to enclosure of crystalline minerals, arranged in a definite system. In 1875 sapphires were discovered in deposits of clay and sand in Battambang (Siam), where they have been worked on a considerable scale. They occur also with rubies in the provinces of Chantabun and Krat. Many of the Siamese sapphires are of very dark colour, some being so deeply tinted as to appear almost black by reflected light. In Upper Burma sapphires occur in association with rubies, but are much less important (see RUBY). Sapphires are also found in Kashmir, where they occur, associated with tourmaline, in the Zanskar range, especially near the village of Soomjam. Madagascar yields sapphires generally of very deep colour, occurring as rolled crystals. Sapphire is widely distributed through the gold-bearing drifts of Victoria, New South Wales and Queensland, but the blue colour of the Australian stones is usually dark, and it is notable that green tints are not infrequent. The Anakie sapphire-fields of Queensland are situated near Anakie station on the Central railway, to the west of Emerald and east of the Drummond Range. Sapphire occurs also in Tasmania. Coarse sapphire is found in many parts of the United States, and the mineral occurs of gem quality in North Carolina and Montana. The great corundum deposits of Corundum Hill, Macon county, N.C., have yielded good sapphires, and they are found also at Cowee Creek in the same county. In Montana, sapphires were discovered as far back as 1865, and have been worked on a large scale. They were originally found in washing for gold. The rolled crystals of sapphire occur, with garnet and other minerals, in glacial deposits, and have probably been derived from dykes of igneous rocks, like andesite and lamprophyre. They display much variety of colour, and exhibit peculiar brilliancy when cut, but are often of pale tints. The principal localities are at Missouri Bar, Ruby Bar and other places near Helena, where they were first worked, and also at Yogo Gulch, near Utica. The Helena crystals are of tabular habit, being composed of the basal pinacoid with a very short hexagonal prism, whilst at Yogo Gulch many of the crystals affect a rhombohedral habit. The Montana sapphires and the matrix have been described by Dr G. F. Kunz, Professor L. V. Pirsson and Dr J. H. Pratt (*Amer. Jour. Sc.*, ser. 4, vol. iv., 1897). The sapphire occurs also in Europe, being found in the Iserweise of Bohemia and in the basalt of the Rhine valley and of Le-Puy-en-Velay in France, but the European stones have no interest as gems.

Although the term sapphire is primarily applied to blue corundum, it is often used in a general sense so as to include all corundum of gem quality, regardless of colour. Hence clear colourless corundum is known as white sapphire or "leucosapphire." Such stones have been occasionally cut as lenses for microscopes, being recommended for such use by their high refractivity, weak dispersion and great hardness. White topaz is sometimes called "water-sapphire," a name which should, however, be restricted to iolite (*q.v.*). Yellow corundum is not uncommon in Ceylon and is termed yellow sapphire or "oriental topaz," the prefix "oriental" being often applied to corundum. When of pale yellowish-green colour the sapphire is called "oriental chrysolite," when greenish-blue "oriental aquamarine," when of brilliant green colour "oriental emerald," and when violet "oriental amethyst." (For figure of crystal of sapphire see CORUNDUM and for artificial sapphire see GEM, § *Artificial*.)

The so-called "Hope sapphires" of trade have been shown to be artificial blue spinels, coloured by cobalt.

Sapphirine is a rare mineral, not related to sapphire except in colour. It is a silicate, containing aluminium, magnesium and iron, brought originally from Greenland, and since found in a rock from the Vizagapatam district in India. (F. W. R.*)

SAPPHO (7th–6th centuries B.C.), Greek poetess, was a native of Lesbos, contemporary with Alcaeus, Stesichorus and Pittacus, in fact, with the culminating period of Aeolic poetry. One of her brothers, Charaxus, fell in love with a courtesan named Doricha upon whom he squandered his property. Sappho wrote an ode, in which she severely satirized and rebuked him. Another brother, Larichus, was public cup-bearer at Mytilene—a position for which it was necessary to be well born. It is said that she had a daughter, named after her grandmother Cleis, and she had some personal acquaintance with Alcaeus. He addressed her in an ode of which a fragment is preserved: "Violet-weaving (or dark-haired), pure, sweet-smiling Sappho, I wish to say somewhat, but shame hinders me"; and she answered in another ode: "Hadst thou had desire of aught good or fair, shame would not have touched thine eyes, but thou wouldst have spoken thereof openly." The story of her love for the disdainful Phaon, and her leap into the sea from the Leucadian promontory, together with that of her flight from Mytilene to Sicily, has no confirmation; we are not even told whether she died of the leap or not. Critics again are agreed that Suïdas was simply gulled by the comic poets when he tells of her husband, Cercolas of Andros. Both the aspersions which these poets cast on her character and the embellishments with which they garnished her life passed for centuries as undoubted history. Six comedies entitled *Sappho* and two *Phaon*, were produced by the Middle Comedy; but, when we consider, for example, the way in which Socrates was caricatured by Aristophanes, we are justified in putting no faith whatever in such authority. We may conclude that Sappho was not utterly vicious, though by no means a paragon of virtue. All ancient tradition and the character of her extant fragments show that her morality was what has ever since been known as "Lesbian."

At Lesbos she was head of a great poetic school, for poetry in that age and place was cultivated as assiduously and apparently as successfully by women as by men. Her most famous pupils were Erinna of Telos and Damophyla of Pamphylia. In antiquity her fame rivalled that of Homer. She was called "the poetess," he "the poet." Different writers style her "the tenth Muse," "the flower of the Graces," "a miracle," "the beautiful," the last epithet referring to her writings, not her person, which is said to have been small and dark.

Her poems were arranged in nine books, on what principle is uncertain; she is said to have sung them to the Mixo-Lydian mode, which she herself invented. The perfection and finish of every line, the correspondence of sense and sound, the incomparable command over all the most delicate resources of verse, and the exquisite symmetry of the complete odes which are extant, raise her into the very first rank of technical poetry at once, while her painting of passion, which caused Longinus to quote the ode to Anactoria as an example of the sublime, has never been since surpassed, and only approached by Catullus and in the *Vita Nuova*. Her fragments also bear witness to a profound feeling for the beauty of nature. The ancients also attributed to her a considerable power in satire, but in hexameter verse they considered her inferior to her pupil Erinna.

The fragments of Sappho have been preserved by other authors incidentally. Three fragments ascribed to her have been found on Egyptian papyri within recent years. The first two were published by W. Schubart in *Sitzungsberichte d. königl. preuss. Akademie d. Wissenschaften* (1902), i. 195 and re-edited (with bibliography) in the *Berliner Klassikertexte*, v. 2 (1907); the third, discovered in 1879, and attributed to Sappho by Blass, is re-edited in the *Berlin. Klass.* v. For these three fragments see especially J. M. Edmonds, in *Classical Review* (June, 1909), pp. 99-104 (text, trans., comment.) and on the text of the "Ode to the Nereids" in *Classical Quarterly* (October, 1909). The poems were separately edited with translation by Wharton (3rd ed., 1895); also in H. Weir Smyth's *Greek Melic Poets* (1900). See also P. Brandt, *Sappho* (Leipzig, 1905); B. Steiner, *Sappho* (1907). (J. A. Pl.)

SAPPORO, the official capital of the island of Yezo, Japan, situated in 43° 4′ N. and 141° 21′ E. Pop. 39,000. It was chosen in 1870, and owed its prosperity at the outset chiefly to the public institutions established by the Japanese government in connexion with the colonization bureau, which had for its object the development of the resources of Yezo. It is now a garrison town

and has an agricultural college, a museum, saw-mills, flour-mills, breweries, and hemp and flax factories.

SARABAND (Ital. *Sarabanda, Zarabanda*; Fr. *Sarabande*), a slow dance, generally believed to have been imported from Spain in the earlier half of the 16th century, though attempts have been made to trace it to an Eastern origin. The most probable account of the word is that the dance was named after Zarabanda, a celebrated dancer of Seville. During the 16th and 17th centuries the saraband was exceedingly popular in Spain, France, Italy and England. Its music was in triple time—generally with three minims in the bar—and almost always consisted of two strains, each beginning upon the first beat, and most frequently ending on the second or third. Many very fine examples occur in the *Suites* and *Partitas* of Handel and J. S. Bach; by far the finest is that which Handel first composed for his overture to *Almira*, and afterwards adapted to the words "Lascia, ch'io pianga," in *Rinaldo*.

SARACCO, GIUSEPPE (1821–1907), Italian politician and financier, and knight of the Annunziata, was born at Bistagno on the 9th of October 1821, and, after qualifying as an advocate, entered the Piedmontese parliament in 1849. A supporter of Cavour until the latter's death he joined the party of Rattazzi and became under-secretary of state for public works in the Rattazzi cabinet of 1862. In 1864 he was appointed, by Sella, secretary-general of finance, and after being created senator in 1865, acquired considerable fame as a financial authority. In 1879 he succeeded in postponing the total abolition of the grist tax, and was throughout a fierce opponent of Magliani's loose financial administration. Selected as minister of public works by Depretis in 1887, and by Crispi in 1893, he contrived to mitigate the worst consequences of Depretis's corruptly extravagant policy, and introduced a sounder system of government participation in public works. In November 1898 he was elected president of the senate, and in June 1900 succeeded in forming a "Cabinet of pacification" after the Obstructionist crisis which had caused the downfall of General Pelloux. His term of office was clouded by the assassination of King Humbert (29th July 1900), and his administration was brought to an end in February 1901 by a vote of the chamber condemning his weak attitude towards a great dock strike at Genoa. After his fall he resumed his functions as president of the senate; but on the advent of the third Giolitti cabinet, he was not reappointed to that position. He died on the 19th of January 1907. He received the supreme honour of the knighthood of the Annunziata from King Humbert in 1898.

SARACENS, the current designation among the Christians in the middle ages for their Moslem enemies, especially for the Moslems in Europe. In earlier times the name *Saraceni* was applied by Greeks and Romans to the nomad Arabs of the Syro-Arabian desert who harassed the frontier of the empire. Σαρακηνή, a district in the Sinaitic peninsula, is mentioned by Ptolemy (v. 16). Its inhabitants, though unknown to Arab tradition, made themselves notorious in the adjacent Roman provinces. Thus all Bedouins in that region came to be called *Saraceni*, in Aramaic *Sarkaje*, usually with no very favourable meaning. The latter form occurs in a dialogue concerning Fate written about A.D. 210 by a pupil of Bardesanes (Cureton, *Spicilegium Syriacum*, 16 ult.). The appellation then became general, and occurs frequently in Ammianus Marcellinus. The name "Saracen" continued to be used in the West in later times, probably rather through the influence of literature than by oral tradition, and was applied to all Arabs, even to all Moslems.

SARAGHARI, a small signalling post on the Samana Range in the North-West Frontier Province of India between Forts Lockhart and Gulistan. It is memorable for the stout defence made by its garrison of 21 sepoys of the 36th Sikhs in 1897. Saraghari, a mere mud block-house with a wooden door and a dead-angle, was held for six and a half hours against seven or eight thousand Orakzais, till the 21 Sikhs were finally overwhelmed and killed to a man. A memorial in commemoration was unveiled at Ferozepore in 1904.

SARAGOSSA (*Zaragoza*), an inland province of northern Spain, one of the three into which Aragon was divided in 1833; bounded on the N. by Logroño and Navarre, N.E. and E. by Huesca, S.E. by Lérida and Tarragona, S. by Teruel and Guadalajara and W. by Soria. Pop. (1900) 421,843; area, 6726 sq. m. Saragossa belongs wholly to the basin of the Ebro (*q.v.*). The main valley is bounded on the south-west by the Sierra de Moncayo (with the highest elevation in the province, 7707 ft.), and is continued in a south-easterly direction by the lower sierras of La Virgen and Vicor; on the north-west are the spurs of the Pyrenees. The principal tributaries of the Ebro within the province are the Jalon (*q.v.*), Huerva and Aguas on the right and the Arba and Gallego on the left; the Aragon also, which flows principally through Navarre, has part of its course in the north of this province. At its lowest point, where the Ebro quits it, Saragossa is only 105 ft. above sea-level. There are large tracts of barren land, but where water is abundant the soil is fertile; its chief productions are wheat, rye, barley, oats, hemp, flax, oil and wine. Silkworms are bred; and on the higher grounds sheep are reared. The manufactures are less important than the agricultural interests. Since 1885, however, the Aragonese have bestirred themselves, especially since the extremely protectionist policy of 1890 gave great impetus to native industries all over Spain. The industries include iron-founding and manufactures of paper, leather, soap, brandies, liqueurs, machinery, carriages of all sorts, railway material, pianos, beds, glass, bronze, chocolate, jams and woollen and linen goods. Much timber is obtained from the Pyrenean forests; the chief exports are live stock, excellent wines, flour, oil and fruit. The province contains important mineral resources, the bulk of which, however, await development.

Saragossa is traversed by the Ebro Valley Railway, which connects Miranda with Lérida, Barcelona and Tarragona, and has a branch to Huesca; it also communicates via Calatayud with Madrid and Sagunto; and there are local lines to Cariñena (south-west from Saragossa) and to Tarazona and Borja (near the right bank of the Ebro). The only towns with upwards of 5000 inhabitants in 1900 were Saragossa (99,118) and Calatayud (11,526) (see separate articles); Tarazona (8790), an episcopal see, with a curious 13th-century cathedral; Caspe (7735); and Borja (5701), the original home of the celebrated family of Borgia (*q.v.*). (For an account of the imperial canal, and of the inhabitants and history of this region, see ARAGON.)

SARAGOSSA (*Zaragoza*), the capital of the Spanish province of Saragossa and formerly of the kingdom of Aragon, seat of an archbishop, of a court of appeal, and of the captain-general of Aragon; on the right bank of the river Ebro, 212 m. by rail N.E. of Madrid. Pop. (1900) 99,118. Saragossa is an important railway junction; it is connected by direct main lines with Valladolid, Madrid and Valencia in the west and south, and by the Ebro Valley Railway with Catalonia and the Basque Provinces; it is also the starting-point of railways to the northern districts of Aragon and to Carineña on the south-west. The city is built in an oasis of highly cultivated land, irrigated by a multitude of streams which distribute the waters of the Imperial Canal, and surrounded by an arid plain exposed to the violent gales which blow down, hot in summer and icy in winter, from the Castilian plateau. The monthly range of temperature frequently varies by as much as 50° Fahr., and the climate is rarely pleasant for many consecutive days except in spring, when warm easterly winds blow from the Mediterranean. The city is surrounded by gardens, farms and country-houses (locally known as *torres*, "towers"). Seen from a distance it has a fine appearance owing to the number of its domes and towers; on a nearer approach it presents a remarkable contrast between the older streets, narrow, gloomy, ill-paved and lined with the fortress-like palaces of the old Aragonese nobility, and the business and residential quarters, which are as well built as any part of Madrid or Barcelona. Saragossa is thus in appearance at once one of the oldest and one of the newest of Spanish cities.

One of its two stone bridges, the seven-arched Puente de Piedra, dates from 1447; there is also an iron bridge for the railway to Pamplona. Beside the river there are public walks and avenues of poplar; the suburb on the left bank is named Arrabal. The two most important buildings of Saragossa are its cathedrals, to each of

which the chapter is attached for six months in the year. La Seo ("The See") is the older of the two, dating chiefly from the 14th century; its prevailing style is Gothic, but the oldest portion, the lower walls of the apse, is Byzantine. The Iglesia Metropolitana del Pilar is the larger building, dating only from the latter half of the 17th century; it was built after designs by Herrera el Mozo, and owes its name to one of the most venerated objects in Spain, the "pillar" of jasper on which the Virgin is said to have alighted when she manifested herself to St James as he passed through Saragossa. It has little architectural merit; externally its most conspicuous features are its cupolas, which are decorated with rows of green, yellow and white glazed tiles. The church of San Pablo dates mainly from the 13th century. The Torre Nueva, an octangular clock tower in diapered brickwork, dating from 1504, was pulled down in 1892; it leaned some 9 or 10 ft. from the perpendicular, owing to faulty foundations, which ultimately rendered it unsafe. Among other conspicuous public buildings are the municipal buildings, the exchange (*Lonja*), and the civil and military hospitals and almshouse (*Hospicio provincial*), which are among the largest in Spain. The university was founded in 1474, but its history has not been brilliant. To the west of the town is the Aljafería or old citadel, originally built as a palace by the Moors and also used as such by its Christian owners. Late in the 15th century it was assigned by Ferdinand and Isabella to the Inquisition, and has since been used as a military hospital, as a prison and as barracks. Saragossa is the headquarters of a large agricultural trade; its industries include iron-founding, tanning, brewing, distillation of spirits, and manufactures of machinery, candles, soap, glass and porcelain.

History.—Saragossa (Celtiberian, *Salduba*) was made a colony by Augustus at the close of the Celtiberian War (25 B.C.), and renamed *Caesarea Augusta* or *Caesaraugusta*, from which "Saragossa" is derived. Under the Romans it was a highly privileged city, the chief commercial and military station in the Ebro valley, and the seat of one of the four *conventus juridici* (assizes) of Hither Spain. It is now, however, almost destitute of antiquities dating from the Roman occupation. It was captured in 452 by the Suebi, and in 476 by the Visigoths, whose rule lasted until the Moorish conquest in 712, and under whom Saragossa was the first city to abandon the Arian heresy. In 777 its Moorish ruler, the viceroy of Barcelona, appealed to Charlemagne for aid against the powerful caliph of Cordova, Abd-ar-Rahman I. Charlemagne besieged the Cordovan army in *Sarkosta*, as the city was then called; but a rebellion of his Saxon subjects compelled him to withdraw his army, which suffered defeat at Roncesvalles (*q.v.*), while recrossing the Pyrenees. The Moors were finally expelled by Alphonso I. of Aragon in 1118, after a siege lasting nine months in which the defenders were reduced to terrible straits by famine. As the capital of Aragon, Saragossa prospered greatly until the second half of the 15th century, when the marriage between Ferdinand and Isabella (1469) resulted in the transference of the court to Castile. In 1710 the allied British and Austrian armies defeated the forces of Philip V. at Saragossa in the war of the Spanish Succession; but it was in the Peninsular War (*q.v.*) that the city reached the zenith of its fame. An ill-armed body of citizens, led by José de Palafox y Melzi (see PALAFOX), whose chief lieutenants were a priest and two peasants, held the hastily-entrenched city against Marshal Lefebvre from the 15th of June to the 15th of August 1808. The siege was then raised in consequence of the reverse suffered by the French at Bailen (*q.v.*), but it was renewed on the 20th of December, and on the 27th of January the invaders entered the city. Even then they encountered a desperate resistance, and it was not until the 20th of February that the defenders were compelled to capitulate, after more than three weeks of continuous street fighting. About 50,000 persons, the majority non-combatants, perished in the city, largely through famine and disease. Among the defenders was the famous "Maid of Saragossa," Maria Agustin, whose exploits were described by Byron in *Childe Harold* (I, 55 sqq.).

SARAGOSSA, COUNCILS OF (*Concilia Caesaraugustana*). In or about 380 a council of Spanish and Aquitanian bishops adopted at Saragossa eight canons bearing more or less directly on the prevalent heresy of Priscillianism. A second council, held in 592, solved practical problems incident to the recent conversion of the West Goths from Arianism to orthodox Christianity. The third council, in 691, issued five canons on discipline. In 1318 a provincial synod proclaimed the elevation of Saragossa to the rank of an archbishopric; and from September 1565 to February 1566 a similar synod made known the decrees of Trent.

H. T. Bruns, *Canones apostolorum et conciliorum saeculorum iv., v., vi., vii., pars altera* (Berlin, 1839); P. B. Gams, *Die Kirchengeschichte von Spanien* (Regensburg, 1862–1879). (W. W. R.*)

SARAN, a district of British India, in the Tirhut division of Bengal. Area, 2674 sq. m. It is a vast alluvial plain, possessing scarcely any undulations, but with a general inclination towards the south-east, as indicated by the flow of the rivers in that direction. The principal rivers, besides the Ganges, are the Gandak and Gogra, which are navigable throughout the year. The district has long been noted for its high state of cultivation. It yields large crops of rice, besides other cereals, pulses, oil seeds, poppy, indigo and sugar-cane.

The population in 1901 was 2,409,509, showing a decrease of 2·2 %, compared with an increase of 7·4 % in the previous decade. The average density of population, 901 per square mile, is the highest rate for all India. The indigo industry, formerly of the first importance, has declined, and sugar refining has in great part taken its place. Some saltpetre is produced, and shellac is manufactured. Saran is exposed to drought and flood. It suffered from the famine of 1874, and again in 1896–1899. An irrigation scheme from the river Gandak, started in 1878, proved a failure, after a capital expenditure of Rs. 7,00,000. The Bengal North-Western railway runs through the south of the district. The administrative headquarters are at Chapra.

See *Saran District Gazetteer* (Calcutta, 1908).

SARAPUL, a town of N. Russia, in the government of Vyatka, on the river Kama, 333 m. by river E.N.E. of Kazan and 266 m. S.W. of Perm. Pop. (1855) 12,367; (1897) 21,395. Boots, shoes and gloves are manufactured, the first-named being mostly exported to Siberia, Caucasia and Turkestan. It has also tanneries, flax mills, distilleries, ironworks and rope-works, and is a busy river-port, trafficking in corn and timber. There are a lace-making school and a municipal library.

SARASATE Y NAVASCUES, PABLO MARTIN MELITON DE (1844–1908), Spanish violinist, was born at Pamplona on the 10th of March 1844. From his early years he displayed his aptitude for the violin, and at the age of 12 he began to study under Alard at the Paris Conservatoire. His first public appearance as a concert violinist was in 1860. He played in London in 1861, and in the course of his career he visited all parts of Europe and also both North and South America. His artistic pre-eminence was due principally to the purity of his tone, which was free from any tendency towards sentimentality and rhapsodic mannerism, and to the astonishing facility of execution which made him in the best sense of the word a virtuoso. Although in the Beethoven and Mendelssohn concertos, and in modern French and Belgian works, his playing was unrivalled, his qualities were most clearly revealed in the solos which he himself composed, which were "the spirit of Spanish dance translated into terms of the violin virtuoso." Sarasate died at Biarritz on the 20th of September 1908.

SARASIN, or SARRAZIN, **JEAN FRANÇOIS** (1611 ?–1654), French author, son of Roger Sarasin, treasurer-general at Caen, was born at Hermanville near Caen. He was educated at Caen, and settled in Paris. As a writer of *vers de société* he rivalled Voiture, but he was never admitted to the inner circle of the hôtel de Rambouillet. He was on terms of intimate friendship with Scarron, with whom he exchanged verses, with Ménage, and with Pellisson. In 1639 he supported Georges de Scudéry in his attack on Corneille with a *Discours de la tragédie.* He accompanied Léon Bouthillier, comte de Chavigny, secretary of state for foreign affairs, on various diplomatic errands. He was to have been sent on an embassy to Rome, but spent the money allotted for the purpose in Paris. This weakened his position with Chavigny, from whom he parted in the winter of 1643–1644. To restore his fallen fortunes he married a rich widow, but the alliance was of short duration. He joined in the pamphlet war against Pierre de Montmaur, against whom he directed his satire, *Bellum parasiticum* (1644). He was accused of writing satires on Mazarin, and for a short time gave up the practice of verse. In 1648, supported by the cardinal

de Retz and Madame de Longueville, he entered the household of Armand de Bourbon, prince de Conti, whose marriage with Mazarin's niece he helped to negotiate. He died of fever at Pézénas, in Languedoc on the 5th of December 1654. His biographers have variously stated on inadequate evidence that his death was caused by the prince de Conti in a moment of passion, or that he was poisoned by a jealous husband. The most considerable of his poems were the epic fragments of *Rollon conquérant, la guerre espagnole*, with *Dulot vaincu* and the *Pompe funèbre* in honour of Voiture. As a poet he was overrated, but he was the author of two excellent pieces of prose narration, the *Histoire du siège de Dunkerque* (1649) and the unfinished *Conspiration de Walstein* (1651). The *Walstein* has been compared for elegance and simplicity of style to Voltaire's *Charles XII.*

His *Œuvres* appeared in 1656, *Nouvelles Œuvres* (2 vols.) in 1674. His *Poésies* were edited in 1877 by Octave Uzanne with an introductory note. Much of his correspondence is preserved in the library of the Arsenal, Paris. See Albert Mennung's *Jean François Sarasins Leben und Werke* (2 vols., Halle, 1902-1904).

SARASUATI, in early Hindu mythology, a river-goddess; in later myths the wife of Brahma, goddess of wisdom and science, mother of the Vedas, and inventor of the Devanagari letters. There has been much dispute as to the stream of which she is a personification. Some have identified it with the Avestan river, Haragaiti, in Afghanistan, while others think the term a general one for any great river, and in particular the sacred name for the Indus, Sindhu being the popular one.

Two small but sacred rivers in India are still called Saraswati, one in the Punjab and the other in Gujarat, both of which ultimately lose themselves in the sand. According to one legend, the Punjab river reappears to unite with the Ganges and Jumna at Allahabad. From this river is derived the name of the Sarswat Brahmans, the most numerous and influential of the priestly class in the Punjab, with whom the Gaur Sarswats or Shenvis of the Konkan claim connexion.

SARATOGA, BATTLES OF. The British campaign for the year 1777 in America (see AMERICAN WAR OF INDEPENDENCE) involved the operations of two armies moving from opposite and distant points. The lack of co-operation between the two led to the loss of one of them. This was General Burgoyne's force of 7000 men which marched from Canada in June 1777 with the view of reaching the upper Hudson and combining with British troops from New York to isolate New England from the colonies below. Lord Howe, commander-in-chief of the British in America, who had received no instructions binding him in detail to co-operate with Burgoyne, moved southward and captured Philadelphia. In drawing Washington after him he claimed to be assisting Burgoyne. Burgoyne pushed down by way of Lakes Champlain and George and approached the American army under General Horatio Gates in its fortified camp near Stillwater on the W. bank of the Hudson, about 24 m. N. of Albany. On the 19th Burgoyne attacked the American left under General Benedict Arnold. The battle, fought in densely wooded country till nightfall, was severe but indecisive. The British suffered heavy losses, especially in officers. This is variously known as the First Battle of Saratoga, the Battle of Freeman's Farm, the First Battle of Bemis Heights or the First Battle of Stillwater. Burgoyne fortified himself on the site of the action, and on October 7th made another attempt to turn the American left. An engagement still more severe than that of the 19th, known as the Second Battle of Saratoga, followed, in which the Americans under Benedict Arnold, E. Poor and D. Morgan drove the enemy into their works. Among many British officers killed was Brigadier-General Simon Fraser, who had been the life of the expedition. Crippled to an alarming extent, Burgoyne retreated. He was closely followed and harassed, and on the 16th of October nearly surrounded. On the 17th he surrendered, with about 6000 men, near the present village of Saratoga Springs.

See W. L. Stone, *Campaign of Lieut.-Gen. John Burgoyne* (Albany, 1877).

SARATOGA SPRINGS, a village of Saratoga county, New York, U.S.A., about 38 m. N. of Albany, and about 12 m. W. of the Hudson river. Pop. (1900) 12,409, of whom 1684 were foreign-born and 619 were negroes; (1910) 12,693. Saratoga Springs is served by the Delaware & Hudson and the Boston & Maine railways and by several interurban electric lines. The village is in a region of great historic interest, is famous for its medicinal mineral springs, and has long been one of the most popular watering places in America. Its hotels accommodate more than 20,000 guests. Of the hotels, the best known are the United States, Congress Hall, the Grand Union and the American-Adelphi. The springs, of which there are more than forty, were known in colonial times.

The waters, all having the same ingredients but in varying proportions, are heavily charged with carbonic acid gas, and contain considerable quantities of bicarbonates of lime and magnesium, and chloride of sodium. They rise in a stratum of Potsdam sandstone, underlaid by Laurentian gneiss, &c., and reach the surface after passing through a bed of blue clay. The most noteworthy springs are Congress, Vichy, Arondack, Hathorn, Patterson, High Rock, Putnam, Star, Red, Lincoln, Victoria, Carlsbad and Geyser. Some of the springs originally rose above the surface by their own force, but with the boring of new springs and the pumping for carbonic acid gas south of the village the pressure was greatly lessened; the courts interfered to stop the pumping and it was prohibited by the state legislature. These measures, however, were not effective, and in May 1909 an act was passed establishing a state reservation at Saratoga, creating a commission of three to select the lands to be taken over by the state, and providing for an issue of bonds for $600,000 to buy the springs. Saratoga Lake, a beautiful body of water 6 m. long and 1 m. wide, 3½ m. south-east of the village, is a favourite resort.

The streets are well-shaded and broad, with wide stretches of lawn between the sidewalk and the curb. There is a speedway and a famous race-track, where there are annual running races. In the village are Woodlawn Park (1200 acres), a town-hall, a state armoury, a public library, several theatres and a number of private hospitals and sanatoriums. The Convention Hall has been the meeting place of many conventions; near it is a reproduction of the House of Pansa at Pompeii, built by Franklin W. Smith. The principal business is the bottling and shipping of the mineral waters which are sold in large quantities and exported to many foreign countries. Among the manufactures are patent medicines, druggists' preparations and chemicals, silk gloves, textiles, foundry products and boilers and engines. In 1905 the value of the factory product was $1,709,073, an increase of 28·1 % since 1900.

The Saratoga country was a favourite summer camping ground of the Iroquois, particularly the Mohawks, who were attracted thither by the medicinal value of the springs long before Europeans visited the region. The Indian name, "Sa-ragh-to-ga" or "Se-rach-ta-gue," is said to have meant "hillside country of the great water" or "place of the swift water." The district became during the colonial wars a theatre of hostilities between the French and English colonists and their Indian allies. In 1693 a French expedition was checked in a sharp conflict near Mt. M'Gregor by an English and colonial force under Governor Benjamin Fletcher and Peter Schuyler. Early in the 18th century the region along the upper Hudson began to be settled, the settlement on the Hudson at the mouth of the Fishkill, directly east of the present Saratoga Springs, being known first as Saratoga (later "Old Saratoga") and finally as Schuylerville (pop. in 1905, 1529), in honour of the Schuyler family. Upon the settlement the French and Indians descended in 1745, and massacred many of the inhabitants. After the close of the Seven Years War, there was a new influx of settlers. Near Stillwater (pop. in 1905, 973), about 5 m. south-east of the present village, the battles of Saratoga (*q.v.*) were fought during the War of Independence. On the site of the present village a small log lodging house for the reception of visitors was built in 1771. After the close of the War of Independence, the fame of the Springs as a health resort spread abroad, and many sought them annually. In 1791 Gideon Putnam (1764–1812), a nephew of Major General Israel Putnam, bought a large tract of land here; he built the first inn (on the site of the present Grand Union Hotel). Other hotels were erected within the next few years; between 1820 and 1830, by which time the Springs had become one of the most popular of American resorts, several large barn-like wooden hotels were constructed; and Saratoga Springs was incorporated as a village in 1826.

See G. G. Scott and J. S. L'Amoreaux, *History of Saratoga County* (New York, 1876), N. B. Sylvester, *History of Saratoga County* (Philadelphia, 1878), and G. B. Anderson, *Saratoga County* (New York, 1899).

SARATOV, a government of south-eastern Russia, on the right bank of the lower Volga, having the governments of Penza and Simbirsk on the N., Samara and Astrakhan on the E. and the Don Cossacks territory and the governments of Voronezh and Tambov on the W. The area is 32,614 sq. m. The government has an irregular shape; and a narrow strip 140 m. long and 20 to 45 m. wide, extending along the Volga as far south as its Sarepta bend, separates the river from the territory of the Don Cossacks.

Saratov occupies the eastern part of the great central plateau of Russia, which slopes gently towards the south until it merges imperceptibly into the steppe region; its eastern slope, deeply cut into by ravines, falls abruptly towards the Volga. As the higher parts of the plateau range from 700 to 900 ft. above the sea, while the Volga flows at an elevation of only 20 ft. at Khvalynsk in the north, and is 48 ft. below sea-level at Sarepta, the steep ravine-cut slopes of the plateau give a hilly aspect to the banks of the river. In the south, and especially in the narrow strip above mentioned, the country assumes the characteristics of elevated steppes, intersected by waterless ravines.

Every geological formation from the Carboniferous up to the Miocene is represented in Saratov; the older formations are, however, mostly concealed under the Cretaceous, whose fossiliferous marls, flint-bearing clays and iron-bearing sandstones cover extensive areas. The Jurassic deposits seldom crop out from beneath them. Eocene sands, sandstones and marls, abounding in marine fossils and in fossil wood, extend over wide tracts in the east. The boulder-clay of the Finland and Olonets ice-sheet penetrates as far south-east as the valleys of the Medvyeditsa and the Sura; and extensive layers of loess and other deposits of the Lacustrine or Post-Glacial period emerge in the south-east and elsewhere above the Glacial deposits. Iron-ore is abundant; chalk, lime and white pottery clay are extracted to a limited extent. The mineral waters at Sarepta, formerly much visited, have been superseded in public favour by those of Caucasia.

Saratov is well drained, especially in the north. The Volga separates it from the governments of Samara and Astrakhan for a length of 500 m.; its tributaries are but small, except the Sura, which rises in Saratov, and serves for the northward transit of timber. The tributaries of the Don are more important: the upper Medvyeditsa and the Khoper, which both have a southward course parallel to the Volga and drain Saratov each for about 200 m., are navigated notwithstanding their shallows, ready-made boats being brought in separate pieces from the Volga. The Ilovlya, which flows in the same direction into the Don, is separated from the Volga by a strip of land only 15 m. wide; Peter the Great proposed to utilize it as a channel for connecting the Don with the Volga, but the idea has never been carried out, and the two rivers are now connected by the railway (45 m.) from Tsaritsyn to Kalach which crosses the southern extremity of Saratov. The region is rapidly drying up, and the forests diminishing. In the south, about Tsaritsyn, they have almost wholly disappeared. In the north they still occupy more than a third of the surface, the aggregate area under wood being reckoned at nearly 13 % of the total. The remainder is distributed as follows: arable land, 58 %; prairies and pasture lands, 19 %. Such is the scarcity of timber that the peasants' houses are made of clay, the corner posts and door and window frames being largely shipped from the wooded districts of the middle Volga. The climate is severe and continental. The average yearly temperatures are 41·5° at Saratov (January, 12·4°; July, 71·5°) and 44·4° at Tsaritsyn (January, 13·2°; July, 74·6°). The average range of temperature is as much as 119°. The Volga is frozen for an average of 162 days at Saratov and 153 days at Tsaritsyn. The soil is very fertile, especially in the north, where a thick sheet of black-earth covers the plateaus; sandy clay and saline clay appear in the south.

The population numbered 2,113,077 in 1882 and 2,419,884 in 1897. The density in the different districts in 1897 varied from 55 to 107 inhabitants per sq. m., and the urban population amounted to 319,918; the female population numbered 1,230,957. The estimated population in 1906 was 2,862,600. There are a few Germans, a fair number of Mordvinians, Chuvashes and Tatars, but nearly all the rest are Russians; 83 % belong to the Orthodox Greek Church, 5 % are Nonconformists, 6 % Lutherans and 2 % Roman Catholics. The government is divided into ten districts, the chief towns of which, with their populations in 1897, are Saratov (*q.v.*), Atkarsk (9750), Balashov (12,160), Kamyshin (16,834), Khvalynsk (15,455), Kuznetsk (21,740), Petrovsk (13,212), Serdobsk (12,721), Tsaritsyn (67,650 in 1900) and Volsk (27,572 in 1900). Education makes some progress: in 1897, 40 % of the military recruits were able to read, as against 21 % in 1874. The proportion of illiterate women, however, continues very large. Of the total area, 52 % belonged to the peasants in 1896, 38 % to private landowners, 5 % to the crown and 5 % to the imperial family and the municipal authorities; the peasants, however, are constantly buying land in considerable quantities. Green crops are being cultivated more widely, both on the private estates and among the peasants. Agriculture suffers, however, very much from droughts, and the attacks of marmots, mice and insects. The principal crops are wheat, rye, oats, barley, potatoes and beetroot, with some tobacco and fruit. Oil-yielding plants are cultivated; linseed in all districts except Tsaritsyn; and mustard, both for grain and oil, extensively about Sarepta and in the Kamyshin district. Gardening is a considerable source of income around Saratov, Volsk, Atkarsk and Kamyshin, the cucumbers, melons and water-melons being specially famous. Fishing and the preparation of caviare are of some importance at Kamyshin and elsewhere. Live-stock breeding is declining. On the other hand, the export trade in poultry, especially geese, has developed greatly. The factories comprise mainly steam flour-mills, oil-works, distilleries, oil-mills, timber-mills, tanneries, fur-dressing works and tobacco factories. Weaving, the fabrication of agricultural machinery and pottery, boot-making, &c., are carried on in the villages. The fairs of the government have lost much of their importance: that at Bekovo, however, in the district of Serdobsk, has held its ground, especially as regards cattle and animal products. The peasants are no better off than those of the other governments of south-east Russia (see SAMARA). Years of scarcity are common, and many peasants leave their homes in search of work on the Volga and elsewhere. An active trade is carried on in corn, hides, tallow, oils, exported; the merchants of Saratov, moreover, are intermediaries in the trade between south-east Russia and the central governments. The chief ports are Saratov, Tsaritsyn, Kamyshin and Khvalynsk. The German colony of Sarepta is a lively little town with 5650 inhabitants, which carries on an active trade in mustard, woollen cloth and manufactured wares.

The district of Saratov has been inhabited since at least the Neolithic period. The inhabitants of a later epoch have left numerous bronze remains in their *kurgans* (burial-mounds), but their ethnological position is still uncertain. In the 8th and 9th centuries the semi-nomad Burtases peopled the territory and recognized the authority of the Khazar princes. Whether the Burtases were the ancestors of the Mordvinians has not yet been determined. At the time of the Mongol invasion in 1239–1242, the Tatars took possession of the territory, and one of their settlements around the khan's palace at Urek, 10 m. from Saratov, seems to have had some importance, as well as those about Tsaritsyn and Dubovka. The Crimean Tatars devastated the country in the 15th century, and after the fall of Kazan and Astrakhan the territory was annexed to Moscow. Saratov and Tsaritsyn, both protected by forts, arose in the second half of the 16th century. Dmitrievsk (now Kamyshin) and Petrovsk were founded about the end of the 17th century, and a palisaded wall was erected between the Volga and the Don. Regular colonization may be said to have begun only at the end of the 18th century, when Catherine II. called back the runaway dissenters, invited German colonists and ordered her courtiers to settle here their serfs, deported from central Russia.

(P. A. K.; J. T. Be.)

SARATOV, a town of Russia, capital of the government of the same name, on the right bank of the Volga, 532 m. by rail S.E. of Moscow. It is one of the most important cities of eastern Russia, and is picturesquely situated on the side of hills which come close down to the Volga. One of these, the Sokolova (560 ft.), is liable to frequent landslips, and is a continual source of danger. The city is divided into three parts by two ravines; the outer two may be considered as suburbs. A large village, Pokrovsk (pop. 20,000), situated on the opposite bank of the Volga, though in the government of Samara, is in reality a suburb of Saratov. Apart from this suburb, Saratov had in 1882 a population of 112,430 (49,660 in 1830, and 69,660 in 1859), and 143,431 in 1900. It is the see of an Orthodox Greek bishop and of a Roman Catholic bishop, and is better built than many towns of central Russia. Its old cathedral (1697) is a very plain structure, but the new one, completed in 1825, is fine, and has a

striking campanile. The theatre and the railway station are also fine buildings. The streets are wide and regular, and there are several broad squares. A new fine-art gallery was erected in 1884 by the painter Bogolubov, who bequeathed to the city his collection of modern pictures and objects of art. A school of drawing and the public library are in the same building, the Radishchev Museum.

Agriculture and gardening support a section of the population. The cultivation of the sunflower deserves special mention. Of the manufacturing establishments the distilleries rank first in importance; next come the liqueur factories, flour-mills, oil-works, railway workshops and tobacco-factories. The city has a trade not only in corn, oil, hides, tallow, woollen cloth, wool, fruits and various raw produce exported from Samara, but also in salt from the Crimea and Astrakhan, in iron from the Urals and in wooden wares from the upper Volga governments. Saratov also supplies south-eastern Russia with manufactured articles and grocery wares imported from central Russia. The shallowness of the Volga opposite the town and the immense shoals along its right bank are, however, a great drawback to its usefulness as a river-port.

The town of Saratov was founded at the end of the 16th century, on the left bank of the Volga, some 7 m. above the present site, to which it was removed about 1605. The place it now occupies (Sary-tau or Yellow Mountain) has been inhabited from remote antiquity. Although founded for the maintenance of order in the Volga region, Saratov was several times pillaged in the 17th and 18th centuries. The peasant leader Stenka Razin took it, and his followers kept it until 1671; the insurgent Cossacks of the Don pillaged it in 1708 and the rebel Pugachev in 1774.

SARAVIA, ADRIAN (1531–1613), theologian, was born at Hesdin, Pas-de-Calais, of a Spanish father and Flemish mother, both Protestants. He entered the ministry at Antwerp, had a hand in the Walloon Confession and gathered a Walloon congregation in Brussels. He migrated to the Channel Islands early in the reign of Elizabeth; and, after a period as schoolmaster, officiated (1564–1566) at St Peter's, Guernsey, then under Presbyterian discipline. Subsequently he held the mastership of the grammar school at Southampton, and in 1582 was professor of divinity and minister of the reformed church at Leiden. From Leiden he wrote (9 June 1585) to Lord Burghley advising the assumption of the protectorate of the Low Countries by Elizabeth. He became domiciled in England in 1587–1588, leaving Holland on the discovery of his complicity in a political plot, and was appointed (1588) rector of Tattenhall, Staffordshire. His first work, *De diversis gradibus ministrorum Evangelii* (1590; in English, 1592, and reprinted), was an argument for episcopacy, which led to a controversy with Theodore Beza, and gained him incorporation (9 June 1590) as D.D. at Oxford, and a prebend at Gloucester (22 Oct. 1591). On 6th December 1595 he was admitted to a canonry at Canterbury (which he resigned in 1602), and in the same year to the vicarage of Lewisham, Kent, where he became an intimate friend of Richard Hooker, his near neighbour, whom he absolved on his deathbed. He was made prebendary of Worcester (1601) and of Westminster (5 July 1601). In 1604, or early in 1605, he presented to James I. his Latin treatise on the Eucharist, which remained in the Royal Library unprinted, till in 1885 it was published (with translation and introduction) by Archdeacon G. A. Denison. In 1607 he was nominated one of the translators of the Authorised Version of 1611, his part being Genesis to end of Kings ii. On the 23rd of March 1610 he exchanged Lewisham for the rectory of Great Chart, Kent. He died at Canterbury on the 15th of January 1612, and was buried in the cathedral on the 19th of January.

See the particulars collected in Denison's "Notice of the Author" prefixed to *De sacra eucharistia*. (A. Go.*)

SARAVIA, a town of the province of Negros Occidental, island of Negros, Philippine Islands, on the N.W. coast and the coast road, 16 m. N.N.E. of Bacolod, the capital. Pop. (1903) 13,132. The town is in a rich sugar-producing region, and sugar culture is the only important industry. The language is Panay-Visayan.

SARAWAK, a state situated in the north-west of Borneo; area, 55,000 sq. m.; pop. about 500,600. The coast line extends from Tanjong Datu, a prominent cape in 2° 3′ N., northwards to the mouth of the river Lawas 5° 10′ N. and 115° 30′ W., the whole length of the coast line being about 440 m. in a straight line; but a tract, 80 m. in length, of Brunei territory still remains between the mouths of the Baram and Limbang rivers. The frontier of the southern portion of Sarawak is formed by the Serang, Kelingkang and Batang Lupar ranges of mountains.

The inland or eastern boundary is formed by the broken range of mountains which constitutes the principal watershed of the island. Of these the highest peaks are: Batu Puteh (5400 ft.), Tebang (10,000 ft.), Batu Bulan (7000 ft.), Ubat Siko (4900 ft.), Bela Lawing (7000 ft.) and Batu Leihun (6000 ft.), from which the Rejang and Baram rivers, on the Sarawak side, and the Koti and Balungun rivers, on the Dutch side, take their rise. North of Sarawak is the Pamabo mountain range (8000 ft.), whence flow the rivers Limbang and Trusan, and the mountains Batu Lawei (8000 ft.) and Lawas (6000 ft.). The interior is mountainous, the greatest elevations being Mount Mulu (9000 ft.), of limestone formation, Batu Lawei (8000 ft.), Pamabo (8000 ft.), Kalulong, Dulit, Poeh and Penrisam. The Rejang is the largest river, the Baram ranking second, the Batang Lupar third and the Limbang fourth. The Rejang is navigable for small steamers for about 160 m., the Baram for about 100 m., but there is a formidable bar at the mouth of the Baram. The chief town of Sarawak, Kuching, with a population of about 30,000, is situated on the Sarawak river 20 m. from its mouth, and can be reached by steamers of a thousand tons.

The fauna is rich. The most important mammals are the *maias*, or *orang utan*, the gibbon, the proboscis, semnopithecus and macacus monkeys; lemurs, cats, otters, bears, porcupines, wild pigs, wild cattle, deer and pangolin. Bats, shrews, rats and squirrels are included among the smaller mammals, while sharks, porpoises and dugongs are found along the coast. Of birds, Sarawak has over five hundred species; fish and reptiles are abundant; the jungle swarms with insect life, and is rich in many varieties of fern and orchid.

The mineral wealth gives promise of considerable development. The Borneo Company for some years have successfully worked gold from the quartz reefs at Bau, on the Sarawak river, by the cyanide process, as well as antimony and cinnabar. Antimony occurs in pockets in various localities, notably at Sariki, in the Rejang district, and at Burok Buang and Telapak, in the Baram district and in the river Atun. Cinnabar has also been found in small quantities at Long Liman and in the streams about the base of Mount Mulu. Sapphires of good quality, but too small to be of commercial value, are found in large numbers in the mountain streams of the interior. Coal is worked at Sadong and Brooketon, and shipped to Singapore. The great coal-field of Selantik, along the Kelingkang range in the Batang Lupar district, is being developed. Indications of coal seams have also been found in the river Mukah; at Pelagus in the Rejang; at Similajau and Tutau and on Mount Dulit, in the Baram district.

Timber is one of the most valuable products, but with the exception of bilian (iron wood) from the river Rejang, little is exported. The most important timbers are bilian, merebo, rasak, kruin, tapang, kranji, benaga, bintangor, gerunggang, medang, meranti and kapor. Except near the banks of the rivers, which have been cleared by the natives for farming purposes, the whole country is thickly clothed with timber. The industrial establishments also comprise sago-mills, brick-works, cyanide-works and saw-mills.

In 1904 the total trade of Sarawak (Foreign and Coastwise) reached a value of $16,466,241 as compared with $4,564,200 in 1890. The remarkable increase in trade is shown by the following table:—

	1900.	1904.
Gold . . .	$84,370	$1,819,200
Pepper . .	125,442	2,611,478
Sago flour .	75,026	830,319
Rubber . .	35,181	351,735
Gutta . .	78,829	637,348
Gambier .	20,060	173,500

The revenue increased from $457,596 in 1894 to $1,321,879 in 1904; and the expenditure increased in the same period from $486,533 to $1,225,384. The Public Debt of Sarawak on the 1st of January 1905 was $25,000.

The population of the state, in addition to a small number of Europeans, government officials and others, a few natives of British India, and a large number of Chinese traders and pepper planters, consists of semi-civilized Malays in the towns and villages of the coast districts and of a number of wild tribes of Indonesian affinities in the interior. Of these the most important are the Dyaks, Milanaus, Kayans, Kenyahs, Kadayans and Muruts. No census has ever been taken. "Without the Chinaman," said the Raja (*Pall Mall Gazette*, 19th September 1883), "we could do nothing. When not allowed to form secret societies he is easily governed, and this he is forbidden to do on pain of death." The Milanaus, who live in the northern districts, have adopted the Malay-dress, and in many cases have become Mahommedans; they are a contented and laborious people. Slavery has been abolished, except among certain of the inland tribes among whom it still obtains in a very mild form ▸

head-hunting has been entirely suppressed by the government, save for occasional outbreaks among the Dyaks.

The government consists of the raja (the succession is hereditary) who is absolute, assisted by a supreme council of seven, consisting of the three chief European officials and four Malay magistrates, nominated by him. There is also a general council of fifty which meets every three years. It includes, besides European and Malay officials, native chiefs chosen from all the principal tribes of the country. The whole country comprises four administrative divisions, each of these being subdivided into several districts. The first division consists of Sarawak proper, which comprises the districts of the river Sarawak, and those of Lundu and Sadong. The second division is formed by the Batang Lupar, Saribas and Kelakah districts. The third division consists of the Rejang, Mukah, Oya and Bintulu; the fourth of the Baram, Limbang, Trusan and Lawas districts. The military force—some 250 men, Dyaks and Sikhs—is under the control of an English commandant. There is also a small police force, and the government possesses a few small steam vessels. The civil service is regularly organized and pensioned. The superior posts, about 50 in number, are filled by Englishmen. There are both Roman Catholic and Protestant missions in Sarawak, the latter forms part of the see of the bishop of Singapore. Sarawak is easily accessible from Singapore, whence the passage occupies about forty-six hours: steamers run at intervals of seven days. The coast is well lighted, lighthouses having been built and maintained in good order at Tanjong Po, Sirik, Mukah, Oya, Tanjong, Kidurong, Baram Mouth and Brooketon. The climate is equable, the daily temperature ranging on the average between 70° and 90°. The nights are generally cool. The rainfall averages about 200 in. annually, it is heaviest during the north-east monsoon (October–March), but continues through the south-west monsoon, which blows for the rest of the year.

History.—In 1839–1840 Sarawak (which then comprised only the districts now constituting the first and second divisions), the most southern province of the sultanate of Brunei, was in rebellion against the tyranny of the Malay officials, insufficiently controlled by the raja Muda Hassim. The insurgents held out at Blidah fort in the Siniawan district, and there Sir James Brooke first took part in the affairs of the territory. By his assistance the insurrection was suppressed, and on September 24th Muda Hassim resigned in his favour and he became raja of Sarawak. In 1843–1844 Captain (afterwards Admiral Sir Henry) Keppel (*q.v.*) and Raja Brooke expelled the Malay and Dyak pirates from the Saribas and Batang Lupar rivers, and broke up the fleets of Lanun pirates, which, descending from the Sulu Islands and the territory which is now British North Borneo, had long been the scourge of the seas.

In 1857 the Chinese, who for many generations had been working the alluvial deposits of gold in Upper Sarawak, sacked Kuching, killed two or three of the English residents and seized the government; Raja Brooke narrowly escaping with his life. His nephew, afterwards raja, quickly raised a force of Malays and Dyaks in the Batang Lupar district and suppressed the insurrection, driving the main body of the rebels out of the Sarawak territory. Raja Sir Charles Johnson Brooke (b. 1829) succeeded his uncle at his death in 1868; in 1888 he was created G.C.M.G. and Sarawak was made a British Protectorate, and in 1904 the position of his highness as raja of Sarawak was formally recognized by King Edward. His eldest son, the raja Muda (Charles Vyner Brooke, b. 1874), has for some years taken part in the administration of the country.

The extent of the raj of Sarawak, at the time when Sir James Brooke became its ruler, was not more than 7000 sq. m.; since that time the basins of the four rivers, Rejang, Muka, Baram and Trusan, have been added. The sultan of Brunei, who claimed suzerainty over them, ceded them on successive occasions in consideration of annual money payments. A few years after these cessions had been made many of the people of the river Limbang rose in rebellion against the sultan, and their territory was annexed by Sarawak, with the subsequent approval of the British government. In 1905 the basin of yet another river, the Lawas, was added to the northern end of Sarawak, the territory being acquired by purchase from the British North Borneo Company.

See Charles Brooke, *Ten Years in Sarawak* (1866); Gertrude L. Jacob, *The Raja of Sarawak* (1876); Spencer St John, *Life in the Forests of the Far East* (1862), and *Life of Sir James Brooke* (1879); "Notes on Sarawak" in *Proc. Roy. Geogr. Soc.* (1881), by W. M. Crocker; "In the Heart of Borneo," *Proc. Roy. Geogr. Soc.* (July 1900), by Charles Hose; and *The Far Eastern Tropics* (1905), by Alleyne Ireland. (C. H.)

SARCASM, an ironical or sneering remark or taunt, a biting or satirical expression. The word comes through the Latin from the Greek σαρκάζειν, literally to tear flesh (σάρξ) like a dog; hence, figuratively, to bite the lips in rage, to speak bitterly (cf. Stobaeus, *Eclog.* ii. 222). The etymology of this may be paralleled by the English "sneer," from Dan. *snarre*, to grin like a dog, cognate with "snarl," to make a rattling *r* sound in the throat, Ger. *schnarren*, and possibly also by "sardonic." This latter word appears in Greek in the form σαρδάνιος, always in the sense of bitter or scornful laughter, in such phrases as σαρδάνιον γελᾶν, γέλως σαρδάνιος and the like. It is probably connected with σαίρειν, to draw back, *i.e.* the lips, like a dog, but was usually explained (by the early scholiasts and commentators) as referring to a Sardinian plant (*Ranunculus Sardous*), whose bitter taste screwed up the mouth. Thus, later Greek writers wrote Σαρδόνιον, and it was adopted into Latin; cf. Servius on Virg. *Ecl.* vii. 41 "immo ego Sardois videas tibi amarior herbis."

SARCEY, FRANCISQUE (1827–1899), French journalist and dramatic critic, was born at Dourdan (Seine-et-Oise), on the 8th of October 1827. He spent some years as schoolmaster, but his temperament was little fitted to the work. In 1858 he devoted himself to journalism. He contributed to the *Figaro*, *L'Illustration*, *Le Gaulois*, *Le XIXe Siècle* and other periodicals; but his chief bent was towards dramatic criticism, of which he had his first experience in *L'Opinion nationale* in 1859. In 1867 he began to contribute to *Le Temps* the "feuilleton" with which his name was associated till his death. His position as dictator of dramatic criticism was unique. He had the secret of taking the public into his confidence, and his pronouncements upon new plays were accepted as final. He was a masterly judge of acting and of stage effect; his views as to the drama itself were somewhat narrow and indifferent to the march of events. He published several miscellaneous works, of which the most interesting are *Le Siège de Paris*, an account compiled from his diary (1871), *Comédiens et comédiennes* (1878–1884), *Souvenirs de jeunesse* (1884) and *Souvenirs d'âge mûr* (1892; Eng. trans., 1893). *Quarante ans de théâtre* (1900, &c.) is a selection from his dramatic feuilletons edited by A. Brisson. He died in Paris, on the 16th of May 1899.

SARCOCARP (Gr. σάρξ, flesh, καρπός, fruit), a botanical term for the succulent and fleshy part of a fruit.

SARCODINA, a principal group or phylum of Protista, defined by O. Bütschli as those which during their active and motile existence discharge the functions of motion and nutrition by simple flowing movements of their protoplasm or by the extension of simple pseudopods, which merge without trace into the protoplasmic body (Bronn's *Tierreich*, vol. i. pt. i., 1882). Thus defined, it is co-extensive with the older group Rhizopoda (Dujardin), and comprises five classes: Proteomyxa (Lankester), Rhizopoda (Dujardin), Foraminifera (d'Orbigny), Heliozoa (Haeckel) and Radiolaria (Haeckel).

The delimitation of Sarcodina is not unattended with difficulties. A very few of those we include possess in addition to the pseudopods one or more flagella, such as *Dimorpha* and *Myriophrys* (Heliozoa), *Arcuothrix* (Rhizopoda), and might equally be referred to the Flagellata (*q.v.*). The Sporozoa differ in that their active state is usually (not always, *e.g.* Haemosporidia, &c.) a wriggling, sickle-shaped cell, that growth takes place in the whole surface of the body, and not by ingestion of food and consequently without the active deformations that characterize Sarcodina,

and that the life-cycle embraces at least two alternating modes of brood formation.

The subdivision of the phylum is no less difficult. The character of the pseudopods (see AMOEBA) is the most obvious one to select, as it appears to be fairly constant. The surface may be a "precipitation-pellicle," not wetted by water, and the cytoplasm immediately within ("ectosarc") free from granules, so that no streaming movement is visible at the surface of the pseudopods, which are blunt or taper sharply to a point (Rhizopoda Lobosa); or the cytoplasm has no such protective outer layer, and the granules extend to the surface where they show a constant streaming, and the pseudopods are fine-pointed, and taper very slowly to the tip, as in all the other groups. For convenience, however, from general similarity of habit, habitat and general structure, we have been obliged to give a minor importance to this character within Rhizopoda. The divisions then stand thus:—

1. PROTEOMYXA.—Pseudopods fine granular, not branching freely, fission usually multiple, in a cyst; no conjugation process known.

2. RHIZOPODA.—Simple forms, sometimes with a simple shell, chitinous, siliceous or of cemented particles, never calcareous, pseudopods lobose, in the tapering and branching never either stiff or reticulate.

3. HELIOZOA.—Pseudopods granular, finely radiate, and gradually tapering, stiff; skeleton variable, never calcareous nor of cemented particles.

4. FORAMINIFERA.—Pseudopods branching freely and anastomosing, flexible except in a few pelagic forms where they are more radiate; shell variable, mostly of cemented sand-grains, calcareous, very rarely siliceous in a few deep-sea forms, not generically separable from

5. RADIOLARIA.—Cytoplasm divided into a central and a peripheral region by a perforated membranous central capsule; pseudopods radiate flexible branching or not; skeleton either of a proteid (?) substance ("a canthin") or siliceous, of spicules or forming an elegant lattice, more rarely continuous.

6. LABYRINTHULIDEA.—Body a reticulate plasmodium, formed by cells more or less coalescent, and connected by a network of anastomosing threadlike pseudopods. Cells aggregated into loose networks without distinct boundaries, the minor aggregates connected by fine threadlike pseudopodia.

7. MYXOMYCETES.—Cells at first free, finally aggregated to form a coalescent fructification, usually preceded by a continuous or fenestrated plasmodium stage in which all cytoplasmic boundaries may be lost.

The reproduction processes of the Sarcodina are (1) Binary fission, equal or nearly so. (2) Multiple fission or "sporulation" (also termed "brood formation"). Conjugation (equal or unequal) usually occurs between cells produced by the latter mode (microgametes); or if not, there are antecedent processes suggesting that brood formation has been lost. Conjugation is entirely unknown in Proteomyxa, Labyrinthulidea and Myxomycetes, even at stages where it occurs in other groups, and it has only been definitely made out in a very limited number of genera in the remaining groups. The zygote or product of cell fusion is usually here, as in the majority of *types* of conjugation, a resting cell. (See the separate articles on the classes.)

The young of the Sarcodina, formed from the outcome of multiple fission, or single resting cells (spores), may be provided with pseudopodia from the first (myxopods or amoebulae), or come into active life for a short time with flagella (mastigopods or flagellulae).

LITERATURE.—*Bütschli* in Bronn's *Tierreich*, vol. i. pt. i. (1882); Y. Delage and E. Hérouard, *Traité de zoologie concrète*, vol. i., *La Cellule et les protozoaires* (1896); A. Lang, *Handb. der Zoologie*, ed. 2, pt. i. "Protozoen" (1902); M. Hartog, *Cambridge Natural History*, vol. i. (1906); in the first four books full bibliographies are given.

(M. HA.)

SARCOPHAGUS (Gr. σαρκοφάγος, literally "flesh-eating," from σάρξ, flesh, φαγεῖν, to eat), the name given to a coffin in stone, which on account of its caustic qualities, according to Pliny (*H.N.* xxxvi. 27), consumed the body in forty days; also by the Greeks to a sepulchral chest, in stone or other material, which was more or less enriched with ornament and sculpture. One of the finest examples known is the sarcophagus of Seti, the second king of the XIX. Egyptian dynasty (1326–1300 B.C.), which is carved out of a block of Aragonite or hard carbonate of lime, now in the Soane Museum; of later date are the green porphyry sarcophagus and the terra-cotta sarcophagus from Clazomenae; both of these date from the early 6th century B.C., and are in the British Museum. The finest Greek examples are those found at Sidon in 1887 by Hamdy Bey, which are now in the Imperial Museum at Constantinople (see GREEK ART). Of Etruscan sarcophagi there are numerous examples in terra-cotta; occasionally they are miniature-representations of temples, and sometimes in the form of a couch on which rest figures of the deceased; one of these in the British Museum dates from 500 B.C. The earliest Roman sarcophagus is that of Scipio in the Vatican (3rd century B.C.), carved in peperino stone. Of later Roman sarcophagi, there is an immense series enriched with figures in high relief, of which the chief are the Niobid example in the Lateran, the Lycomedes sarcophagus in the Capitol, the Penthesilea sarcophagus in the Vatican, and the immense sarcophagus representing a battle of the Romans and the barbarians in the Museo delle Terme. In later Roman work there was a great decadence in the sculpture, so that in the following centuries recourse was had to the red Egyptian porphyry, of which the sarcophagi of Constantia (A.D. 355) and of the empress Helena (A.D. 589), both in the Vatican, are fine examples. Of later date, during the Byzantine period, there is a large series either in museums or in the cloisters of the Italian churches. They are generally decorated with a series of niches with figures in them, divided by small attached shafts with semicircular or sloping covers carved with religious emblems, one of the best examples being the sarcophagus of Sta Barbara, dating from the beginning of the 6th century, at Ravenna, where there are many others. The term sarcophagus is sometimes applied also to an altar tomb.

SARD, a reddish-brown chalcedony much used by the ancients as a gem-stone. Pliny states that it was named from Sardis, in Lydia, where it was first discovered; but probably the name came with the stone from Persia (Pers. *sered*, yellowish-red). Sard was used for Assyrian cylinder-seals, Egyptian and Phoenician scarabs, and early Greek and Etruscan gems. The Hebrew *odem* (translated *sardius*), the first stone in the High Priest's breastplate, was a red stone—probably sard, but perhaps carnelian or red jasper (see J. Taylor, "Sardius," in Hastings's *Dict. Bibl.*). Some kinds of sard closely resemble carnelian, but are usually rather harder and tougher, with a duller and more hackly fracture. Mineralogically the two stones pass into each other, and indeed they have often been regarded as identical, both being chalcedonic quartz coloured with oxide of iron. The range of colours in sard is very great, some stones being orange-red, or hyacinthine, and others even golden, whilst some present so dark a brown colour as to appear almost black by reflected light. The hyacinthine sard, resembling certain garnets, was the most valued variety among the ancients for cameos and intaglios. Dark-brown sard is sometimes called "sardoine," or "sardine"; whilst certain sards of yellowish colour were at one time known to collectors of engraved gems as "beryl."

SARDANAPALUS, or SARDANAPALLUS, according to Greek fable, the last king of Assyria, the thirtieth in succession from Ninyas. The name is derived from that of Assur-danin-pal, the rebel son of Shalmaneser II., whose reign ended with the fall of Nineveh in 823 B.C. (or perhaps from that of Assur-dan III., the last king but one of the older Assyrian dynasty); his character is that ascribed to Assur-bani-pal. He was the most effeminate and corrupt of a line of effeminate princes; hence Arbaces, satrap of Media, rebelled and, with the help of Belesys, the Babylonian priest, besieged Nineveh. Sardanapalus now threw off his sloth and for two years the issue was doubtful. Then, the Tigris having undermined part of the city wall, he collected his wives and treasures and burned them with himself in his palace (880 B.C.). His fate is an echo of that of Samas-sum-yukin, the brother of Assur-bani-pal (*q.v.*).

See J. Gilmore, *Fragments of the Persika of Ktesias* (1888).

(A. H. S.)

SARDARPUR, a British station in Central India, within the state of Gwalior, on the Mahi river, 58 m. by road E. of Mhow;

pop. (1901) 2783. It is the headquarters of the political agent for the Bhopawar agency, and of the Malwa Bhil corps, originally raised in 1837 and recently converted into a military police battalion.

SARDHANA, a town of British India, in Meerut district of the United Provinces, 12 m. by rail N.W. of Meerut. Pop. (1901), 12,467. Though now a decayed place, Sardhana is historically famous as the residence of the Begum Samru (d. 1836). This extraordinary woman was a Mussulman married to Reinhardt or Sombre (Samru), the perpetrator of the massacre of British prisoners at Patna in 1763. On his death in 1778 she succeeded to the command of his mercenary troops. Ultimately she was baptized into the Roman Catholic Church, and bequeathed an immense fortune to charitable and religious uses. She built in Sardhana a Roman Catholic cathedral, a college for training priests, and a handsome palace.

SARDICA, COUNCIL OF, an ecclesiastical council convened in 343 by the emperors Constantius and Constans, to attempt a settlement of the Arian controversies, which were then at their height. Of the hundred and seventy bishops assembled, about ninety were Homousians—principally from the West—while on the other side were eighty Eusebians from the East. The anticipated agreement, however, was not attained; and the result of the council was simply to embitter the relations between the two great religious parties, and those between the Western and Eastern halves of the Empire. For as Athanasius and Marcellus of Ancyra appeared on the scene, and the Western bishops declined to exclude them, the Eusebian bishops of the East absolutely refused to discuss, and contented themselves with formulating a written protest addressed to numerous foreign prelates. That they instituted a rival congress of their own in Philippopolis is improbable. The bishops, however, who remained in Sardica (mod. *Sofia* in Bulgaria) formed themselves into a synod, and naturally declared in favour of Athanasius and Marcellus, while at the same time they anathematized the leaders of the Eusebian party. The proposal to draw up a new creed was rejected.

Especial importance attaches to this council through the fact that Canons 3-5 invest the Roman bishop with a prerogative which became of great historical importance, as the first legal recognition of his jurisdiction over other sees and the basis for the further development of his primacy. "In order to honour the memory of St Peter," it was enacted that any bishop, if deposed by his provincial synod, should be entitled to appeal to the bishop of Rome, who was then at liberty either to confirm the first decision or to order a new investigation. In the latter case, the tribunal was to consist of bishops from the neighbouring provinces, assisted—if he so chose—by legates of the Roman bishop. The clauses thus made the bishop of Rome president of a revisionary court; and afterwards Zosimus unsuccessfully attempted to employ these canons of Sardica, as decisions of the council of Nice, against the Africans. In the middle ages they were cited to justify the claim of the papacy to be the supreme court of appeal. Attacks on their authenticity have been conclusively repelled.

The canons are printed in C. Mirbt, *Quellen zur Geschichte des Papsttums* (Tubingen, 1901), p. 46 f.; Hefele, *Conciliengeschichte*, ed. 2, i. 533 sqq. See also, J. Friedrich, *Die Unechtheit der Canones von Sardika* (Vienna, 1902); on the other side F. X. Funk, "Die Echtheit der Canones von Sardica," *Historisches Jahrbuch der Görresgesellschaft*, xxiii. (1902), pp. 497-516; *ibid.* xxvi. (1905), pp. 1-18, 255-274; C. H. Turner, "The Genuineness of the Sardican Canons," *The Journal of Theological Studies*, iii. (London, 1902), pp. 370-397. (C. M.)

SARDINIA (Gr. Ἰχνοῦσα, from a fancied resemblance to a footprint in its shape, Ital. *Sardegna*), an island of the Mediterranean Sea, belonging to the kingdom of Italy. It lies 7½ m. S. of Corsica, from which it is separated by the Strait of Bonifacio, which is some 50 fathoms deep. The harbour of Golfo degli Aranci, in the north-eastern portion of the island, is 138 m. S.W. of Civitavecchia, the nearest point on the mainland of Italy. Sardinia lies between 8° 7′ and 9° 49′ E., and extends from 38° 52′ to 41° 15′ N. The length from Cape Teulada in the S.W. to Punta del Falcone in the N. is about 160 m., the breadth from Cape Comino to Cape Caccia about 68 m. The area of the island is 9187 sq. m.—that of the department (*compartimento*), including the small islands adjacent, being 9294 sq. m. It ranks sixth in point of size (after Sicily) among the islands of Europe, but it is much more sparsely populated.

The island is mountainous in the main, almost continuously so, indeed, along the east coast, and very largely granitic, with a number of lofty upland plains in the east, and volcanic in the west. The highest point in the north-east group of the island (called Gallura) is Monte Limbara (4468 ft.), S.E. of Tempio. This mountain group is bounded on the S.E. and S.W. by valleys, which are followed by the railways from Golfo degli Aranci to Chilivani, and from Chilivani to Sassari. The north-western portion of the island, called the Nurra, lies to the west of Sassari and to the north of Alghero, and is entirely volcanic; so are the mountains to the south of it, near the west coast; the highest point is the Monte Ferru (3448 ft.). East of the railway from Chilivani to Oristano, on the other hand, the granitic mountains continue. The highest points are Monte Rasu (4127 ft.), S. of Ozieri, in the district called Logudoro, on the chain of the Marghine, which runs to Macomer, and, farther S., in the region called Barbargia, the Punta Bianca Spina, the highest summit of the chain of Gennargentu (6016 ft.). These two groups are divided by the deep valley of the Tirso, the only real river in Sardinia, which has a course of 94 m. and falls into the sea in the Gulf of Oristano. South of Gennargentu, in the district of the Sarcidano, is the Monte S. Vittoria (3980 ft.), to the west of which is the deep valley of the Flumendosa, a stream 76 m. long, which rises south of Gennargentu, and runs S.E., falling into the sea a little north of Muravera on the east coast. Still farther W. is the volcanic upland plain of the Giara (1998 ft.), and south of the Sarcidano are the districts known as the Trexenta, with lower, fertile hills, and the Sarrabus, which culminates in the Punta Serpeddi (3507 ft.), and the Monte dei Sette Fratelli (3333 ft.), from the latter of which a ridge descends to the Capo Carbonara, at the S.E. extremity of the island. South of Oristano and west of the districts last described, and traversed by the railway from Oristano to Cagliari, is the Campidano (often divided in ordinary nomenclature into the Campidano of Oristano and the Campidano of Cagliari), a low plain, the watershed of which, near S. Gavino, is only about 100 ft. above sea-level. It is 60 m. long by 7-14 broad, and is the most fertile part of the island, but much exposed to malaria. South-west of it, and entirely separated by it from the rest of the island, are the mountain groups to the north and south of Iglesias, the former culminating in the Punta Perda de Sa Mesa or Monte Linas (4055 ft.), and the latter, in the district known as the Sulcis, reaches 3661 ft. It is in this south-western portion of the island, and more particularly in the group of mountains to the north of Iglesias, that the mining industry of Sardinia is carried on.

The scenery is fine, but wild and desolate in most parts, and of a kind that appeals rather to the northern genius than to the Italian, to whom, as a rule, Sardinia is not attractive. The railway between Mandas and Tortoli traverses some of the boldest scenery in the island, passing close to the Monte S. Vittoria. The mountains near Iglesias are also very fine.

Coast.—The coast of Sardinia contains few seaports, but a good proportion of these are excellent natural harbours. At the north-eastern extremity is a group of islands, upon one of which is the naval station of La Maddalena: farther S.E. is the well-protected Gulf of Terranova, a part of which, Golfo degli Aranci, is the port of arrival for the mail steamers from Civitavecchia, and a port of call of the British Mediterranean squadron. To the south of Terranova there is no harbour of any importance on the east coast (the Gulf of Orosei being exposed to the E., and shut in by a precipitous coast) until Tortoli is reached, and beyond that to the Capo Carbonara at the south-east extremity, and again along the south coast, there is no harbour before Cagliari, the most important on the island. In the south-west portion of Sardinia the island of S. Antioco, joined by a narrow isthmus and a group of bridges to the mainland, forms a good natural harbour to the south of the isthmus, the Golfo di Palmas; while the north portion of the peninsula, with the island of S. Pietro, forms a more or less protected basin, upon the shores of which are several small harbours (the most important being Carloforte), which are centres of the export of minerals and of the tunny fishery. Not far from the middle of the west coast, a little farther S. than the Gulf of Orosei on the east coast, is the Gulf of Oristano, exposed to the west winds, into which, besides the Tirso, several

streams fall, forming considerable lagoons. For some way beyond the only seaport is Bosa, which has only an open roadstead; and at the southern extremity of the Nurra come the Gulf of Alghero and the Porto Conte to the W., the latter a fine natural harbour but not easy of ingress or egress. The northern extremity of the Nurra, the Capo del Falcone, is continued to the N.N.E. by the island of Asinara, about 11 m. in length, the highest point of which, the Punta della Scomunica, is 1339 ft. high. This small island serves as a quarantine station. On the mainland, on the south shore of the Golfo dell' Asinara, is the harbour of Porto Torres, the only one of any importance on the north-west coast of Sardinia.

Geology.—Geologically Sardinia consists of two hilly regions of Pre-Tertiary rock, separated by a broad depression filled with Tertiary deposits. This depression runs nearly from north to south, from the Gulf of Asinara to the Gulf of Cagliari. Physically its continuity is broken by Monte Urticu and several smaller hills which rise within it, but these are all composed of volcanic rock and are the remains of Tertiary volcanoes. It is in the south that the depression remains most distinct and it is there known as the Campidano. In the north it forms the plain of Sassari. Both to the east and to the west of this depression the Archean and Palaeozoic rocks which form the greater part of the island are strongly folded, with the exception of the uppermost beds, which belong to the Permian system. In the eastern region this was the last folding which has affected the country, and the Mesozoic and Tertiary beds are almost undisturbed. In the western region, on the other hand, all the Mesozoic beds are involved in a later system of folds; but here also the Tertiary beds lie nearly horizontal. There were, therefore, two principal epochs of folding in the island, one at the close of the Palaeozoic era which affected the whole of the island, and one at the close of the Mesozoic which was felt only in the western region. Corresponding with this difference of structure there is also a difference in the geological succession. In the western region all the Mesozoic systems, including the Trias, are well developed. The Trias does not belong, as might have been expected, to the Alpine or Mediterranean type; but resembles that of Germany and northern Europe. In the eastern region the Trias is entirely absent and the Mesozoic series begins with the Upper Jurassic.

Granite and Archean schists form nearly the whole of the eastern hills from the Strait of Bonifacio southwards to the Flumendosa river, culminating in Monti del Gennargentu. The Palaeozoic rocks form two extensive masses, one in the south-east and the other in the south-west. They occur also on the extreme north-western coast, in the Nurra. Cambrian, Ordovician and Silurian beds have been recognized, the Upper Cambrian consisting of a limestone which is very rich in metalliferous ores (especially galena and calamine). The Permian, which contains workable coal seams, lies unconformably upon the older beds and seems to have been deposited in isolated basins (*e.g.* at Fondu Corrongiu and San Sebastiano), like those of the Central Plateau of France. The Mesozoic beds are limited in extent, the most extensive areas lying around the Gulf of Orosei on the east and west of Sassari in the north. The Tertiary deposits cover the whole of the central depression, where they are associated with extensive flows of lava and beds of volcanic ash. The most widely spread of the sedimentary beds belong to the Miocene period.[1]

Climate.—The climate of Sardinia is more extreme than that of Italy, but varies considerably in different districts. The mean winter temperature for Sassari for 1871–1900 was 48° F., the mean summer temperature 73° F., while the mean of the extremes reached in each direction were 99° F. and 31 5° F. The island is subject to strong winds, which are especially felt at Cagliari owing to its position at the south-east end of the Campidano, and the autumn rains are sometimes of almost tropical violence. The lower districts are hot and often unhealthy in the summer, while the climate of the mountainous portion of the island is less oppressive, and would be still cooler if it possessed more forest. There are comparatively few streams and no inland lakes. Snow hardly ever falls near the coast, but is abundant in the higher parts of the island, though none remains throughout the summer. The rainfall in the south-west portion of the island is considerably greater than in other districts. The mean annual rainfall for Sassari for 1871–1900 was 24·45 in., the average number of days on which rain fell being 109, of which 37 were in winter and only 8 in summer—the latter equal with Palermo, but lower than any other station in Italy.

Malaria.—The island has a bad reputation for malaria, due to the fact that it offers a considerable quantity of breeding places for the *Anopheles claviger*, the mosquito whose bite conveys the infection. Such are the various coast lagoons, formed at the mouths of streams for lack of proper canalization, while much of the harm is also due to the disforestation of the mountains, owing to which the rains collect in the upland valleys, and are brought down by violent torrents, carrying the soil with them, and so impeding the proper drainage and irrigation of these valleys, and encouraging the formation of unhealthy swamps; moreover, the climate has become much more tropical in character. The mortality from malaria in 1902 was higher than for any other part of Italy – 1037 persons, or 154 per 100,000 (Basilicata, 141; Apulia, 104; Calabria, 77; Sicily, 76; province of Rome, 27).

Customs and Dress.—The population of Sardinia appears (though further investigation is desirable) to have belonged in ancient times, and to belong at present, to the so-called Mediterranean race (see G. Sergi, *La Sardegna*, Turin, 1907). In the aeneolithic necropolis of Anghelu Ruju, near Alghero, of 63 skulls, 53 belong to the "Mediterranean" dolico-mesocephalic type and 10 to a Eurasian brachycephalic type of Asiatic origin, which has been found in prehistoric tombs of other parts of Europe. The race has probably suffered less here than in most parts of the Mediterranean basin from foreign intermixture, except for a few Catalan and Genoese settlements on the coast (Alghero and Carloforte are respectively the most important of these); and the population in general seems to have deteriorated slightly since prehistoric times, the average cranial capacity of the prehistoric skulls from the Anghelu Ruju being 1490 c.c. for males and 1308 for females, while among the modern population 60 % of males and females together fall below 1250 c.c.; and the stature is generally lower than in other parts of Italy, as is shown by the measurements of the recruits (R. Livi, *Antropometria Militare*, Rome 1896). Anthropologists, indeed, have recently observed a large proportion of individuals of exceptionally small stature, not found in Sardinia only, but elsewhere in south Italy also; though in Sardinia they are distributed over the whole island, and especially in the southern half. In the province of Cagliari 29·99 % of the recruits born in 1862 were under 5 ft. 1 in., and in that of Sassari 21·99 %, the percentage for ten provinces of south Italy being 24·35. These small individuals present apparently no other differences, and Sergi maintains that the difference is racial, these being the descendants of a race of pygmies who had emigrated from central Africa. But the lowness of stature extends to the lower animals—cattle, horses, donkeys, &c.—and this may indicate that climatic causes have some part in the matter also, though Sergi denies this.

The dialects differ very much in different parts of the island, so that those who speak one often cannot understand those who speak another, and use Italian as the medium of communication. They contain a considerable number of Latin words, which have remained unchanged. The two main dialects are that of the Logudoro in the north and that of Cagliari in the south of the island.

The native costumes also vary considerably. In the south-east they have largely gone out of use, but elsewhere, especially in the mountainous districts, they are still habitually worn. In the Barbargia the men have a white shirt, a black or red waistcoat and black or red coat, often with open sleeves; the cut and decorations of these vary considerably in the different districts. They have a kind of short kilt, stiff, made of black wool, with a band from back to front between the legs; under this they wear short linen trousers, which come a little below the knee, and black woollen leggings with boots. They wear a black cap, about 1½ ft. long, the end of which falls down over one side of the head. In other districts the costume varies considerably, but the long cap is almost universal. Thus at Ozieri the men wear ordinary jackets and trousers with a velvet waistcoat; the shepherds of the Sulcis wear short black trousers without kilt and heavy black sheepskin coats, and the two rows of waistcoat buttons are generally silver or copper coins. The costume of the women is different (often entirely so) in each village or district. Bright colours (especially red) are frequent, and the white chemise is an integral part of the dress. The skirts are usually of the native wool (called *orbacia*). For widows or deep mourning the peculiar cut of the local costume is preserved, but carried out entirely in black. The native costume is passing out of use in many places (especially among the women, whose costume is more elaborate than that of the men), partly owing to the spread of modern ideas, partly owing to its cost; and in the Campidano and in the mining districts it is now rarely seen. The curious customs, too, of which older writers tell us, are gradually dying out. But the festivals, especially those of mountain villages or of pilgrimage churches, attract in the summer a great concourse of people, all in their local costumes. There may be seen the native dances and break-neck horse-races—the riders bareback—through the main street of the village. The people are generally courteous and kindly, the island being still

[1] See A. de la Marmora, *Voyage en Sardaigne*, vol. iii. (1857); J. C. Bornemann, "Die Versteinerungen des Cambrisches Schichtensystems der Insel Sardinien," *Nova Acta k. L-C. Akad. Naturf.* vol. li. (1886), pp. 1-148, pls. i.-xxxiii., and *ib.* vol. lvi. (1891), pp. 427-528, pls. xix.-xxviii.; A. Törnquist, "Ergebnisse einer Bereisung der Insel Sardinien," *Sitz. k. preuss. Akad. Wiss.* (1902), pp. 808-829, and "Der Gebirgsbau Sardiniens und seine Beziehungen zu den jungen, circum-mediterranen Faltenzügen," *ib.* (1903), pp. 685-699; A. Dannenberg, "Der Vulkanberg Mte Ferru in Sardinien," *Neues Jahrb. f. Min.* Beil. Bd. xxi. (1906), pp. 1-62, pl. i.

comparatively rarely visited by foreigners, while Italians seem to regard it as almost a place of exile. They have the virtues and defects of a somewhat isolated mountain race—a strong sense of honour and respect for women, of hospitality towards the stranger, and a natural gravity and dignity, accompanied by a considerable distrust of change and lack of enterprise. Despite their poverty begging is practically unknown. The houses are often of one storey only. Chimneys are unknown in the older houses; the hearth is in the centre of the chief room, and the smoke escapes through the roof. In the mountain villages the parish priest takes the lead among his people, and is not infrequently the most important person.

Agriculture.—The rest of the island is mainly devoted to agriculture; according to the statistics of 1901, 151,853 individuals out of a total rural population of 708,034 (*i.e.* deducting the population of Cagliari and Sassari) are occupied in it. Of these 41,661 cultivate their own land, 15,408 are fixed tenants, 24,031 are regular labourers, and no less than 72,753 day labourers; while there are 35,056 shepherds. Emigration is a comparatively new phenomenon in Sardinia, which began only in 1896, but is gaining ground. A considerable proportion of the emigrants are miners who proceed to Tunis, and remain only a few years, but emigration to America is increasing.

Much of the island is stony and unproductive; but cultivation has not been extended nearly as much as would be possible, and the implements are primitive. Where rational cultivation has been introduced, it has almost always been by non-Sardinian capitalists. Two-fifths of the land belongs to the state, and two-fifths more to the various communes; the remaining fifth is minutely subdivided among a large number of small proprietors, many of whom have been expropriated from inability to pay the taxes, which, considering the low value of the land, are too heavy; while the state is unable to let a large proportion of its lands. Comparatively little grain is now produced, whereas under the republic Sardinia was one of the chief granaries of Rome. The Campidano and other fertile spots, such as the so-called Ogliastra on the east side of the island, inland of Tortoli, the neighbourhood of Olbena, Bosa, &c., produce a considerable quantity of wine, the sweet, strong, white variety called Vernaccia, produced near Oristano, being especially noteworthy. Improved methods are being adopted for protecting vines against disease, and the importation of American vines has now ensured immunity against a repetition of former disasters. The cultivation of the vine prevails far more in the province of Cagliari than in that of Sassari, considerable progress having been made both in the extent of land under cultivation and in the ratio of produce to area. The entire island produced 28,613,000 gallons of wine in the year 1899 and 19,809,000 in 1900. In 1902 the production fell to 13,491,517 gallons; in 1903 it was 26,997,680; in 1904 it reached the phenomenal figure of 63,105,577 gallons, of which the province of Cagliari produced 53,995,362 gallons; in 1905 it fell to 36,700,000, of which the province of Cagliari produced 32,500,000 gallons. Though much land previously devoted to grain culture has been planted with vines, the area under wheat, barley, beans and maize is still considerable. Most of the soil, except the rugged mountain regions, is adapted to corn growing. In 1896 the grain area was 380,000 acres, a slight diminution having taken place since 1882. The yield of corn varies from six to ten times the amount sown. In 1902 the total production of wheat in the island was 2,946,070 bushels, but in 1903 it rose to 4,823,800 bushels, in 1904 it fell to 4,015,020, and in 1905 rose again to 4,351,987 bushels, $\frac{1}{14}$ of the whole production of Italy. The cultivation of olives is widespread in the districts of Sassari, Bosa, Iglesias, Alghero and the Gallura. The government, to check the decrease of olive culture in Sassari, has offered prizes for the grafting of wild olive trees, of which vast numbers grow throughout the island. Tobacco, vegetables and other garden produce are much cultivated; cotton could probably be grown with profit.

The houses of the Campidano are mostly built of sun-dried unbaked bricks. The ox-wagons with their solid wheels, and the curious water-wheels of brushwood with earthenware pots tied on to them and turned by a blindfolded donkey, are picturesque. Both European and African fruit trees grow in the island; there are in places considerable orange groves, especially at Milis, to the north of Oristano. The olive oil produced is mainly mixed with that from Genoa or Provence, and placed on the market under the name of the latter. Among the natural flora may be noted the wild olive, the lentisk (from which oil is extracted), the prickly pear, the myrtle, broom, cytisus, the juniper. Large tracts of mountain are clothed with fragrant scrub composed of these and other plants.[1] The higher regions produce cork trees, oaks, pines, chestnuts, &c., but the forests have been largely destroyed by speculators, who burned the trees for charcoal and potash, purchasing them on a large scale from the state. This occurred especially in the last half of the 19th century, largely owing to the abolition of the so-called *beni ademprivili*. These were lands over which, in distinction from the other feudal lands, rights of pasture, cutting of wood, &c. &c., existed. When, in 1837, the baronial fiefs were suppressed by Charles Albert, and the land transferred to the state, the *adempriviо* was maintained on the lands subject to it, and it was thus to the interest of all that the woods should be maintained. In 1865, however, it was suppressed, and one half of the *beni ademprivili* was assigned to the state, the other half being given to the communes, with the obligation of compensating those who claimed rights over these lands. The state, which had already sold not only a considerable part of the domain land, but a large part of the *beni ademprivili*, continued the process, and the forests of Sardinia were sacrificed; and, as has been said, the necessity of reafforestation, of the regulation of streams, and of irrigation[2] is urgent. Laws to secure this object have been passed, but funds are lacking for their execution on a sufficiently large scale. Another difficulty is that Italian and foreign capitalists, have produced a great rise in prices which has not been compensated by a rise in wages. Native capital is lacking, and taxation on unremunerative lands is, as elsewhere in Italy, too heavy in proportion to what they may be expected to produce, and not sufficiently elastic in case of a bad harvest.

Live-Stock.—A considerable portion of Sardinia, especially in the higher regions, is devoted to pasture. The native Sardinian cattle are small, but make good draught oxen. A considerable amount of cheese is manufactured, but largely by Italian capitalists. Sheep's milk cheese (*pecorino*) is largely made, but sold as the Roman product. Horses are bred to some extent, while the native race of donkeys is remarkably small in size. Pigs, sheep and goats are also kept in considerable numbers. Whereas in 1881 Sardinia was estimated to possess only 157,000 head of cattle, 478,000 sheep and 165,000 goats, the numbers in 1896 had increased to 1,159,000 head of cattle, 4,960,000 sheep and 1,780,000 goats. The nomadic system prevails in the island. Breeding is unregulated and natural selection prevails. A more progressive form of pastoral industry is that of the *tanche* (enclosed holdings), in which the owner is both agriculturist and cattle raiser. On these farms the cultivation of the soil and the rearing of stock go hand in hand, to the great advantage of both. Nevertheless the idea of the value of improving breeds is gaining ground. Good cattle for breeding purposes are being imported from Switzerland and Sicily, and efforts are likewise being made to improve the breed of horses, which are bought mainly for the army. The opportunity of utilizing the wool for textile industries has not yet been taken, though Sardinian women are accustomed to weave strong and durable cloth. Everywhere capital and enterprise are lacking. Agricultural products require perfecting and fitting for export.

Of wild animals may be noted the moufflon (*Ovis Ammon*), the stag, and the wild boar, and among birds various species of the vulture and eagle in the mountains, and the pelican and flamingo (the latter coming in August in large flocks from Africa) in the lagoons.

Fisheries.—The tunny fishery is considerable; it is centred principally in the south-west. The sardine fishery, which might also be important, at present serves mainly for local consumption. Lobsters are exported, especially to Paris. The coral fishery—mainly on the west coast—has lost its former importance. Neither the tunny nor the coral fishery is carried on by the Sardinians themselves, who are not sailors by nature; the former is in the hands of Genoese and the latter of Neapolitans. The unhealthy lagoons contain abundance of fish. The mountain streams often contain small but good trout.

In Roman times Sardinia, relatively somewhat more prosperous than at present, though not perhaps greatly different as regards its products, was especially noted as a grain-producing country. It is also spoken of as a pastoral country (Diod. v. 15), but we do not hear anything of its wine. Solinus (4, § 4) speaks of its mines of silver and iron, Suidas (*s.v.*) of its purple and tunny fisheries, Horace (*Ars Poet.* 375) of the bitterness of its honey. Pausanias (x. 17, § 12) mentions its immunity from wolves and poisonous snakes—which it still enjoys,—but Solinus (*l.c.*) mentions a poisonous spider, called *solifuga*, peculiar to the island.

Minerals.—The mining industry in Sardinia is confined in the main to the south-western portion of the island. The mines were known to the Carthaginians, as discoveries of lamps, coins, &c. (now in the museum at Cagliari), testify. The Roman workings too, to judge from similar finds, seem to have been considerable. The centre of the mining district (*Metalla* of the itineraries) was probably about 5 m. south of Fluminimaggiore, in a locality known as Antas, where are the remains of a Roman temple (*Corpus Inscr. Lat.* x. 7539), dedicated to an emperor, probably Commodus—but the inscription is only in part preserved. A pig of lead found near Fluminimaggiore bears the imprint *Imp. Caes. Hadr. Aug.* (*C.I.L.* x. 8073, 1, 2). After the fall of the Roman Empire the workings remained abandoned until the days of the Pisan supremacy,[3] and were again given up under the Spanish government, especially after the discovery of America. When the island passed to Savoy, in 1720, the mines passed to the state. The government let the mines to contractors for forty years and then took them over; but in the period from 1720 to 1840 only 14,620 tons of galena were extracted and 2772 of lead. In 1840 the freedom of mining was introduced,

[1] The *herba Sardoa*, said to cause the *risus Sardonicus* (sardonic laugh), cannot be certainly identified (Pausanias x. 17, 13).

[2] By the law of 1906 the state has not assumed the responsibility of the construction of reservoirs for irrigation.

[3] The Pisan workings are only distinguished from the Roman by the character of the small objects (lamps, coins, &c.) found in them

the state giving perpetual concessions in return for 3 % of the gross production. In 1904-1905, 14,188 workmen were employed in the mines of the province of Cagliari. The following table (from the consular report of 1905) shows the amount and value of the minerals extracted, the whole amount being exported:

	Tons.	Value £.
Zinc—		
Calamine . . .	99,749	466,070
Blende . . .	26,051	135,569
Lead	24,798	140,534
Silver	167	5,012
Manganese . . .	2,362	3,360
Antimony . . .	1,005	4,700
Lignite	15,429	8,778
Anthracite . . .	577	586
Copper	98	445
	170,236	765,054

The chief mines are those of Gennamare and Ingurtosu and others of the group owned by the Pertusola Company, Monteponi and Montevecchio. The mining and washing plant is extremely good and largely constructed at Cagliari. The most important minerals are lead and zinc, obtained in lodes in the forms of galena and calamine respectively. In most cases, owing to the mountainous character of the country, horizontal galleries are possible. The Monteponi Company smelts its own zinc, but the lead is almost all smelted at the furnaces of Pertusola near Spezia. Silver has also been found in the district of Sarrabus, iron at S. Leone to the west of Cagliari, and antimony and other metals near Lanusei, but in smaller quantities than in the Iglesias district, so that comparatively little mining has as yet been done there. Lignite is also mined at Bacu Abis, near Gonnesa, and anthracite in small quantities near Seui.

The salt-pans of Cagliari and of Carloforte are of considerable importance; they are let by the government to contractors, who have the sole right of manufacture, but are bound to sell the salt necessary for Sardinian consumption at 35 centesimi (3½d.) per cwt.; the government does not exercise the salt monopoly in Sardinia any more than in Sicily, but in the latter island the right of manufacture is unrestricted. The total production in 1905 was 149,431 tons; the average price of salt for the island in 1905 was 2½d. per cwt. (unground), and 1s. per cwt. ground; whereas for Italy, where the government monopoly exists, the price is £1, 12s. the cwt.

Commerce.—The total exports of the province of Cagliari in 1905 attained a value of £1,388,735, of which £550,023 was foreign trade, while the imports amounted to £1,085,514, of which £360,758 was foreign trade. Among the exports may be noticed minerals, wines and spirits, tobacco, hides, live animals; and among the imports, groceries, cotton and cereals. The tonnage of the shipping entering and clearing the ports of the province in 1905 was 1,756,866, of which 352,992 was foreign.

Communications.—The railway system of Sardinia is in the hands of two companies—the Compagnia Reale delle Ferrovie Sarde, and the Compagnia delle Ferrovie Secondarie della Sardegna. The former company's lines (of the ordinary gauge) run from Cagliari, past Macomer, to Chilivani (with a branch at Decimomannu for Iglesias and Monteponi). From Chilivani the line to Sassari and Porto Torres diverges to the N.W., and that to Golfo degli Aranci to the N.E. The latter company owns narrow-gauge lines from Cagliari to Mandas (whence lines diverge N. to Sorgono and E. to Tortoli, the latter having a short branch from Gairo to Ierzu), from Macomer E. to Nuoro and W. to Bosa, from Sassari S.W. to Alghero, from Chilivani S. to Tirso (on the line between Macomer and Nuoro), and from Monti (on the line from Chilivani to Golfo degli Aranci) N.W. to Tempio. In the south-western portion of the island are several private railways belonging to various mining companies, of which the lines from Monteponi to Portoscuso, and from S. Gavino to Montevecchio, are sometimes available for ordinary passengers. There is also a steam tramway from Cagliari to Quartu S. Elena. The trains are few and the speed on all these lines is moderate, but the gradients are often very heavy.

Communication is thus most wanted with the northern and south-eastern extremities of the island, and between Tortoli and Nuoro, and Nuoro and Golfo degli Aranci. The main road system, which dates from 1828, previous to which there were only tracks, is good, and the roads well engineered; many of them are traversed daily by post vehicles. Some road motor services have been instituted. The total length of the railways is 602 m., and of the roads of all classes 3101 m., *i.e.* 596 yds. per sq. m. There is daily steam communication (often interrupted in bad weather) with Civitavecchia from Golfo degli Aranci (the mail route), and weekly steamers run from Cagliari to Naples, Genoa (via the east coast of the island), Palermo and Tunis, and from Porto Torres to Genoa (calling at Bastia in Corsica and Leghorn) and Leghorn direct. A fortnightly line also runs along the west coast of the island from Cagliari to Porto Torres. All these lines (and also the minor lines from Golfo degli Aranci to La Maddalena and from Carloforte to Porto Vesme and Calasetta) are in the hands of the Navigazione Generale Italiana, there being no Sardinian steamship companies. There is also a weekly French service between Porto Torres and Ajaccio in Corsica.

Administration.—Sardinia is divided into two provinces—Cagliari and Sassari; the chief towns of the former (with their communal population in 1901) are: Cagliari (53,057); Iglesias (20,874); Quartu S. Elena (8510), really a large village; Oristano (7107); Fluminimaggiore (9647); Lanusei (3250); and the total population of the province is 486,767: while the chief towns of the latter are Sassari (38,053); Alghero (10,741); Ozieri (9555); Nuoro (7051); Tempio Pausania (14,573); Terranova Pausania (4348); Porto Torres (4225); and the total population of the province 309,026. The density of population is 85·38 per sq. m. (294·55 for the whole of Italy), by far the lowest figure of any part of Italy.

The archiepiscopal sees of the island are: Cagliari (under which are the suffragan sees of Galtellì-Nuoro, Iglesias and Ogliastra), Oristano (with the suffragan see of Ales and Terralba) and Sassari (under which are the suffragan sees of Alghero, Ampurias and Tempio, Bisarchio and Bosa). The number of monastic institutions in the island is very small.

Education.—The number of scholars in the elementary schools for 1901–1902 was 59·09 per 1000 (Calabria 42·27, Tuscany 67·09, Piedmont 118·00); the teachers are 1·34 per 1000, a total of 1084 of both sexes (among whom only one priest) (Calabria 1·18, Tuscany 1·29, Piedmont 2·0), while the rural schools are not buildings adapted for their purpose. In some of the towns, however, and especially at Iglesias, they are good modern buildings. Still, the percentage of those unable to read and write is 72·8, while for the whole of Italy it is 56·0. The male scholars at the secondary schools amounted in 1900 to 2·74 per 1000 inhabitants. The university of Cagliari, which in 1874–1875 had only 60 students, had 260 in 1902–1903. At Sassari in the same year there were 162. There are besides in the island 10 gymnasia, 3 lycées, 6 technical and nautical schools and institutes (including a school of mines at Iglesias), and 9 other institutes for various branches of special education. A tendency is growing up towards the extension of technical and commercial education in place of the exclusively classical instruction hitherto imparted. To the growth of this tendency the excellent results of the agricultural schools have especially contributed.

Crime.—For the years 1897–1901 statistics show that Sardinia has more thefts and frauds than any other region of Italy (1068·15 for Sardinia and 210·56 per 100,000 inhabitants per annum for the rest of Italy). This is no doubt accounted for by the extreme poverty which prevails among the lower classes, though beggars, on the other hand, are very few, the convictions being 8·95 per 100,000 against 258·15 per 100,000 for the province of Rome. Sardinia has less convictions for serious crimes than any other *compartimento* of south Italy. Public security is considerably improved, and regular brigandage (as distinct from casual robbery) hardly exists. The vendetta, too, is now hardly ever heard of.

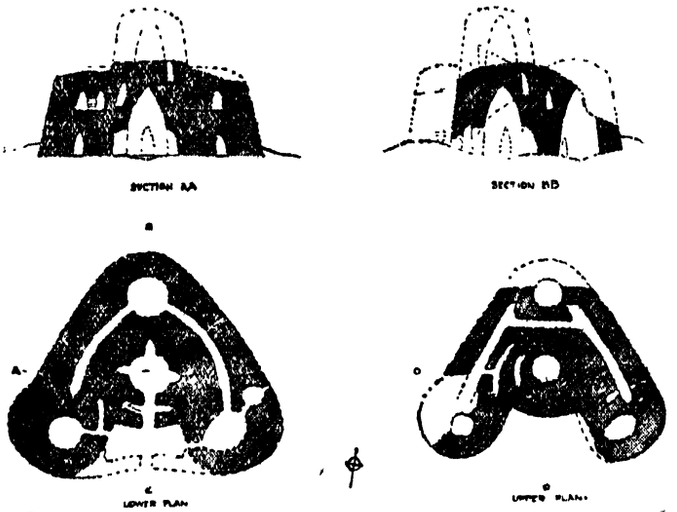
Finance.—In 1887 a severe banking crisis occurred in Sardinia. Though harmful to the economic condition of the island, it left agriculture comparatively unaffected, because the insolvent institutions had never fulfilled the objects of their foundation. Agricultural credit operations in Sardinia are carried on by the Bank of Italy, which, however, displays such caution that its action is almost imperceptible. An agricultural loan and credit company has been formed on the ruins of the former institutions, but hitherto no charter has been granted it. Institutions possessing a special character are the *monti frumentarii*, public grain deposits, founded for the purpose of supplying peasant proprietors with seed corn, debts being paid in kind with interest after harvest. But they, too, lack funds sufficient to assure extensive and efficient working, even after the law of 1906. Meantime much evil arises from usury in the poorer districts. It is estimated that Sardinia pays, in local and

general, direct and indirect taxation of all kinds, 23,000,000 lire (£920,000), a sum corresponding to 35·44 lire per head.

History and Archaeology.—The early history of Sardinia is entirely unknown.[1] The various accounts of Greek writers of the early colonizations of the island cannot be accepted, and it appears rather to have been the case that though there were various schemes formed by Greeks for occupying it or parts of it (*e.g.* that recorded by Herodotus i. 170, when it was proposed, after the capture of Phocaea and Teos in 545 B.C., that the remainder of the Ionian Greeks should emigrate to Sardinia) none of them ever came to anything.

Nuraghi.

On the other hand, the island contains a very large number of important prehistoric monuments, belonging to the Bronze Age, during which it must have been comparatively well populated. The most conspicuous and important of these are the *nuraghi* (the word is said to be a corruption of *muraglie*, *i.e.* large walls, but it is more probably a native word). Of



From *Papers of the British School at Rome*, v. 92, fig. 1.

FIG. 1.—Nuraghe of Voes (Plans and Sections).

these there are, as has been estimated, as many as 6000 still traceable in the island. The nuraghe in its simplest form is a circular tower about 30 ft. in diameter at the base and decreasing in diameter as it ascends; it is built of rough blocks of stone, as a rule about 2 ft. high (though this varies with the material employed); they are not mortared together, but on the inside, at any rate, the gaps between them were often filled with clay. The entrance almost invariably faces south, and measures, as a rule, 5 or 6 ft. in height by 2 in width. The architrave is flat, and there is a space over it, serving both to admit light and to relieve the pressure on it from above, and the size decreases slightly from the bottom to the top. Within the doorway is, as a rule, a niche on the right, and a staircase ascending in the thickness of the wall to the left; in front is another similar doorway leading to the chamber in the interior, which is circular, and about 15 ft. in diameter; it has two or three niches, and a conical roof formed by the gradual inclination of the walls to the centre. It is lighted by the two doorways already mentioned. The staircase leads either to a platform on the top of the nuraghe or, more frequently, to a second chamber concentric with the first, lighted by a window which faces, as a rule, in the same direction as the main doorway. A third chamber above the second does not often occur. The majority perhaps of the nuraghi of Sardinia present this simple type; but a very large number, and, among them, those best preserved, have considerable additions. The construction varies with the site, obviously with a view to the best use of the ground from a strategic point of view. Thus, there may be a platform round the nuraghe, generally with two, three or four bastions, each often containing a chamber; or the main nuraghe may have additional chambers added to it. In a few cases, indeed, we find very complicated systems of fortification—a wall of circumvallation with towers at the corners, protecting a small settlement of nuraghe-like buildings, as in the case of the Nuraghe Losa near Abbasanta and the Nuraghe Saurecci near Guspini;[2] or, as in the Nuraghe Lugheras near Paulilatino, or the Nuraghe de S'Orcu near Domusnovas, the entrance may be protected by a regular system of courtyards and subsidiary nuraghi. Roughness of construction cannot be regarded as a proof of antiquity, inasmuch as in some cases we find the additions less well built than the original nuraghe; and it is often clear from the careful work at points where it was necessary that the lack of finer construction was often simply economy of labour. That the simpler forms, on the other hand, preceded those of more complicated plan is probable. The manner of their arrangement seems to indicate clearly that they were intended to be fortified habitations, not tombs or temples. The niche at the entrance, which is rarely wanting, served, no doubt, for the sentry on guard

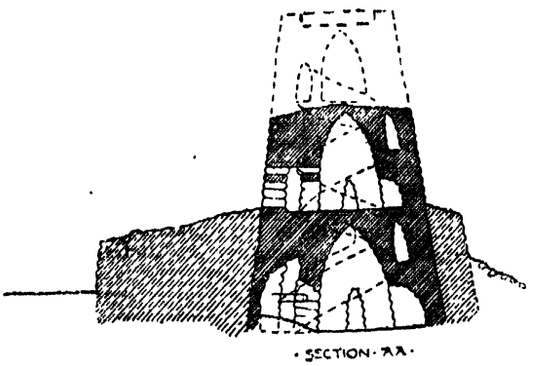
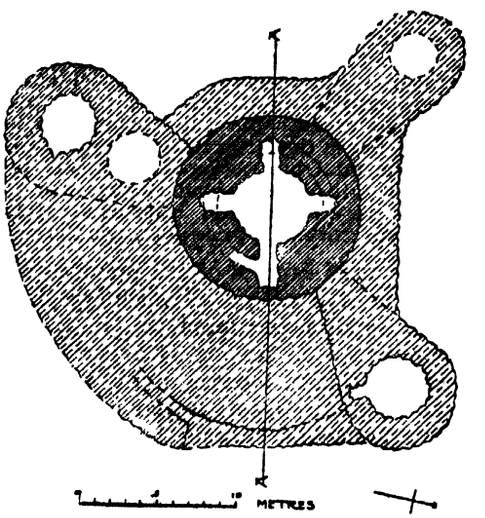


FIG. 2.



From *Papers of the British School at Rome*, v. 97, fig. 3.

FIG. 3.—Nuraghe Aiga (Plan and Section).

and would be on the unprotected side of any one coming in; the door, too, is narrow and low, and closed from within. The approach is, as we have seen, often guarded by additional constructions; the fact that the door and window face south is another argument in favour of this theory, and the access from one part of the interior to another is sometimes purposely rendered difficult by a sudden vertical rise of 5 or 6 ft. in the stairs; while the objects found in them—household pottery, &c.—and near them (in some cases silos containing carbonized grain and dolia) point to the same conclusion. Numerous fragments of obsidian arrow-heads and chips are also found in and near them all over the island. The only place where obsidian is known to be found in Sardinia in a natural state is the Punta Trebina, a mountain south-east of Oristano. The choice of site, too, is decisive. Sometimes they occupy the approaches to tablelands, the narrowest points of gorges, or the fords of rivers; sometimes almost inaccessible mountain tops or important points on ridges; and it may be noticed that, where two important nuraghi are not visible from one another, a small one is interpolated, showing that there was a system of signalling from one to another. Or again, a group of them may occupy a fertile plain, a river valley or a tableland,[3] or they may stand close to the seashore. Generally there is, if possible, a water-supply in the vicinity; sometimes a nuraghe guards a spring, or there may be a well in the nuraghe itself.

A final argument is the existence in some cases of a village of circular stone buildings of similar construction to the nuraghi, but only 15 to 25 ft. in diameter, at the foot of a nuraghe, which, like the baronial castle of a medieval town, towered above the settlement.

[1] It has been widely believed that the Shardana, who occur as foreign mercenaries in Egypt from the time of Rameses II. downwards, are to be identified with the Sardinians; but the question is uncertain. There were certainly no Egyptian colonies in Sardinia; the Egyptian objects and their imitations found in the island were brought there by the Phoenicians (W. H. Roscher, *Lexikon der griechischen und römischen Mythologie*, ii. 392).

[2] In neither of these cases have the subsidiary buildings been fully traced out. The plan of the former is given by Pinza (*op. cit.*), and that of the latter by La Marmora (*op. cit.*). The latter seen from a distance resembles a medieval castle crowning a hill-top.

[3] Those of the Giara are fully described by A. Taramelli and F. Nissardi in *Monumenti dei Lincei*, vol. xviii.; Nissardi's map of the Nurra, published by G. Pinza, ibid. vol. xi. sqq., may also be consulted.

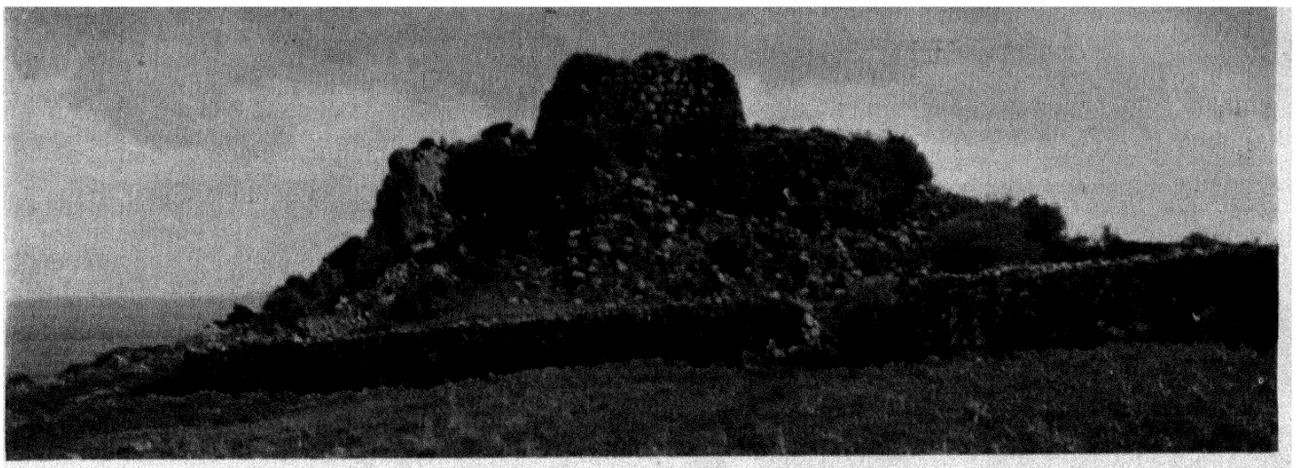


FIG. 1.—NURAGHE MELAS, NEAR GUSPINI.

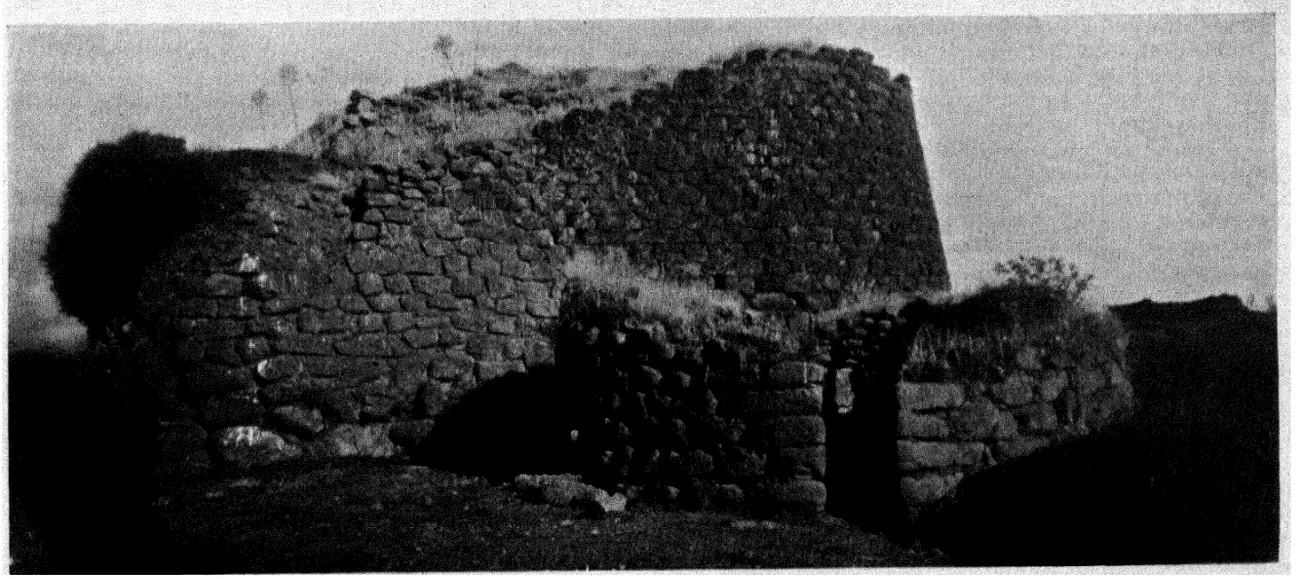


FIG. 2.—NURAGHE LOSA, NEAR ABBASANTA.

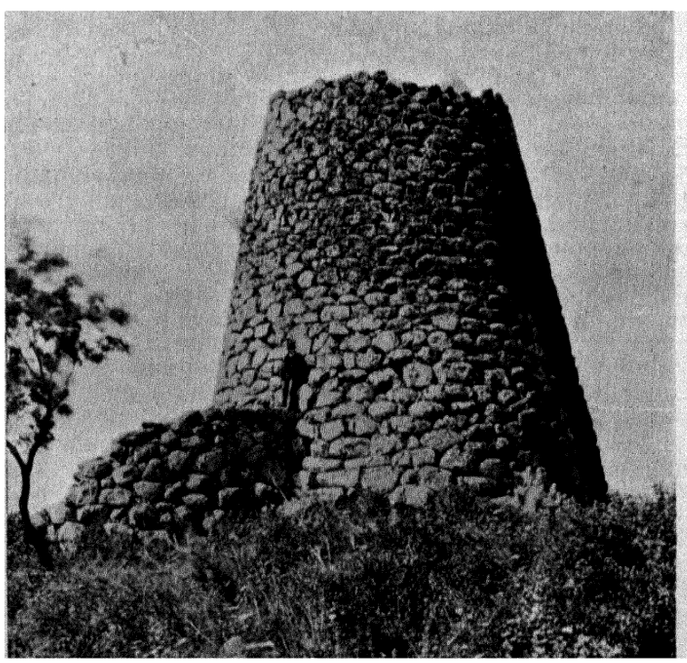


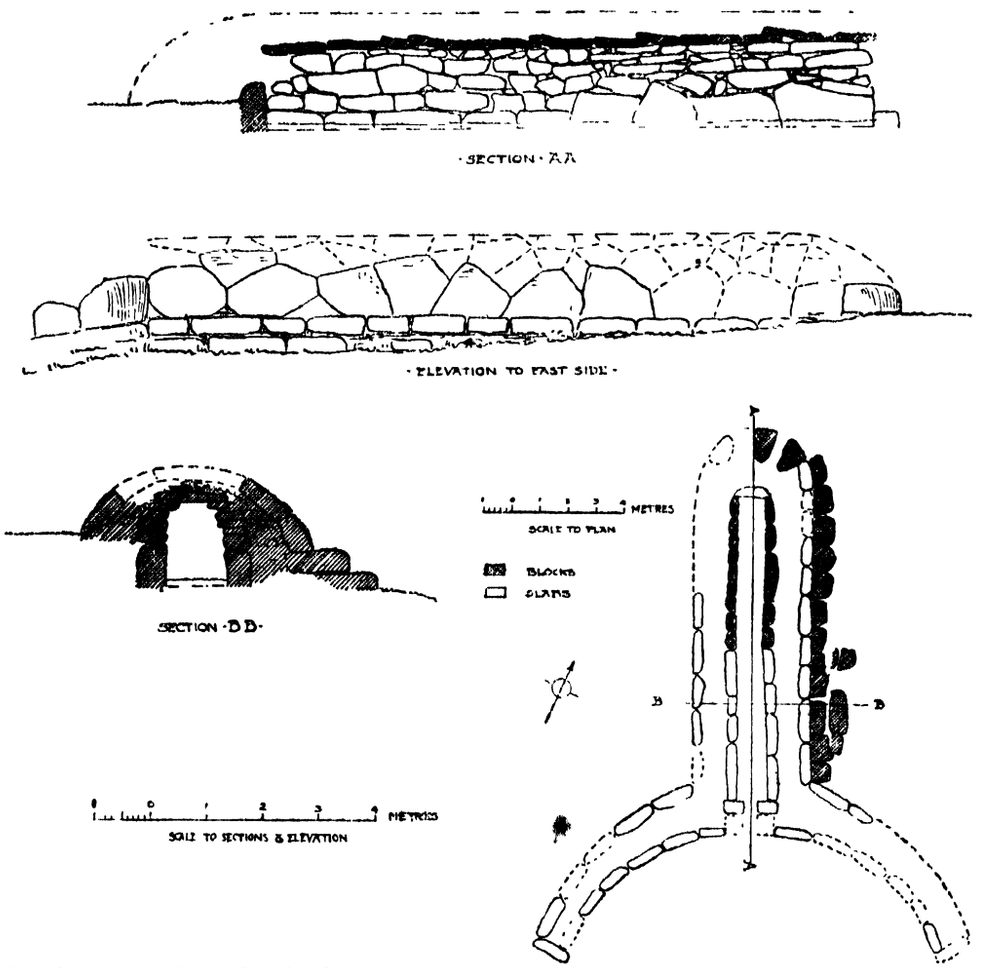
FIG. 3.—NURAGHE MADRONI, NEAR SILANUS.



FIG. 4.—NURAGHE OROLO, NEAR POZZOMAGGIORE.

They are distributed over the whole island, but are perhaps most frequent towards the centre and in the Nurra. They seem to be almost entirely lacking in the north-east extremity, near Terranova, and in the mountains immediately to the north of Iglesias, though they are found to the north of the Perda de sa Mesa. In the district of Gennargentu they occur, rarely, as much as 3600 ft. above sea-level. The tombs of their inhabitants are of two classes—the so-called *tombe dei giganti*, or giants' tombs, and the *domus de gianas*, or houses of the spirits. The former are generally found close to, or at least in sight of, the nuraghe to which they belong. They consist of a chamber about 3½ ft. or less in height and width, with the sides slightly inclined towards one another, and from 30 to 40 ft., or even more, in length; the sides are composed sometimes of slabs, sometimes of rough walling, while the roof is composed of flat slabs; and the bodies were probably disposed in a sitting position. At the front is a large slab, sometimes carved, with a small aperture in it, through which offerings might be inserted. On each side of this is a curve formed of two rows of

Tombs.



From *Papers of the British School at Rome*, v. p. 119, fig. 11.

FIG. 4.—Giant's Tomb of Srigidanu.

slabs or two small walls; the semicircular space thus formed has a diameter of about 45 ft., and was probably intended for sacrifices. The tomb proper was no doubt covered with a mound of earth, which has in most cases disappeared. Close to these tombs smaller round enclosures, about 4 ft. in diameter, covered with a heap of stones, like a small cairn, may sometimes be seen; these were possibly intended for the burial of slaves or less important members of the tribe. Dolmens (probably to be regarded as a simpler form of the *tomba dei giganti*, inasmuch as specimens with chambers elongated after their first construction have been found) and menhirs are also present in Sardinia, though the former are very rare—that known as Sa Perda e S'altare, near the railway to the south of Macomer is illustrated by A. Taramelli in *Bullettino di Paleoetnologia*, xxxii. (1906), 208, but there are others. The latter, however, are widely distributed over the island, being especially frequent in the central and most inaccessible part. The *domus de gianas*, on the other hand, resemble closely the rock tombs of the prehistoric cemeteries of Sicily. They are small grottos cut in the rock. We thus have two classes of tombs in connexion with the nuraghi, and if these were to be held to be tombs also, habitations would be entirely wanting.[1]

Among the most curious relics of the art of the period is a group of bronze statuettes, some found at Uta near Cagliari and others near Teti, west of Fonni, in the centre of the island, of which many specimens are now preserved in the museum at Cagliari.

It is thus clear that in the Bronze Age Sardinia was fairly thickly populated over by far the greater part of its extent; this may explain the lack of Greek colonies, except for Olbia, the modern Terranova, and Neapolis on the west coast, which must from their names have been Greek, though we do not know when or by whom they were founded. Pausanias (x. 17. 5) attributes the foundation of Olbia to the Thespians and Athenians under Iolaus, while Solinus (i. 61) states that he founded other cities also. In any case, the Phoenician settlements are the earliest of which we have any accurate knowledge. The date of the conquest by Carthage may perhaps be fixed at about 500–480 B.C., following the chronology of Justin Martyr (xviii. 7), inasmuch as up till that period colonization by the Greeks seems to have been regarded as a possible enterprise. The cities which they founded—Cornus, Tharros, Sulci, Nora, Carales—are all on the coast of the island, and it is doubtful to what extent they penetrated into the interior. Even in the 1st century B.C. there were still traces of Phoenician influence (Cicero, *Pro Scauro*, 15, 42, 45). There are signs of trade with Etruria as early as the 7th century B.C. The Carthaginians made it into an important grain-producing centre; and the Romans set foot in the island more than once during the First Punic War.

Phoenicians.

In 238 B.C. the Carthaginian mercenaries revolted, and the Romans took advantage of the fact to demand that the island should be given up to them, which was done. The native tribes opposed the Romans, but were conquered after several campaigns; the island became a province under the government of a *praetor* or *propraetor*, to whose jurisdiction Corsica was added soon afterwards. A rebellion in 215 B.C., fostered by the Carthaginians, was quelled by T. Manlius Torquatus (Livy xxiii. 40). After this the island began to furnish considerable supplies of corn; it was treated as a conquered country, not containing a single free city, and the inhabitants were obliged to pay a tithe in corn and a further money contribution. It was classed with Sicily and Africa as one of the main sources of the corn-supply of Rome. There were salt-works in Sardinia too as early as about 150 B.C., as is attested by an inscription assigned to this date in Latin, Greek and Punic, being a dedication by one Cleon salari(us) soc(iorum) s(ervus) (*Corp. Inscr. Lat.* x. 7856). We only hear of two insurrections of the mountain tribes, in 181, when no less than 80,000 Sardinian slaves[2] were brought to Rome by T. Sempronius Gracchus, and in 114 B.C., when M. Caecilius Metellus was proconsul and earned a triumph after two years' fighting: but even in the time of Strabo there was considerable brigandage. Inscriptions record the boundaries of the territories of various tribes with outlandish names otherwise unknown to us (*Corp. inscr. Lat.* x. 7889. 7930).

Roman period.

Some light is thrown on the condition and administration of the island in the 1st century B.C. by Cicero's speech (of which a part only is preserved) in defence of M. Aemilius Scaurus (*q.v.*), praetor in 53 B.C. Cicero, speaking no doubt to his brief, gives them a very bad character, adding "ignoscent alii viri boni ex Sardinia; credo enim esse quosdam" (§ 43). In the division of provinces made by

[1] The whole question is well dealt with by F. Nissardi in *Atti del Congresso delle Scienze Storiche* (Rome, 1903), vol. v. (*Archeologia*), 651 sqq.; cf. *Builder*, May 18, 1907 (xcii. 589).

[2] The large number of slaves is said to have given rise to the phrase *Sardi venales* for anything cheap or worthless.

Augustus, Sardinia and Corsica fell to the share of the senate, but in A.D. 6, Augustus, owing to the frequent disturbances, took them over and placed them under a *praefectus*. Tiberius sent 4000 Jewish and Egyptian freedmen to the island to bring the brigands to submission (Tac. *Ann.* ii. 85). Later on two cohorts were quartered there and also detachments of the *Classis Misenas*, as the discharge certificates (*tabulae honestae missionis*) of the former and tombstones of the latter found in the island[1] show (*C.I.L.* x. 777). In A.D. 67 Nero restored Sardinia to the senate (but not Corsica) in exchange for Achaea, and the former was then governed by a *legatus pro praetore*; but Vespasian took it over again before A.D. 78, and placed it under an imperial *procurator* as *praefectus*. It returned to the senate, not before A.D. 83 but certainly before the reign of M. Aurelius, when we find it governed by a proconsul, as it was under Commodus; the latter, or perhaps Septimius Severus, took it over again and placed it under a *procurator* as *praefectus* once more (D. Vaglieri in *Notizie degli scavi*, 1897, 280).

A bronze tablet discovered in 1866 near the village of Esterzili is inscribed with a decree of the time of Otho with regard to the boundaries of three tribes, the Gallienses, Patulienses and Campani, who inhabited the eastern portion of the island. The former tribe had crossed the boundaries of the other two, and was ordered to withdraw immediately under pain of punishment (*Corp. inscr. Lat.* x. 7852). Carales was the only city with Roman civic rights in Sardinia in Pliny's time (when it received the privilege is unknown) and by far the most important place in the island; a Roman colony had been founded at Turris Libisonis (Porto Torres) and others, later on, at Usellis and Cornus.

We hear little of the island under the Empire, except as a granary and as remarkable for its unhealthiness and the audacity of its brigands. It was not infrequently used as a place of exile.

A number of Roman towns are known to us. Besides those already mentioned, including the Phoenician cities (all of which continued to exist in Roman days) the most important were Bosa (*q.v.*), Forum Traiani (mod. Fordungianus) (*q.v.*), Neapolis and Othoca (mod. Oristano, *q.v.*). An interesting group of Roman houses was found in 1878 at Bacu Abis, 5 m. W. of Iglesias, but has been covered up again (F. Vivanet in *Notizie degli scavi*, 1878, 271). The name Barbaria for the mountainous district in the east centre of Sardinia, in the district of Nuoro, which still exists in the form Barbargia, goes back to the Roman period, the *civitates Barbariae* being mentioned in an inscription of the time of Tiberius (*Corp. inscr. Lat.* xiv. 2954). The Barbaricini are mentioned in the 6th century A.D. by Procopius, who wrongly derives the name from several thousand Moors and Numidians who were banished to the island by the Vandal kings, while Gregory the Great speaks of them in a letter (iv. 23) to Hospito, their chief, as a still pagan race, worshipping stocks and stones. The towns were connected by a considerable network of roads, with a total length of 958 Roman miles according to the Itineraries, the most important of which ran from Carales to Turris Libisonis (Porto Torres) through the centre of the island, passing Othoca (Oristano) and Forum Traiani. Its line is followed closely by the modern highroad and railway. A portion of its course, however, between Forum Traiani and the modern Abbasanta, is not so followed, and is still well preserved. Its width is as a rule about 24 ft.; at present its surface is formed of rough cobbling, upon which there was probably a gravel layer, now washed away. Several milestones belonging to it have been discovered, including one of the time of Augustus and one of Claudius near Forum Traiani, and one of Nero near Turris Libisonis, though it was probably not completed right through until a later period (T. Mommsen in *Corp. inscr. Lat.* x. 833; cf. *Eph. epigr.* viii. 181-183). A branch from this road ran to Olbia (followed closely by the modern highroad and railway also), and was perhaps the main line of communication, though the itineraries state that the road from Carales to Olbia ran through the centre of the island by Biora, Valentia, Sorabile (near Fonni) and Caput Thyrsi.

Towns and tribes.

Roads.

Many milestones belonging to the road from Carales to Olbia have been found, but all but one of them (which was seen at Valentia) belong to the portion of the road within 12 m. of the latter place, so that they might belong to either line (see OLBIA). The distance seems to be identical by either route. The itineraries give it as 176 m.—the exact distance in English miles by the modern railway! The difference between English and Roman miles would be compensated for by the more devious course taken by the railway. Turris Libisonis was also connected with Othoca by a road along the west coast, passing through Tharros, Cornus and Bosa; this road went on to Tibula[2] (Capo della Testa) at the north extremity of the island and so by the coast to Olbia. From Tibula another road ran inland to join the road from Carales to Olbia some 10 m. west of the latter. Carales was also connected with Olbia by a road along the east coast. The south-west corner of the island was served by a direct road from Carales westward through Decimomannu (note the name Decimo, a survival, no doubt, of a Roman post-station *ad decimum lapidem*), where there is a fine Roman bridge over 100 yds. long of fourteen arches, still well preserved. The width of the roadway is only 11 ft. There is also a road through Nora and along the coast past Sulci to Metalla and Neapolis, and thence to Othoca.

After the time of Constantine, the administration of Sardinia was separated from that of Corsica, each island being governed by a *praeses* dependent on the *vicarius urbis Romae*. In 456 it was seized by Genseric. It was retaken for a short time by Marcellianus, but was not finally recovered until the fall of the Vandal kingdom in Africa in 534, by Cyril. In 551 it was taken by Totila, but reconquered after his death by Narses for the Byzantine Empire. Under Byzantium it remained nominally until the 10th century, when we find the chief magistrate still bearing the title of ἄρχων.[3]

Byzantine period.

In the 8th century[4] (720) the period of Saracen invasion began; but the Saracens never secured a firm footing in the island. In 725 Luidprand purchased and removed to Pavia the body of St Augustine of Hippo from Cagliari, whither it had been brought in the 6th century by the exiled bishop of Hippo. In 815 Sardinia submitted to Louis the Pious, begging for his protection;[5] but the Saracens were not entirely driven out, and about A.D. 1000 the Saracen chief Musat established himself in Cagliari. Pope John XVIII. preached a crusade in 1004, promising to bestow the island (when or whether it had ever definitely passed into the power of the papacy is not absolutely clear) upon whoever should drive out the Saracens. The Pisans took up the challenge, and Musat was driven out of Cagliari with the help of the Genoese in 1022 for the third time. The Pisans and Genoese now disputed about the ownership of Sardinia, but the pope and the emperor decided in favour of Pisa. Musat returned to the island once more and made himself master of it, but was defeated and taken prisoner under the walls of Cagliari in 1050, when the dominion of Pisa was established.

Saracens.

The island had (probably since the end of the 9th century) been divided into four districts—Cagliari, Arborea, Torres (or Logudoro) and Gallura—each under a *giudice* or judge, in whom the dignity became hereditary. *Judices* are already mentioned as existing in the account of the mission sent by Nicholas I. in 864 (Duchesne, *Liber pontificalis*, ii. 162), as though the single authority of the Byzantine ἄρχων was already weakened. The three ἄρχοντες who appear in the 10th-century inscriptions just mentioned bear alternately the names Torcotorius and Salusius; and, inasmuch as this is the case with the *judices* of Cagliari from the 11th to the 13th century, there seems no doubt that they were the successors of these Byzantine ἄρχοντες, who were perhaps the actual founders of the dynasty. These names, indeed, continue even after the Pisan family of Lacon-Massa had by marriage succeeded to the judicature. The Greek language occurs in their official seals down to the 13th century. Intermarriage (sometimes illicit) was apparently freely used by the dominant families for the concentration of their power. Thus we find that after the failure of Musat members of the family of Lacon-Unali filled all the four judicatures of the island (Taramelli, *Arch. stor. Sard., cit.* 105). In the continual struggles between Pisa and Genoa some of these princes took the side of the latter. In 1164 Barisone, *giudice* of Arborea, was given the title of king of the whole island by Frederick Barbarossa, but his supremacy was never effective. In 1241 Adelasia, heiress of Gallura and Logudoro, was married as her third husband to Enzio, the natural son of Frederick II., who received the title of king of Sardinia from his father, but fell into the hands of the Bolognese in 1249, and

Pisan period.

[1] The discharge certificates of sailors from the *Classis Misenas* and *Classis Ravennatis* belong to Sardinians who had returned home after service in those fleets.

[2] Excavations made in 1880 at Tibula and Sorabile resulted in the discovery at the former of a necropolis of the late Empire, in which the dead were buried in long amphorae, while at the latter Roman baths were explored (F. Vivanet in *Notizie degli scavi*, 1879, 350; 1881, 29 sqq.).

[3] Three inscriptions of the middle of this century, set up by the ἀρχων Σαρδηνίας with the title *protospatarius*, are illustrated by A. Taramelli in *Notizie degli scavi* (1906), 123 sqq.; cf. *Archivio storico Sardo* (1907), 92; and there are a few churches of the Byzantine period and style, a considerable number of Byzantine inscriptions, dedications to Greek saints, and other traces of the influence of the Eastern Empire in the island.

[4] Some authorities attribute to 774, others to 817, a donation of Sardinia to the papacy; we hear of Pope Nicholas I. sending legates in 865 to quell disturbances and check evil practices in the island.

[5] There is no authentic history for the intervening period; the famous "pergamene d'Arborea," published by P. Martini in 1863 at Cagliari, have been shown to be modern forgeries.

remained a prisoner at Bologna until his death. After this the Pisan supremacy of the island seems to have become more of a reality, but Arborea remained independent, and after the defeat of the Pisans by the Genoese at the naval battle of Meloria in 1284 they were obliged to surrender Sassari and Logudoro to Genoa. In 1297 Boniface VIII. invested James II., the king of Aragon, with Sardinia; but it was not until 1323 that he attempted its conquest, nor until 1326 that the Pisans were finally driven out of Cagliari, which they had fortified in 1305–1307 by the construction of the Torre di S. Pancrazio and the Torre dell' Elefante, and which became the seat of the Aragonese government. To the Pisan period belong a number of fine Romanesque churches, among which may be specially mentioned those of Ardara, S. Giusta near Oristano, La Trinità di Saccargia and Tratalias (see D. Scano, *op. cit. infra*).

Aragonese period.

The Aragonese enjoyed at first the assistance of the *giudici* of Arborea, who had remained in power; but in 1352 war broke out between Mariano IV. and the Aragonese, and was carried on by his daughter Eleonora, wife of Brancaleone Doria of Genoa, until her death in 1403. Peter IV. had meanwhile in 1355 called together the Cortes (parliament) of the three estates (the nobles, the clergy and the representatives of the towns) for the first time after the model of Aragon. After 1403 the Aragonese became masters of Arborea also. The title of *giudice* was abolished and a feudal marquisate substituted. The *carta de logu* (del luogo) or code of laws issued by her was in 1421 extended to the whole island by the cortes under the presidency of Alphonso V., who visited Sardinia in that year. In 1478 the marquisate of Oristano was suppressed, and henceforth the island was governed by Spanish viceroys with the feudal régime of the great nobles under them, the Cortes being convoked once every ten years. Many of the churches show characteristic Spanish Late Gothic architecture, which survived until a comparatively recent period. The Renaissance had little or no influence on Sardinian architecture and culture.

Modern history.

The island remained a Spanish province until the War of the Spanish Succession, when in 1708 Cagliari capitulated to an English fleet, and the island became Austrian; the *status quo* was confirmed by the peace of Utrecht in 1713. In 1717, however, Cardinal Alberoni retook Cagliari for Spain; but this state of things was short-lived, for in 1720, by the treaty of London, Sardinia passed in exchange for Sicily to the dukes of Savoy, to whom it brought the royal title. The population was at that time a little over 300,000; public security and education were alike lacking, and there were considerable animosities between different parts of the island. Matters improved considerably under Charles Emmanuel III., in whose reign of forty-three years (1730–1773) the prosperity of the island was much increased. The French attacks of 1792–1793 were repelled by the inhabitants, Cagliari being unsuccessfully bombarded by the French fleet, and the refusal by Victor Amadeus III. to grant them certain privileges promised in consideration of their bravery led to the revolution of 1794–1796. In 1799 Charles Emmanuel IV. of Savoy took refuge in Cagliari after his expulsion by the French, but soon returned to Italy. In 1802 he abdicated in favour of his brother Victor Emmanuel I., who in 1806 returned to Cagliari and remained there until 1814, when he retired, leaving his brother, Carlo Felice, as viceroy. Carlo was successful in repressing brigands, but had to deal with much distress from famine. In 1821 he became king of Savoy by the abdication of his brother, and the construction of the highroad from Cagliari to Porto Torres was begun (not without opposition on the part of the inhabitants) in 1822. Feudalism was abolished in 1836, and in 1848 complete political union with Piedmont was granted, the viceregal government being suppressed, and the island being divided into three divisions of which Cagliari, Sassari and Nuoro were the capitals. General A. La Marmora was appointed royal commissioner to supervise the transformation to the new régime.

BIBLIOGRAPHY.—G. Manno, *Storia della Sardegna* (1825); A. de La Marmora, *Voyage en Sardaigne* (Paris and Turin, 1826–1857); Valery, *Viaggi alle isole di Corsica e di Sardegna* (Milan, 1842); Tyndal, *The Island of Sardinia* (London, 1849); G. Spano, *Bullettino archeologico Sardo* (1855–1864) and other works; A. Bresciani, *Dei costumi dell' isola di Sardegna* (Naples, 1861); H. von Maltzan, *Reise auf der Insel Sardinien* (Leipzig, 1869); E. Pais, "La Sardegna avanti al dominio dei Romani" in *Memorie dei Lincei* (1881); R. Tennant, *Sardinia and its Resources* (London, 1885); G. Strafforello, *Sardegna* (Turin, 1895); F. Pais-Serra, *Relazione dell' inchiesta sulle condizioni economiche della Sardegna* (Rome, 1896); G. Pinza, "I Monumenti primitivi della Sardegna" in *Monumenti dei Lincei*, xi. (1901); F. Nissardi, "Contributo alla storia dei Nuraghi" in *Atti del Congresso delle Scienze Storiche* (Rome, 1903), vol. v. (Archeologia) (1904), 651 sqq.; G. Sergi, *La Sardegna* (Turin, 1907); *Archivio storico Sardo* from 1905; D. Scano, *Storia dell' arte in Sardegna dal XI. al XIV. secolo* (Cagliari and Sassari, 1907); D. Mackenzie, *Ausonia*, iii. (Rome, 1908), 18, and *Memnon*, ii. (Leipzig, 1909); and "Dolmens, Tombs of the Giants and Nuraghi of Sardinia," in *Papers of the British School at Rome*, v. 89 (1910). (T. As.)

SARDIS, more correctly SARDES (αἱ Σάρδεις), the capital of the ancient kingdom of Lydia, the seat of a *conventus* under the Roman Empire, and the metropolis of the province Lydia in later Roman and Byzantine times, was situated in the middle Hermus valley, at the foot of Mt. Tmolus, a steep and lofty spur of which formed the citadel. It was about 2½ m. S. of the Hermus. The earliest reference to Sardis is in the *Persae* of Aeschylus (472 B.C.); in the *Iliad* the name Hydē seems to be given to the city of the Maeonian (*i.e.* Lydian) chiefs, and in later times Hydē was said to be the older name of Sardis, or the name of its citadel. It is, however, more probable that Sardis was not the original capital of the Maeonians, but that it became so amid the changes which produced the powerful Lydian empire of the 8th century B.C. The city was captured by the Cimmerians in the 7th century, by the Persians and by the Athenians in the 6th, and by Antiochus the Great at the end of the 3rd century. Once at least, under the emperor Tiberius, in A.D. 17, it was destroyed by an earthquake; but it was always rebuilt, and was one of the great cities of western Asia Minor till the later Byzantine time. As one of the Seven Churches of Asia, it was addressed by the author of the Apocalypse in terms which seem to imply that its population was notoriously soft and faint-hearted. Its importance was due, first to its military strength, secondly to its situation on an important highway leading from the interior to the Aegean coast, and thirdly to its commanding the wide and fertile plain of the Hermus.

The early Lydian kingdom was far advanced in the industrial arts (see LYDIA), and Sardis was the chief seat of its manufactures. The most important of these trades was the manufacture and dyeing of delicate woollen stuffs and carpets. The statement that the little stream Pactolus which flowed through the market-place rolled over golden sands is probably little more than a metaphor, due to the wealth of the city to which the Greeks of the 6th century B.C. resorted for supplies of gold; but trade and the organization of commerce were the real sources of this wealth. After Constantinople became the capital of the East a new road system grew up connecting the provinces with the capital. Sardis then lay rather apart from the great lines of communication and lost some of its importance. It still, however, retained its titular supremacy and continued to be the seat of the metropolitan bishop of the province of Lydia, formed in A.D. 295. It is enumerated as third, after Ephesus and Smyrna, in the list of cities of the Thracesian *thema* given by Constantine Porphyrogenitus in the 10th century; but in the actual history of the next four centuries it plays a part very inferior to Magnesia ad Sipylum and Philadelphia (see ALA-SHEHR), which have retained their pre-eminence in the district. The Hermus valley began to suffer from the inroads of the Seljuk Turks about the end of the 11th century; but the successes of the Greek general Philocales in 1118 relieved the district for the time, and the ability of the Comneni, together with the gradual decay of the Seljuk power, retained it in the Byzantine dominions. The country round Sardis was frequently ravaged both by Christians and by Turks during the 13th century. Soon after 1301 the Seljuk amirs overran the whole of the Hermus and Cayster valleys, and a fort on the citadel of Sardis was handed over to

them by treaty in 1306. Finally in 1390 Philadelphia, which had for some time been an independent Christian city, surrendered to Sultan Bayezid's mixed army of Ottoman Turks and Byzantine Christians, and the Seljuk power in the Hermus valley was merged in the Ottoman empire. The latest reference to the city of Sardis relates its capture (and probable destruction) by Timur in 1402. Its site is now absolutely deserted, except that a tiny village, Sart, merely a few huts inhabited by semi-nomadic Yuruks, exists beside the Pactolus, and that there is a station of the Smyrna & Cassaba railway 1 m. north of the principal ruins.

The ruins of Sardis, so far as they are now visible, are chiefly of the Roman time; but though few ancient sites offered better hope of results, the necessity for heavy initial expenditure was a deterrent (*e.g.* to H. Schliemann). On the banks of the Pactolus two columns of a temple of the Greek period, probably the great temple of Cybele, are still standing. More than one attempt to excavate this temple, the last by G. Dennis in 1882, has been made and prematurely brought to an end by lack of funds. In 1904 a few trial pits were sunk by M. Mendel for the Constantinople Museum, and the site was ultimately conceded to an American syndicate, for whom H. C. Butler of Princeton University undertook the task of excavation. The necropolis of the old Lydian city, a vast series of mounds, some of enormous size, lies on the north side of the Hermus, 4 or 5 m. from Sardis, a little south of the sacred Gygaean Lake, Coloe; here the Maeonian chiefs, sons, according to Homer, of the lake, were brought to sleep beside their mother. The series of mounds is now called Bin Tepe (Thousand Mounds). Several of them have been opened by modern excavators, but in every case it was found that treasure-seekers of an earlier time had removed any articles of value which had been deposited in the sepulchral chambers.

See K. Buresch, *Aus Lydien* (1898); G. Radet, *La Lydie* (1893); *Kybebe* (1908); W. M. Ramsay, *The Letters to the Several Churches* (1904), and article in Hastings' *Dict. of the Bible* (1902). (D. G. H.)

SARDONYX, an ornamental stone much used for seals and cameos. It usually consists of a layer of sard or carnelian with one of milk-white chalcedony, but it may present several alternating layers of these minerals. The sardonyx is therefore simply an onyx in which some of the bands are of sard or carnelian: if, however, the latter is present the stone is more appropriately called a "carnelian onyx." It was considered by ancient authorities that a fine Oriental sardonyx should have at least three strata—a black base, a white intermediate zone and a superficial layer of brown or red; these colours typifying the three cardinal virtues—humility (black), chastity (white) and modesty or martyrdom (red). The ancients obtained sardonyx from India, and the Indian locality, Mount Sardonyx, referred to by Ptolemy, is supposed to have been near Broach, where agates and carnelians are still worked. In the Revised Version of the Old Testament, Ex. xxviii. 18, "sardonyx" is given in the margin as an alternative reading for "diamond," the word by which the Hebrew *yahalom* is usually translated. The stone known to the Romans as *aegyptilla* may have been a kind of sardonyx, or perhaps a *nicolo*, which is an onyx with a thin translucent milky layer on the surface. Imitations of sardonyx have been made by cementing together two or three stones of the required colours, while baser counterfeits have been produced in paste. By coating a sard or carnelian with sodium carbonate and then placing the stone on a red-hot iron a white layer may be produced, so that a kind of sardonyx is obtained (see CARNELIAN). Most of the modern sardonyx is cut from South American agate, modified in colour by artificial treatment. (See AGATE; GEM.)

SARDOU, VICTORIEN (1831–1908), French dramatist, was born in Paris on the 5th of September 1831. The Sardous were settled at Le Cannet, a village near Cannes, where they owned an estate, planted with olive trees. A night's frost killed all the trees and the family was ruined. Victorien's father, Antoine Léandre Sardou, came to Paris in search of employment. He was in succession a book-keeper at a commercial establishment, a professor of book-keeping, the head of a provincial school, then a private tutor and a schoolmaster in Paris, besides editing grammars, dictionaries and treatises on various subjects. With all these occupations, he hardly succeeded in making a livelihood, and when he retired to his native country, Victorien was left on his own resources. He had begun studying medicine, but had to desist for want of funds. He taught French to foreign pupils; he also gave lessons in Latin, history and mathematics to students, and wrote articles for cheap encyclopaedias. At the same time he was trying to make headway in the literary world. His talents had been encouraged by an old *bas-bleu*, Mme de Bawl, who had published novels and enjoyed some reputation in the days of the Restoration. But she could do little for her *protégé*. Victorien Sardou made efforts to attract the attention of Mlle Rachel, and to win her support by submitting to her a drama, *La Reine Ulfra*, founded on an old Swedish chronicle. A play of his, *La Taverne des étudiants*, was produced at the Odéon on the 1st of April 1854, but met with a stormy reception, owing to a rumour that the *débutant* had been instructed and commissioned by the government to insult the students. *La Taverne* was withdrawn after five nights. Another drama by Sardou, *Bernard Palissy*, was accepted at the same theatre, but the arrangement was cancelled in consequence of a change in the management. A Canadian play, *Fleur de Liane*, would have been produced at the Ambigu but for the death of the manager. *Le Bossu*, which he wrote for Charles Albert Fechter, did not satisfy the actor; and when the play was successfully produced, the nominal authorship, by some unfortunate arrangement, had been transferred to other men. M. Sardou submitted to Adolphe Montigny (Lemoine-Montigny), manager of the Gymnase, a play entitled *Paris à l'envers*, which contained the love scene, afterwards so famous, in *Nos Intimes*. Montigny thought fit to consult Eugène Scribe, who was revolted by the scene in question.

Sardou felt the pangs of actual want, and his misfortunes culminated in an attack of typhoid fever. He was dying in his garret, surrounded with his rejected manuscripts. A lady who was living in the same house unexpectedly came to his assistance. Her name was Mlle de Brécourt. She had theatrical connexions, and was a special favourite of Mlle Déjazet. She nursed him, cured him, and, when he was well again, introduced him to her friend. Then fortune began to smile on the author. It is true that *Candide*, the first play he wrote for Mlle Déjazet, was stopped by the censor, but *Les Premières Armes de Figaro*, *Monsieur Garat*, and *Les Prés Saint Gervais*, produced almost in succession, had a splendid run, and *Les Pattes de mouche* (1860: afterwards anglicized as *A Scrap of Paper*) obtained a similar success at the Gymnase. *Fédora* (1882) was written expressly for Sarah Bernhardt, as were many of his later plays. He soon ranked with the two undisputed leaders of dramatic art, Augier and Dumas. He lacked the powerful humour, the eloquence and moral vigour of the former, the passionate conviction and pungent wit of the latter, but he was a master of clever and easy flowing dialogue. He adhered to Scribe's constructive methods, which combined the three old kinds of comedy—the comedy of character, of manners and of intrigue—with the *drame bourgeois*, and blended the heterogeneous elements into a compact body and living unity. He was no less dexterous in handling his materials than his master had been before him, and at the same time opened a wider field to social satire. He ridiculed the vulgar and selfish middle-class person in *Nos Intimes* (1861: anglicized as *Peril*), the gay old bachelors in *Les Vieux Garçons* (1865), the modern Tartufes in *Séraphine* (1868), the rural element in *Nos Bons Villageois* (1866), old-fashioned customs and antiquated political beliefs in *Les Ganaches* (1862), the revolutionary spirit and those who thrive on it in *Rabagas* (1872) and *Le Roi Carotte* (1872), the then threatened divorce laws in *Divorçons* (1880).

He struck a new vein by introducing a strong historic element in some of his dramatic romances. Thus he borrowed *Théodora* (1884) from Byzantine annals, *La Haine* (1874) from Italian chronicles, *La Duchesse d'Athènes* from the forgotten records of medieval Greece. *Patrie* (1869) is founded on the rising of the Dutch *gueux* at the end of the 16th century. The scene of *La Sorcière* (1904) was laid in Spain in the 16th century. The French Revolution furnished him with three plays, *Les Merveilleuses*, *Thermidor* (1891) and *Robespierre* (1902). The last named was written expressly for Sir Henry Irving, and produced at the Lyceum theatre, as was *Dante* (1903). The imperial

epoch was revived in *La Tosca* [1] (1887) and *Madame Sans Gêne* (1893). Later plays were *La Piste* (1905) and *Le Drame des poisons* (1907). In many of these plays, however, it was too obvious that a thin varnish of historic learning, acquired for the purpose, had been artificially laid on to cover modern thoughts and feelings. But a few—*Patrie* and *La Haine* (1874), for instance—exhibit a true insight into the strong passions of past ages.

M. Sardou married his benefactress, Mlle de Brécourt, but eight years later he became a widower, and soon after the revolution of 1870 was married a second time, to Mlle Soulié, the daughter of the erudite Eudore Soulié, who for many years superintended the Musée de Versailles. He was elected to the French Academy in the room of the poet Joseph Autran (1813–1877), and took his seat on the 22nd of May 1878. He died at Paris on the 8th of November 1908.

See L. Lacour, *Trois Théâtres* (1880); Brander Matthews, *French Dramatists* (New York, 1881); R. Doumic, *Écrivains d'aujourd'hui* (Paris, 1895); F. Sarcey, *Quarante Ans de théâtre* (vol. vi., 1901).

SARGASSO SEA, a tract of the North Atlantic Ocean, covered with floating seaweed (*Sargassum*, originally named *sargaço* by the Portuguese). This tract is bounded approximately by 25° and 30° N. and by 38° and 60° W., but its extent varies according to winds and ocean currents. By these agencies the weed is carried and massed together, the original source of supply being probably the Caribbean Sea and Gulf of Mexico (see ALGAE). Similar circumstances lead to the existence of other similar tracts covered with floating weed, *e.g.* in the solitary part of the Pacific Ocean, north of the Hawaiian islands, between 30° and 40° N. and between 150° and 180° W. There is a smaller tract S.E. of New Zealand, and along a belt of the southern ocean extending from the Falkland Islands, south of Africa and south-west of Australia, similar floating banks of weed are encountered. The Sargasso Sea was discovered by Columbus, who on his first voyage was involved in it for about a fortnight. The widely credited possibility of ships becoming embedded in the weed, and being unable to escape, is disproved by the expedition of the "Michael Sars," under the direction of Sir John Murray and the Norwegian government, in 1910, which found the surface covered with weed only in patches, not continuously.

SARGENT, JOHN SINGER (1856–), American artist, son of a distinguished Boston physician, was born at Florence, Italy, on the 12th of January 1856. He was educated in Italy and Germany, and in 1874 entered the atelier of Carolus-Duran in Paris. He received an "honourable mention" in the Salon of 1878 for his "En route pour la pêche," and in 1881 a second class medal for his "Portrait of a Young Lady" (made famous by Henry James's appreciation). In 1886 his "Carnation, Lily, Lily, Rose," exhibited at the Royal Academy, was bought for the Chantrey Bequest. He rapidly became known in London as a brilliant portrait painter, and year by year his Academy portraits were the leading features of its exhibitions. Though of the French school, and American by birth, it is as a British artist that he won fame by his vogue as the most sought-after portrait painter of the day, his sitters including the men and women of greatest distinction in the literary, artistic and social life of Europe and America. While best known, and consequently busily employed, as a portrait painter, he had at the same time a disposition towards other, and especially decorative work; his paintings of Brittany, Venice and Eastern scenes are less known, but his labour of love, the ornate decorations for the Boston public library (completed in 1903), "The Pageant of Religion," shows the other side of his genius. Among his pictures in public galleries not already mentioned are "El Jaleo" (exhibited 1882), in the Boston Art Museum; "La Carmencita," in the Luxembourg; "Coventry Patmore," in the National Portrait Gallery, London; and "Henry Marquand" (1887), in the Metropolitan Museum, New York. He was elected an A.R.A. in 1894, and R.A. in 1897; he was the recipient of various medals of honour, and was made a member of the chief artistic societies of Europe and America.

[1] Adapted as an opera for the music of Puccini (Rome, 14th Jan. 1900).

SARGON, more correctly SARRU-KINU ("the legitimate king," Sargon being a hybrid formation from the Semitic *sar* and the Sumerian *gina*, "established"), an Assyrian general who, on the death of Shalmaneser IV., during the siege of Samaria, seized the crown on the 12th of Tebet 722 B.C. He claimed to be the descendant of the early kings, and accordingly assumed the name of a famous king of Babylonia who had reigned about 3000 years before him. His first achievement was the capture of Samaria, 27,200 of its inhabitants being carried into captivity. Meanwhile Babylon had revolted under a Chaldaean prince, Merodach-baladan, who maintained his power there for twelve years. In 720 B.C. Yahu-bihdi of Hamath led Arpad, Damascus and Palestine into revolt: this was suppressed, and the Philistines and Egyptians were defeated at Raphia (mod. er-Rafa). In 719 B.C. Sargon defeated the Minni to the east of Armenia, and in 717 overthrew the combined forces of the Hittites and Moschi (Old Testament Meshech). The Hittite city of Carchemish was placed under an Assyrian governor, and its trade passed into Assyrian hands. The following year Sargon was attacked by a great confederacy of the northern nations—Ararat, the Moschi, Tibareni, &c.—and in the course of the campaign marched into the land of the Medes in the direction of the Caspian. In 715 B.C. the Minni were defeated, and one of their chiefs, Dāyuku or Daiukku (Deioces), transported to Hamath. In 714 B.C. the army of Rusas of Ararat was annihilated, and a year later five Median chiefs, including Arbaku (Arbaces) became tributary. Cilicia and the Tibareni also submitted as well as the city of Malatia, eastern Cappadocia being annexed to the Assyrian Empire. A league was now formed between Merodach-baladan and the princes of the west, but before the confederates could move, an Assyrian army was sent against Ashdod, and Edom, Moab and Judah submitted to Sargon, who was thus free to turn his attention to Babylonia, and Merodach-baladan was accordingly driven from Babylon, where Sargon was crowned king. Shortly after this Sargon sent a statue of himself to Cyprus and annexed the kingdom of Commagene. He was murdered in 705 B.C., probably in the palace he had built at Dur-Sargina, now Khorsabad, which was excavated by P. E. Botta. (A. H. S.)

SĀRI, a town of Persia, in the province of Mazandaran, on the left bank of the Tejen river, 80 m. S.W. of Astarabad. Pop. 10,000. It is the seat of the governor of Mazandaran, and has post and telegraph offices. The town is picturesque but very unhealthy, has stone-paved streets and houses built of brick and covered with green and red glazed tiles.

SARIPUL, or SIRIPUL, a town and khanate of Afghan Turkestan. The town lies 100 m. S.W. of Balkh; estimated pop. 18,000. Two-thirds of the people are Uzbegs and the rest Hazaras. The khanate, which lies between Balkh and Maimana, is one of the "four domains" which were in dispute between Bokhara and Kabul, and were allotted to the Afghans by the Anglo-Russian boundary agreement of 1873.

SĀRIPUTTA, one of the two principal disciples of Gotama the Buddha. He was born in the middle of the 6th century B.C. at Nāla, a village in the kingdom of Magadha, the modern Behar, just south of the Ganges and a little east of where Patna now stands. His personal name was Upatissa; the name of his father, who was a brahmin, is unknown; his mother's name was Sārī, and it was by the epithet or nickname of Sāriputta (that is "Sārī's son"), that he was best known. He had three sisters, all of whom subsequently entered the Buddhist Order. When still a young man he devoted himself to the religious life, and followed at first the system taught by Sañjaya of the Belattha clan. A summary of the philosophical position of this teacher has been preserved in the Dialogue called *The Perfect Net.*

According to this account his main tendency was to avoid committing himself to any decided conclusion on any one of the numerous points then discussed so eagerly among the clansmen in the valley of the Ganges. Early in the Buddhist movement Sāriputta had a conversation with one of the men who had just joined it; and the Buddhist quoted to him the now famous stanza, "Of all the things that proceed from a cause, the Buddha the cause hath told; and he tells too how each shall come to an end—such alone is the word of

the Sage." The result was that Sāriputta, with his friend Kolita and other disciples of Sañjaya, asked for admission, and were received into the Buddhist Order. He rapidly attained to mastery in the Buddhist system of self-training, and is declared to have been the chief of all the disciples in insight. He was present at a dialogue between the Buddha and a Wanderer named Aggivessana on the nature of sensations; and at the end of that discourse he attained to Arahatship. He is constantly represented as discussing points, usually of ethics or philosophy, either with the Buddha himself, or with one or other of the more prominent disciples. One whole book of the Saṃyutta is therefore called after his name. A number of stanzas inscribed to him are preserved in the *Songs of the Elders* (Thera-gāthā), and one of the poems in the Sutta Nipāta is based on a question he addressed to the Buddha. Asoka the Great, in his Bhabra Edict, enjoins on the Buddhists the study of seven passages in the Scriptures selected for their especial beauty. One of these is called *The Question of Upatissa*, and this poem may be the passage referred to. Feeling his end approaching, he went home, and died just six months before the death of the Buddha, that is, approximately in 480 B.C. He was cremated with great ceremony, and the ashes placed in a tope or burial-mound. An inscribed casket in such a mound at Sāñchi opened by Cunningham in February 1851 contained a portion of these ashes which had been removed to that spot, in General Cunningham's opinion by Asoka.

BIBLIOGRAPHY.—For the birth, death, cremation and relics, see Alex. Cunningham, *Bhilsa Topes* (London, 1854); Rhys Davids and S. W. Bushell, *Watters on Yuan Chwang* (London, 1904, 1905). For names of mother and sisters, *Therī Gāthā*, ed. R. Pischel (London, 1883). For conversion Rhys Davids and H. Oldenberg, *Vinaya Texts* (Oxford, 1881), i. 144-151. For attainment of Arahatship, V. Trenckner, *Majjhima Nikāya* (London, 1888), i. 501.

(T. W. R. D.)

SARK, a small island of the Channel Islands, 7 m. E. of Guernsey, much visited on account of its magnificent cliff-scenery and caves. It is 3 m. long from N. to S. and 1½ m. in extreme breadth. Area, 1274 acres; pop. (1901) 504. It is divided into two unequal parts, known as Great Sark (the more northern) and Little Sark, connected by the Coupée, a lofty isthmus so narrow at the summit that it bears only a roadway, artificially built up, and flanked by a precipice on either side. Many islets and detached rocks lie off the coast; Brechou Island to the west is large enough to have a few fields and a house upon it. Some of the rocks are very fine, such as the four lofty flat-topped pillars called the Autelets (altars).

The harbour of Sark lies on the east coast, a tiny cliff-bound bay protected by a breakwater, communicating with the interior only through two tunnels, one of which is modern, while the other dates from 1588. The harbour is called Creux. This is a term of common use in the Channel Islands, applying primarily to natural funnels or pits, but extended also to clefts such as that which forms the harbour. The Creux du Derrible (Old French, a downfall of rocks) is a wide shaft opening from the summit of the cliff and communicating with the sea through a double cave, through which the sea rushes at high water. Of the many majestic caverns in the cliffs the Boutiques and the Gouliots, both on the west coast of Great Sark, may be specially mentioned. The marine fauna is very rich. On Great Sark are the majority of the houses, the church, and the *seigneurie* or manor-house. An ancient mill stands at the summit of the island (375 ft.). Agriculture and fishing are carried on. In Little Sark a disused shaft marks a silver-mine, worked in 1835, but soon abandoned. The island is included in the bailiwick of Guernsey, but has a court of justice of feudal character, the officers being appointed by the *seigneur*.

SARLAT, a town of south-western France, capital of an arrondissement in the department of Dordogne, 44 m. E. by N. of Bergerac on the railway to Aurillac. Pop. (1906) town 4018, commune 6195. The town grew up round a monastery founded in the 8th century and early in the 14th century became the seat of a bishopric which was suppressed in 1790. The former cathedral and abbey-church preserves interesting architecture of the Romanesque and later periods and remarkable wood-carving of the 15th century. There is also a curious pyramidical structure of the 12th century, which was probably used as a burial-place. The house where Étienne de la Boétie (d. 1563), the moralist, was born, and other houses in the Gothic and Renaissance styles are to be seen. La Boétie has a statue in the town. There is a large trade in cattle. Distilling, the manufacture of tin-boxes, and the preparation of truffles, pâtés de foie gras and other delicacies and of nut-oil are carried on; there are coal and iron mines and stone-quarries in the vicinity.

SARMATAE, or SAUROMATAE (the second form is mostly used by the earlier Greek writers, the other by the later Greeks and the Romans), a people whom Herodotus (iv. 21. 117) puts on the eastern boundary of Scythia (*q.v.*) beyond the Tanais (Don). He says expressly that they were not pure Scythians, but, being descended from young Scythian men and Amazons, spoke an impure dialect and allowed their women to take part in war and to enjoy much freedom. Later writers call some of them the "woman-ruled Sarmatae." Hippocrates (*De Aere*, &c., 24) classes them as Scythian. From this we may infer that they spoke a language cognate with the Scythic. The greater part of the barbarian names occurring in the inscriptions of Olbia, Tanais and Panticapaeum are supposed to be Sarmatian, and as they have been well explained from the Iranian language now spoken by the Ossetes of the Caucasus, these are supposed to be the representatives of the Sarmatae and can be shown to have a direct connexion with the Alani (*q.v.*), one of their tribes. By the 3rd century B.C. the Sarmatae appear to have supplanted the Scythspr oper in the plains of south Russia, where they remained dominant until the Gothic and Hunnish invasions. Their chief divisions were the Rhoxolani (*q.v.*), the Iazyges (*q.v.*), with whom the Romans had to deal on the Danube and Theiss, and the Alani. The term Sarmatia is applied by later writers to as much as was known of what is now Russia, including all that which the older authorities call Scythia, the latter name being transferred to regions farther east. Ptolemy gives maps of European and Asiatic Sarmatia. (E. H. M.)

SARMENTOSE (Lat. *sarmentum*, twigs), a botanical term for plants producing long runners.

SARNEN, the capital of the western half (or Obwalden) of the Swiss canton of Unterwalden. It stands 1558 ft. above sea-level, at the north end of the lake of Sarnen (3 sq. m. in extent) and on the river Aa. Pop. (1900) 3949. It has a large parish church and two convents. In the archives is preserved the famous MS. known from the colour of its binding as the *White Book of Sarnen*, which contains one of the earliest known versions of the Tell legend (see TELL). Sarnen is a station on the Brünig Railway, being 4½ m. from Alpnachstad, its port on the lake of Lucerne. (W. A. B. C.)

SARNIA, a town and port of entry, Ontario, Canada, capital of Lambton county, 55 m. N.E. of Detroit, on the left bank of the river St Clair. Pop. (1901) 8176. It is on the Grand Trunk and Lake Erie & Detroit River railways, and is a port of call for steamers plying on the Great Lakes. It contains a large oil-refinery which handles the greater part of the product of the Ontario oil region. The Grand Trunk railway crosses the river at this point by the St Clair tunnel, 6025 ft. long or, including the approaches, 2¼ m., which connects the town with the American city of Port Huron (Michigan).

SARNO (anc. *Sarnus*), a town of Campania, Italy, in the province of Salerno, 15 m. N.E. from that city and 30 m. E. of Naples by the main railway. Pop. (1901) 15,130 (town), 19,192 (commune). It lies at the foot of the Apennines, 92 ft. above sea-level, near the sources of the Sarno (anc. *Sarnus*), a stream connected by canal with Pompeii and the sea. Sarno has the ruins of a medieval castle, which belonged to Count Francesco Coppola, who took an important part in the conspiracy of the barons against Ferdinand of Aragon in 1485. Walter of Brienne is buried in the ancient church of S. Maria della Foce rebuilt in 1701. Paper, cotton, silk, linen and hemp are manufactured. The travertine which forms round the springs of the Sarno was used even at Pompeii as building material. Before its incorporation with the domains of the crown of Naples Sarno gave its name to a countship held in succession by the Orsini, Cappola, Suttavilla and Colonna families.

SARONNO, a town of Lombardy, Italy, in the province of Milan, from which city it is distant 13 m. N.N.W. by rail. Pop. (1901) 8729 (town), 9533 (commune). The pilgrimage church of the Madonna dei Miracoli, begun in 1498 by Vincenzo dell' Orto, has a dome of rich architecture externally; the campanile dates from 1516, the rest of the church is later. Internally it is decorated with fine frescoes by Gaudenzio Ferrari, representing a concert of angels, while those in the choir are by Bernardino Luini and are among his finest works (see F. Malaguzzi Valeri

in *Rassegna d'arte*, 1904, 69). The place is well known for its gingerbread (*amaretti*) and is also a manufacturing town. It is situated on one of the lines (Ferrovia Nord) from Milan to Como, and has branch lines to Seregno, Busto Arsizio and Varese.

SAROS, in Babylonian numeration, the number 3600, *i.e.* 60 times 60. In astronomy and chronology, a remarkable period of 18 years and 10 or 11 days, at the end of which every eclipse of the sun or moon recurs with little change as regards the time and the character of the eclipse. It is supposed to have afforded in ancient times the principal method of predicting eclipses (see ECLIPSE).

SARPEDÔN, in Greek legend, son of Zeus and Laodameia, Lycian prince and hero of the Trojan war. He fought on the side of the Trojans, and after greatly distinguishing himself by his bravery, was slain by Patroclus. A terrible struggle took place for the possession of his body, until Apollo rescued it from the Greeks, and by the command of Zeus washed and cleansed it, anointed it with ambrosia, and handed it over to Sleep and Death, by whom it was conveyed for burial to Lycia, where a sanctuary (Sarpedoneum) was erected in honour of the fallen hero. Virgil (*Aen.* i. 100) knows nothing of the removal of the body to Lycia. In later tradition, Sarpedon was the son of Zeus and Europa and the brother of Minos. Having been expelled from Crete by the latter, he and his comrades sailed for Asia, where he finally became king of Lycia. Euripides (*Rhesus*, 29) confuses the two Sarpedons.

See Homer, *Iliad*, v. 479, xii. 292, xvi. 419-683; Apollodorus iii. 1, 2; Appian, *Bell. civ.* iv. 78; Herodotus i. 173, with Rawlinson's notes.

SARPI, PAOLO (1552–1623), Venetian patriot, scholar and church reformer, was born at Venice, on the 14th of August 1552, and was the son of a small trader, who left him an orphan at an early age. Notwithstanding the opposition of his relatives, he entered the order of the Servi di Maria, a minor Augustinian congregation of Florentine origin, at the age of thirteen. He assumed the name of Paolo, by which, with the epithet *Servita*, he was always known to his contemporaries. In 1570 he sustained no fewer than three hundred and eighteen theses at a disputation in Mantua, with such applause that the duke made him court theologian. Sarpi spent four years at Mantua, applying himself to mathematics and the Oriental languages. After leaving Mantua, he repaired to Milan, where he enjoyed the protection of Cardinal Borromeo, but was soon transferred by his superiors to Venice, as professor of philosophy at the Servite convent. In 1579 he was sent to Rome on business connected with the reform of his order, which occupied him several years, and brought him into intimate relations with three successive popes, as well as the grand inquisitor and other persons of influence. Having successfully terminated the affairs entrusted to him, he returned to Venice in 1588, and passed the next seventeen years in study, occasionally interrupted by the part he was compelled to take in the internal disputes of his community. In 1601 he was recommended by the Venetian senate for the small bishopric of Caorle, but the papal nuncio, who wished to obtain it for a protégé of his own, informed the pope that Sarpi denied the immortality of the soul, and had controverted the authority of Aristotle. An attempt to procure another small bishopric in the following year also failed, Clement VIII. professing to have taken umbrage at Sarpi's extensive correspondence with learned heretics, but more probably determined to thwart the desires of the liberal rulers of Venice. The sense of injury, no doubt, contributed to exasperate Sarpi's feelings towards the court of Rome. For the time, however, he tranquilly pursued his studies, writing those notes on Vieta which establish his proficiency in mathematics, and a metaphysical treatise now lost, which, if Foscarini's account of it may be relied upon, anticipated the sensationalism of Locke. His anatomical pursuits probably date from a somewhat earlier period. They illustrate his versatility and thirst for knowledge, but are far from possessing the importance ascribed to them by his disciples. His claim to have anticipated Harvey's discovery rests on no better authority than a memorandum, probably copied from Caesalpinus or Harvey himself, with whom, as well as with Bacon and Gilbert, he maintained a correspondence. The only physiological discovery which can be safely attributed to him is that of the contractility of the iris. It must be remembered, however, that his treatises on scientific subjects are lost, and only known from imperfect abstracts.

Clement died in March 1605; and Paul V. assumed the tiara with the resolution to strain papal prerogative to the uttermost. At the same time Venice was adopting measures to restrict it still further. The right of the secular tribunals to take cognizance of the offences of ecclesiastics had been asserted in two remarkable cases; and the scope of two ancient laws of the city of Venice, forbidding the foundation of churches or ecclesiastical congregations without the consent of the state, and the acquisition of property by priests or religious bodies, had been extended over the entire territory of the republic. In January 1606 the papal nuncio delivered a brief demanding the unconditional submission of the Venetians. The senate having promised protection to all ecclesiastics who should in this emergency aid the republic by their counsel, Sarpi presented a memoir, pointing out that the threatened censures might be met in two ways- *de facto*, by prohibiting their publication, and *de jure*, by an appeal to a general council. The document was received with universal applause, and Sarpi was immediately made canonist and theological counsellor to the republic. When in the following April the last hopes of accommodation were dispelled by Paul's excommunication of the Venetians and his attempt to lay their dominions under an interdict, Sarpi entered with the utmost energy into the controversy. He prudently began by republishing the anti-papal opinions of the famous canonist Gerson. In an anonymous tract published shortly afterwards (*Risposta di un Dottore in Teologia*) he laid down principles which struck at the very root of the pope's authority in secular things. This book was promptly put upon the *Index*, and the republication of Gerson was attacked by Bellarmine with a severity which obliged Sarpi to reply in an *Apologia*. The *Considerazioni sulle censure* and the *Trattato dell' interdetto*, the latter partly prepared under his direction by other theologians, speedily followed. Numerous other pamphlets appeared, inspired or controlled by Sarpi, who had received the further appointment of censor over all that should be written at Venice in defence of the republic. Never before in a religious controversy had the appeal been made so exclusively to reason and history; never before had an ecclesiastic of his eminence maintained the subjection of the clergy to the state, and disputed the pope's right to employ spiritual censures, except under restrictions which virtually abrogated it. Material arguments were no longer at the pope's disposal. The Venetian clergy, a few religious orders excepted, disregarded the interdict, and discharged their functions as usual. The Catholic powers refused to be drawn into the quarrel. At length (April 1607) a compromise was arranged through the mediation of the king of France, which, while salving over the pope's dignity, conceded the points at issue. The great victory, however, was not so much the defeat of the papal pretensions as the demonstration that interdicts and excommunications had lost their force. Even this was not wholly satisfactory to Sarpi, who longed for the toleration of Protestant worship in Venice, and had hoped for a separation from Rome and the establishment of a Venetian free church by which the decrees of the council of Trent would have been rejected, and in which the Bible would have been an open book. The republic rewarded her champion with the further distinction of state counsellor in jurisprudence, and, a unique mark of confidence, the liberty of access to the state archives. These honours exasperated his adversaries to the uttermost. On the 5th of October he was attacked by a band of assassins and left for dead, but the wounds were not mortal. The bravos found a refuge in the papal territories. Their chief, Poma, declared that he had been moved to attempt the murder by his zeal for religion, a degree of piety and self-sacrifice which seems incredible in a bankrupt oil-merchant. "Agnosco stylum Curiae Romanae," Sarpi himself pleasantly said, when his surgeon commented upon the ragged and inartistic character of the wounds, and the justice of the observation is as

incontestable as its wit. The only question can be as to the degree of complicity of Pope Paul V.

The remainder of Sarpi's life was spent peacefully in his cloister, though plots against him continued to be formed, and he occasionally spoke of taking refuge in England. When not engaged in framing state papers, he devoted himself to scientific studies, and composed several works. A Machiavellian tract on the fundamental maxims of Venetian policy (*Opinione come debba governarsi la repubblica di Venezia*), used by his adversaries to blacken his memory, is undoubtedly not his. It has been attributed to a certain Gradenigo. Nor did he complete a reply which he had been ordered to prepare to the *Squitinio della libertà veneta*, which he perhaps found unanswerable. In 1610 appeared his *History of Ecclesiastical Benefices*, "in which," says Ricci, "he purged the church of the defilement introduced by spurious decretals." In 1611 he assailed another abuse by his treatise on the right of asylum claimed for churches, which was immediately placed on the *Index*. In 1615 a dispute between the Venetian government and the Inquisition respecting the prohibition of a book led him to write on the history and procedure of the Venetian Inquisition; and in 1619 his chief literary work, the *History of the Council of Trent*, was printed at London under the name of Pietro Soave Polano, an anagram of Paolo Sarpi Veneto. The editor, Marco Antonio de Dominis, has been accused of falsifying the text, but a comparison with a MS. corrected by Sarpi himself shows that the alterations are both unnecessary and unimportant. This memorable book, together with the rival and apologetic history by Cardinal Pallavicini, is minutely criticized by Ranke (*History of the Popes*, appendix No. 3), who tests the veracity of both writers by examining the use they have respectively made of their MS. materials. The result is not highly favourable to either; neither can be taxed with deliberate falsification, but both have coloured and suppressed. They write as advocates rather than historians. Ranke rates the literary qualities of Sarpi's work very highly. Sarpi never acknowledged his authorship, and baffled all the efforts of the prince de Condé to extract the secret from him. He survived the publication four years, dying on the 15th of January 1623, labouring for his country to the last. The day before his death he had dictated three replies to questions on affairs of state, and his last words were "Esto perpetua." His posthumous *History of the Interdict* was printed at Venice the year after his death, with the disguised imprint of Lyons.

Great light has been thrown upon Sarpi's real belief and the motives of his conduct by the letters of Christoph von Dohna, envoy of Christian, prince of Anhalt, to Venice, published by Moritz Ritter in the *Briefe und Acten zur Geschichte des dreissigjährigen Krieges*, vol. ii. (Munich, 1874). Sarpi told Dohna that he greatly disliked saying mass, and celebrated it as seldom as possible, but that he was compelled to do so, as he would otherwise seem to admit the validity of the papal prohibition, and thus betray the cause of Venice. This supplies the key to his whole behaviour; he was a patriot first and a religious reformer afterwards. He was "rooted" in what Diodati described to Dohna as "the most dangerous maxim, that God does not regard externals so long as the mind and heart are right before Him." Sarpi had another maxim, which he thus formulated to Dohna: *Le falsità non dico mai mai, ma la verità non a ognuno.* It must further be considered that, though Sarpi admired the English prayer-book, he was neither Anglican, Lutheran nor Calvinist, and might have found it difficult to accommodate himself to any Protestant church. On the whole, the opinion of Le Courayer, "qu'il était Catholique en gros et quelque fois Protestant en détail," seems not altogether groundless, though it can no longer be accepted as a satisfactory summing up of the question. His scientific attainments must have been great. Galileo would not have wasted his time in corresponding with a man from whom he could learn nothing; and, though Sarpi did not, as has been asserted, invent the telescope, he immediately turned it to practical account by constructing a map of the moon.

Sarpi's life was written by his enthusiastic disciple, Father Fulgenzio Micanzio, whose work is meagre and uncritical. Bianchi-Giovini's biography (1836) is greatly marred by digressions, and is inferior in some respects to that by Arabella Georgina Campbell (1869), which is enriched by numerous references to MSS. unknown to Bianchi-Giovini. T. A. Trollope's *Paul the Pope and Paul the Friar* (1861) is in the main a mere abstract of Bianchi-Giovini, but adds a spirited account of the conclave of Paul V. The incidents of the Venetian dispute from day to day are related in the contemporary diaries published by Enrico Cornet (Vienna, 1859). Giusto Fontanini's *Storia arcana della vita di Pietro Sarpi* (1863), a bitter libel, is nevertheless important for the letters of Sarpi it contains, as Griselini's *Memorie e aneddote* (1760) is from the author's access to Sarpi's unpublished writings, afterwards unfortunately destroyed by fire. Foscarini's *History of Venetian Literature* is important on the same account. Sarpi's memoirs on state affairs remain in the Venetian archives. Portions of his correspondence have been printed at various times, and inedited letters from him are of frequent occurrence in public libraries. The King's library in the British Museum has a valuable collection of tracts in the Interdict controversy, formed by Consul Smith.

[In addition to the above works see Balan, *Fra Paolo Sarpi* (Venice, 1887) and Pascolato, *Fra Paolo Sarpi* (Milan, 1893). Some hitherto unpublished letters of Sarpi were edited by Karl Benrath and published, under the title *Paolo Sarpi. Neue Briefe, 1608–1610* (at Leipzig in 1909).] (R. G.)

SARPSBORG, a seaport and manufacturing town of Norway, in Smaalenene *amt* (county), 68 m. S.S.E. of Christiania on the Gothenburg railway. Pop. (1900) 6888. It is the junction for an alternative line to Christiania following the Glommen valley. It sprang into importance through the utilization of the falls in the river Glommen for driving saw-mills and generating electric power. The Sarpsfos, south-east of the town, is a majestic fall, descending 74 ft. with a width of 120 ft. There are wood-pulp factories (one worked by an English company employing over 1000 hands), factories for calcium carbide (used for manufacturing acetylene gas), paper and aluminium; and spinning and weaving mills. There are two large electric supply stations, and power and light are furnished from this point to Frederikstad, 9 m. S.W. The port is at Sannesund, 1 m. S.; its quays can be reached by vessels drawing 20 ft. The town was originally founded in the 11th century, and destroyed by the Swedes in 1567. The existing town dates from 1839.

SARRACENIA, or SIDE-SADDLE FLOWER, a genus of pitcher-plants with seven species native in the eastern states of North America. They are perennial herbaceous marsh-plants with a rosette of leaves from the centre of which springs a tall stalk bearing a large single nodding flower. The leaves are erect and in the form of long slender pitchers, with a longitudinal wing and a terminal hood, to which insects are attracted by the bright colouring of the upper parts and the nectar which is secreted there. The interior of the pitcher is half-filled with water and the wall is lined internally in the lower part with stiff downward pointing hairs, which prevent the escape of insects. The insects which are drowned in the pitcher become decomposed and digested by the fluid, and the products of digestion are ultimately absorbed by the walls of the pitcher and serve as a source of nitrogenous food. (See also PITCHER PLANTS.)

SARRAZIN, JACQUES (1588–1660), French painter, born at Noyon in 1588, went to Rome at an early age and worked there under a Frenchman named Anguille. Starting thus, Sarrazin speedily obtained employment from Cardinal Aldobrandini at Frascati, where he won the friendship of Domenichino, with whom he afterwards worked on the high altar of St Andrea della Valle. His return to Paris, where he married a niece of Simon Vouet, was signalized by a series of successes which attracted the notice of Sublet des Noyers, who entrusted to him the work by which Sarrazin is best known, the decoration of the great portal and the dome of the western façade of the interior court of the Louvre. The famous Caryatides of the attic show the profound study of Michelangelo's art to which Sarrazin had devoted all the time he could spare from bread-winning whilst in Rome. He now executed many commissions from the queen, and was an active promoter of the foundation of the Academy. The mausoleum for the heart of the prince de Condé in the Jesuit church of the Rue Saint Antoine was his last considerable work (see Lenoir, *Musée des monuments français*, v. 5); he died on the 3rd of December 1660, whilst it was in progress, and the crucifix of the altar was actually completed by one of his pupils named Gros.

SARRETTE, BERNARD (1765–1858), founder of the Conservatoire National de Musique et de Déclamation in Paris, was born in Bordeaux on the 27th of November 1765, and died in Paris on the 11th of April 1858. Forty-five musicians from the depôt of the Gardes Françaises were gathered together by him after the 14th of July 1789, and formed the nucleus for the music of the Garde Nationale. In May 1790, the municipality of Paris increased the body to seventy-eight musicians. When the financial embarrassments of the commune necessitated the suppression of the paid guard, Sarrette kept the musicians near him and obtained from the municipality, in June 1792, the establishment of a free school of music. On the 18th of Brumaire in the year II. (Nov. 8, 1793) this school was converted

into the Institut National de Musique by decree of the convention, and by the law of the 16th of Thermidor in the year III. (Aug. 3, 1795) it was finally organized under the name of Conservatoire. The motives for the imprisonment of Sarrette from the 25th of March to the 10th of May 1794, have been a source of historical controversy, nor is it possible to ascertain exactly what were his political views throughout this period of the French Revolution. But there is no longer foundation for the theory of Zimmermann, his biographer, that he was imprisoned for singing aloud Crétry's air, *O Richard, ô mon roi!* For the last forty years of his life Sarrette lived in retirement. The protection of Napoleon I. was a source of disaster to him in 1815, when the conservatoire was closed; its subsequent history was watched by its founder as a mere spectator from outside.

See Constant Pierre, *B. Sarrette et les origines du Conservatoire*, (Paris, 1895).

SARSAPARILLA, a popular drug, prepared from the long fibrous roots of several species of the genus *Smilax*, indigenous to Central America, and extending from the southern and western coasts of Mexico to Peru. These plants grow in swampy forests, and, being dioecious and varying much in the form of leaf in different individuals, are imperfectly known to botanists, only two species having been identified with certainty. These are *Smilax officinalis* and *S. medica*, which yield respectively the so-called "Jamaica" and the Mexican varieties. They are large perennial climbers growing from short thick underground stems, from which rise numerous semi-woody flexuous angular stems, bearing large alternate stalked long-persistent and prominently net-veined leaves, from the base of which spring the tendrils which support the plant. The genus is a member of the natural order Smiliaceae, and constitutes the tribe Smilacoidide, characterized by its climbing habit, net-veined leaves and dioecious flowers.

The introduction of sarsaparilla into European medicine dates from the middle of the 16th century. Monardes, a physician of Seville, records that it was brought to that city from New Spain about 1536–1545. Sarsaparilla must have come into extensive use soon afterwards, for John Gerard, about the close of the century, states that it was imported into England from Peru in great abundance.

When boiled in water the root affords a dark extractive matter, the quantity of extract yielded by the root being used as a criterion of its quality. Boiling alcohol extracts from the root a neutral substance in the form of crystalline prisms, which crystallize in scales from boiling water. This body, which is named *parillin*, is allied to the saponin of quillaia bark, from which it differs in not exciting sneezing. The presence in the root of starch, resin and oxalate of lime is revealed by the use of the microscope. Sarsaparilla still has a popular reputation as an "alterative," but it has been examined and tested in every manner known to modern medical science, and is professionally regarded as "pharmacologically inert and therapeutically useless."

The varieties of sarsaparilla met with in commerce are the following: Jamaica, Lima, Honduras, Guatemala, Guayaquil and Mexican. Of these the first-named yields the largest amount of extract, viz. from 33 to 44 %; it is the only kind admitted into the British pharmacopoeia. On the Continent, especially in Italy, the varieties having a white starchy bark, like those of Honduras and Guatemala, are preferred. "Jamaica" sarsaparilla derives its name from the fact that Jamaica was at one time the emporium for sarsaparilla, which was brought thither from Honduras, New Spain and Peru. Sarsaparilla is grown to a small extent in Jamaica, and is occasionally exported thence to the London market in small quantities, but its orange colour and starchy bark are so different in appearance from the thin reddish-brown bark of the genuine drug, that it does not meet with a ready sale. The Jamaica sarsaparilla of trade is collected on the Cordilleras of Chiriqui, in Panama, where the plant yielding it grows at an elevation of 4000 to 8000 ft. The root bark is reddish-brown, thin and shrivelled, and there is an abundance of rootlets, which are technically known by the name of "beard." Lima sarsaparilla resembles the Jamaica kind, but the roots are of a paler brown colour. In Honduras sarsaparilla the roots are less wrinkled, and the bark is whiter and more starchy, than in the Jamaica kind. It is exported from Belize. Guatemala sarsaparilla is very similar to that of Honduras, but has a more decided orange hue, and the bark shows a tendency to split off. Guayaquil sarsaparilla is obtained chiefly in the valley of Alausi, on the western side of the equatorial Andes. The bark is thick and furrowed, and of a pale fawn colour internally; the rootlets are few, and the root itself is of larger diameter than in the other kinds. Sometimes there is attached to the rootstock a portion of stem, which is round and not prickly, differing in these respects from that of *Smilax officinalis*, which is square and prickly. Mexican sarsaparilla has slender, shrivelled roots nearly devoid of rootlets. It is collected on the eastern slope of the Mexican Andes throughout the year, and is the produce of *Smilax medica*.

The collection of sarsaparilla root is a very tedious business; a single root takes an Indian half a day or sometimes even a day and a half to unearth. The roots extend horizontally in the ground on all sides for about 9 ft., and from these the earth has to be carefully scraped away and other roots cut through where such come across them. A plant four years old will yield 10 lb of fresh root, and a well-grown one from 32 to 64 lb, but more than half the weight is lost in drying. The more slender roots are generally left, and the stem is cut down near to the ground, the crown of the root being covered with leaves and earth. Thus treated, the plant continues to grow, and roots may again be cut from it after the lapse of two years, but the yield will be smaller and the roots more slender and less starchy. In some varieties, as the Guayaquil and Mexican, the whole plant, including the rootstock, is pulled up.

In several species of *Smilax* the roots become thickened here and there into large tuberous swellings 4 to 6 in. long, and 1 or 2 in. in thickness. These tubers form a considerable article of trade in China, but are used to a limited extent only on the Continent, under the name of China root, although introduced into Europe about the same time as sarsaparilla. China root is obtained from *S. China* and is a native of Cochin China, China and Japan, and extensively imported into India, also from *S. glabra* and *S. lanceaefolia*, natives of India and China, the tubers of which closely resemble those of *S. China*. A similar root is yielded by *S. pseudo-China* and *S. tamnoides* in the United States from New Jersey southwards; by *S. balbisiana*, in the West Indies, and by *S. Japicanga* and *S. syringoides*, and *S. brasiliensis* in South America. The name of Indian sarsaparilla is given to the roots of *Hemidesmus indicus*, an Asclepiadaceous plant indigenous to India. These roots are readily distinguished from those of true sarsaparilla by their loose cracked bark and by their odour and taste, recalling those of melilot.

SARSFIELD, PATRICK (? –1693), titular earl of Lucan, Irish Jacobite and soldier, belonged to an Anglo-Norman family long settled in Ireland. He was born at Lucan, but the date is unknown. His father Patrick Sarsfield married Anne, daughter of Rory (Roger) O'Moore, who organized the Irish rebellion of 1641. The family possessed an estate of £2000 a year. Patrick, who was a younger son, entered Dongan's regiment of foot on the 9th of February 1678. In his early years he is known to have challenged Lord Grey for a supposed reflection on the veracity of the Irish people (September 1681), and in the December of that year he was run through the body in a duel in which he engaged as second. During the last years of the reign of King Charles II. he saw service in the English regiments which were attached to the army of Louis XIV. of France. The accession of King James II. led to his return home.

He took part in the suppression of the Western rebellion at the battle of Sedgemoor on the 6th of July 1685. In the following year he was promoted to a colonelcy. King James had adopted the dangerous policy of remodelling the Irish army so as to turn it from a Protestant to a Roman Catholic force, and Sarsfield, whose family adhered to the church of Rome, was selected to assist in this reorganization. He went to Ireland with Richard Talbot, afterwards earl of Tyrconnel (*q.v.*), who was appointed commander-in-chief by the king. In 1688 the death of his elder brother, who had no son, put him in possession of the family estate, which in those troubled times can have been of small advantage to him. When the king brought over a few Irish soldiers to coerce the English, Sarsfield came in command of them. As the king was deserted by his army there was no serious fighting, but Sarsfield had a brush with some of the Scottish soldiers in the service of the prince of Orange at Wincanton. When King James disbanded his army and fled to France, Sarsfield accompanied him. In 1689 he returned to Ireland with the king. During the earlier part of the war he did good service by securing Connaught for the Jacobites. The king, who is said to have described him as a brave fellow who had no head, promoted him to the rank of brigadier, and then major-general with some reluctance. It was not till after the battle of the Boyne (1st of July 1690), and during the siege of Limerick, that Sarsfield came prominently forward. His capture of a convoy of military stores at one of the two places called Ballyneety between Limerick and Tipperary, delayed the siege of the town till the winter rains forced the English to retire. This achievement, which is said by the duke of Berwick to have turned Sarsfield's head, made him the popular hero of the war with the

Irish. His generosity, his courage and his commanding height, had already commended him to the affection of the Irish. When the cause of King James was ruined in Ireland, Sarsfield arranged the capitulation of Limerick and sailed to France on the 22nd of December 1691 with many of his countrymen who entered the French service. He received a commission as lieutenant-general (maréchal de camp) from King Louis XIV. and fought with distinction in Flanders till he was mortally wounded at the battle of Landen or Neerwinden, on the 19th of August 1693. He died at Huy two or three days after the battle. In 1691 he had been created earl of Lucan by King James. He married Lady Honora de Burgh, by whom he had one son James, who died childless in 1718. His widow married the duke of Berwick.

J. Todhunter, *Life of Patrick Sarsfield* (London, 1895).

SARTAIN, JOHN (1808–1897), American artist, was born in London, England, on the 24th of October 1808. At the age of twenty-two he emigrated to America, and settled in Philadelphia. He was the pioneer of mezzotint engraving in America. Early in his career he painted portraits in oil and made miniatures; he engraved plates in 1841–1848 for *Graham's Magazine*, published by George Rex Graham (1813–1894); became editor and proprietor of *Campbell's Foreign Semi-Monthly Magazine* in 1843; and from 1849–1852 published with Graham *Sartain's Union Magazine*. He had charge of the art department of the Centennial Exposition, Philadelphia, in 1876; took a prominent part in the work of the committee on the Washington Memorial, by Rudolf Siemering, in Fairmount Park, Philadelphia; designed medallions for the monument to Washington and Lafayette erected in 1869 in Monument Cemetery, Philadelphia; and was a member of the Pennsylvania Academy of the Fine Arts and a cavaliere of the Royal Equestrian Order of the Crown of Italy. He died in Philadelphia on the 25th of October 1897. His *Reminiscences of a Very Old Man* (New York, 1899) are of unusual interest. Of his children WILLIAM SARTAIN (b. 1843), landscape and figure painter, was born at Philadelphia on the 21st of November 1843, studied under his father and under Léon Bonnat, Paris, was one of the founders of the Society of American Artists, and became an associate of the National Academy of Design. Another son, SAMUEL SARTAIN (1830–1906), and a daughter, EMILY SARTAIN (b. 1841), who in 1886 became principal of the Philadelphia School of Design for Women, were also American artists.

SARTHE, a department of north-western France, formed in 1790 out of the eastern part of Maine, and portions of Anjou and of Perche. Pop. (1906) 421,470. Area 2410 sq. m. It is bounded N. by the department of Orne, N.E. by Eure-et-Loir, E. by Loir-et-Cher, S. by Indre-et-Loire and Maine-et-Loire and W. by Mayenne. The Sarthe, a sub-tributary of the Loire, flows in a south-westerly direction through the department; and the Loir, which along with the Sarthe joins the Mayenne to form the Maine above Angers, traverses its southern borders. Broken and elevated country is found in the north and east of the department, which elsewhere is low and undulating. The highest point (on the boundary towards Orne) is 1115 ft. The Sarthe flows past Le Mans and Sablé, receiving the Merdereau and the Vègre from the right, and the Orne Saosnoise and the Huisne from the left. The Loir passes La Flèche, and along its chalky banks caves have been hollowed out which, like those along the Cher and the Loire, serve as dwelling-houses and stores. The mean annual temperature is 51° to 52° Fahr. The rainfall is between 25 and 26 in.

The majority of the inhabitants live by agriculture. There are three distinct districts:—the corn lands to the north of the Sarthe and the Huisne; the region of barren land and moor, partly planted with pine, between those two streams and the Loir; and the wine-growing country to the south of the Loir. Sarthe ranks high among French departments in the production of barley, and more hemp is grown here than in any other department. The raising of cattle and of horses, notably those of the Perche breed, prospers, and fowls and geese are fattened in large numbers for the Paris market. Apples are largely grown for cider. The chief forests are those of Bercé in the south and Perseigne in the north, but the department owes its well-wooded appearance in a great measure to the hedges planted with trees which divide the fields. Coal, marble and freestone are among the mineral products. The staple industry is the weaving of hemp and flax, and cotton and wool-weaving are also carried on. Paper and cardboard are made in several localities. Iron-foundries, copper and bell foundries, factories for provision-preserving, marble-works at Sablé, potteries, tile-works, glass-works and stained-glass manufactories, currieries, machine factories, wire-gauze factories, flour-mills and distilleries are also prominent industrial establishments, a great variety of which are found at Le Mans. Flour, agricultural products, live stock and poultry form the bulk of the exports. The department is served by the Western, the Orléans and the State railways, and the Sarthe and Loir provide about 100 m. of waterway, though the latter river carries little traffic.

The department forms the diocese of Le Mans and part of the ecclesiastical province of Tours, has its court of appeal at Angers, and its educational centre at Caen, and constitutes part of the territory of the IV. army corps, with its headquarters at Le Mans. The four arrondissements are named from Le Mans, the chief town, La Flèche, Mamers and St Calais. The principal places are Le Mans, La Flèche, La Ferté Bernard, Sablé and Solesmes, which receive separate treatment. Besides these places, those of chief architectural interest are Le Lude, which has a fine château of the Renaissance period, Sillé-le-Guillaume, where there is a Gothic church and a stronghold of the 15th century, and St Calais, the church of which dates from the 14th to the 17th centuries.

SARTI, GIUSEPPE (1729–1802), Italian composer, was born at Faenza on the 28th of December 1729. He was educated by Padre Martini, and appointed organist of the cathedral of Faenza before the completion of his nineteenth year. Resigning his appointment in 1750, Sarti devoted himself to the study of dramatic music, becoming director of the Faenza theatre in 1752. In 1751 he produced his first opera, *Pompeo*, with great success. His next works, *Il Rè Pastore*, *Medonte*, *Demofoonte* and *L'Olimpiade*, assured him so brilliant a reputation that in 1753 King Frederick V. of Denmark invited him to Copenhagen, with the appointments of Hofkapellmeister and director of the opera. Here he produced his *Ciro riconosciuto*. In 1765 he travelled to Italy to engage some new singers; meanwhile the death of King Frederick put an end for the time to his engagement. In 1769 he went to London, where he could only contrive to exist by giving music lessons. In 1770 he obtained a post in Venice as music master at the Conservatorio dell' Ospedaletto. In 1779 he was elected maestro di cappella at the cathedral of Milan, where he remained until 1784. Here he exercised his true vocation—composing, in addition to at least twenty of his most successful operas, a vast quantity of sacred music for the cathedral, and educating a number of clever pupils, the most distinguished of whom was Cherubini. In 1784 Sarti was invited by the empress Catherine II. to St Petersburg. On his way thither he stopped at Vienna, where the emperor Joseph II. received him with marked favour, and where he made the acquaintance of Mozart. He reached St Petersburg in 1785, and at once took the direction of the opera, for which he composed many new pieces, besides some very striking sacred music, including a *Te Deum* for the victory of Ochakov, in which he introduced the firing of real cannon. He remained in Russia until 1801, when his health was so broken that he solicited permission to return. The emperor Alexander dismissed him in 1802 with a liberal pension; letters of nobility had been granted to him by the empress Catherine. His most successful operas in Russia were *Armida* and *Olega*, for the latter of which the empress herself wrote the libretto. Sarti died at Berlin on the 28th of July 1802.

Sarti's opera *I Due Litiganti* has been immortalized by Mozart, who introduced an air from it into the supper scene in *Don Giovanni*. It should be noted that Mozart's *Nozze di Figaro* owed a great deal to the influence of this opera, which was performed in Vienna in 1784. The admirable libretto by Da Ponte, author of the libretti of *Figaro* and *Don Giovanni*, shows similar situations, and the complicated finale of the first act served as a model to Mozart for the finale of the last act of *Figaro*.

SARZANA, a town and episcopal see of Liguria, Italy, in the province of Genoa, 9 m. E. of Spezia, on the railway to Pisa, at the point where the railway to Parma diverges to the north, 59 ft. above sea-level. Pop. (1901) 6531 (town); 11,850 (commune). The handsome cathedral of white marble in the Gothic style, dating from 1355, was completed in 1474. It contains two elaborately-sculptured altars of the latter period. The former

citadel (now gaol), built by the Pisans, was demolished and re-erected by Lorenzo de' Medici. The castle of Sarzanello was built by Castruccio Castracani (d. 1328), whose tomb by the Pisan Giovanni di Balducci is in S. Francesco. The Palazzo del Capitano, by Giuliano da Maiano (1472), has been entirely altered. Sarzana has one of the most important glass-bottle factories in Italy, also brick-works and a patent fuel factory.

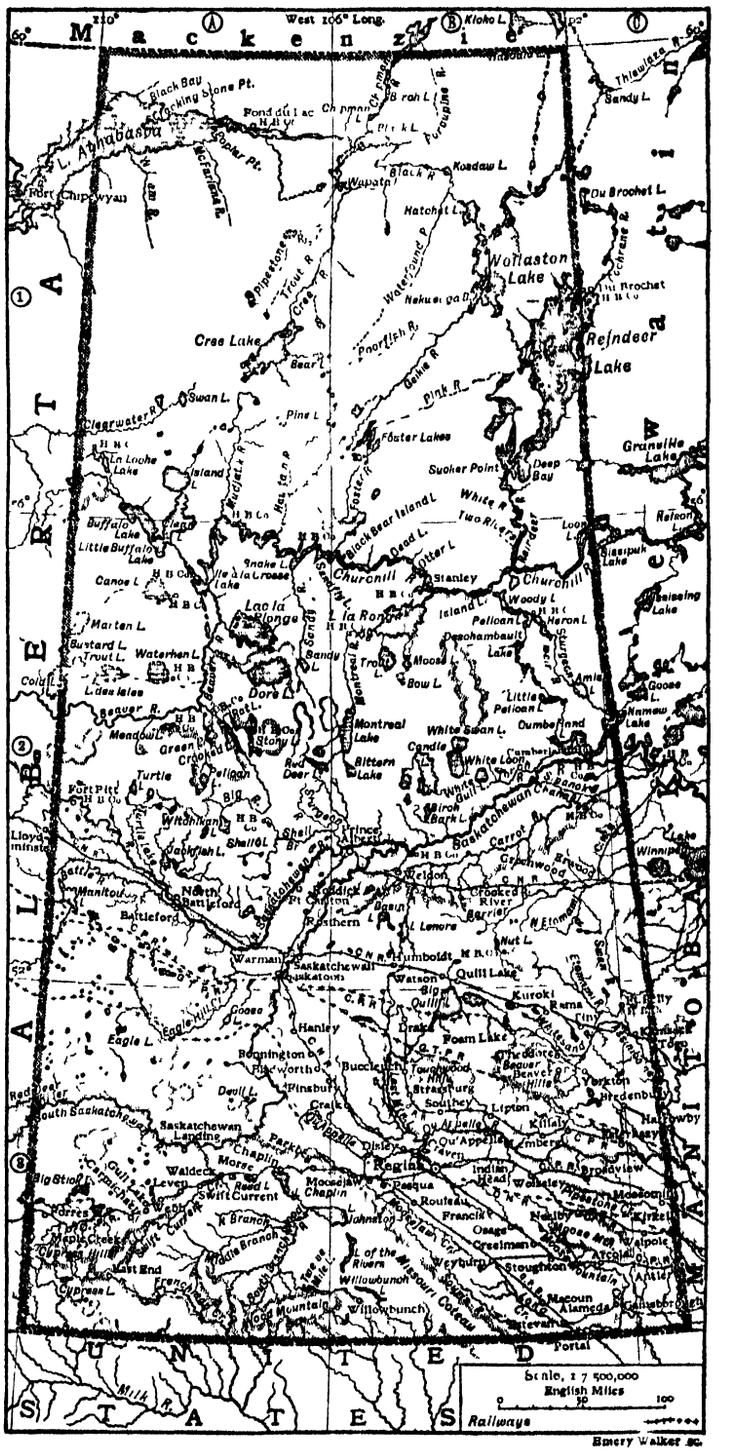
Sarzana was the birthplace of Pope Nicholas V. Its position at the entrance to the valley of the Magra (anc. *Macra*), the boundary between Etruria and Liguria in Roman times, gave it military importance in the middle ages. It arose as the successor of the ancient Luna, 3 m. S.E.; the first mention of it is found in 983, and in 1202 the episcopal see was transferred hither. A branch of the Cadolingi di Borgonuovo family, lords of Fucecchio in Tuscany from the 10th century onwards, which had acquired the name of Bonaparte, had settled near Sarzana before 1264; in 1512 a member of the family took up his residence in Ajaccio, and hence, according to some authorities, was descended the emperor Napoleon I. Sarzana, owing to its position on the frontier, changed masters more than once, belonging first to Pisa, then to Florence, then to the Banco di S. Giorgio of Genoa and from 1572 to Genoa itself. In 1814 it was assigned to the kingdom of Sardinia, the frontier between Liguria and Tuscany being now made to run between it and Carrara.

SĀSANA VAṂSA, a history of the Buddhist order in Burma, which was composed, in that country, by Paññā-sāmi in 1851. It is written in Pali prose; and is based on earlier documents, in Pali or Burmese, still extant, but not yet edited. The earlier part of the work deals with the history of Buddhism outside of Burma. This is based on the Mahāvaṃsa, and other well-known Ceylon works; and has no independent value. The latter part of the work, about three-fifths of the whole, deals with Buddhism in Burma, and contains information not obtainable elsewhere. Down to the 11th century the account is meagre, legendary and incredible. After that date it is sober, intelligible and in all probability mostly accurate. This portion occupies about one hundred pages 8vo in the excellent edition of the text prepared for the Pali Text Society in 1897 by Dr Mabel Bode. It shows a continuous literary effort through the eight and a half centuries, and constantly renewed ecclesiastical controversy. The latter is concerned for the most part with minor questions relating to rules of the order, there being a tendency, as relaxations of the rules crept in with the lapse of time, to hark back to the original simplicity. Of differences in matters of doctrine there is no mention in this manual. Dr Bode has prefixed to her edition a detailed summary of the contents of the book. (T. W. R. D.)

SASARAM, a town of British India, in the Shahabad district of Bengal, with a station on the East Indian railway, 406 m. N.W. from Calcutta. Pop. (1901) 23,644. It is famous as containing the tomb of the Afghan Sher Shah, who defeated Humayun and became emperor of Delhi (1540–1545). The tomb, which is the finest example of Mahommedan architecture in Bengal, stands on an island in the middle of an artificial lake. Close by is the tomb of Sher Shah's father.

SASH. (1) A framework of wood in which glass is fixed for a window, particularly a framework for large panes of glass in two parts which open and shut by sliding up or down. The word is a corruption of the Fr. *châssis, châsse,* Lat. *capsa,* box, case, *capere,* to hold. The word is, therefore, a doublet of "case" and "cash" (*qq.v.*). (2) A long band of silk or other fine or ornamented material worn round the waist or over the shoulders as part of a woman's or child's dress, or as a sign or badge of office, or as part of an official costume or uniform. The word is an adaptation of the Arab. *shāsh,* muslin, especially used (of the soft muslin or silken bands used for wrapping round the head in the form of a turban). In its early uses in English it appears as a term used by oriental travellers and writers on the East as an equivalent for a Mahommedan.

SASKATCHEWAN, a province of Western Canada, lying between the two provinces of Alberta and Manitoba. Area, 250,650 sq. m. The south-eastern portion is chiefly prairie, being the continuation of the second prairie steppe found in Manitoba. About 104° W. the Missouri Coteau, an elevation of several hundred feet, probably an old glacial moraine, crosses the southern boundary and runs north-westward, being the eastern escarpment of the third prairie steppe which runs to the Rocky Mountains. Several elevations of note are found in the southern half of the province. On the central part of the southern boundary is Wood Mountain, a succession of clay hills. On the lower level is Moose Mountain, and north of it Beaver



Hills and Touchwood Hills. These are elevations of morainal or glacial deposits. The river Saskatchewan (*q.v.*) gives its name to the province. In central Saskatchewan near the south bend of the South Saskatchewan begins the river Qu'Appelle ("Who Calls?"), which runs eastward, and crossing the western boundary of Manitoba falls into the Assiniboine river. Farther to the south rises the Souris river, which flows parallel to the Missouri Coteau, passes southward into N. Dakota, and again entering the province of Manitoba finds its way at length into the Assiniboine river. North of the Saskatchewan river the

surface of the province becomes heavily wooded, and this great forest continues through the broken Laurentian and Cambrian region, becoming dwarfed as it goes north. In this portion of the province are found Reindeer Take, and north-west of this the easterly portion of Lake Athabasca, which is on the provincial boundary line of Alberta.

Climate.—Extending as the province does from north to south for more than 750 m., it may be readily seen that, as in the case of Alberta, there will be a great range of climate and temperature. The south-western part of the province is influenced much by the chinook winds which from the Rocky Mountain valleys come through Alberta. The climate here is dry, and portions of the country need irrigation. In south-eastern Saskatchewan the prairie lies on a lower level, there is more moisture, and the climate in winter is more steady. The whole province of Saskatchewan, except the south-western part, is well watered. As in the case of Alberta, the southern third of Saskatchewan has a moderate and changeable climate; in the central third ranging from Regina to Prince Albert it is steady, while in the northern third, through the Laurentian region to 60° N., it is severe. Compare the following table:—

	Elevation.	Mean Temperature.		Average Precipitation.
		Summer.	Winter.	
Maple Creek .	2495 ft.	62°	15·3°	10·18 in.
Swift Current	2423 „	60°	9·4°	17·04 „
Regina . .	1885 „	50°	0°	9·03 „
Prince Albert	1402 „	54·6°	·09°	14·45 „
Battleford .	1615 „	61·4°	7·1°	13·62 „

The animal life of Saskatchewan resembles that of Alberta (*q.v.*), excepting the mountain lion, mountain sheep and mountain goat, which belong to the Rocky Mountains. The plant life of Saskatchewan is much like that of eastern Alberta. The Douglas fir and several varieties of pine found in the Rocky Mountains do not occur.

Population.—By the census of 1906 the population of Saskatchewan was found to be 257,763. It had grown from 91,279 in 1901 (the area of the province being in 1906 somewhat greater than in 1901). The population is to a large extent Canadian, and the immigration has been largely from (1) the British Isles; (2) the United States; (3) the continent of Europe. Several large bodies of foreigners are found. There is a community of upwards of 8000 Doukhobors—a sect of Russian Quakers. Their tenets are peculiar, involving opposition to form in religion, to marriage and to submission to governmental requirements. They desire to hold their land in common. The Russian writer Tolstoy was a promoter of this immigration. Considerable bodies of Galicians are also found in the province. Of the Indian population there were 9049 in 1901; and of Indian half-breeds 7949 in the same year. The Indians of Saskatchewan are chiefly Plain or Wood Crees, with a mixture among them of Saulteaux. Toward the south small bands of Assiniboines are found, and here and there small companies of refugee Sioux from the United States. All the Indians are on government reserves. In these reserves along the Qu'Appelle river are presented many examples of the successful management of the Indians by the Dominion government. These reserves are largely self-supporting; the Indians have comfortable houses, grow considerable crops of grain, make large quantities of hay and possess herds of cattle. At Regina, Qu'Appelle, Crooked Lakes and other industrial schools, young Indians—both male and female—receive a practical education. Many of these are making excellent farmers.

Government, &c.—Throughout the province the municipal system of self-government, especially in the cities, towns and villages, is being introduced. There are two cities in the province, (1) Regina (pop. 9804 in 1907), the capital; (2) Moose Jaw (pop. 6249). The latter is a divisional point on the Canadian Pacific railway, and owes its importance chiefly to its railway connexions. In the northern portion of the province are two considerable towns (1) Prince Albert (pop. 3005), on the banks of the North Saskatchewan river, giving promise of becoming a manufacturing centre, having as it has the great forest on the north side of the Saskatchewan river, adjoining it. (2) Saskatoon (pop. 3011), on the South Saskatchewan river. This, though a new town, bids fair to become a great railway centre. Here the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific railways all cross the great river of the province, and tributary to this town is a large area of arable and prairie land. The Saskatchewan is to some extent navigated, but a serious obstacle, the Grand Rapids, near the mouth of the river, requires a canal to allow the entrance of steamers into Lake Winnipeg. The southern part of the province is being covered by railways, the Canadian Pacific railway having its main line generally parallel to the international boundary line, at a distance of one hundred to one hundred and fifty miles. This railway has south of its main line two important branches: (1) The "Soo" line from Moose Jaw to Estevan, and connecting with the United States' system of railways. (2) The Arcola branch from the south-eastern corner of the province running to Regina. Another branch leaves the main line for the north at Kirkella, and this will make a direct communication with Edmonton, while another branch line enters the province at Harrowby and runs westward to join the Kirkella branch on its way to Saskatoon and Edmonton. The Canadian Northern railway has a line which enters the province at Togo and following the Saskatchewan leaves the province at Lloydminster and pushes on to Edmonton. The Grand Trunk Pacific railway follows a direct line from Winnipeg to Edmonton, entering the province at 51° 25′ N. and leaving it at 52° 35′ N. for the west.

The chief industries of Saskatchewan are cattle-rearing in the northern part and grain growing in the south of the province. Coal is found on the Saskatchewan, and a light variety of lignite on the Souris river near the international boundary. The province follows in general the plan of government found in the other provinces of the Dominion. The capital of the province is Regina (*q.v.*). A provincial governor lives at Regina and he has a cabinet of four ministers. The legislature consists of twenty-five members. The province has adopted a public schools act, which has a proviso for the establishment of separate schools, but this is so surrounded by restrictions as to be almost non-effective, every such school being required in all particulars to follow the public school model. The system covers both secondary and primary public schools. A normal school is in operation at Regina.

The religions of the people are similar to those in the other western provinces of Canada. The principal denominations were in 1901 as follows:—

Presbyterians . .	17,151	Baptists . .	2618
Roman Catholics .	17,116	Doukhobors .	8700
Church of England .	16,418	Greek Church .	2579
Methodists . . .	11,528	Mennonites .	3683
Lutherans . . .	12,098		

History.—The history of Saskatchewan gathers round the Hudson's Bay Company. The open plains of the south were the home of the buffalo and few posts were established here, but the Saskatchewan river was the great line of communication for the fur-traders. It was first reached by the Montreal fur-traders in 1766, and by the Hudson's Bay Company from Hudson Bay in 1772. By this route the traders reached the great fur country of Mackenzie river, and the forts on the Saskatchewan river were notable. These were Fort Cumberland, Fort Carlton and Edmonton House. Alexander Mackenzie in 1789 left Edmonton and Fort Chippewyan (on Lake Athabasca) and going northward discovered Mackenzie river and reached the Arctic Sea. On his second voyage, leaving Fort Chipewyan, he gained the Peace river, and by means of this crossed the Rocky Mountains and reached the Pacific coast (July 22nd, 1793), being first of white men, north of Mexico, to cross the continent. The Saskatchewan and Mackenzie river basins were the real fur country of the traders. The northern portion of the province of Saskatchewan is still the home of the fur-trader.

SASKATCHEWAN (Cree: "Rapid River"), a river of Alberta and Saskatchewan provinces, Canada. Two large streams known as the North and South Saskatchewan unite near Prince Albert, and thence flow E. into Lake Winnipeg. The North Saskatchewan rises in the Rocky Mountains in 52° 07′ N. and 117° 06′ W., and flows east, though with many windings, receiving several important tributaries, including the Clearwater, Brazeau and Battle. The South Saskatchewan is formed by the union of the Bow and the Belly, the former and larger of which rises in western Alberta in one of the highest districts of the Rockies. Flowing east in an extremely tortuous course, it receives the waters of the Red Deer, and farther on turns abruptly north to its junction with the other branch. The length of the united Saskatchewan is about 300 m.; shallow draught steamers ascend from its mouth to Edmonton on the North Branch, a distance of about 850 m.

SASSANID, or SASSANIAN DYNASTY (or SASANIAN), the ruling dynasty of the neo-Persian empire founded by Ardashir I. in

A.D. 226 and destroyed by the Arabs in 637. The dynasty is named after Sāsān, an ancestor of Ardashir I. For a list of the kings and the history of the empire see PERSIA: *Ancient History*, section viii.; for its fall see also CALIPHATE, section A, § 1.

SASSARI, a town and archiepiscopal see of Sardinia, capital of the province of Sassari, situated in the N.W. corner of the island, 12½ m. by rail S.E. of Porto Torres on the north coast, and 21½ m. N.W. of Alghero on the west coast, 762 ft. above sea-level. Pop. (1906) 34,897 (town); 41,638 (commune). The Aragonese castle and the Genoese walls have been demolished in recent times, and the town has a modern aspect, with spacious streets and squares. The cathedral has a baroque façade; but traces of Romanesque work (12th century) can be seen at the sides and in the campanile. The see was transferred from Porto Torres in 1441. S. Maria di Betlemme has a good façade and Romanesque portal of the end of the 13th (?) century (D. Scano, in *L'Arte*, 1905, 134). In the municipal collection are a few pictures of interest. The museum in the university has an interesting collection of antiquities, largely formed by G. Spano, from all parts of the island, and belonging to the prehistoric, Phoenician and Roman periods. To the east of the town is the Fontana del Rosello, which supplied the town with water before the construction of the aqueduct, the water being brought up in small barrels by donkeys. Sassari is connected by rail by a branch (28½ m. E.S.E. to Chilivani) with the main line from Cagliari to Golfo degli Aranci, and with Porto Torres and Alghero. To the district near Sassari belong some of the most picturesque costumes of the island.

The date of the origin of the town is uncertain; but it was no doubt founded as the result of migrations from Porto Torres. This can hardly have occurred during the 11th century, when we find the *giudici* of Torres or Logudoro residing either at Porto Torres or at Ardara; but it must have occurred before 1217, when a body of Corsicans, driven out of their island by the cruelties of a Visconti of Pisa, took refuge at Sassari, and gave their name to a part of the town. About this time we find one of the *giudici* residing at Sassari for a whole summer, no doubt to escape the malaria. The *giudici* continued to exist at least until 1275, and perhaps till 1284, but about 1260 Sassari seems to have shaken itself free, and in 1275 and 1286 we find Pisa treating Sassari as a free commune. In 1288, four years after the defeat of Meloria, Pisa ceded Sassari to Genoa; but Sassari enjoyed internal autonomy, and in 1316 published its statutes (still extant), which are perhaps in part the reproduction of earlier ones. These, however, did not last long, for in 1323 Sassari submitted to the Aragonese king, and lost its independence. Sassari was sacked by the French in 1527, and disastrous pestilences are recorded in 1528, 1580 and 1652. In 1795 Sassari was the centre of the reaction of the barons against the popular ideas sown by the French Revolution; an insurrection of the people led by one Angioi lasted only a short while, and led to reactionary measures.

See P. Satta-Branca, *Il Comune di Sassari nei secoli XIII e XIV* (Rome, 1885). (T. As.)

SASSINA (or *Sarsina*, the modern form), an ancient town of Umbria, Italy, on the left bank of the river Sapis (Savio), 16 m. S. of Caesena (Cesena). In 266 B.C. both consuls, on different dates, celebrated a triumph over the Sassinates, as is recorded in the *Fasti*, and in the enumeration of the Italian allies of the Romans in 225 B.C. the Umbri and Sassinates are mentioned, on an equal footing, as providing 20,000 men between them. It is possible that the *tribus Sapinia* (the name of which is derived from the river Sapis) mentioned by Livy in the account of the Roman marches against the Boii in 201 and 196 B.C. formed a part of the Sassinates. The poet Plautus was a native of Sassina (b. 254 B.C.). The town was of some importance, as inscriptions show; these are preserved in the local museum. Remains of several buildings, one of which was probably the public baths, have been found (A. Santarelli in *Notizie degli scavi*, 1892, 370; A. Negrioli, *ibid.*, 1900, 392). Its milk is frequently mentioned—no doubt it was the centre of a pasture district—and it provided a number of recruits for the praetorian guard. An episcopal see was founded here in the 3rd century A.D. and still exists. The present town has 2291 inhabitants (commune, 3861).

SASSOON, SIR ALBERT ABDULLAH DAVID, BART. (1818–1896), British Indian philanthropist and merchant, was born at Bagdad on the 25th of July 1818, a member of a Jewish family settled there since the beginning of the 16th century, and previously in Spain. His father, a leading Bagdad merchant, was driven by repeated Anti-Semitic outbreaks to remove from Bagdad to Bushire, Persia, and, in 1832, he settled in Bombay where he founded a large banking and mercantile business. Albert Sassoon was educated in India, and on the death of his father became head of the firm. He was a great benefactor to the city of Bombay, among his gifts being the Sassoon dock, completed in 1875, and a handsome proportion of the cost of the new Elphinstone High School. In 1867 he was made a C.S.I., and in 1872 a Knight of the Bath. In 1873 he visited England and received the freedom of the city of London. Shortly afterwards he settled in England, and was made a baronet in 1890. He died at Brighton on the 24th of October 1896.

SATARA, a town and district of British India, in the Central division of Bombay. The name is derived from the "seventeen" walls, towers and gates which the fort was supposed to possess. The town is 2320 ft. above sea-level, near the confluence of the rivers Kistna and Vena, 56 m. S. of Poona. Pop. (1901) 26,022.

The DISTRICT OF SATARA has an area of 4825 sq. m. It contains two hill systems, the Sahyadri, or main range of the Western Ghats, and the Mahadeo range and its offshoots. The former runs through the district from north to south, while the Mahadeo range starts about 10 m. north of Mahabaleshwar and stretches east and south-east across the whole breadth of the district. The Mahadeo hills are bold, presenting bare scarps of black rock like fortresses. Within Satara are two river systems—the Bhima system in a small part of the north and north-east, and the Kistna system throughout the rest of the district. The hill forests have a large store of timber and firewood. The whole of Satara falls within the Deccan trap area; the hills consist of trap intersected by strata of basalt and topped with laterite, while, of the different soils on the plains, the commonest is the black loamy clay containing carbonate of lime. This when well watered is capable of yielding heavy corps. Satara contains some important irrigation works, including the Kistna canal. In some of the western parts of the district the average annual rainfall exceeds 200 in.; but on the eastern side water is scanty, the rainfall varying from 40 in. in Satara town to less than 12 in. in some places farther east. The population in 1901 was 1,146,559, showing a decrease of 6 % in the preceding decade. The principal crops are millet, pulse, oil-seeds and sugar-cane. The only manufactures are cotton cloth, blankets and brass-ware. The district is traversed from north to south by the Southern Mahratta railway, passing 10 m. from Satara town. The Satara agency comprises the two feudatory states of Phaltan and Aundh. Total area 844 sq. m.; pop. (1901) 109,660.

On the overthrow of the Jadhav dynasty in 1312 the district passed to the Mahommedan power, which was consolidated in the reign of the Bahmani kings. On the decline of the Bahmanis towards the end of the 15th century the Bijapur kings finally asserted themselves, and under these kings the Mahrattas arose and laid the foundation of an independent kingdom with Satara as its capital. Intrigues and dissensions in the palace led to the ascendancy of the Peshwas, who removed the capital to Poona in 1749, and degraded the raja of Satara into the position of a political prisoner. The war of 1817 closed the career of the peshwas, and the British then restored the titular raja, and assigned to him the principality of Satara, with an area much larger than the present district. In consequence of political intrigues, he was deposed in 1839, and his brother was placed on the throne. This prince dying without male heirs in 1848, the state was resumed by the British government.

SATELLITE (from the Lat. *satelles*, an attendant), in astronomy, a small opaque body revolving around a planet, as the moon around the earth (see PLANET). In the theory of cubic curves,

Arthur Cayley defined the satellite of a given line to be the line joining the three points in which tangents at the intersections of the given (primary) line and curve again meet the curve.

SATIN-SPAR, a name given to certain fibrous minerals which exhibit, especially when polished, a soft satiny or silky lustre, and are therefore sometimes used as ornamental stones. Such fibrous minerals occur usually in the form of veins or bands, having the fibres disposed transversely. The most common kind of satin-spar is a white finely-fibrous gypsum not infrequently found in the Keuper marls of Nottinghamshire and Derbyshire, and used for beads, &c. Other kinds of satin-spar consist of calcium carbonate, in the form of either aragonite or calcite, these being distinguished from the fibrous gypsum by greater hardness, and from each other by specific gravity and optical characters. The satin-spar of Alston, Cumberland, is a finely-fibrous calcite occurring in veins in a black shale of the Carboniferous series. Fibrous calcite is known sometimes to German mineralogists as *Atlasspath*.

SATIN-WOOD, a beautiful light-coloured hard wood, having a rich, silky lustre, sometimes finely mottled or grained, the produce of a moderate-sized tree, *Chloroxylon Swietenia* (natural order *Meliaceae*), native of India and Ceylon. A similar wood, known under the same name, is obtained in the West Indies, the tree being probably a species of *Zanthoxylum* (natural order *Rutaceae*). Satin-wood was in request for rich furniture about the end of the 18th century, the fashion then being to ornament panels of it with painted medallions and floral scrolls and borders. It is used for inlaying and small veneers, in covering the backs of hair and clothes-brushes and in making small articles of turnery.

SATIRE (Lat. *satira, satura*; see below). Satire, in its literary aspect, may be defined as the expression in adequate terms of the sense of amusement or disgust excited by the ridiculous or unseemly, provided that humour is a distinctly recognizable element, and that the utterance is invested with literary form. Without humour, satire is invective; without literary form, it is mere clownish jeering. It is indeed exceedingly difficult to define the limits between satire and the regions of literary sentiment into which it shades. The first exercise of satire was no doubt coarse and boisterous. It must have consisted in gibing at personal defects; and Homer's description of Thersites, the earliest example of literary satire that has come down to us, probably conveys an accurate delineation of the first satirists. The character reappears in the heroic romances of Ireland and elsewhere; and it is everywhere implied that the licensed backbiter is a warped and distorted being, readier with his tongue than his hands. To dignify satire by rendering it the instrument of morality or the associate of poetry was a development implying considerable advance in the literary art. The latter is the course adopted in the Old Testament, where the few passages approximating to satire, such as Jotham's parable of the bramble and Job's ironical address to his friends, are embellished either by fancy or by feeling. An intermediate stage between personal ridicule and the correction of faults and follies seems to have been represented in Greece by the *Margites*, attributed to Homer, which, while professedly lampooning an individual, practically rebuked the meddling sciolism impersonated in him. In the accounts that have come down to us of the writings of Archilochus, the first great master of satire, we seem to trace the elevation of the instrument of private animosity to an element in public life. Though a merciless assailant of individuals, Archilochus was also a distinguished statesman, naturally for the most part in opposition, and his writings seem to have fulfilled many of the functions of a newspaper press. Their merit is attested by Quintilian; and Gorgias's comparison of them with Plato's persiflage of the Sophists proves that their virulence must have been tempered by grace and refinement. Archilochus also gave satiric poetry its accepted form by the invention of the iambic trimeter, slightly modified into the scazonic metre by his successors. Simonides of Amorgus and Hipponax were distinguished like Archilochus for the bitterness of their attacks on individuals, with which the former combined a strong ethical feeling and the latter a bright active fancy. All three were restless and turbulent, aspiring and discontented, impatient of abuses and theoretically enamoured of liberty; and the loss of their writings, which would have thrown great light on the politics as well as the manners of Greece, is to be lamented. With Hipponax the direct line of Greek satire is interrupted; but two new forms of literary composition, capable of being the vehicles of satire, almost simultaneously appear. Fable is first heard of in Asiatic Greece about this date; and, although its original intention does not seem to have been satirical its adaptability to satiric purposes was soon discovered. A far more important step was the elevation of the rude fun of rustic merrymakings to a literary status by the evolution of the drama from the Bacchic festival. The means had now been found of allying the satiric spirit with exalted poetry, and their union was consummated in the comedies of Aristophanes.

A rude form of satire had existed in Italy from an early date in the shape of the Fescennine verses, the rough and licentious pleasantry of the vintage and harvest, which, lasting down to the 16th century, inspired Tansillo's *Vendemmiatore*. As in Greece, these eventually, about 364 B.C., were developed into a rude drama, originally introduced as a religious expiation. This was at first, Livy tells us (vii. 2), merely pantomimic, as the dialect of the Tuscan actors imported for the occasion was not understood at Rome. Verse, "like to the Fescennine verses in point of style and manner," was soon added to accompany the mimetic action, and, with reference to the variety of metres employed, these probably improvised composition were entitled *Saturae*, a term denoting *miscellany*, and derived from the *satura lanx*, "a charger filled with the first-fruits of the year's produce, anciently offered to Bacchus and Ceres." The Romans thus had originated the name of satire, and, in so far as the Fescennine drama consisted of raillery and ridicule, possessed the thing also; but it had not yet assumed a literary form among them. Livius Andronicus (240 B.C.), the first regular Latin dramatic poet, appears to have been little more than a translator from the Greek. Satires are mentioned among the literary productions of Ennius (200 B.C.) and Pacuvius (170 B.C.), but the title rather refers to the variety of metres employed than to the genius of the composition. The real inventor of Roman satire is Gaius Lucilius (148–103 B.C.), whose *Satirae* seem to have been mostly satirical in the modern acceptation of the term, while the subjects of some of them prove that the title continued to be applied to miscellaneous collections of poems, as was the case even to the time of Varro, whose "Saturae" included prose as well as verse, and appear to have been only partially satirical. The fragments of Lucilius preserved are scanty, but the verdict of Horace, Cicero and Quintilian demonstrates that he was a considerable poet. It is needless to dwell on compositions so universally known as the *Satires* of Lucilius's successor Horace, in whose hands this class of composition received a new development, becoming genial, playful and persuasive. "Arch Horace strove to mend." The didactic element preponderates still more in the philosophical satires of Persius. Yet another form of satire, the rhetorical, was carried to the utmost limits of excellence by Juvenal, the first example of a great tragic satirist. Nearly at the same time Martial, improving on earlier Roman models now lost, gave that satirical turn to the epigram which it only exceptionally possessed in Greece, but has ever since retained. About the same time another variety of satire came into vogue, destined to become the most important of any. The Milesian tale, a form of entertainment probably of Eastern origin, grew in the hands of Petronius and Apuleius into the satirical romance, immensely widening the satirist's field and exempting him from the restraints of metre. Petronius's "Supper of Trimalchio" is the revelation of a new vein, never fully worked till our days. As the novel arose upon the ruins of the epic, so dialogue sprang up upon the wreck of comedy. In Lucian comedy appears adapted to suit the exigencies of an age in which a living drama had become impossible. With him antique satire expires as a distinct branch of literature,—though mention should be made of the sarcasms and libels with which the population of Egypt were for centuries accustomed to insult the Roman conqueror and his parasites. A denunciation of the apostate poet Hor-Uta—a kind of Egyptian "Lost Leader"—composed under Augustus, has been published by M. Revillout from a demotic papyrus.

After the great deluge of barbarism has begun to retire, one form of satire after another peeps forth from the receding flood, the order of development being determined by the circumstances of time and place. In the Byzantine empire, indeed, the link of continuity is unbroken, and such raillery of abuses as is possible under a despotism finds vent in the pale copies of Lucian published in Adolf Ellissen's *Analekten*. The first really important satire, however, is a product of western Europe, recurring to the primitive form of fable, upon which, nevertheless, it constitutes a decided advance. *Reynard the Fox*, a genuine expression of the shrewd and homely Teutonic mind, is a landmark in literature. It gave the beast-epic a development of

which the ancients had not dreamed, and showed how ridicule could be conveyed in a form difficult to resent. About the same time, probably, the popular instinct, perhaps deriving a hint from Rabbinical literature, fashioned Morolf, the prototype of Sancho Panza, the incarnation of sublunar mother-wit contrasted with the starry wisdom of Solomon; and the *Till Eulenspiegel* is a kindred Teutonic creation, but later and less significant. *Piers Ploughman*, the next great work of the class, adapts the apocalyptic machinery of monastic and anchoritic vision to the purposes of satire, as it had often before been adapted to those of ecclesiastical aggrandizement. The clergy were scourged with their own rod by a poet and a Puritan too earnest to be urbane. Satire is a distinct element in Chaucer and Boccaccio, who nevertheless cannot be ranked as satirists. The mock-heroic is successfully revived by Luigi Pulci, and the political songs of the 14th and 15th centuries attest the diffusion of a sense of humour among the people at large. The Renaissance, restoring the knowledge and encouraging the imitation of classic models, sharpened the weapons and enlarged the armoury of the satirist. Partly, perhaps, because Erasmus was no poet, the Lucianic dialogue was the form in the ascendant of his age. Erasmus not merely employed it against superstition and ignorance with infinite and irresistible pleasantry, but fired by his example a bolder writer, untrammelled by the dignity of an arbiter in the republic of letters. The ridicule of Ulric von Hutten's *Epistolae obscurorum virorum* is annihilating, and the art there for the first time fully exemplified though long previously introduced by Plato, of putting the ridicule into the mouth of the victim, is perhaps the most deadly shaft in the quiver of sarcasm. It was afterwards used with even more pointed wit though with less exuberance of humour by Pascal, the first modern example, if Dante may not be so classed of a great tragic satirist. Ethical satire is vigorously represented by Sebastian Brant and his imitator Alexander Barclay; but in general the metrical satirists of the age seem tame in comparison with Erasmus and Hutten, though including the great name of Machiavelli. Sir Thomas More cannot be accounted a satirist, but his idea of an imaginary commonwealth embodied the germ of much subsequent satire.

In the succeeding period politics take the place of literature and religion, producing in France the *Satyre Ménippée*, elsewhere the satirical romance as represented by the *Argenis* of Barclay, which may be defined as the adaptation of the style of Petronius to state affairs. In Spain, where no freedom of criticism existed, the satiric spirit took refuge in the *novela picaresca*, the prototype of Le Sage and the ancestor of Fielding; Quevedo revived the medieval device of the vision as the vehicle of reproof; and Cervantes's immortal work might be classed as a satire were it not so much more. About the same time we notice the appearance of direct imitation of the Roman satirists in English literature in the writings of Donne, Hall and Marston, the further elaboration of the mock-heroic by Tassoni, and the culmination of classical Italian satire in Salvator Rosa. The prodigious development of the drama at this time absorbed much talent that would otherwise have been devoted to satire proper. Most of the great dramatists of the 17th century were more or less satirists, Molière perhaps the most consummate that ever existed; but, with an occasional exception like *Les Précieuses ridicules*, the range of their works is too wide to admit of their being regarded as satires. The next great example of unadulterated satire is Butler's *Hudibras*, and perhaps one more truly representative of satiric aims and methods cannot easily be found. At the same period dignified political satire, bordering on invective, received a great development in Andrew Marvell's *Advices to a Painter*, and was shortly afterwards carried to perfection in Dryden's *Absalom and Achitophel*; while the light literary parody of which Aristophanes had given the pattern in his assaults on Euripides, and which Shakespeare had handled somewhat carelessly in the *Midsummer Night's Dream*, was effectively revived in the duke of Buckingham's *Rehearsal*. In France Boileau was long held to have attained the *ne plus ultra* of the Horatian style in satire and of the mock-heroic, but Pope was soon to show that further progress was possible in both. The polish, point and concentration of Pope remain unsurpassed, as do the amenity of Addison and the daring yet severely logical imagination of Swift; while the *History of John Bull* and the *Pseudologia* place their friend Arbuthnot in the first rank of political satirists.

The 18th century was, indeed, the age of satire. Serious poetry had for the time worn itself out; the most original geniuses of the age, Swift, Defoe and Richardson, are decidedly prosaic, and Pope, though a true poet, is less of a poet than Dryden. In process of time imaginative power revives in Goldsmith and Rousseau; meanwhile Fielding and Smollett have fitted the novel to be the vehicle of satire and much beside, and the literary stage has for a time been almost wholly engrossed by a colossal satirist, a man who has dared the universal application of Shaftesbury's maxim that ridicule is the test of truth. The world had never before seen a satirist on the scale of Voltaire, nor had satire ever played such a part as a factor in impending change. As a master of sarcastic mockery he is unsurpassed; his manner is entirely his own; and he is one of the most intensely national of writers, notwithstanding his vast obligations to English humorists, statesmen and philosophers. English humour also played an important part in the literary regeneration of Germany, where, after Liscow and Rabener, imitators of Swift and the essayists, Lessing, imbued with Pope but not mastered by him, showed how powerful an auxiliary satire can be to criticism—a relation which Pope had somewhat inverted. Another great German writer, Wieland, owes little to the English, but adapts Lucian and Petronius to the 18th century with playful if somewhat mannered grace. Kortum's *Jobsiad*, a most humorous poem, innovates successfully upon established models by making low life, instead of chivalry, the subject of burlesque. Goethe and Schiller, Scott and Wordsworth, are now at hand, and as imagination gains ground satire declines. Byron, who in the 18th century would have been the greatest of satirists, is hurried by the spirit of his age into passion and description, bequeathing, however, a splendid proof of the possibility of allying satire with sublimity in his *Vision of Judgment*. Moore gives the epigram a lyrical turn; Béranger, not for the first time in French literature, makes the gay chanson the instrument of biting jest; and the classic type receives fresh currency from Auguste Barbier. Courier, and subsequently Cormenin, raise the political pamphlet to literary dignity by their poignant wit. Peacock evolves a new type of novel from the study of Athenian comedy. Miss Edgeworth skirts the confines of satire, and Miss Austen seasons her novels with the most exquisite satiric traits. Washington Irving revives the manner of *The Spectator*, and Tieck brings irony and persiflage to the discussion of critical problems. Two great satiric figures remain—one representative of his nation, the other most difficult to class. In all the characteristics of his genius Thackeray is thoroughly English, and the faults and follies he chastises are those especially characteristic of British society. Good sense and the perception of the ridiculous are amalgamated in him; his satire is a thoroughly British article, a little over-solid, a little wanting in finish, but honest, weighty and durable. Posterity must go to him for the humours of the age of Victoria, as they go to Addison for those of Anne's. But Heine hardly belongs to any nation or country, time or place. He ceased to be a German without becoming a Frenchman, and a Jew without becoming a Christian. Only one portrait really suits him, that in Tieck's allegorical tale, where he is represented as a capricious and mischievous elf; but his song is sweeter and his command over the springs of laughter and tears greater than it suited Tieck's purpose to acknowledge. In him the satiric spirit, long confined to established literary forms, seems to obtain unrestrained freedom to wander where it will, nor have the ancient models been followed since by any considerable satirist except the Italian Giusti. The machinery employed by Moore was indeed transplanted to America by James Russell Lowell, whose *Biglow Papers* represent perhaps the highest moral level yet attained by satire.

In no age was the spirit of satire so generally diffused as in the 19th century, but many of its eminent writers, while bordering on the domains of satire, escape the definition of satirist. The term cannot be properly applied to Dickens, the keen observer of the oddities of human life; or to George Eliot, the critic of its emptiness when not inspired by a worthy purpose; or to Balzac, the painter of French society; or to Trollope, the mirror of the middle classes of England. If *Sartor Resartus* could be regarded as a satire, Carlyle would rank among the first of satirists; but the satire, though very obvious, rather accompanies than inspires the composition. The number of minor satirists of merit, on the other hand, is legion. Poole, in his broadly farcical *Little Pedlington*, rang the changes with inexhaustible ingenuity on a single fruitful idea; Jerrold's comedies sparkle with epigrams, and his tales and sketches overflow with quaint humour; Mallock, in his *New Republic*, made the most of personal mimicry, the lowest form of satire; Samuel Butler (*Erewhon*) holds an inverting mirror to the world's face with imperturbable gravity; the humour of Bernard Shaw has always an essential character of satire—the sharpest social lash. One remarkable feature of the modern age is the union of caricature (*q.v.*) with literature. (R. G.)

SATISFACTION (Lat. *satisfacere*, to satisfy), reparation for an injury or offence; payment, pecuniary or otherwise, of a debt or obligation; particularly, in law, an equitable doctrine of much importance. It may operate either as between strangers or as between father and child. As between strangers: it was laid down in *Talbot* v. *Duke of Shrewsbury*, 1714, Pr. Ch. 394, that where a debtor bequeaths to his creditor a legacy as great as, or greater than the debt, the legacy shall be deemed a satisfaction of the debt. This rule, however, has fallen under a considerable amount of discredit, and very small circumstances are required to rebut the presumption of satisfaction. If the debt was incurred after the execution of the will, there is no satisfaction, nor is there where the will giving the legacy contains a direction to pay debts. As between parent and child, the doctrine operates (*a*) in the satisfaction of legacies by portions, and (*b*) of portions by legacies. In the case of (*a*), it has been laid down that where a parent, or one acting *in loco parentis*, gives a legacy to a child, without stating the purpose for which he gives it, it will be understood as a portion; and if the father afterwards advance a portion on the marriage, or preferment

in life, of that child, though of less amount, it is a satisfaction of the whole, or in part. This application of the doctrine is based on the maxim that "equality is equity," as is also the rule (*b*) that where a legacy bequeathed by a parent, or one *in loco parentis*, is as great as, or greater than, a portion or provision previously secured to the child, a presumption arises that the legacy was intended by the parent as a complete satisfaction. In each of the above cases, of course, the presumption may be rebutted by evidence of the testator's intentions.

In theology, the doctrine of satisfaction is the doctrine that the sufferings of Christ are accepted by the divine justice as a substitute for the punishment due for the sins of the world (see ATONEMENT).

SATNA, a British station in Central India, within the state of Rewah, with a station on the East Indian railway, 102 m. S.W. from Allahabad. Pop. (1901) 7471. It is the headquarters of the political agent for Baghelkhand, and an important centre of trade.

SATPURA, a range of hills in the centre of India. Beginning at the lofty plateau of Amarkantak (about 82° E.), the range extends westward almost to the W. coast. From Amarkantak an outer ridge runs S.W. for about 100 m. to a point known as the Saletekri hills in Balaghat district. As it proceeds westward the range narrows from a broad tableland to two parallel ridges enclosing the valley of the Tapti, as far as the famous hill-fortress of Asirgarh. Beyond this point the Khandesh hills, which separate the valley of the Nerbudda from that of the Tapti, complete the chain as far as the Western Ghats. The mean elevation is about 2500 ft.; but the plateaus of Amarkantak and Chauradadar in the east of Mandla district rise to nearly 3500 ft., and many of the peaks and some of the tablelands exceed this altitude. The hill of Khamla in Betul district is 3700 ft., which is also the general height of the Chikalda hills overlooking the Berar plain, while the Pachmarhi hills east of Betul, rising abruptly from the Nerbudda valley, culminate in Dhokgarh at an elevation of 4500 ft. Just east of Asirgarh there is a break in the range, through which passes the railway from Bombay to Jubbulpore, the elevation at this point being about 1240 ft. The extreme length of the range is about 600 m.; the breadth, which is 100 m. at its head across Balaghat and Mandla, diminishes to the narrow ridges of Nimar.

SATRAE, in ancient geography, a Thracian people, inhabiting part of Mount Pangaeus between the rivers Nestus (Mesta) and Strymon (Struma). According to Herodotus, they were independent in his time, and had never been conquered within the memory of man. They dwelt on lofty mountains covered with forests and snow, and on the highest of these was an oracle of Dionysus, whose utterances were delivered by a priestess. They were the chief workers of the gold and silver mines in the district. Herodotus is the only ancient writer who mentions the Satrae, and Tomaschek regards the name not as that of a people but of the warlike nobility among the Thracian Dii and Bessi. J. E. Harrison and others identify them with the Satyri (Satyrs), the attendants and companions of Dionysus in his revels, and also with the Centaurs. The name Satrokentae, a Thracian tribe according to Hecataeus (quoted in Stephanus of Byzantium), seems to support the second identification.

See Herodotus vii. 110-112; J. E. Harrison, *Prolegomena to Greek Religion* (1903), p. 379; W. Tomascheck, *Die alten Thraker* (1893).

SATRAP [Pers. *Khshatrapāvan, i.e.* "protector (superintendent) of the country (or district)," Heb. *sakhshadrapan*, Gr. ἐξαιτράπης (insc. of Miletus, *Sitzungsber. Berl. Ak.* 1900, 112), ἐξαιδραπεύων (insc. of Mylasa, Dittenberger, *Sylloge*, 95), ἐξατράπης (insc. of Mylasa Lebas iii. 388, Theopomp p. 111), shortened into σατράπης], in ancient history, the name given by the Persians to the governors of the provinces. By the earlier Greek authors (Herodotus, Thucydides and often in Xenophon) it is rendered by ὕπαρχος "lieutenant, governor," in the documents from Babylonia and Egypt and in Ezra and Nehemiah by *pakha*, "governor"; and the satrap Mazaeus of Cilicia and Syria in the time of Darius III. and Alexander (Arrian iii. 8) calls himself on his coins "Mazdai, who is [placed] over the country beyond the Euphrates and Cilicia." Cyrus the Great divided his empire into provinces; a definitive organization was given by Darius, who established twenty great satrapies and fixed their tribute (Herodot. iii. 89 sqq.). The satrap was the head of the administration of his province; he collected the taxes, controlled the local officials and the subject tribes and cities, and was the supreme judge of the province to whose "chair" (Nehem. iii. 7) every civil and criminal case could be brought. He was responsible for the safety of the roads (cf. Xenophon, *Anab.* i. 9. 13), and had to put down brigands and rebels. He was assisted by a council of Persians, to which also provincials were admitted; and was controlled by a royal secretary and by emissaries of the king (esp. the "eye of the king"). The regular army of his province and the fortresses were independent of him and commanded by royal officers; but he was allowed to have troops in his own service (in later times mostly Greek mercenaries). The great provinces were divided into many smaller districts, the governors of which are also called satraps and hyparchs. The distribution of the great satrapies was changed occasionally, and often two of them were given to the same man. When the empire decayed, the satraps often enjoyed practical independence, especially as it became customary to appoint them also as generals in chief of their army district, contrary to the original rule. Hence rebellions of satraps became frequent from the middle of the 5th century; under Artaxerxes II. occasionally the greater part of Asia Minor and Syria was in open rebellion. The last great rebellions were put down by Artaxerxes III. The satrapic administration was retained by Alexander and his successors, especially in the Seleucid empire, where the satrap generally is designated as *strategus*; but their provinces were much smaller than under the Persians.

In later times the cult of a god Satrapes occurs in Syrian inscriptions from Palmyra and the Hauran; by Pausanias vi. 25, 6, Satrapes is mentioned as the name of a god who had a statue and a cult in Elis and is identified with Korybas. The origin of this god is obscure; perhaps it arose from a cult connected with a statue or a tomb of some satrap.

See further under PERSIA: *Ancient History*, from the Achaemenid period onwards, and works there quoted (especially section v. § 2). (ED. M.)

SATRICUM (mod. *Conca*), an ancient town of Latium, situated some 30 m. to the S.E. of Rome, in a low-lying region to the S. of the Alban Hills, to the N.W. of the Pomptine Marshes. It was accessible direct from Rome by a road running more or less parallel to the Via Appia, to the S.W. of it. It is said to have been an Alban colony: it was a member of the Latin league of 499 B.C. and became Volscian in 488. It was several times won and lost by the Romans, and twice destroyed by fire. After 346 B.C. we hear of it only in connexion with the temple of Mater Matuta. A. Nibby (*Analisi della carta dei dintorni di Roma*, Rome, 1848, iii. 64) was the first to fix the site upon the low hill, surrounded by tufa cliffs, on which were still scanty remains of walling in rectangular blocks of the same material, which is now occupied by the farm-house of Conca. One mile W.N.W., on the hill above Le Ferriere, remains of an archaic temple, ascribed to Mater Matuta, were discovered by excavation in 1896. The work was begun under the direction of Professor H. Graillot of the University of Bordeaux, member of the French School of Rome, but after two weeks' work was suspended by order of the Italian government, and then resumed under the supervision of their own officials. The objects discovered are in the Museo di Papa Giulio at Rome. Another Satricum lay on the right bank of the Liris, not far from Arpinum.

See H. Graillot in *Mélanges de l'école française de Rome* (1896), 131; and *Notizie degli scavi* (1896), *passim*. (T. As.)

SATSUMA ISLANDS, a group of islands belonging to Japan, lying westward of the province of Satsuma (31° 40′ N. and 129° 40′ E.). The two principal are Kami-Koshiki-shima (24½ m. by 5½) and Shimo-Koshiki-shima (8½ m. by 5½).

SATTERLEE, WALTER (1844–1908), American figure and genre painter, was born in Brooklyn, New York, on the 18th of January 1844. He graduated at Columbia University in 1863, studied in the National Academy of Design, and with Edwin

White, in New York, and in 1878–1879 under Léon Bonnat in Paris. He first exhibited at the National Academy in 1868, was elected an associate of the Academy in 1879, and received its Thomas B. Clarke prize in 1886. He was a member of the American Water Color Society and of the New York Etching Club, and was an excellent teacher. Satterlee died in Brooklyn on the 28th of May 1908. Among his favourite subjects were Arab life and figures in the costume of the colonial period.

SATURN [SATURNUS], a god of ancient Italy, whom the Romans, and till recently the moderns, identified with the Greek god Cronus.

1. Cronus was the youngest of the Titans, the children of Sky (Uranus) and Earth (Gaea). Besides the Titans, Sky and Earth had other children, the Cyclopes and the Hundred-handers. When the Cyclopes and the Hundred-handers proved troublesome, Sky thrust them back into the bosom of Earth. This vexed Earth, and she called on her sons to avenge her on their father Sky. They all shrank from the deed save Cronus, who waylaid and mutilated his father with a sickle or curved sword. From the drops of blood which fell to the earth sprang the Furies and the Giants. Cronus now reigned in room of Sky. His wife was Rhea, who was also his sister, being a daughter of Sky and Earth. Sky and Earth had foretold to Cronus that he would be deposed by one of his own children, so he swallowed them one after another as soon as they were born. Thus he devoured Hestia, Demeter, Hera, Hades and Poseidon. But when Rhea had brought forth Zeus, the youngest,[1] she wrapped up a stone in swaddling clothes and gave it to Cronus, who swallowed it instead of the babe. When Zeus, who had been hidden in Crete, grew up, he gave his father a dose which compelled him to disgorge first the stone and then the children whom he had swallowed. The stone was preserved at Delphi; every day it was anointed and on festivals it was crowned with wool. Zeus and his brothers now rebelled against Cronus, and after a ten years' struggle they were victorious. Cronus and the Titans were thrust down to Tartarus, where they were guarded by the Hundred-handers. According to others, Cronus was removed to the Islands of the Blest, where he ruled over the departed heroes, judging them in conjunction with Rhadamanthus. Plutarch (*De Def. Orac.* 18) mentions a story that the dethroned monarch of the gods slept on an island of the northern seas guarded by Briareus and surrounded by a train of attendant divinities. The reign of Cronus was supposed to have been the golden age, when men lived like gods, free from toil and grief and the weakness of old age (for death was like sleep); and the earth brought forth abundantly without cultivation. There are few traces of the worship of Cronus in Greece. Pausanias, in his description of Greece, mentions only one temple of Cronus; it stood at the foot of the Acropolis at Athens and was sacred to Cronus and Rhea jointly. The Athenians celebrated an annual festival in his honour on the 12th of Hecatombaeon. A mountain at Olympia was called after him, and on its top annual sacrifices were offered to him at the spring equinox.

The idea that Cronus was the god of time seems to have arisen from a simple confusion between the words Cronus and Chronus ("time"). Curtius derives Cronus from the root *kra*, meaning "to accomplish." Cronus may have been a god of some aboriginal half-savage tribe which the Greeks conquered. Hence the savage traits in his legend, his conquest by Zeus and the scanty traces of his worship in Greece. The myth of the mutilation of Sky by Cronus may be a particular form of the widespread story of the violent separation of Sky and Earth by one of their children. Other forms of this myth are found in New Zealand, India and China. Parallels to the swallowing and disgorging incident are to be found in the folklore of Bushmen, Kaffres, Basutos, Indians of Guiana and Eskimo.

2. Saturn and his wife Ops were amongst the oldest deities of ancient Italy. He is said to have had an altar at the foot of the Capitol before Rome was founded. Saturn was a god of agriculture, his name being derived from *serere*, "to sow."[2] The identification of Saturn with Cronus[3] gave rise to the legend that after his deposition by Zeus (Jupiter) Saturn wandered to Italy, where he ruled as king in the golden age and gave the name Saturnia to the country.[4] Janus, another of the most ancient gods of Italy, is said to have welcomed him to Rome, and here he settled at the foot of the Capitol, which was called after him the Saturnian Hill. His temple stood at the ascent from the Forum to the Capitol and was one of the oldest buildings in Rome, but the eight remaining columns of the temple probably formed a portion of a new temple built in the imperial times. The image of Saturn in this temple had woollen bands fastened round its feet all the year through, except at the festival of the Saturnalia; the object of the bands was probably to detain the deity. Similarly there was a fettered image of Enyalius (the War God) at Sparta, and at Athens the image of Victory had no wings, lest she might fly away. The mode of sacrifice at this temple was so far peculiar that the head of the sacrificer was bare as in the Greek ritual, instead of being covered, as was the usual Roman practice. Legend said that the Greek ritual was introduced by Hercules, who at the same time abolished the human sacrifices previously offered to Saturn. Others said that the rule had been observed by the Pelasgians before. Under or behind the temple was the Roman treasury, in which the archives as well as the treasures of the state were preserved. Dionysius Halicamassensis (*Ant. Rom.* i. 34) tells that there were many sanctuaries of Saturn in Italy and that many towns and places, especially mountains, were called after him. The oldest national form of verse was known as the Saturnian. Like many other figures in Roman mythology, Saturn is said to have vanished at last from earth. His emblem was a sickle. The substitution of a great scythe for the sickle, and the addition of wings and an hour-glass, are modern.[5] Ops ("plenty"), wife of Saturn, was an earth-goddess, as appears from the custom observed by her suppliants of sitting and carefully touching the earth while they made their vows to her. As goddess of crops and the harvest she was called Consiva, and under this name had a sanctuary at Rome, to which only the Vestals and the priest were admitted. As Saturn was identified in later times with Cronus, so was Ops with Rhea. Another goddess mentioned as wife of Saturn was Lua, a goddess of barrenness. She was one of the deities to whom after a victory the spoils of the enemy were sometimes dedicated and burned.

Saturnalia.—This, the great festival of Saturn, was celebrated on the 19th, but after Caesar's reform of the calendar on the 17th, of December. Augustus decreed that the 17th should be sacred to Saturn and the 19th to Ops.[6] Henceforward it appears that the 17th and 18th were devoted to the Saturnalia, and the 19th and 20th to the Opalia, a festival of Ops.[7] Caligula added a fifth day, "the day of youth" (*dies juvenalis*), devoted no doubt to the sports of the young. But in popular usage the festival lasted seven days. The woollen fetters were taken from the feet of the image of Saturn, and each man offered a pig. During the festival schools were closed; no war was declared or battle fought; no punishment was inflicted. In place of the toga an undress garment (*synthesis*) was worn. Distinctions of rank were laid aside: slaves sat at table with their masters or were waited on by them, and the utmost freedom of speech was allowed them. Gambling with dice, at other times illegal, was now permitted.[8] All classes exchanged gifts, the commonest being wax tapers and clay dolls. These dolls were especially given to children, and the makers of them held a regular fair at this time. Varro thought these dolls represented original sacrifices of human beings to the infernal god. There was, as we have seen, a tradition that human sacrifices were once offered to Saturn, and the Greeks and Romans gave the name of Cronus and Saturn to a cruel Phoenician Baal, to whom, *e.g.* children were sacrificed at Carthage. The Cronus to whom human sacrifices are said to have been offered in Rhodes was probably a Baal, for there are traces of Phoenician worship in Rhodes. It may be conjectured that the Saturnalia was originally a celebration of the winter solstice. Hence

[1] So Hesiod. But, according to Homer, Zeus was the eldest of the children of Cronus and Rhea.

[2] He was also known by the epithet of Stercutus or Sterculius, the god of fertilizing manure.

[3] Cronus himself was a harvest god under one of his aspects.

[4] He is said to have taught the inhabitants of Latium agriculture, the art of navigation and the use of stamped pieces of metal for money.

[5] During the first centuries of the Christian era, Saturn was one of the chief popular divinities of northern Africa, representing the Carthaginian Baal under the title of Dominus Saturnus; see Toutain, *De Saturni dei in Africa Romana cultu* (1894).

[6] There was also a special festival, Opeconsiva, on Aug. 25.

[7] The fourth day of the festival was added by some one unknown.

[8] It is curious to find a similar rule with a similar exception in Nepal. See H. A. Oldfield, *Sketches from Nepal*, vol. ii. pp. 353 sq.

the legend that it was instituted by Romulus under the name of the Brumalia (*bruma* = winter solstice). The prominence given to candles at the festival points to the custom of making a new fire at this time. The custom of solemnly kindling fires at the summer solstice (Eve of St John) has prevailed in most parts of Europe, notably in Germany, and there are traces (of which the yule-log is one) of the observance of a similar custom at the winter solstice. In ancient Mexico a new fire was kindled, amid great rejoicings, at the end of every period of fifty-two years.

The designation of the planets by the names of gods is at least as old as the 4th century B.C. The first certain mention of the star of Cronus (Saturn) is in Aristotle (*Metaphysics*, p. 1073 b. 35). The name also occurs in the *Epinomis* (p. 987 b), a dialogue of uncertain date, wrongly ascribed to Plato. In Latin, Cicero (1st century B.C.) is the first author who speaks of the planet Saturn. The application of the name Saturn to a day of the week (*Saturni dies*, Saturday) is first found in Tibullus (i. 3, 18). (J. G. Fr.; X.)

SATURN, in astronomy, the sixth major planet in the order of distance from the sun, and the most distant one known before the discovery of Uranus in 1781. Its symbol is ♄. Its periodic time is somewhat less than 30 years, and the interval between oppositions is from 12 to 13 days greater than a year. It appears as a star of at least the first magnitude, but varies much in brightness with its orbital position, owing to the varying phases of its rings. It seems to resemble Jupiter in its physical constitution, but the belts and cloud-like features so conspicuous on that planet are so faint on Saturn that they can be seen only in a general way as a slight mottling. In colour the planet has a warmish tint, not dissimilar to that of Arcturus. Its density is the smallest known among the planets, being only 0·13 that of the earth, and therefore less than that of water.

Owing to the difficulty of distinguishing any individual feature, the rotation of the planet has been observed only on a few rare occasions when a temporary bright spot appeared and continued during several days. The first observation of such a spot was made by the elder Herschel, who derived a rotation period of 10 h. 16 m. In December 1876 a bright spot appeared near the equator of the planet, which was observed by Asaph Hall at Washington for more than a month. It gradually spread out in longitude, and finally faded away. The time of rotation found by Hall was 10 h. 14 m. 24 s. A third spot appeared in 1903 on the northern hemisphere, and had a rotation period of about 10 h. 38 m. The deviation of this period from the others indicates that, as in the case of Jupiter and the sun, the time of rotation is least at the equator, and increases toward the poles. Both from this difference and from the appearance presented by the planet it is clear that the visible surface is not a solid, as in the case of Mars, but consists of a layer of cloudy or vaporous matter, which conceals from view the solid body of the planet, if any such exists. Owing to the rapid rotation the figure of the disk is markedly elliptical, but when, owing to the rings being seen edgewise, the entire disk is visible, the latter sometimes seems to have the form of a square with its edges rounded off. This may be an illusion.

The most remarkable feature associated with Saturn is its magnificent system of ring and satellites. The former is unique in the solar system. The ring, the seeming ends of which were first seen by Galileo as handles to the planet, was for some time a mystery. After Galileo had seen it at one or two oppositions, it faded from sight, a result which we now know was due to the advance of the planet in its orbit, bringing our line of sight edgeways to the ring. When it reappeared, Galileo seems to have abandoned telescopic observation, but the "ansae" of Saturn remained a subject of study through a generation of his successors without any solution of their mystery being reached. The truth was at length worked out in 1656 by Huygens, who first circulated his solution in the form of an anagram. When arranged in order the letters read:

"Annulo cingitur tenui, plano, nusquam cohaerente, ad eclipticam inclinato."

This designation of a plain thin ring surrounding the planet, but disconnected from it, and inclined to the ecliptic, is accurate and as complete as the means of observation permitted.

The varying phases presented by the ring arise from its having an inclination of 27° to the orbit of the planet, while its plane remains invariable in direction as the planet performs its orbital revolution. There are therefore two opposite points of the orbit, at each of which the plane of the ring passes through the sun, and is seen nearly edgeways from the earth. At the two intermediate points the ring is seen as opened out at an angle of 27°. The apparent illuminated surface which it then presents to us exceeds that presented by the planet, so that the brightness of the entire system to the naked eye is more than double.

In 1665 William Ball or Balle, joint-founder and first treasurer of the Royal Society, discovered that the ring was apparently formed of two concentric rings, separated by a fine dark line. This was afterwards independently discovered by G. D. Cassini at the Paris Observatory. As the telescope was improved, yet other shaded lines concentric with the ring itself were found. These were sometimes regarded as divisions, but if they are such they are by no means complete and sharp. The universal rule is that, if we consider any portion of the ring contained between two circles concentric with the ring itself, the general aspect and brightness of this circular portion are alike through its whole circumference. That is to say, if the brightness of different parts of the ring be compared, it is found to be constant when the parts compared are equally distant from the centre, but subject to variation as we pass from the circumference towards the centre. The inner and broader of the two rings is brightest near the outer part and shades off toward the planet, gradually at first, and more rapidly afterwards. Its inner portion is so dark that it was at one time regarded as separate, and called the "crape" or "dusky" ring. This supposed discovery of an inner ring was made independently by W. R. Dawes of England and G. P. Bond of the Harvard Observatory, though J. G. Galle at Berlin noticed the actual appearance at an earlier date. The more powerful telescopes of the present time show this dusky ring to be continuous with the inner portions of the main ring, and transparent, at least near its inner edge.

The physical constitution of the rings is unlike that of any other object in the solar system. They are not formed of a continuous mass of solid or liquid matter, but of discrete particles of unknown minuteness, probably widely separated in proportion to their individual volumes, yet so close as to appear continuous when viewed from the earth. This constitution was first divined by Cassini early in the 18th century. But, although the impossibility that a continuous ring could surround a planet without falling upon it was shown by Laplace, and must have been evident to all investigators in celestial mechanics, Cassini's explanation was forgotten until 1848. In that year James Clerk Maxwell, in an essay which was the first to gain the newly-founded Adams prize of the university of Cambridge, made an exhaustive mathematical investigation of the satellite constitution, showing that it alone could fulfil the conditions of stability. Although this demonstration placed the subject beyond doubt, it was of great interest when J. E. Keeler at the Allegheny Observatory proved this constitution by spectroscopic observation in 1895. He found by measuring the velocity of different parts of the ring to or from the earth that, as we pass from the outer to the inner regions of the ring, the velocity of revolution around the planet increases, each concentric portion of the ring having the speed belonging to a satellite revolving in a circular orbit at the same distance from the planet.

A remarkable feature of the rings is that they are so thin as to elude measurement and nearly disappear from view when seen edgeways even in powerful telescopes. As this can happen only at the rare moments when the plane of the ring passes accurately through the earth, precise observations of the phenomenon with powerful telescopes are few. But before or after the epochs at which the plane passes through the sun, there is sometimes a period of several weeks, during which the sun shines on one face of the ring while the other is presented to the earth. In October 1907 the appearance presented by the rings was studied by W. W. Campbell at the Lick Observatory, and E. E. Barnard at the Yerkes Observatory. The position of the ring as seen against the planet is marked by a dark line stretching across the equator, which is the thin shadow of the ring, on which the sun shines at a very acute angle.

An interesting question still open is the nature of the so-called divisions of the rings. Are these divisions real or are they simply apparent, arising from a darker colour in the matter which composes them? In the case of the sharpest and best-known division, to which the name of Cassini has been given from its first observer, there would seem to be little doubt that the division is real. But there is some doubt in the case of the other divisions. While many excellent observers have sometimes thought they saw a complete separation between the bright and the crape rings, no such phenomenon has been seen in the great telescopes of our times, and it is almost certain that the dark colour of the crape ring arises merely from its tenuity and transparency. From Barnard's observation of the passage of Japetus through the shadow of Saturn and its rings it appears that the transparency gradually diminishes from the centre of this ring to its line of junction with the bright ring. If there should ever be a transit of Saturn centrally past a bright star, many questions as to the constitution of the rings may be settled by noting the times at which the star was seen through the divisions of the ring.

Elements of the Satellites of Saturn.

	Mean Longitude.	Epoch Greenwich Mean Noon.	Mean Daily Motion.	Mean Distance.	Eccentricity.	Long. of Pericentre.	Mass Saturn.
Mimas	127° 19·0′	1889, April	381·9945°	26·814″	Small	Doubtful	16,340,000
Enceladus	199 19·8	,,	272·73199	34·401	,,	,,	4,000,000
Tethys	284 31·0	,,	190·69795	42·586	,,	,,	921,500
Dione	253 51·4	,,	131·534975	54·543	,,	,,	536,000
Rhea	358 23·8	,,	79·690087	76·170	,,	,,	250,000
Titan	260 25·1	1890, Jan.	22·5770093	176·578	·02886	276° 15′ + 31·7′t	4,700
Hyperion	304 31·8	,,	16·919983	213·92	·1043	255 47 − 18·663°t	unknown
Japetus	75 26·4	1885, Sept. 1	4·537997	514·59	·02836	354 30 + 7·9°t	100,000
Phoebe	343 9·0	1900, Jan.	− 0·65398	1871·6	·1659	291 2 − 0·27°t	unknown

Satellites of Saturn.

Saturn is surrounded by a system of nine or (perhaps) ten satellites. The brightest of these was discovered by Huygens in 1665 while pursuing his studies of the ring. The following table shows the names, distances, times of revolution, discoverer and date of discovery of the nine whose orbits are well established:

Name.	Distance.	Periodic Time.	Discoverer.	Date of Discovery.
		d. h.		
1 Mimas	3·1	0 23	W. Herschel	1789, Sept. 17
2 Enceladus	4·0	1 9	,,	1789, Aug. 28
3 Tethys	5·0	1 21	G. D. Cassini	1684, March
4 Dione	6·3	2 18	,,	1684, March
5 Rhea	8·9	4 12	,,	1672, Dec. 23
6 Titan	20·5	15 23	Huygens	1655, Mar. 25
7 Hyperion	25·1	21 7	W. C. Bond	1848, Sept. 16
8 Japetus	59·6	79 8	J. D. Cassini	1671, October
9 Phoebe	209·3	546 12	W. H. Pickering	1898, August

The five inner satellites seem to form a class by themselves, of which the distinguishing feature is that the orbits are so nearly circular that no eccentricity has been certainly detected in them, and that the planes of their orbits coincide with that of the ring and, it may be inferred, with the plane of the planet's equator. Thus, so far as the position of the planes of rotation and revolution are concerned, the system keeps together as if it were rigid. This results from the mutual attraction of the various bodies. A remarkable feature of this inner system is the near approach to commensurability in the periods of revolution. The period of Tethys is nearly double that of Mimas, and the period of Enceladus nearly double that of Dione. The result of this near approach to commensurability is a wide libration in the longitudes of the satellites, having periods very long compared with the times of revolution.

Each of the four outer satellites has some special feature of interest. Titan is much the brightest of all and has therefore been most accurately observed. Hyperion is so small as to be visible only in a powerful telescope, and has a quite eccentric orbit. Its time of revolution is almost commensurable with that of Titan, the ratio of the period being 3 to 4. The result is that the major axis of the orbit of Hyperion has a retrograde motion of 18° 40′ annually, of such a character that the conjunction of the two satellites always occurs near the apocentre of the orbit, when the distance of the orbit from that of Titan is the greatest. This is among the most interesting phenomena of celestial mechanics. Japetus has the peculiarity of always appearing brighter when seen to the west of the planet than when seen to the east. This is explained by the supposition that, like our moon, this satellite always presents the same face to the central body, and is darker in colour on one side than on the other.

In studying a series of photographs of the sky in the neighbourhood of Saturn, taken at the branch Harvard observatory at Arequipa, Peru, W. H. Pickering found on each of three plates a very faint star which was missing on the other two. He concluded that these were the images of a satellite moving around the planet. The latter was then entering the Milky Way, where minute stars were so numerous that it was not easy to confirm the discovery. When the planet began to emerge from the Milky Way no difficulty was found in relocating the object, and proving that it was a ninth satellite. Its motion was found to be retrograde, a conclusion confirmed by Frank E. Ross. This phenomenon may be regarded as unique in the solar system, for, although the motion of the satellite of Neptune is retrograde, it is the only known satellite of that planet.

Another extremely faint satellite has probably been established by Pickering, but its orbit is still in some doubt.

The conclusions from the spectrum of Saturn, and numerical particulars relating to the planet, are found in the article PLANET.

The planes of the orbits of the inner six satellites are coincident with the plane of the ring system, of which the elements are as follow:

Longitude of ascending node on ecliptic	167° 43′ 29″
Inclination	28° 10′ 22″
Exterior diameter of outer ring, in miles	166,920
Interior ,, ,, ,,	147,670
Exterior ,, inner ring ,,	144,310
Interior ,, ,, ,,	109,100
Interior ,, dark ring ,,	91,780
Breadth of outer bright ring ,,	9,625
Breadth of division between the rings, in miles	1,680
Breadth of inner bright ring ,,	17,605
Breadth of dark ring ,,	8,660
Breadth of system of bright rings ,,	28,910
Breadth of entire system of rings ,,	37,570
Space between planet and dark rings ,,	9,760

(S. N.)

SATURNIA (mod. *Saturnia*), an ancient town of Etruria Italy, about 23 m. N.E. of Orbetello and the coast. Dionysius of Halicarnassus enumerates it among the towns first occupied by the Pelasgi and then by the Tuscans. A Roman colony was conducted there in 183 B.C., and it was a *praefectura*, but otherwise little is known about it. Remains of the city walls, in the polygonal style, still exist, to which Roman gates were added. Roman remains have also been discovered within the town, and remains of tombs outside, originally covered by tumuli, which have now disappeared, so that Dennis wrongly took them for megalithic remains. Pitigliano, some 12 m. to the S.W., is another Etruscan site.

See G. Dennis, *Cities and Cemeteries of Etruria* (London, 1883), i. 496; ii. 275; A. Pasqui in *Notizie degli scavi* (1882), 52.

(T. As.)

SATURNIAN METRE (Lat. *Saturnius*, *i.e.* which relates to Saturn), the name given by the Romans to the crude and irregular measures of the oldest Latin folk-songs. The scansion is generally of the following type:

⏑ – ⏑ – ⏑ – ⏑ | – ⏑ – ⏑ – ⏑

with which Macaulay compares the nursery rhyme, "The Queen was in her parlour, eating bread and honey." There was, however, considerable licence in the scansion, and we can gather only that the verse was generally of this type, and had a light and vivacious movement. It occurs in a few inscriptions (the verses on the tombs of the Scipios: cf. Bücheler, *Anthologia Latina*, 1895) in fragments, Livius Andronicus and the *Bellum Punicum* of Naevius. Subsequently it was ousted by Greek metres. The question as to whether it depended upon accent or upon quantity has been much discussed.

See Keller, *Der saturnische Vers* (Prague, 1883 and 1886); Thurneysen, *Der Saturnier* (Halle, 1885); Havet, *De saturnio Latinorum versu* (Paris, 1880); Muller, *Der saturnische Vers und seine Denkmäler* (1885); Leo, *Der saturnische Vers* (1905); Du Bois, *Stress Accent in Roman Poetry* (New York, 1906); also Mommsen, *Hist. of Rome*, i. chap. xv.

SATURNINUS, LUCIUS APPULEIUS, Roman demagogue. As quaestor (104 B.C.) he superintended the importation of corn at Ostia, but had been removed by the Senate (an unusual proceeding), and replaced by M. Aemilius Scaurus (*q.v.*), one of the chief members of the government party. He does not appear to have been charged with incapacity or mismanagement,

and the injustice of his dismissal drove him into the arms of the popular party. In 103 he was elected tribune. He entered into an agreement with C. Marius, and in order to gain the favour of his soldiers proposed that each of his veterans should receive an allotment of 100 jugera of land in Africa. He was also chiefly instrumental in securing the election of Marius to his fourth consulship (102). An opportunity of retaliating on the nobility was afforded him by the arrival (101) of ambassadors from Mithradates VI. of Pontus, with large sums of money for bribing the senate; compromising revelations were made by Saturninus, who insulted the ambassadors. He was brought to trial for violating the law of nations, and only escaped conviction by an *ad misericordiam* appeal to the people. To the first tribunate of Saturninus is probably to be assigned his law on *majestas*, the exact provisions of which are unknown, but its object was probably to strengthen the power of the tribunes and the popular party; it dealt with the *minuta majestas* (diminished authority) of the Roman people, that is, with all acts tending to impair the integrity of the Commonwealth, being thus more comprehensive than the modern word "treason." One of the chief objects of Saturninus's hatred was Q. Caecilius Metellus Numidicus, who, when censor, endeavoured to remove Saturninus from the senate on the ground of immorality, but his colleague refused to assent. In order to ingratiate himself with the people, who still cherished the memory of the Gracchi, Saturninus took about with him Equitius, a paid freedman, who gave himself out to be the son of Tiberius Gracchus. Although the mother of the Gracchi refused to acknowledge him, the people stoned Metellus because he would not admit his claim to citizenship. Equitius was afterwards elected tribune. Marius, on his return to Rome after his victory over the Cimbri, finding himself isolated in the senate, entered into a compact with Saturninus and his ally C. Servilius Glaucia, and the three formed a kind of triumvirate, supported by the veterans of Marius and the needy rabble. By the aid of bribery and assassination Marius was elected (100) consul for the sixth time, Glaucia praetor, and Saturninus tribune for the second time. Saturninus now brought forward an agrarian law, an extension of the African law already alluded to. It was proposed that all the land north of the Padus (Po) lately in possession of the Cimbri, including that of the independent Celtic tribes which had been temporarily occupied by them, should be held available for distribution among the veterans of Marius. This was unjust, since the land was really the property of the provincials who had been dispossessed by the Cimbri. Colonies were to be founded in Sicily, Achaea and Macedonia, on the purchase of which the "Tolosan gold," the temple treasures embezzled by Q. Servilius Caepio (praetor 110), was to be employed. Further, Italians were to be admitted to these colonies, and as they were to be burgess colonies, the right of the Italians to equality with the Romans was thereby partially recognized. This part of the bill was resented by many citizens, who were unwilling to allow others to share their privileges. A clause provided that, within five days after the passing of the law, every senator should take an oath to observe it, under penalty of being expelled from the senate and heavily fined. All the senators subsequently took the oath except Metellus, who went into exile. Saturninus also brought in a bill, the object of which was to gain the support of the rabble by supplying corn at a nominal price. The quaestor Q. Servilius Caepio[1] declared that the treasury could not stand the strain, and Saturninus's own colleagues interposed their veto. Saturninus ordered the voting to continue, and Caepio dispersed the meeting by violence. The senate declared the proceedings null and void, because thunder had been heard; Saturninus replied that the senate had better remain quiet, otherwise the thunder might be followed by hail. The bills (*leges Appuleiae*) were finally passed by the aid of the Marian veterans.

Marius, finding himself overshadowed by his colleagues and compromised by their excesses, thought seriously of breaking with them, and Saturninus and Glaucia saw that their only hope of safety lay in their retention of office. Saturninus was elected tribune for the third time for the year beginning the 10th of December 100, and Glaucia, although at the time praetor and therefore not eligible until after the lapse of two years, was a candidate for the consulship. M. Antonius the orator was elected without opposition; the other government candidate, Gaius Memmius, who seemed to have the better chance of success, was beaten to death by the hired agents of Saturninus and Glaucia, while the voting was actually going on. This produced a complete revulsion of public feeling. The senate met on the following day, declared Saturninus and Glaucia public enemies, and called upon Marius to defend the State. Marius had no alternative but to obey. Saturninus, defeated in a pitched battle in the Forum (Dec. 10), took refuge with his followers in the Capitol, where, the water supply having been cut off, they were forced to capitulate. Marius, having assured them that their lives would be spared, removed them to the Curia Hostilia, intending to proceed against them according to law. But the more impetuous members of the aristocratic party climbed on to the roof, stripped off the tiles, and stoned Saturninus and many others to death. Glaucia, who had escaped into a house, was dragged out and killed.

[1] According to some, the son of the Caepio mentioned above. But chronological reasons make the relationship doubtful.

BIBLIOGRAPHY. — Appian, *Bell. civ.* i. 28-33; Diod. Sic. xxxvi. 12; Plutarch, *Marius*, 28-30; Livy, *Epit.* 69; Florus iii. 16; Vell. Pat. ii. 12; Auctor ad Herennium i. 21; Aurelius Victor, *De viris illustribus*, 73; Orosius v. 17; Cicero, *Pro Balbo*, 21, 48, *Brutus*, 62, *De oratore*, ii. 49, *De haruspicum responsis*, 19, *Pro Sestio*, 47, *Pro Rabirio*, passim; Mommsen, *Hist. of Rome* (Eng. trans), bk. iv. ch. 6; G. Long, *Decline of the Roman Republic*, ii. ch. 10; E. Klebs in Pauly-Wissowa's *Realencyclopädie*, ii. 1 (1896); see further ROME: *History*, II., "The Republic," Period C.

SATYRS (SATYRI), in Greek mythology, spirits, half-man half-beast, that haunted the woods and mountains, companions of Pan and Dionysus. They are not mentioned in Homer; in a fragment of Hesiod they are called brothers of the mountain nymphs and Curetes, an idle and worthless race. Fancy represented them as strongly built, with flat noses, pointed ears, small horns growing out of the forehead, and the tails of horses or goats. They were a roguish but faint-hearted folk, lovers of wine and women, roaming to the music of pipes and cymbals, castanets and bagpipes, dancing with the nymphs or pursuing them and striking terror into men. They had a special form of dance called *Sikinnis*. In earlier Greek art they appear as old and ugly, but in later art, especially in works of the Attic school, this savage character is softened into a more youthful and graceful aspect. There is a famous statue supposed to be a copy of a work of Praxiteles, representing a graceful satyr leaning against a tree with a flute in his hand. In Attica there was a species of drama known as the Satyric; it parodied the legends of gods and heroes, and the chorus was composed of satyrs. Euripides's play of the *Cyclops* is the only extant example of this kind of drama. The older satyrs were called Sileni, the younger Satyrisci. By the Roman poets they were often confounded with the Fauns. The symbol of the shy and timid satyr was the hare. In some districts of modern Greece the spirits known as Calicantsars offer points of resemblance to the ancient satyrs; they have goats' ears and the feet of asses or goats, are covered with hair, and love women and the dance. The herdsmen of Parnassus believe in a demon of the mountain who is lord of hares and goats.

Satyr in art important.

In the Authorized Version of Isa. xiii. 21, xxxiv. 14 the word "satyr" is used to render the Hebrew *sē'irim*, "hairy ones." A kind of demon or supernatural being known to Hebrew folk-lore as inhabiting waste places is meant; a practice of sacrificing to the *sē'irim* is alluded to in Lev. xvii. 7, where E. V. has "devils." They correspond to the "shaggy demon of the mountain-pass" (*azabb al-'akaba*) of old Arab superstition.

SAUCE, flavouring or seasoning for food, usually in a liquid or semi-liquid state, either served separately or mixed with the dish. The preparation of suitable sauces is one of the essentials of good cookery. The word comes through the Fr. from the Lat. *salsa*, salted or pickled food (*salire*, to season or sprinkle with *sal*, salt). The same Latin word has also given "saucer," properly a dish for sauce, now a small flat plate with a depressed centre to hold a cup and so prevent the spilling of liquid, and

"sausage" (O. Fr. *saulcisse*, Late Lat. *salsicium*), minced seasoned meat, chiefly pork, stuffed into coverings of skin. The colloquial use of "saucy," impertinent, "cheeky" is an obvious transference from the tartness or pungency of a sauce, and has a respectable literary ancestry; thus Latimer (*Misc. Sel.*) "when we see a fellow sturdy, lofty and proud, men say this is a saucy fellow."

SAUERLAND, a mountainous district of Germany, in the Prussian province of Westphalia, between the Sieg and the Ruhr, separated by the former from the Westerwald on the S., and by the latter from the coal formation of Ardey on the N. It is a well-wooded plateau of the Devonian formation, diversified by deep valleys and tracts of heather land. The district is a favourite tourist resort.

See F. W. Grimme, *Das Sauerland und seine Bewohner* (2nd ed., Paderborn, 1886); Fricke, *Der Tourist im Sauerland* (Bielefeld, 1892), and Kneebusch, *Reiseführer durch das Sauerland* (Dortmund, 1899).

SAUGOR, or SAGAR, a town and district of British India, in the Jubbulpore division of the Central Provinces. The town, in a picturesque situation on a spur of the Vindhyan hills, 1758 ft. above sea-level, has a station on the Indian Midland railway. Pop. (1901) 42,330. It has long ceased to be a growing place, though it is still third in importance in the province. It was founded in 1660, but owes its importance to having been made the capital of the Mahratta governor who established himself here in 1735. The cantonments contain a battery of artillery, a detachment of a European regiment, a native cavalry and a native infantry regiment. The town is handsomely built, and is an emporium of trade.

The DISTRICT OF SAUGOR has an area of 3962 sq. m. It is an extensive, elevated and in parts tolerably level plain, broken in places by low hills of the Vindhyan sandstone. It is traversed by numerous streams, chief of which are the Sunar, Beas, Dhasan and Bina, all flowing in a northerly direction towards the valley of the Ganges. In the southern and central parts the soil is black, formed by decaying trap; to the north and east it is a reddish-brown alluvium. Iron ore of excellent quality is found and worked at Hirapur, a small village in the extreme north-east. The district contains several densely wooded tracts, the largest of which is the Ramna teak forest preserve in the north.

The population in 1901 was 469,479, showing a decrease of 20 % in the decade, due to the results of famine. The principal crops are wheat, millet, pulse, oil-seeds and a little cotton. The main line of the Indian Midland railway crosses the district, with a branch from Bina to Katni on the East Indian system.

By a treaty concluded with the Mahratta Peshwa in 1818, the greater part of the present district was made over to the British; and the town became the capital of the Saugor and Nerbudda Territories, then attached to the North-western Provinces. During the Mutiny of 1857 the whole district was in the possession of the rebels, excepting the town and fort, in which the Europeans were shut up for eight months, till relieved by Sir Hugh Rose. The rebels were totally defeated and order was again restored by March 1858.

See the *Saugor District Gazetteer* (Allahabad, 1907).

SAUJBULAGH, or SUJBULAK, the principal town of the Mukri district, in the province of Azerbaijan in Persia, in a fertile valley, between 30 and 40 m. S. of Lake Urmia, at an elevation of 4270 ft. It has post and telegraph offices, and a population of about 7000, mostly Kurds of the Mukri tribe, and exports dried fruit, grain and tobacco. There are many more localities with this name (Turkish, meaning "cold stream," or "cold spring") in Persia, the most notable, after the above-mentioned Kurdish city, being a district of the province of Teheran, with many villages. The place was temporarily occupied by Turkish troops in January 1908.

SAUL (Heb. *shā'ūl*, "asked"), in the Old Testament, son of Kish, and king of Israel.[1] His history is closely interwoven with that of the prophet Samuel and the Judaean king David. Two distinct accounts are given of his rise. In one Samuel, after defeating the Philistines, rules as the last "judge" of Israel; the people demand a king, and Saul, a young giant of Benjamin, is chosen by lot; the choice is confirmed when he delivers Jabesh-Gilead from the Ammonites (1 Sam. i.-viii., x. 17-27, xi., xii.). In the other, Saul is raised up by Yahweh to deliver Israel from a sore Philistine oppression. Samuel, a seer of local fame, previously unknown to Saul, gives him the divine commission, and ultimately a complete victory is gained which is celebrated by the erection of an altar (ix. 1–x. 16, xiii. seq.). See further SAMUEL. Once king, Saul achieves conquests over the surrounding states, and the brief summary in 1 Sam. xiv. 47-51 may be supplemented by 2 Sam. i. 19 sqq., where the brave deeds of the loving pair Saul and his son Jonathan, and their untimely death, form the subject of an old poem which vividly describes the feelings of a prostrate nation. Saul and his sons fell in the battle on Mt. Gilboa in the north and the land was thrown into confusion (1 Sam. xxxi.). Jabesh-Gilead, mindful of its debt, secretly carried away the dead bodies (cf. 2 Sam. xxi. 12 seq.), and Abner the commander hurriedly removed the surviving son, Ishbosheth,[2] to Mahanaim and at length succeeded in establishing his power over all Israel north of Jerusalem (2 Sam. ii. 8 seq.). But the sequel is lost in the more popular accounts of the rise of David.

Little old tradition is preserved of the house of Saul. The interest now lies in the prominence of Samuel, and more particularly in the coming supremacy of the Judaean king David (see the introductory verse 1 Sam. xiv. 52); as a result of this Saul is depicted in less sympathetic colours, his pettiness and animosity stand in strong contrast to David's chivalry and resignation, and in the melancholy Benjamite court with its rivalry and jealousy, the romantic attachment between David and Jonathan forms the one redeeming feature. The great Israelite disaster is foreshadowed in a thrilling narrative of Saul's visit to the since famous Witch of Endor (1 Sam. xxviii.). Israel had lost its mainstay through the death of Samuel (cf. xii. 23), and the king, uneasy at the approach of the enemy, invoked the shade of the prophet only to learn that his cause was lost through his own sin. The incident is now connected with David's nearing supremacy, and refers to a previous act of disobedience in his Amalekite campaign. In a detailed account of Saul's expedition we learn that his failure to carry out Yahweh's commands to the letter had brought the prophet's denunciation (cf. Ahab, 1 Kings xx. 42), and that he had lost the divine favour (xv.). This in turn ignores an earlier occasion when Saul is condemned and the loss of his kingdom foretold ere he had accomplished the task to which he had been called (xiii. 8-14).[3]

This later tendency to subordinate the history of Saul to that of David appears especially in a number of detailed and popular narratives encircling Judah and Benjamin, superseding other traditions which give an entirely different representation of David's move from the south to Jerusalem. Consequently it proves impossible to present a consistent outline of the history. Instead of the sequel to Ishbaal's recovery of power, and instead of David's incessant conflicts north of Hebron, ending with the capture of Jerusalem and its district from a strange people (2 Sam. v. xxi. 15-22, xxiii. 8 sqq.), we meet with the stories of the war with Benjamin and Israel, of the intrigue of Abner (*q.v.*) and the vengeance of Joab (*q.v.*). While Saul's death had left Israel in the hands of the Philistines, it is David who accomplishes the deliverance of the people (2 Sam. iii. 18, xix. 9). So, also, in accordance with his generous nature, David takes vengeance upon the Amalekite who had slain Saul (2 Sam. i. 6-10, contrast the details in 1 Sam. xxxi.), and upon the treacherous aliens who had murdered Ishbaal (iv.). When king at Jerusalem (seven years after Saul's death) he seeks out the survivors of Saul in order to fulfil his covenant with Jonathan. Jonathan's son Mephibosheth[4] is found in safe-keeping east of the Jordan

[1] On the name Saul, also that of an Edomite king (Gen. xxxvi. 37 seq.), see SAMUEL note 1. Kish seems to be identical with the Arabic personal and god-name Ḳais.

[2] Ishbosheth, *i.e.* Ishbaal, "man of Baal," cf. 1 Chron. viii. 33.

[3] For other explanations see 1 Chron. x. 13 seq. (which refers to 1 Sam. xxviii.), and Josephus, *Ant.* vi. 14, 9 (a reference to Saul's massacre of the priests at Nob, 1 Sam. xxii., a crime which is not brought to his charge in biblical history and probably belongs to one of the latest traditions).

[4] Perhaps Meribaal, "man of Baal," or Meribbaal, "Baal contends"; for the intentional alteration of the name cf. note 2 above, and see BAAL.

and is installed at court (ix.). Another impression is given by the relations between David and Saul's daughter, Michal (vi. 16 sqq., cf. also the "wives" in xii. 8), and we learn from yet another source that he handed over Saul's sons to the Gibeonites who had previously suffered from the king's bloodthirsty zeal (xxi. 1-14). On this occasion (the date is quite uncertain) the remains of Saul and Jonathan were removed from Jabesh-Gilead and solemnly interred in Benjamin. During Absalom's revolt, Mephibosheth entertained some hopes of reviving the fortunes of his house (xvi. 1-4, xix. 24-30), and two Benjamites, Shimei and Sheba, appear (xvi. 5 sqq., xix. 16-23, xx.). But there is no concerted action; the three are independent figures whose presence indicates that Judaean supremacy over Israel was not accepted without a protest, and that the spilt blood of the house of Saul was laid upon the shoulders of David. Henceforth Saul's family disappears from the pages of history. But a genealogy of his descendants (1 Chron. viii. 33-40, ix. 39-44) tells of "mighty men of valour, archers," who with their sons number 150 strong, and this interesting post-exilic list is suggestive for the vitality of the traditions of their ancestors.

In surveying the earlier traditions of Saul's rise, it is clear that the desperate state of Israel leaves little room for the quiet picture of the inexperienced youth wandering around in search of his father's asses, or for the otherwise valuable representation of popular cult at the local sanctuaries (1 Sam. ix.). Since it is Saul who is commissioned to deliver Israel, it is disconcerting to meet his grown-up son who slays the Philistine "garrison" (rather "officer") in Geba (Gibeah, xiii. 3 seq.), and takes the initiative in overthrowing the Philistines (xiv. 1-16); yet the account which follows of Jonathan's violation of Saul's hasty vow and its consequences prepares us for the subsequent stories of the unfriendly relations between the two. Finally the absence of any prelude to the Philistine oppression is perplexing. On the other hand, Judg. x. 6 sqq. (*now* the introduction to the Gileadite Jephthah and the Ammonites) contain references (now obscure) to the distress caused by the Philistines, the straitened circumstances of the people, and their penitent appeal to Yahweh. When at length Yahweh "could bear the misery of Israel no longer," it is evident that in the original connexion some deliverer was raised. But the sequel cannot be found in the Danite Samson, the priest Eli, or the seer Samuel, and it is only in the history of Saul that Yahweh's answer to the people's cry leads to the appointment of the saviour. The traces of the older accounts of Saul's rise and the fragments in the highly composite introduction in Judg. x. (*vv. 7a, 8b*, 10-16) agree so materially that unless both the prelude to the former and the sequel to the latter have been lost it is probable that the two were once closely connected, but have been severed in the course of the literary growth of the traditions. See further SAMUEL, Books, § 6.

The development of views regarding the pre-monarchical "judges," the rise of the monarchy and its place in the religion of Yahweh have been factors quite as powerful as the growth of national tradition of the first king of Israel and the subordination of the narratives in order to give greater prominence to the first king of the Judaean dynasty. Although a considerable body of native tradition encircled the great Israelite heroes (cf. Ahab, Jehu, the wars of Aramaeans and Ammonites), Saul is pre-eminently a Benjamite figure. From the biblical evidence alone it is far from certain that this is the earliest phase. Saul's deliverance of Jabesh-Gilead from Ammon and his burial may suggest (on the analogy of Jephthah) that Gilead regarded him as its own. Some connexion between Gilead and Benjamin may be inferred from Judg. xxi., and, indeed, the decimation of the latter (see *ibid.* xx. 4, 7, xxi. 13 seq.) seems to link the appearance of the tribe in the earlier history with its new rise under Saul. But the history of the tribe as such in this period is shrouded in obscurity, and the Benjamite cycle appears to represent quite secondary and purely local forms of the great founder of the Israelite monarchy, whose traditions contain features which link him now with another founder of Israel—the warrior Joshua, and now with the still more famous invader and conqueror Jacob.

See S. A. Cook, *Critical Notes on O. T. History* (Index, *s.v.*), and art. JEWS, §§ 6-8, SAMUEL (Books). (S. A. C.)

SAULT SAINTE MARIE, a city and the county-seat of Chippewa county, Michigan, U.S.A., on Saint Mary's river, at the outlet of Lake Superior and at the E. end of the upper peninsula. Pop. (1890) 5760; (1900) 10,538, of whom 5329 were foreign-born; (1910 census), 12,615. It is served by the Canadian Pacific, the Duluth, South Shore & Atlantic, and the Minneapolis, Saint Paul & Sault Sainte Marie railways. A railway bridge (3607 ft. long, completed in 1887) and steam ferries connect it with the Canadian town of Sault Sainte Marie (pop. 1901, 7169) on the opposite side of the river. The principal buildings are the Court House, City Hall, Post Office, Custom House and Carnegie Library (1905). Fort Brady, in the south-western part of the city, is an infantry garrison; the old Ft. Brady (built about 1822) in another part of the city is still standing.

The river is here nearly 1 m. wide and falls 20 ft. in three-fourths of a mile; it has been made navigable by lock canals for vessels drawing 20 ft. of water. The North West Fur Company built a lock here in 1797–1798. A canal 5700 ft. long, navigable for vessels of 11·5 ft. draught, was completed by the state in 1855. Between 1870 and 1881 the Federal government widened the canal to 100 ft., made the draught 16 ft., and built the Weitzel lock, 515 ft. long, 80 ft. wide, 60 ft. at gate openings, with a lift of 18-20 ft.; in 1896 the Poe lock (on the site of the old state locks), having a lift of 18-20 ft., and measuring 800 ft. × 100 ft., was opened, and the canal and its approaches were deepened. In 1908 the government began the widening of the canal above the locks and the construction of a new lock, 1350 ft. long between gates and having a draft of 24·5 ft. at extreme low-water. The estimated cost of this lock and approaches is $6,200,000. In 1907 the commerce passing here during the navigation season of eight months and twenty-three days amounted to 58,217,214 tons of freight, valued at more than $600,000,000; the commerce passing through the canals at this point is larger than that of any other canal in the world. There is a ship canal (1⅛ m. long) on the Canadian side of the river, which was completed in 1895 at a cost of $3,750,000. From the rapids opposite the city two water-power plants (of 50,000 and 10,000 h.p. respectively) derive their power; the larger, a hydraulic water-power canal (costing, with power equipment, $6,500,000) is 1½ m. long, and extends from the lake above to a power-house below the rapids; in this power-house are 320 turbines. The total value of the factory product in 1904 was $2,412,481, an increase of 231·3 % over that of 1900. Much hay and fish are packed and shipped here.

The place was long a favourite fishing-ground of the Chippewa Indians. It was visited by the French missionaries Rambault and Joques in 1641 and by Père René Ménard in 1660. In 1668 Jacques Marquette founded a mission here. In 1671 the governor-general of New France called a great council of the Indians here and in the name of the king of France took formal possession of all the country S. to the Gulf of Mexico and W. to the Pacific. The mission was abandoned in 1689; but as a trading post of minor importance—for a time protected by a palisade fort—the settlement was continued. In 1879 Sault Sainte Marie was incorporated as a village; in 1887 it was chartered as a city.

For an account of the mission see Antoine I. Rezek, *History of the Diocese of Sault Ste Marie and Marquette* (2 vols., Houghton, Mich., 1906–1907); see also A. B. Gilbert's "A Tale of Two Cities" in *Historical Collections*, vol. 29 (Lansing, 1901) of the Michigan Pioneer and Historical Society.

SAUMAREZ, JAMES SAUMAREZ [or SAUSMAREZ], BARON DE (1757–1836), English admiral, was descended from an old family, and was born at St Peter Port, Guernsey, 11th of March 1757. Many of his ancestors had distinguished themselves in the naval service, and he entered it as midshipman at the age of thirteen. For his bravery at the attack of Charleston in 1776 on board the "Bristol" he was raised to the rank of lieutenant, and he was promoted commander for his gallant services off the Dogger Bank, 5th of August 1781, when he was wounded. In command of the "Russell," 70, he contributed to Rodney's victory over De Grasse (12th of April 1782). For the capture of "La Réunion," a French frigate, in 1793, he was knighted. While in command of a small squadron he was on the 5th of June 1794 attacked by a superior French force on the way from Plymouth to Guernsey, but succeeded in gaining a safe anchorage in Guernsey harbour. After being promoted to the "Orion," 74, in 1795, he took part in the defeat of the French fleet off Lorient, on the 22nd of June, distinguished himself in the battle of Cape St Vincent in February 1797, and was present at the blockade of Cadiz from February 1797 to April 1798, and at the battle of the Nile, where he was wounded. On his return from Egypt he received the command of the "Caesar," 84, with orders to watch the French fleet off Brest during the winters of 1799 and 1800. In 1801 he was raised to the rank of rear-admiral of the blue, was created a baronet, and received the command of a small squadron which was destined to watch the movements of the Spanish fleet at Cadiz. Between the 6th and 12th of July he performed a brilliant piece of service, in which after a first repulse at Algeciras he routed a much superior combined force of French and Spanish ships. For his services

Saumarez received the order of the Bath and the freedom of the city of London. In 1803 he received a pension of £1200 a year. On the outbreak of the war with Russia in 1809 he was given command of the Baltic fleet. He held it during the wars preceding the fall of Napoleon, and his tact was conspicuously shown towards the government of Sweden at the crisis of the invasion of Russia. Charles XIII. (Bernadotte) bestowed on him the grand cross of the military order of the Sword. At the peace of 1814 he attained the rank of admiral; and in 1819 he was made rear-admiral, in 1821 vice-admiral of Great Britain. He was raised to the peerage as Baron de Saumarez in 1831, and died at Guernsey on the 9th of October 1836.

See *Memoirs of Admiral Lord de Saumarez*, by Sir John Ross (2 vols., 1838).

SAUMUR, a town of western France, capital of an arrondissement in the department of Maine-et-Loire, 28 m. S.E. of Angers on the railway to Tours. Pop. (1906) 14,747. Saumur is well situated on the left bank of the Loire, which here receives the Thouet, and on an island in the river. A large metal bridge connects the Tours-Angers railway with that of Montreuil-Bellay, by which Saumur communicates with Poitiers and Niort. Two stone bridges (764 and 905 ft. long) unite the town on the island with the two banks of the river. Several of the Saumur churches are interesting. St Pierre, of the 12th century, has a 17th-century façade and a Renaissance nave; and Notre-Dame of Nantilly, often visited by Louis XI., who rebuilt portions of it, has a remarkable though greatly damaged façade, a doorway and choir of the 12th century, and a nave of the 11th. Both these churches contain curious tapestries, and in the latter, fixed in the wall, is the copper cross of Gilles de Tyr, keeper of the seals to St Louis. St Jean is a small building in the purest Gothic style of Anjou. St Nicolas-du-Chardonnet, in the Gothic style of the 12th century, has a fine modern spire. Notre-Dame of Ardilliers, of the 16th century, was enlarged in the following century by Richelieu and Madame de Montespan. The hotel de ville, containing a museum and library, is an elegant 16th century edifice; and the whole town is rich in examples of the domestic architecture of the 15th, 16th and 17th centuries. The house known as the Maison de la Reine Cécile (15th century) was built by René, duke of Anjou. The castle, built between the 11th century and the 13th, and remodelled in the 16th, is used as an arsenal and powder magazine. There is also an interesting almshouse, with its chambers in part dug out in the rock. The famous cavalry school of Saumur was founded in 1768 and is used for the special training of young officers appointed to cavalry regiments on leaving the cadet school of St Cyr. Other public institutions are the sub-prefecture, tribunals of first instance and of commerce, a chamber of commerce, a branch of the Bank of France, colleges for both sexes and a horticultural garden, with a school of vines. Saumur prepares and carries on a large trade in the sparkling white wines grown in the neighbourhood, as well as in brandy, grain, flax and hemp; and it manufactures enamels and rosaries and carries on liqueur-distilling.

The Saumur caves along the Loire and on both sides of the valley of the Thouet must have been occupied at a very remote period. The Tour du Tronc (9th century), the old stronghold of Saumur, served as a place of refuge for the inhabitants of the surrounding district during foreign invasions (whence perhaps the name Saumur, from *Salons Murus*) and became the nucleus of a monastery built by monks from St Florent le Vieil. On the same site rose the castle of Saumur two hundred years later. The town fell into the hands of Foulques Nerra, duke of Anjou, in 1025, and passed in the 13th century into the possession of the kings of France. The English failed to capture it during the Hundred Years' War. After the Reformation the town became the metropolis of Protestantism in France and the seat of a theological seminary. The school of Saumur, as opposed to that of Sedan, represented the more liberal side of French Protestantism (Cameron, Amyraut, &c.). In 1623 the fortifications were dismantled; and the revocation of the edict of Nantes reduced the population by more than one half. In June 1793, the town was occupied by the Vendeans, against whom it soon afterwards became a base of operations for the republican army.

SAUNDERSON, EDWARD JAMES (1837–1906), Irish politician, was born at Castle Saunderson, Co. Cavan, on the 1st of October 1837. He was the son of Alexander Saunderson, M.P. for Cavan (d. 1857), his mother being a daughter of the 6th Baron Farnham. The Irish Saundersons were a 17th century branch of an old family, originally of Durham; a Lincolnshire branch, the Saundersons of Saxby, held the titles of Viscount Castleton (Irish: cr. 1628) and Baron Saunderson (British: cr. 1714) up to 1723. Edward Saunderson was educated abroad, and, having succeeded to the Cavan estates, married in 1865 a daughter of the 3rd Baron Ventry, and in the same year was elected M.P. for the county as a Palmerstonian Liberal. He lost his seat in 1874, and by 1885, when he again entered parliament for North Armagh, he had become a prominent Orangeman and a Conservative; the question of Irish home rule had now come to the front, and Saunderson's political career as a representative Irish Unionist had begun. He had entered the Cavan militia (4th battalion Royal Irish Fusiliers) in 1862, and was now major (1875), becoming colonel in 1886 and in command of the battalion from 1891 to 1893. Almost from the first he became leader of the Irish Unionist party in the House of Commons, his uncompromising speeches being full of force and humour. In 1898 his services were recognized by his being made a privy councillor. He died on the 21st of October 1906. In private life Colonel Saunderson was well known as a keen yachtsman; his character was deeply marked by stern religious feeling, and his fine sincerity, while endearing him to his friends, never lost him the respect of his opponents.

See the *Memoir* by Reginald Lucas (1908).

SAUNDERSON, or SANDERSON, **NICHOLAS** (1682–1739), English mathematician, was born at Thurlstone, Yorkshire, in January 1682. When about a year old he lost his sight through smallpox; but this did not prevent him from acquiring a knowledge of Latin and Greek, and studying mathematics. In 1707 he began lecturing at Cambridge on the principles of the Newtonian philosophy, and in November 1711 he succeeded William Whiston, the Lucasian professor of mathematics in Cambridge. He was created doctor of laws in 1728 by command of George II., and in 1736 was admitted a member of the Royal Society. He died of scurvy, on the 19th of April 1739.

Saunderson possessed the friendship of many of the eminent mathematicians of the time, such as Sir Isaac Newton, Edmund Halley, Abraham De Moivre and Roger Cotes. His senses of hearing and touch were extraordinarily acute, and he could carry on mentally long and intricate mathematical calculations. He devised a calculating machine or abacus, by which he could perform arithmetical and algebraical operations by the sense of touch; this method is sometimes termed his *palpable arithmetic*, an account of which is given in his elaborate *Elements of Algebra* (2 vols., Cambridge, 1740). Of his other writings, prepared for the use of his pupils, the only one which has been published is *The Method of Fluxions* (1 vol., London, 1756). At the end of this treatise there is given, in Latin, an explanation of the principal propositions of Sir Isaac Newton's philosophy.

SAUNTER, to loiter, lounge, walk idly or lazily. The derivation of the word has given rise to some curiously far-fetched guesses; thus it has been referred to the Holy Land, *La Sainte Terre*, where pilgrims lingered and loitered, or to the supposed tendency to idle propensities of those who possess no landed property, *sans terre*. The most probable suggestions are (1) that of Wedgwood, who connects it with a word in exactly the English sense which appears in various forms in Scandinavian languages, Icel. *slentr*, Dan. *slentre*, Swed. *slentra*, cf. *slen*, sloth, *slunt*, lout; this derivation assumes the disappearance of the *l*. (2) That supported by Skeat, and first propounded by Blackley (*Word Gossip*, 1869), which connects it with the Middle Eng. *aunter*, adventure; it may represent the Fr. *s'aventurer*, to go out on an adventure, and the sense-development would be from the idle and apparently objectless expeditions of knights-errant in search of adventure.

SAUROPSIDA. This name was introduced by T. H. Huxley in his *Introduction to the Classification of Animals* (1869), to designate a province of the *Vertebrata* formed by the union of the *Aves* with the *Reptilia*. In his *Elements of Comparative Anatomy* (1864) he had used the term "Sauroids" for the same province. The five divisions of the *Vertebrata*—*Pisces*, *Amphibia*, *Reptilia*, *Aves*, and *Mammalia*—are all distinctly definable, but their relations to one another differ considerably in degree. Whilst it

was Huxley's great merit to emphasize by the term *Sauropsida* the close and direct relationship between the classes of reptiles and birds, it was an unfortunate innovation to brigade the Amphibia and fishes as *Ichthyopsida*, thereby separating the Amphibia much more from the reptiles than is justifiable, more than perhaps he himself intended. The great gulf within the recent Vertebrata lies between fishes, absolutely aquatic creatures with internal gills and "fins" on the one side, and on the other side all the other, tetrapodous creatures with lungs and fingers and toes, for which H. Credner has found the excellent term of *Tetrapoda*. Another drawback of Huxley's divisions resulted in the tendency of alienating the Mammalia, the third division, from the reptiles whilst trying to connect their ancestry with the Amphibia, a view which even now has some vigorous advocates.

The characters which distinguish the *Sauropsida*, that is, which are common to birds and reptiles, and not found combined in the other classes, have been thus summarized by Huxley: no branchiae at any period of existence; a well-developed amnion and allantois present in the embryo; a mandible composed of many bones and articulated to the skull by a quadrate bone; nucleated blood-corpuscles; no separate parasphenoid bone in the skull; and a single occipital condyle. In addition to these principal characters others exist which are found in all birds and reptiles, but are not exclusively confined to them. The oviduct is always a Müllerian duct separate from the ovary and opening from the body cavity. The adult kidney is a metanephros with separate ureter; the mesonephros and mesonephric duct become in the adult male the efferent duct of the testis. The intestine and the reproductive and urinary ducts open into a common cloaca. There is usually an exoskeleton in the form of scales; in the birds the scales take the form of feathers. There are two aortic arches in reptiles, in birds only one—the right. The heart is usually trilocular, becoming quadrilocular in crocodiles and birds. In all the eggs are meroblastic and large, possessing a large quantity of yolk; in all the egg is provided in the oviduct with a layer of albumen and outside this with a horny or calcareous shell. In a few cases the egg is hatched in the oviduct, but in these cases there is no intimate connexion between the embryo and the walls of the duct. Fertilization takes place internally, occurring at the upper end of the oviduct previously to the deposition of the albuminous layer and egg shell.

Comparative anatomy clearly shows that birds are closely allied to reptiles; enthusiasts even spoke of them as "glorified reptiles," and this view seemed to receive its proof by the discoveries of Archaeopteryx (*q.v.*), and the numerous bipedal Dinosaurs. But Archaeopteryx was after all a bird, although still somewhat primitive, and the question, what group of reptiles has given rise to the birds? is still unanswered. By irony of fate, mere lack of the fossil material, it has come to pass that the bridges between Amphibia and reptiles and from them to Mammals are in a fairer way of reconstruction than is that between reptiles and birds, the very two classes of which we know that they "belong together." (H. F. G.)

SAUSSURE, HORACE BÉNÉDICT DE (1740–1799), Swiss physicist and Alpine traveller, was born at Geneva on the 17th of February 1740.[1] Under the influence of his father and his maternal uncle, Charles Bonnet, he devoted himself to botany. In 1758 he made the acquaintance of Albrecht von Haller, and in 1762 he published his first work, *Observations sur l'écorce des feuilles et des pétales*. The same year he was chosen professor of philosophy at the academy of Geneva, and retained this chair till 1786. His health began to fail in 1791, when too he suffered great pecuniary losses. But he was able to complete his great work in 1796, before his death on the 22nd of January 1799. He became a F.R.S. after his visit to England (autumn of 1768), and in 1772 founded the Société pour l'Avancement des Arts at Geneva. His early devotion to botanical studies naturally led him to undertake journeys among the Alps, and from 1773 onwards he directed his attention to the geology and physics of that great chain. Incidentally, he did much to clear up the topography of the snowy portions of the Alps, and to attract the attention of pleasure travellers towards spots like Chamonix and Zermatt. In 1760 he first visited Chamonix, and offered a reward to the man who should first succeed in reaching the summit of Mont Blanc (then unscaled). He made an unsuccessful attempt himself in 1785, by the Aiguille du Goûter route. Two Chamonix men attained the summit in 1786, by way of the Grands Mulets, and in 1787 Saussure himself had the delight of gaining the summit (the third ascent). In 1788 he spent 17 days in making observations on the crest of the Col du Géant (11,060 ft.). In 1774 he mounted the Crammont, and again in 1778, in which year he also explored the Valsorey glacier, near the Great St Bernard. In 1776 he had ascended the Buet (10,201 ft.). In 1789 he visited the Pizzo Bianco (near Macugnaga) and made the first traveller's passage of the St Théodule Pass (10,899 ft.) to Zermatt, which he was the first traveller to visit. On that occasion he climbed from the pass up the Klein Matterhorn (12,750 ft.), while in 1792 he spent three days on the same pass (not descending to Zermatt), making observations, and then visited the Theodulhorn (11,392 ft.). In 1780 he climbed the Roche Michel, above the Mont Cenis Pass. The descriptions of seven of his Alpine journeys (by no means all), with his scientific observations gathered *en route*, were published by him in four quarto volumes, under the general title of *Voyages dans les Alpes* (1779–1796; there was an octavo issue in eight volumes, issued 1780–1796, while the non-scientific portions of the work were first published in 1834, and often since, under the title of *Partie pittoresque des ouvrages de M. de Saussure*).

The Alps formed the centre of Saussure's investigations. They forced themselves on his attention as the grand key to the true theory of the earth, and among them he found opportunity for studying geology in a manner never previously attempted. The inclination of the strata, the nature of the rocks, the fossils and the minerals received his closest attention. He acquired a thorough knowledge of the chemistry of the day; and he applied it to the study of minerals, water and air. Saussure's geological observations made him a firm believer in the Neptunian theory: he regarded all rocks and minerals as deposited from aqueous solution or suspension, and in view of this he attached much importance to the study of meteorological conditions. He carried barometers and boiling-point thermometers to the summits of the highest mountains, and estimated the relative humidity of the atmosphere at different heights, its temperature, the strength of solar radiation, the composition of air and its transparency. Then, following the precipitated moisture, he investigated the temperature of the earth at all depths to which he could drive his thermometer staves, the course, conditions and temperature of streams, rivers, glaciers and lakes, even of the sea. The most beautiful and complete of his subsidiary researches is described in the *Essai sur l'hygrométrie*, published in 1783. In it he records experiments made with various forms of hygrometer in all climates and at all temperatures, and supports the claims of his hair-hygrometer against all others. He invented and improved many kinds of apparatus, including the magneto-meter, the cyanometer for estimating the blueness of the sky, the diaphanometer for judging of the clearness of the atmosphere, the anemometer and the mountain eudiometer. His modifications of the thermometer adapted that instrument to many purposes: for ascertaining the temperature of the air he used one with a fine bulb hung in the shade or whirled by a string, the latter form being converted into an evaporometer by inserting its bulb into a piece of wet sponge and making it revolve in a circle of known radius at a known rate; for experiments on the earth and in deep water he employed large thermometers wrapped in non-conducting coatings so as to render them extremely sluggish, and capable of long retaining the temperature once they had attained it. By the use of these instruments he showed that the bottom water of deep lakes is uniformly cold at all seasons, and that the annual heat wave takes six months to penetrate to a depth of 30 ft. in the earth. He recognized the immense advantages to meteorology of high-level observing stations, and whenever it was practicable he arranged for simultaneous observations being made at different altitudes for as long periods as possible. It is perhaps as a geologist (it is said that he was the first to use the term geology"—see the "Discours préliminaire" to vol. i. of his *Voyages*, publ. in 1779) that Saussure worked most; and although his ideas on matters of theory were in many cases very erroneous he was instrumental in greatly advancing that science.

See Lives by J. Senebier (Geneva, 1801), by Cuvier in the *Biographie universelle*, and by Candolle in *Décade philosophique*, No. xv. (trans. in the *Philosophical Magazine*, iv. p. 96); articles by E. Naville in the *Bibliothèque universelle* (March, April, May 1883), and chaps. v.-viii. of Ch. Durier's *Le Mont-Blanc* (Paris, various editions between 1877 and 1897). (W. A. B. C.)

SAUSSURE, NICOLAS THÉODORE DE (1767–1845), eldest son of Horace Bénédict de Saussure, was born on the 14th of October 1767, at Geneva, and is known chiefly for his work on the chemistry of vegetable physiology. He lived quietly and avoided society; yet like his ancestors he was a member of the

[1] His father, Nicolas de Saussure (1709–1790), an agriculturist of unusually liberal opinions, resided all his life at his farm of Conches, on the Arve, near Geneva. As a member of the council of Two Hundred he took part in public affairs. Most of his writings bear on the growth and diseases of grain and other farm produce. His last work *Le Feu, principe de la fécondité des plantes et de la fertilité de la terre* (1782), was more speculative in its nature.

Genevan representative council, and gave much attention to public affairs. In the latter part of his life he became more of a recluse than ever, and died at Geneva on the 18th of April 1845.

When a young man Nicolas Théodore accompanied his father in his Alpine journeys and assisted him by the careful determination of many physical constants. He was attracted to chemistry by Lavoisier's brilliant conceptions, but he did not become great as an originator. He took a leading share in improving the processes of ultimate organic analysis; and he determined the composition of ethyl alcohol, ether and some other commonly occurring substances. He also studied fermentation, the conversion of starch into sugar, and many other processes of minor importance. The greater number of his 36 published papers dealt with the chemistry and physiology of plants, the nature of soils, and the conditions of vegetable life, and were republished under the title *Recherches chimiques sur la végétation.*

SAUVAL, HENRI (1623–1676), French historian, son of an advocate in the Parlement, was born in Paris, and baptized on the 5th of March 1623. He devoted most of his life to researches among the archives of his native city, and in 1656 even obtained a licence to print his *Paris ancien et moderne*; but on his death (21st March 1676) the whole work was still in manuscript. A long time afterwards it appeared, thanks to his collaborator, Claude Bernard Rousseau, under the title of *Histoire et recherches des antiquités de la ville de Paris* (1724), but remodelled, with the addition of long and dull dissertations which were not by Sauval. The work was not without merits, and it was re-issued in 1733 and 1750. The original manuscript first belonged to Montmerqué, and then passed into the possession of Le Roux de Lincy, who prepared an annotated edition; unfortunately this material, together with the original MS., was lost in the incendiary fires which took place under the Commune (1871). There remain, however, Le Roux de Lincy's researches, a series of articles on Sauval which appeared in the *Bulletin du bibliophile et du bibliothécaire* in 1862, 1866 and 1868. See also the *Bibliographie de Paris avant 1789*, by the Abbé Valentin Dufour (1882).

SAVAGE, MINOT JUDSON (1841–), American Unitarian minister and author, was born in Norridgewock, Maine, on the 10th of June 1841. He graduated at the Bangor Theological Seminary in 1864, and for nine years was in the Congregational ministry, being a home missionary at San Mateo and Grass Valley, California, until 1867, and holding pastorates at Framingham, Mass. (1867–1869), and Hannibal, Missouri (1869–1873). He then became a Unitarian, and was pastor of the Third Unitarian Church of Chicago in 1873–1874, of the Church of the Unity in Boston in 1874–1896, and of the Church of the Messiah in New York City in 1896–1906.

He wrote many books, including *Christianity, the Science of Manhood* (1873), *The Religion of Evolution* (1876), *The Morals of Evolution* (1880), *The Religious Life* (1885), *My Creed* (1887), *The Evolution of Christianity* (1892), *Our Unitarian Gospel* (1898), *The Passing and the Permanent in Religion* (1901), *Life beyond Death* (1901), *Can Telepathy Explain?* (1902), *Life's Dark Problems* (1905), and, besides other volumes in verse, *America to England* (1905)

SAVAGE, RICHARD (d. 1743), English poet, was born about 1697, probably of humble parentage. A romantic account of his origin and early life, for which he at any rate supplied the material, appeared in Curll's *Poetical Register* in 1719. On this and other information provided by Savage, Samuel Johnson founded his *Life of Savage*, one of the most elaborate of the *Lives*. It was printed anonymously in 1744, and has made the poet the object of an interest which would be hardly justified by his writings. In 1698 Charles Gerrard, 2nd earl of Macclesfield, obtained a divorce from his wife, Anna, daughter of Sir Richard Mason, who shortly afterwards married Colonel Henry Brett. Lady Macclesfield had two children by Richard Savage, 4th earl Rivers, the second of whom was born at Fox Court, Holborn, on the 16th of January 1697, and christened two days later at St Andrews, Holborn, as Richard Smith. Six months later the child was placed with Anne Portlock in Covent Garden; nothing more is positively known of him. In 1718 Richard Savage claimed to be this child. He stated that he had been cared for by Lady Mason, his grandmother, who had put him to school near St Albans, and by his godmother, Mrs Lloyd. He said he had been pursued by the relentless hostility of his mother, Mrs Brett, who had prevented Lord Rivers from leaving £6000 to him and had tried to have him kidnapped for the West Indies. His statements are not corroborated by the depositions of the witnesses in the Macclesfield divorce case, and Mrs Brett always maintained that he was an impostor. He was wrong in the date of his birth; moreover, the godmother of Lady Macclesfield's son was Dorothea Ousley (afterwards Mrs Delgardno), not Mrs Lloyd. There is nothing to show that Mrs Brett was the cruel and vindictive woman he describes her to be, but abundant evidence that she provided for her illegitimate children. Discrepancies in Savage's story made Boswell suspicious, but the matter was thoroughly investigated for the first time by W. Moy Thomas, who published the results of his researches in *Notes and Queries* (second series, vol. vi., 1858). Savage, impostor or not, blackmailed Mrs Brett and her family with some success, for after the publication of *The Bastard* (1728) her nephew, John Brownlow, Viscount Tyrconnel, purchased his silence by taking him into his house and allowing him a pension of £200 a year. Savage's first certain work was a poem satirizing Bishop Hoadly, entitled *The Convocation, or The Battle of Pamphlets* (1717), which he afterwards tried to suppress. He adapted from the Spanish a comedy, *Love in a Veil* (acted 1718, printed 1719), which gained him the friendship of Sir Richard Steele and of Robert Wilks. With Steele, however, he soon quarrelled. In 1723 he played without success in the title rôle of his tragedy, *Sir Thomas Overbury* (pr. 1724), and his *Miscellaneous Poems* were published by subscription in 1726. In 1727 he was arrested for the murder of James Sinclair in a drunken quarrel, and only escaped the death penalty by the intercession of Frances, countess of Hertford (d. 1754).

Savage was at his best as a satirist, and in *The Author to be Let* he published a quantity of scandal about his fellow-scribblers. Proud as he was, he was servile enough to supply Pope with petty gossip about the authors attacked in the *Dunciad*. His most considerable poem, *The Wanderer* (1729), shows the influence of Thomson's *Seasons*, part of which had already appeared. Savage tried without success to obtain patronage from Walpole, and hoped in vain to be made poet-laureate. Johnson states that he received a small income from Mrs Oldfield, but this seems to be fiction. In 1732 Queen Caroline settled on him a pension of £50 a year. Meanwhile he had quarrelled with Lord Tyrconnel, and at the queen's death was reduced to absolute poverty. Pope had been the most faithful of his friends, and had made him a small regular allowance. With others he now raised money to send him out of reach of his creditors. Savage went to Swansea, but he resented bitterly the conditions imposed by his patrons, and removed to Bristol, where he was imprisoned for debt. All his friends had ceased to help him except Pope, and in 1743 he, too, wrote to break off the connexion. Savage died in prison on the 1st of August 1743.

See Johnson's *Life of Savage*, and *Notes and Queries* as already quoted. He is the subject of a novel, *Richard Savage* (1842), by Charles Whitehead, illustrated by John Leech. *Richard Savage*, a play in four acts by J. M. Barrie and H. B. Marriott-Watson, was presented at an afternoon performance at the Criterion theatre, London, in 1891. The dramatists took considerable liberties with the facts of Savage's career. See also S. V. Makower, *Richard Savage, a Mystery in Biography* (1909).

SAVAGE, a word by derivation meaning belonging to the wilds or forests (O. Fr. *salvage*, mod. *sauvage*, Late Lat. *silvaticus*, *silva*, wood, forest), hence wild, uncultivated, barbarian, and so used of races in an uncivilized or barbarous condition, or of animals or human beings generally, untamed, ferocious.

SAVAH, a small province of central Persia, north of Irak and south-west of Teheran, comprising the districts of Savah, Khalejistan (inhabited by the Turkish Khalej tribe), Zerend and Karaghan. It pays a yearly revenue of about £5000. The capital is the ancient city of Savah, which has a population of about 7000, and is 72 m. S.W. of Teheran, at an elevation of 3380 ft., in 35° 4′ N., 50° 30′ E. The soil is very fertile, is well watered, and produces much wheat, barley and rice. It is occasionally joined to the province of Teheran to facilitate the governor's arrangements for supplying the capital of Persia with grain.

SAVANNA or SAVANNAH (Span. *sávana*, a sheet; Late Lat. *sabanum*, Gr. *σάβανον*, a linen cloth), a term applied either to a plain covered with snow or ice, or, more generally, to a treeless plain. Its use in English, more frequent formerly than now, is most common in application to the great plains of central North America, in which it is practically the equivalent of "prairie" (*q.v.*). In this application it was first used (accented thus—*savána*) by the Spanish historian Gonzalo de Oviedo y Valdés in the 16th century.

SAVANNAH, a city, a port of entry, and the county-seat of Chatham county, Georgia, U.S.A., on the right (south) bank of the Savannah river, about 18 m. from the Atlantic Ocean. Pop. (1890) 43,189; (1900) 54,244, of whom 28,090 were negroes and 3434 were foreign-born; (1910, census) 65,064. It is served by the Atlantic Coast Line, the Central of Georgia, the Southern, and other railways; by river steamers to Augusta; by coastwise steamers to Baltimore, Philadelphia, New York and Boston; and by transatlantic steamers to European ports.

The city is situated on a plateau some 40 ft. above the Savannah river and covers about 6·3 sq. m. Savannah owes its regular form, with streets intersecting each other at right angles, to James Edward Oglethorpe, its founder, but the monotony is slightly relieved by 42 small parks and squares, whose total area is 166·79 acres. The larger parks are the Daffin, the Colonial, on Oglethorpe Avenue (formerly South Broad Street), and Forsyth, on Gaston Street, with fine tropical and semi-tropical flora. The smaller parks or squares are mostly in five series parallel to the Savannah river. On account of the large number of its shade trees Savannah has been called the "Forest City." Bonaventure Cemetery, about 4 m. east of the city, has avenues of fine live-oaks, draped with Spanish moss. In the principal commercial street, Bay Street, are the new City Hall (1906), on the site of the old City Hall built in 1779, the Custom House, completed in 1850, the Cotton Exchange, and a granite seat marking the spot where Oglethorpe first pitched his tent; and in Bull Street, a fashionable promenade, named in honour of William Bull (1683–1755), a military officer who aided Oglethorpe in his survey of the city, are Chatham Academy, a marble post-office building, the county court house, and the Savannah theatre (established in 1818, remodelled in 1895, rebuilt in 1906), one of the oldest playhouses in the United States. In Johnson Square, a little south of the City Hall and Custom House, stands a plain dignified monument, in the design of a Roman sword, erected in 1829 in memory of General Nathanael Greene, to whom a tract of land near Savannah was given by Congress in recognition of his service in the War of American Independence, and who was buried in a vault in the old cemetery in South Broad Street (now Oglethorpe Avenue); his remains were transferred to the monument in 1900. In Monterey Square there is a monument and statue by the German sculptor Robert Eberhard Launitz (1806–1870), in honour of Count Casimir Pulaski, who was mortally wounded during the siege of Savannah in 1779. The corner-stones of these monuments were laid by General La Fayette in 1825. In Madison Square, north of Monterey Square, there is a monument to Sergeant William Jasper (1750–1779), a hero of the War of Independence, who replaced the fallen colours on Fort Moultrie in the face of a galling fire during the battle of Charleston Harbour (June 28th, 1776), rescued a band of American prisoners from British guards at Jasper Spring, 2 m. from Savannah, and was fatally wounded during the siege of the city in 1779. In Chippewa Square there is a bust of Major-General Lafayette McLaws (1821–1897). The Ladies' Memorial Association erected a Confederate Soldiers Monument in the "Parade Ground," which forms an extension to Forsyth Park, in the south central part of the city; and in honour of Tomochichi, an Indian chief who was the staunch friend of the early settlers, a large granite boulder has been placed in Wright Square, where he was buried. At the corner of Anderson and Bull Streets there is a memorial to Major-General Alexander Robert Lawton (1818–1896), state senator in 1854–1861, who seized Fort Pulaski in 1861 upon the governor's orders, served through the Civil War in the Confederate Army, and was U.S. minister to Austria-Hungary in 1887–1889.

Since the founding of Georgia as a bulwark against the Spaniards and French, Savannah has had an ardent martial spirit, and there are five military organizations—the Chatham Artillery, formed in 1786, one of the oldest military companies in the United States; the Savannah Volunteer Guards, organized in 1802 as an infantry corps, now a coast artillery corps of four companies; the Georgia Hussars, formed after the War of 1812 by the consolidation of two other companies; the First Volunteer Regiment of Georgia, composed of five companies, organized respectively in 1808, 1843, 1846, 1860 and 1861, and a division of naval militia organized in 1895. The most prominent clubs are the Oglethorpe, the Guards, the Hussars and the Harmonie. Among the pleasure resorts in the vicinity are Tybee Island, at the mouth of the Savannah river, a popular bathing resort, and Thunderbolt, Isle of Hope, White Bluff and Montgomery, distant 5 m., 6 m., 8 m. and 9 m. respectively.

Among the religious corporations in Savannah, the oldest is Christ Church, whose first building was erected in 1740–1750 and whose present edifice was built in 1838. Its third rector was John Wesley, who is said to have established a Sunday School (still in existence) in Savannah almost half a century before Robert Raikes established such a school in England. The first African Baptist Church, organized in 1788, is the oldest religious society of negroes in the United States. The Convent of St Vincent de Paul was founded in 1842; the Cathedral of St John the Baptist was dedicated in 1876, was destroyed by fire in 1898, but was subsequently rebuilt; and a Jewish synagogue was erected in 1878. Savannah is the see of a Roman Catholic and of a Protestant Episcopal bishop. There are several hospitals and charitable institutions in or near Savannah, including the Bethesda Orphan Asylum, about 8 m. from the city, founded by George Whitefield in 1740 and now owned by the Union Society, and the Savannah Female Asylum (1750). In 1885 the Telfair Academy of Arts and Sciences (near Telfair Square or Telfair Place), endowed by Miss Mary Telfair, was opened; in its collections are Wilhelm von Kaulbach's "Peter Arbues of Epila" and Joseph von Brandt's "Ein Gefecht." The Georgia Historical Society, organized in 1839 and in 1847 united with the Savannah Library Society, has a handsome building (Hodgson Hall) at the intersection of Whitaker and Gaston Streets, and a library of about 35,000 volumes; it published six volumes of *Collections* between 1840 and 1904. The Georgia Industrial College (1890), for negroes, is near the city. The Chatham Academy was chartered and endowed with some of the confiscated property of Loyalists in 1788.

Savannah harbour has permanent seacoast defences, and is the most important Atlantic seaport south of Baltimore. The port is nearer the Panama Canal than either New Orleans or Galveston; and after the completion of harbour improvements by the United States government, begun in 1902, the depth of the river from its mouth to the city was 28 ft. There are great wharves and piers on the water front; more than 4 m. of wharves are occupied by railway terminals. In 1909 Savannah's exports were valued at $66,932,973; its imports at $2,664,079. Of the exports naval stores rank first, Savannah being first among the world markets of naval stores; cotton comes second, but the relative position of the city as a cotton centre has declined because of the greater increase in that of Galveston and New Orleans. Other important exports are fertilizers, rice and lumber. Savannah is the business and shipping centre of the surrounding fruit and truck growing country. The principal manufactures are fertilizers and cars, and, of less importance, lumber and planing-mill products, and foundry and machine-shop products. The city's rice-mills and cotton compresses are commonly visited by tourists. The total value of the city's factory products in 1905 was $6,340,004 (69·1 % more than in 1900).

The city government is vested in a council, consisting of a mayor and twelve aldermen, elected for two years in January of odd-numbered years; the council's committees act as heads of several of the administrative departments; the mayor is head of the police; and the council appoints other city officers. The board of aldermen may pass a measure by a two-thirds vote over the mayor's veto. The city board of education was incorporated in 1866 and took over the powers of the board of education of Chatham county; it is self-perpetuating and practically non-partisan. A free school had been established as early as 1816. In 1909 the assessed value of real estate was $35,147,580 and of personal property $12,828,673, and the bonded debt was $2,701,050 ($218,050 due in 1913 and $2,483,000 due in 1959); the rate of taxation was $1·39 per $100.

The first European settlement in Georgia was made at Savannah in February 1733 by James Edward Oglethorpe. Among the early inhabitants were Charles and John Wesley, who arrived in 1735, but returned to England in 1736 and 1737 respectively, and George Whitefield, who lived in Savannah in 1738 and 1740. Savannah was the seat of government of Georgia until the capture of the city by the British in 1778. Here, on the 1st of January 1755, met the first legislature of Georgia. In the years preceding the War of Independence the political issues excited much partisanship. Riots almost completely prevented the execution of the Stamp Act, and the stamps were reloaded on the ship that brought them to Savannah. In 1769 the merchants agreed not to import any articles mentioned in the Townshend Acts of 1767.

On the 18th of January 1775 the first Provincial Congress was convened here; on the night of the 11th of May the powder magazine was robbed of all its ammunition, part of which was sent to Boston and, according to tradition, was used at Bunker Hill; and on the 22nd of June the people of the city elected a Council of Safety. On the 4th of July the same Provincial Congress again met, and soon the royal administration collapsed. Probably the first naval capture of the War of Independence was made off Tybee Island on the 10th of July, when a schooner,

the first vessel chartered by the Continental Congress, seized a British ship and its cargo of 14,000 lb of powder. Yet the Loyalists were strong in Savannah, and many families were divided among themselves.

In October 1776–February 1777 the convention which framed the first constitution of Georgia was held in Savannah, and the first state legislature assembled here in May 1778; but the British captured the city on the 29th of December in that year, and the seat of the state government was then transferred to Augusta. In 1779 Savannah was unsuccessfully besieged by a French fleet under Comte d'Estaing and land forces under General Benjamin Lincoln, but in May 1782 it was evacuated after a short siege by General Anthony Wayne. It once more became the capital, but in 1783 the seat of the state government was again transferred to Augusta. Savannah soon became the commercial rival of Charleston, South Carolina. It was chartered as a city in 1789. As early as 1817 the Savannah Steamboat Company, which ran a steamer to Charleston, was organized, and in 1819 the "Savannah," the first vessel fitted with steam-engines to cross the Atlantic,[1] owned by Savannah capitalists but built in the North, sailed from Savannah to Liverpool in 25 days. In 1861 the state convention which adopted the ordinance of secession met in Savannah. A blockade of the port was instituted by the Federal government in 1861, and on the 12th of December 1862 Fort Pulaski (on Cockspur Island, at the mouth of the Savannah river), which commanded the channel, and had been seized by the state at the outbreak of the war, was forced to surrender. Savannah was the objective of General W. T. Sherman's "march to the sea," and on the 21st of December 1864 surrendered to him after futile opposition by General William J. Hardee (1818–1873) with a force very inferior in numbers. The city limits were extended in 1879, 1883 and 1901.

SAVARY, ANNE JEAN MARIE RENÉ, Duke of Rovigo (1774–1833), French general and diplomatist, was born at Marcq in the Ardennes on the 26th of April 1774. He was educated at the college of St Louis at Metz and entered the royal army in 1790. His first campaign was that waged by General Custine against the retreating forces of the duke of Brunswick in 1792. He next served in succession under Pichegru and Moreau, and distinguished himself during the skilful retreat of the latter from an untenable position in the heart of Swabia. He became *chef d'escadron* in 1797, and in 1798 served under General Desaix, in the Egyptian campaign, of which he left an interesting and valuable account. He also distinguished himself under Desaix at Marengo (14th of June 1800). His fidelity and address while serving under Desaix, who was killed at Marengo, secured him the confidence of Bonaparte, who appointed him to command the special body of gendarmes charged with the duty of guarding the First Consul. In the discovery of the various ramifications of the Cadoudal-Pichegru conspiracy Savary showed great skill and activity. He proceeded to the cliff of Biville in Normandy, where the plotters were in the habit of landing, and sought, by imitating the signals of the royalist plotters, to tempt the comte d'Artois (afterwards Charles X.) to land. In this he was unsuccessful. He was in command of the troops at Vincennes when the duc d'Enghien (*q.v.*) was summarily executed. Hullin, who presided at the court-martial, afterwards accused Savary, though not by name, of having intervened to prevent the despatch to Bonaparte of an appeal for mercy which he (Hullin) was in the act of drawing up. Savary afterwards denied this, but his denial has not generally been accepted. In February 1805 he was raised to the rank of general of division. Shortly before the battle of Austerlitz (2nd of December 1805) he was sent by Napoleon with a message to the emperor Alexander I. with a request for an armistice, a device which caused that monarch all the more eagerly to strike the blow which brought disaster to the Russians. After the battle Savary again took a message to Alexander, which induced him to treat for an armistice. In the campaign of 1806 Savary showed signal daring in the pursuit of the Prussians after the battle of Jena. Early in the next year he received command of a corps, and with it gained an important success at Ostrolenka (16th of February 1807).

After the treaty of Tilsit (7th of July 1807) Savary proceeded to St Petersburg as the French ambassador, but was soon replaced by General Caulaincourt (*q.v.*), another accessory to the execution of the duc d'Enghien. The repugnance of the empress dowager to Savary is said to have been one of the reasons of his recall, but it is more probable that Napoleon felt the need of his gifts for intrigue in the Spanish affairs which he undertook at the close of 1807. With the title of duke of Rovigo (a small town in Venetia), Savary set out for Madrid when Napoleon's plans for gaining the mastery of Spain were nearing completion. With Murat Savary made skilful use of the schisms in the Spanish royal family (March-April 1808), and persuaded Charles IV., who had recently abdicated under *duresse*, and his son Ferdinand VII., the *de facto* king of Spain, to refer their claims to Napoleon. Savary induced Ferdinand to cross the Pyrenees and proceed to Bayonne—a step which cost him his crown and his liberty until 1814. In September 1808 Savary accompanied the emperor to the famous interview at Erfurt with the emperor Alexander. In 1809 he took part, but without distinction, in the campaign against Austria. On the disgrace of Fouché (*q.v.*) in the spring of 1810, Savary received his appointment, the ministry of police. There he showed his wonted skill and devotion to Napoleon; and this office, which the Jacobinical Fouché had shorn of its terrors, now became a veritable inquisition. Among the incidents of this time may be cited the cynical brutality with which Savary carried out the order of Napoleon for the exile of Mme de Staël and the destruction of her work *De l'Allemagne*. Savary's wariness was, however, at fault at the time of the strange conspiracy of General Malet, two of whose confederates seized him in his bed and imprisoned him for a few hours (23rd of October 1812). Savary's reputation never quite recovered from the ridicule caused by this event. He was among the last to desert the emperor at the time of his abdication (11th of April 1814) and among the first to welcome his return in 1815, when he became inspector-general of gendarmerie and a peer of France. After Waterloo he accompanied the emperor to Rochefort and sailed with him to Plymouth on H.M.S. "Bellerophon." He was not allowed to accompany him to St Helena, but underwent several months' "internment" at Malta. Escaping thence, he proceeded to Smyrna, where he settled for a time. Afterwards he travelled about in more or less distress, but finally was allowed to return to France and regained civic rights; later he settled at Rome. The July revolution (1830) brought him into favour and in 1831 he received the command of the French army in Algeria. Ill-health compelled him to return to France, and he died at Paris in June 1833.

See *Mémoires du duc de Rovigo* (4 vols., London, 1828; English edition also in 4 vols., London, 1828); a new French edition annotated by D. Lacroix (5 vols., Paris, 1900); *Extrait des mémoires de M. le duc de Rovigo concernant le catastrophe de M. le duc d'Enghien* (London, 1823); *Le Duc de Rovigo jugé par lui-même et par ses contemporains*, by L. F. E . . . (Paris, 1823); and A. F. N. Macquart, *Réfutation de l'écrit de M. le duc de Rovigo* (1823). (J. Hl. R.)

SAVE, or Sava (Ger. *Sau*; Hungarian *Száva*; Lat. *Savus*), one of the principal right-bank affluents of the Danube. It runs almost parallel with the other great tributary of the Danube, the Drave, both having about the same length. The Save rises in the Triglav group in Carniola from two sources, the Wurzener Save and the Wocheiner Save, which join at Radmannsdorf. It then takes a south-easterly course, and flows through Carniola and Croatia-Slavonia—forming from Jasenovac the frontier-line between it and Bosnia and Servia—and joins the Danube at Belgrade. The Save has a length of 442 m., the area of its basin being 34,000 sq. m. It is navigable for steamers from Sissek to its mouth, a distance of 360 m., but navigation is greatly hindered by shifting sandbanks and other obstructions. Its principal affluents are, on the right, the Sora, Laibach, Gurk, Kulpa, Una, Vrbas, Bosna and Drina; and on the left, the Kanker, Feistritz, Sann, Sotla, Krapina, Lonja and Orljava.

[1] The "Savannah" did not make the entire voyage under steam; she was fitted with sails and used them in rough weather, unshipping her paddle-boxes.

SAVI, PAOLO (1798–1871), Italian geologist, was born at Pisa. Assistant-lecturer on zoology at the university of his native city when twenty-two years of age, he was appointed professor in 1823, and lectured also on geology. He devoted great attention to the museum of the university, and formed one of the finest natural history collections in Europe. He was regarded as the father of Italian geology. His first paper related to the Bone-caves of Cassano (1825). He studied the geology of Monte Pisano and the Apuan Alps, explaining the metamorphic origin of the Carrara marble; he also contributed essays on the Miocene strata and fossils of Monte Bambolo, the iron-ores of Elba and other subjects. With Giuseppe Meneghini (1811–1889) he published memoirs on the stratigraphy and geology of Tuscany (1850–1851). He became eminent also as an ornithologist, and was author of a great work on the birds of Italy. He died in May 1871.

SAVIGLIANO, a town of Piedmont, Italy, in the province of Cuneo, 32 m. S. of Turin by rail, 1053 ft. above sea-level. Pop. (1901) 9895 (town), 17,340 (commune). It has important ironworks, foundries, locomotive works and silk manufactures, as well as sugar factories, printing works and cocoon-raising establishments. It retains some traces of its ancient walls, demolished in 1707, and has a fine collegiate church (S. Andrea, in its present form comparatively modern), and a triumphal arch erected in honour of the marriage of Charles Emmanuel I. with Catherine of Austria.

SAVIGNY, FRIEDRICH KARL VON (1779–1861), German jurist, was born at Frankfort-on-Main on the 21st of February 1779. He was descended from an ancient family, which figures in the history of Lorraine, and which derived its name from the castle of Savigny near Charmes in the valley of the Moselle. Left an orphan at the age of 13, he was brought up by his guardian until, in 1795, he entered the university of Marburg, where, though suffering at times severely from ill-health, he studied under Professors Anton Bauer (1772–1843) and Philipp Friedrich Weiss (1766–1808), the former one of the most conspicuous pioneers in the reform of the German criminal law, the latter distinguished for his knowledge of medieval jurisprudence. After the fashion of German students, Savigny visited several universities, notably Jena, Leipzig and Halle; and returning to Marburg, took his doctor's degree in 1800. At Marburg he lectured as *Privatdozent* on criminal law and the Pandects. In 1803 he published his famous treatise, *Das Recht des Besitzes* (the rights of possession). It was at once hailed by the great jurist Thibaut as a masterpiece; and the old uncritical study of Roman law was at an end. It quickly obtained a European reputation, and still remains a prominent landmark in the history of jurisprudence. In 1804 Savigny married Kunigunde Brentano, the sister of Bettina von Arnim and Clemens Brentano the poet, and the same year started on an extensive tour through France and south Germany in search of fresh sources of Roman law. In this quest, particularly in Paris, he was successful.

In 1808 he was appointed by the Bavarian government ordinary professor of Roman law at Landshut, where he remained a year and a half. In 1810 he was called, chiefly at the instance of Wilhelm von Humboldt, to fill the chair of Roman law at the new university of Berlin. Here one of his services was to create, in connexion with the faculty of law, a "Spruch-Collegium," an extraordinary tribunal competent to deliver opinions on cases remitted to it by the ordinary courts; and he took an active part in its labours. This was the busiest time of his life. He was engaged in lecturing, in the government of the university (of which he was the third rector), and as tutor to the crown prince in Roman, criminal and Prussian law. Not the least important consequence of his residence in Berlin was his friendship with Niebuhr and Eichhorn. In 1814 appeared his pamphlet *Vom Beruf unserer Zeit für Gesetzgebung und Rechtswissenschaft* (new edition, 1892). It was a protest against the demand for codification, and was intended as a reply to Thibaut's pamphlet urging the necessity of forming a code for Germany which should be independent of the influence of foreign legal systems. In this famous pamphlet Savigny did not oppose the introduction of new laws, or even a new system of laws, but only objected to the proposed codification on two grounds: (1) that the damage which had been caused by the neglect of former generations of jurists could not be quickly repaired, and that time was required to set the house in order; and (2) that there was great risk of the so-called *natural law*, with its "infinite arrogance" and its "shallow philosophy" ruining such a scheme. Indeed, the enduring value of this pamphlet is that it saved jurisprudence for all time from the hollow abstractions of such a work as the *Institutiones juris naturae et gentium* of Christian Wolff (1679–1754), and conclusively proved that a historical study of the positive law was a condition precedent to the right understanding of the science of all law.

In 1815 he founded, with Karl Friedrich Eichhorn, and Johann Friedrich Ludwig Göschen (1778–1837), the *Zeitschrift für geschichtliche Rechtswissenschaft*, the organ of the new historical school, of which he was the representative. In this periodical (vol. iii. p. 129 seq.) Savigny made known to the world the discovery at Verona, by Niebuhr, of the lost text of Gaius, pronouncing it, on the evidence of that portion of the MS. submitted to him, to be the work of Gaius himself and not, as Niebuhr suggested, of Ulpian. The record of the remainder of Savigny's life consists of little else than a list of the merited honours which he received at the hands of his sovereign, and of the works which he published with indefatigable activity. In 1815 appeared the first volume of his *Geschichte des romischen Rechts im Mittelalter*, the last of which was not published until 1831. This work, to which his early instructor Weiss had first prompted him, was originally intended to be a literary history of Roman law from Irnerius to the present time. His design was in some respect narrowed; in others it was widened. He saw fit not to continue the narrative beyond the 16th century, when the separation of nationalities disturbed the foundations of the science of law. His treatment of the subject was not merely that of a bibliographer; it was philosophical. It raised the veil which had hung over the history of Roman law, from the breaking up of the empire until the beginning of the 12th century, and showed how, though considered dead, the Roman law yet lived on through these dark centuries, in local customs, in towns, in ecclesiastical doctrines and school teachings, until it blossomed out once more in full splendour in Bologna and other Italian cities. This history was the parent of many valuable works in which Savigny published the result of his investigations.[1] In 1817 he was appointed a member of the commission for organizing the Prussian provincial estates, and also a member of the department of justice in the Staatsrath, and in 1819 he became a member of the supreme court of appeal for the Rhine Provinces. In 1820 he was made a member of the commission for revising the Prussian code. In 1822 a serious nervous illness attacked him, and compelled him to seek relief in travel. In 1835 he began his elaborate work on contemporary Roman law, *System des heutigen römischen Rechts* (8 vols., 1840–1849). His activity as professor ceased in March 1842, when he was appointed "Grosskanzler" (High Chancellor), the title given by Frederick II. in 1746 to the official at the head of the juridical system in Prussia, as in this position he carried out several important law reforms in regard to bills of exchange and divorce. He held the office until 1848, when he resigned, not altogether to the regret of his friends, who had seen his energies withdrawn from jurisprudence without being able to flatter themselves that he was a great statesman. In 1850, on the occasion of the jubilee of his obtaining his doctor's degree, appeared in five volumes his *Vermischte Schriften*, consisting of a collection of his minor works published between 1800 and 1844. This event gave rise to much enthusiasm throughout Germany in honour of "the great master" and founder of modern jurisprudence. In 1853 he published his treatise on Contracts (*Das Obligationenrecht*), a supplement to his work on modern Roman law, in which he clearly demonstrates the necessity for the historical treatment of law. Savigny died at Berlin on the 25th of October 1861. His son, Karl Friedrich

[1] See von Mohl's *Staatswissenschaft*, vol. iii. p. 55. For a somewhat less favourable view, see Gans's *Vermischte Schriften*.

von Savigny (1814–1875), was Prussian minister of foreign affairs in 1849. He represented Prussia in important diplomatic transactions, especially in 1866.

Savigny belongs to the so-called historical school of jurists, though he cannot claim to be regarded as its founder, an honour which belongs to Gustav Hugo. In the history of jurisprudence Savigny's great works are the *Recht des Besitzes* and the *Beruf unserer Zeit für Gesetzgebung* above referred to. The former marks an epoch in jurisprudence. Professor Jhering says: "With the *Recht des Besitzes* the juridical method of the Romans was regained, and modern jurisprudence born." It marked a great advance both in results and method, and rendered obsolete a large literature. Savigny sought to prove that in Roman law possession had always reference to "usucapion" or to "interdicts"; that there is not a right to continuance in possession but only to immunity from interference; possession being based on the consciousness of unlimited power. These and other propositions were maintained with great acuteness and unequalled ingenuity in interpreting and harmonizing the Roman jurists. The controversy which has been carried on in Germany by Jhering, Baron, Gans and Bruns shows that many of Savigny's conclusions have not been accepted.[1] The *Beruf unserer Zeit*, in addition to the more specific object the treatise had in view, which has been already treated, expresses the idea, unfamiliar in 1814, that law is part and parcel of national life, and combats the notion, too much assumed by French jurists, especially in the 18th century, and countenanced in practice by Bentham, that law might be arbitrarily imposed on a country irrespective of its state of civilization and past history. Of even greater value than his services in consolidating "the historical school of jurisprudence" is the emphatic recognition in his works of the fact that the practice and theory of jurisprudence cannot be divorced without injury to both.

See Biographies by Stinzing (1862); Rudorff (1867); Bethmann-Holweg (1867); and Landsberg (1890).

SAVILE, SIR GEORGE (1726–1784), English politician, was the only son of Sir George Savile, Bart. (d. 1743), of Rufford, Nottinghamshire, and was born in London on the 18th of July 1726. He entered the House of Commons as member for Yorkshire in 1759. In general he advocated views of a very liberal character, including measures of relief to Roman Catholics and to Protestant dissenters, and he defended the action of the American colonists. He refused to take office and in 1783 he resigned his seat in parliament. He died unmarried in London on the 10th of January 1784. Horace Walpole says Savile had "a large fortune and a larger mind," and Burke had also a very high opinion of him. He bequeathed Rufford and some of his other estates to his nephew, Richard Lumley (1757–1832), a younger son of Richard Lumley Saunderson, 4th earl of Scarborough (1725–1782). Richard took the additional name of Savile, but when on his brother's death in 1807 he became 6th earl of Scarborough the Savile estates passed to his brother John (1760–1835), afterwards the 7th earl. John's son and heir was John Lumley Savile, 8th earl of Scarborough (1788–1856). The 8th earl was never married, but he left four natural sons, the eldest of whom was John Savile (1818–1896), the diplomatist, who was created Baron Savile of Rufford in 1888. He entered the foreign office in 1841, was British envoy at Dresden and at Berne, and from 1883 to 1888 represented his country in Rome. Although the eldest son, he did not inherit Rufford and his father's other estates until after the deaths of two of his younger brothers. He made a fine collection of pictures and died at Rufford on the 28th of November 1896, when his nephew John Savile Lumley Savile (b. 1854) became the 2nd baron.

SAVILE, SIR HENRY (1549–1622), warden of Merton College, Oxford, and provost of Eton, was the son of Henry Savile of Bradley, near Halifax, in Yorkshire, a member of an old county family, the Saviles of Methley, and of his wife Elizabeth, daughter of Robert Ramsden. He was educated at Brasenose College, Oxford, where he matriculated in 1561. He became a fellow of Merton in 1565, proceeded B.A. in 1566, and M.A. in 1570. He established a reputation as a Greek scholar and mathematician by voluntary lectures on the *Almagest*, and in 1575 became junior proctor. In 1578 he travelled on the continent of Europe, where he collected manuscripts and is said to have been employed by Queen Elizabeth as her resident in the Low Countries. On his return he was named Greek tutor to the queen, and in 1535 was established as warden of Merton by a vigorous exercise of the interest of Lord Burghley and Secretary Walsingham. He proved a successful and autocratic head under whom the college flourished. A translation of four Books of the Histories of Tacitus, with a learned *Commentary on Roman Warfare* in 1591, enhanced his reputation. On the 26th of May 1596 he obtained the provostship of Eton, the reward of persistent begging. He was not qualified for the post by the statutes of the college, for he was not in orders, and the queen was reluctant to name him. Savile insisted with considerable ingenuity that the queen had a right to dispense with statutes, and at last he got his way. In February 1601 he was put under arrest on suspicion of having been concerned in the rebellion of the earl of Essex. He was soon released and his friendship with the faction of Essex went far to gain him the favour of James I. So no doubt did the views he had maintained in regard to the statutes of Eton. It may have been to his advantage that his elder brother, Sir John Savile (1545–1607), was a high prerogative lawyer, and was one of the barons of the exchequer who in 1606 affirmed the right of the king to impose import and export duties on his own authority. On the 30th of September 1604 Savile was knighted, and in that year he was named one of the body of scholars appointed to prepare the authorized version of the Bible. He was entrusted with parts of the Gospels, the Acts of the Apostles and the Book of Revelations. In 1604 died the only son born of his marriage in 1592 with Margaret Dacre, and Sir Henry Savile is thought to have been induced by this loss to devote the bulk of his fortune to the promotion of learning, though he had a daughter who survived him and who became the mother of the dramatist Sir Charles Sedley. His edition of Chrysostom in eight folio volumes was published in 1610–1613. It was printed by the king's printer, William Norton, in a private press erected at the expense of Sir Henry, who imported the type. The Chrysostom, which cost him £8000 and did not sell well, was the most considerable work of pure learning undertaken in England in his time. At the same press he published an edition of the *Cyropaedia* in 1618. In 1619 he founded and endowed his professorships of geometry and astronomy at Oxford. He died at Eton on the 19th of February 1622. Sir Henry Savile has been sometimes confounded with another Henry Savile, called "Long Harry" (1570–1617), who gave currency to the forged addition to the Chronicle of Asser which contains the story that King Alfred founded the university of Oxford.

A brother, THOMAS SAVILE (d. 1593), was also a member of Merton College, Oxford, and had some reputation as a scholar.

See W. D. Macray, *Annals of the Bodleian Library* (London, 1868); Sir N. C. Maxwell-Lyte, *History of Eton College* (3rd ed., London, 1899); and John Aubrey, *Lives of Eminent Men* (London, 1898).

SAVINGS BANKS (Fr. *caisses d'épargne*; Ger. *Sparkassen*), institutions for the purpose of receiving small deposits of money and investing them for the benefit of the depositors at compound interest. They originated in the latter part of the 18th century—a period marked by a great advance in the organization of provident habits in general (see FRIENDLY SOCIETIES). They seem, however, to have been first suggested by Daniel Defoe in 1697. The earliest institution of the kind in Europe was one established at Brunswick in 1765; it was followed in 1778 by that of Hamburg, which still exists, in 1786 by one at Oldenburg, in 1790 by one at Loire, in 1792 by that of Basel, in 1794 by one at Geneva, which had but a short existence, and in 1796 by one at Kiel in Holstein. In Great Britain, in 1797, Jeremy Bentham revived Defoe's suggestion under the name of "Frugality Banks," and in 1799 the Rev. Joseph Smith put it in action at Wendover. This was followed in 1801 by the addition of a savings bank to the friendly society which Mrs Priscilla Wakefield had established

[1] See Windscheid, *Lehrbuch des Pandektenrechts*, i. 439.

in 1798. Savings banks were shortly after established in London, Bath, Ruthwell in Dumfriesshire by the Rev. H. Duncan (1774–1846), Edinburgh, Kelso, Hawick, Southampton and many other places. By 1817 they had become numerous enough to claim the attention of the legislature, and many acts of parliament were passed from time to time for the management of these institutions in Great Britain, culminating in the establishment on a very broad basis of the Post Office savings banks (see POST AND POSTAL SERVICE). The promotion of thrift, at the end of the 18th century an experiment by a few far-seeing individuals, was by the 20th century almost universally adopted, and was regarded practically as an adjunct to the institutions of every civilized community. Friendly societies, co-operative societies, trade societies and other agencies are all based on this same principle.

The progress of savings banks and the large amount that the deposits have now reached are evidence of the general fitness of the organization for its purpose. So far as regards trustee savings banks, the provisions of the acts of 1817 are still to a great extent the same as those by which they are now regulated, though the law has been frequently amended in matters of detail. The acts relating to trustee savings banks are referred to as the Trustee Savings Banks Acts 1863 to 1904, a title given by s. 16 (2) of the act of 1904. They comprise the Trustee Savings Banks Act 1863 (26 & 27 Vict. c. 87), the Trustee Savings Banks Act 1887 (50 & 51 Vict. c. 47) and so much of the following acts as applies to trustee savings banks: the Post Office Savings Bank Act 1863, the Savings Banks Act 1880, the Savings Banks Act 1887, the Savings Banks Act 1891, the Savings Banks Act 1893 and the Savings Banks Act 1904.

The main feature is the requirement that the whole of the funds should be invested with the government through the Commissioners for the Reduction of the National Debt. The local management of the banks has been left entirely to the trustees, who are precluded from receiving any remuneration for their services or making any profit. They are, however, required to furnish the commissioners with periodical returns of their transactions. This blending of private management with state control has had many advantages in knitting together class and class. A new savings bank requires for its establishment the consent of the National Debt Commissioners and the certificate of the registrar of friendly societies to its rules.

The legislation of 1817, among other inducements to thrift, offered that of a bounty to the savings bank depositor in the shape of a rate of interest in excess of that given to the ordinary public creditor, or—which is the same thing—in excess of that which could be earned by the investment of the deposits in the purchase of government stock. The interest offered in the first instance was 3d. per day, or £4, 11s. 3d. % per annum; and that rate continued to be granted until the passing of the Act of 1828 (9 Geo. IV. c. 92). That act reduced the rate of interest allowed to the trustees of savings banks to 2½d. per day, or £3, 16s. 0½d. per annum, and prohibited them from allowing more to their depositors than 2¼d. per day, or £3, 8s. 5¼d. per annum, requiring them to pay the surplus, if any, into a separate fund held by the National Debt Commissioners, but bearing no interest. In 1844 the interest to trustees was further reduced to 2d. per day, or £3, 5s. %, the maximum to be allowed to depositors being fixed at £3, 0s. 10d. In 1880 the interest to trustees was reduced to £3, and that to depositors to £2, 15s. and again in 1888 to £2, 15s. and £2, 10s. respectively.

The result of the bonus on thrift offered by the earlier statutes was a loss to the state, which ought to have been made good by an annual vote. Between 1817 and 1828 the difference between the interest credited and that earned amounted to £744,363; and this led to the reduction in the rate of interest effected by the act of the latter year. The deficiency, instead of being paid off, was allowed still to accumulate, and as the price of stock rose and the deposits increased fresh deficiencies arose, so that by 1844 the deficiency, which would have been 1½ millions by the mere accumulation of interest on the previous £744,363, had become £3,179,930. The reduction of interest in 1844 was about enough to make the fund self-supporting, though savings banks are always liable to loss from the fact that deposits are in excess when the funds are high and withdrawals when they are low; but the past deficiency was still allowed to accumulate, although in 1863 nearly 2 millions was voted by parliament to make good part of the deficiency; from 1876 income deficiency was met annually as it arose, while in 1880 there was created to meet the capital deficiency a terminable annuity to expire in 1908, but which by the act of 1904 was extended to 1917.

The offer of a bonus on thrift was of necessity accompanied by provisions to guard against its being used by others than the classes it was intended to encourage. This was done by limiting the amount that each depositor should be permitted to pay in. The limit has been varied from time to time, but by the Savings Banks Act 1891, s. 11 (1), the maximum amount standing in the name of any depositor must not exceed £200, nor must interest be allowed on any sum in excess of that amount. By the act of 1893 the maximum deposit in any one year must not exceed £50, but a depositor may, not more than once, replace the amount of any withdrawal made in one entire sum in the course of a year. The replacement may be effected in one or more sums.

When a person comes with his first deposit to a savings bank he is required to sign a declaration, setting forth his name, address and occupation, that he desires to become a depositor on his own account, and that he has no money in any other savings bank.[1] If this declaration be not true, the deposits are liable to be forfeited; but it is to be feared that few depositors take the trouble to read what they are signing, or think much about the meaning of it. If the depositor cannot write, the actuary of the savings bank will usually ask him a few questions, such as his age, mother's maiden name, &c., which may tend to identify him, or defeat any attempt to personate him for the purpose of withdrawal.

Among the benefits conferred by the legislature upon depositors in savings banks has been that of exemption from the jurisdiction of the ordinary courts of law in cases of dispute with the trustees. By the Acts of 1817 disputes were to be settled by arbitration. By that of 1828 the barrister appointed to certify the rules of the savings banks was made umpire in case of difference of opinion between the arbitrators. By that of 1844 the arbitrators were abolished, and an original and final jurisdiction was conferred upon the barrister. By an Act of 1876 the functions of the barrister in this respect were conferred upon the registrar of friendly societies. This in effect made no change in the law, for the offices of barrister and registrar had been always held by the same persons. As early as 1832 it was determined in the case of *Crisp* v. *Bunbury* (8 Bing. 394) that the effect of these enactments is to oust the jurisdiction of all the superior courts of law and equity (see also *Cardiff S.B.* v. *Aberdare District of Oddfellows*, F. S. Rept., 1887, pt. A., p. 70). This jurisdiction has been highly beneficial to depositors in savings banks. The costs of the award are limited by treasury warrant to a few shillings, never exceeding £1. The procedure is simple and elastic, and the results are satisfactory. The central office, acting as registrar, determines law and fact, and adjusts all the equities of each case. Reference to the index to the registrar's decisions appended to the chief registrar's annual reports will show that many interesting questions of law have had to be determined with regard to so small a matter as the ownership of a savings bank deposit.

Many of the old trustee savings banks which were put on a systematic basis in 1817, have been absorbed by the Post Office, but while the total amount of their deposits increases, the number of their depositors remains about the same. In 1863 there were 622 of these banks carrying on operations with 1,558,000 depositors, and deposits amounting to £40,563,000. In 1889 the number of banks had decreased to 380, with 1,500,000 depositors, and £45,000,000 of deposits; while in 1905 they had still further decreased in number to 224, but the depositors had increased to 1,730,331, and their deposits to £52,723,435. The reason for this is that the smaller trustee savings banks, open often only once a week for a short time, cannot give such facilities as the Post Office, which is open every day. Further than this, owing to the break-up of the Cardiff bank in 1886, and other smaller irregularities, a select committee of the House of Commons was appointed to inquire into these banks. By the recommendations of this committee, an independent and permanent inspection committee was appointed, which has carried on its work of inspection ever since, and reports annually to parliament. This action has rather tended to merge the smaller trustee savings banks in the Post Office. At the same time the large banks continue to do a great business, and have become in many ways similar to ordinary joint stock banks, affording to persons of smaller means daily facilities for saving.

Those who have studied the habits of thrift among the people have usually come to the conclusion that its development depends largely on the ready facilities which exist for its exercise. To this fact may perhaps be attributed the efforts that have been made in various directions for establishing some means of saving close to the places where wages are paid. To carry out this

[1] By the Post Office Savings Bank (Public Trustee) Act 1908, the regulations as to declaration by a depositor and the prohibition of a depositor having more than one account do not apply to the public trustee.

idea, some of the large railway corporations have obtained powers in special acts of parliament to establish savings banks for those in their employment. The success of these banks has been great, though it has varied much, and it is difficult to trace any general rule of progress. Thirteen such institutions return their operations to the Registrar of Friendly Societies. The total amount held was, by the return for 1905, £5,513,207 in 60,427 accounts. In these banks the interest paid, as well as the deposits, are really guaranteed by the whole assets of the companies. Further, in order to encourage thrift among their employés, the companies have formally agreed and bound themselves, by the provisions of their special acts, that the rate of interest paid shall be higher than can be obtained in the open market on the same security.

Other efforts have been made to establish savings banks at factories, to be open at the time wages are paid. One great difficulty, however, has been the objection many of those employed have to their employers knowing of their savings, and their fear lest it may affect their rate of pay. To get over this objection the plan has been tried of employing an outside agency to hold the savings bank. This has not been much more successful, as the suspicion that accounts may be looked at by employers is difficult to overcome. It is found that the most successful savings banks are those which are carried on as a business, where the transactions are so numerous that the individual feels that his own private account is not likely to become known.

Another class of savings bank which of late years has developed considerably, is the penny bank. These banks have a twofold object: one to provide facilities for putting by extremely small sums for those whose means are very limited, and the other to attract children in their earliest years so as to train them to habits of thrift and the realization of the importance and use of even quite small savings. Some form of penny bank now exists in nearly every district, and indeed in nearly every parish. No returns have been collected, but it may be safely said that there are tens of thousands in operation. Many of these penny banks are feeders to the Post Office, which gives them special advantages to invest in that institution. Not only is the gross amount of money thus taken large, but (what is more important) the habit of thrift and of husbanding resources is being taught to the young in all parts of the United Kingdom. This has been one cause of the large extension of the Post Office savings bank itself, and has no doubt led to considerable change in the habits of the people. In a few cases successful efforts have been made to establish permanently these penny banks on a commercial basis, as in the case of the Yorkshire Penny Bank, which has 858 branches, nearly 500,000 depositors and deposits of nearly £16,000,000; and the National Penny Bank, which has 13 branches in London, most of them open from 9 in the morning till 9 at night, with 155,768 depositors, and over £2,000,000 in deposits. The establishment of penny banks in schools has been carried on for many years, and it is difficult to exaggerate the useful work they have done in inculcating habits of thrift in the children, and in adding depositors to the Post Office savings banks when the children start in life. In England and Wales there are over 7000 of these savings banks held in the various elementary schools inspected by the Education Department. The London County Council has done much to promote this movement by instituting penny banks in its various schools. Although the financial result is not large, the educational effect of these banks is considerable. It has been found that many children open accounts at outside penny banks in preference to going to those carried on at their own schools, but it is probable that the idea of so doing is often suggested by the school savings bank.

Penny banks.

With a view of bringing the savings bank still nearer the door of the people, efforts have been made to establish collecting savings banks. In these the collector calls at fixed periods for the deposits. This scheme has grown out of the investigations of a committee of the Charity Organization Society, and is based on the idea, which undoubtedly is the fact, that many people will make contributions when the money is called for, who will not take the trouble to walk a few yards themselves to make the same deposit. That this is so is proved most conclusively by the Post Office life insurance experience, a branch of the Post Office which is scarcely used by the people, while at the same time collecting life insurance companies (which of course must charge a considerable extra premium for collecting) do business to the extent of millions. In most of these banks no interest is given, but facilities and encouragements are afforded for the transfer of each individual account to the Post Office as soon as it is large enough to earn interest.

Closely allied, though essentially different, are the very numerous sharing-out clubs which may be called temporary savings banks. These nearly all take a weekly subscription from their members, and, should any member die, his representative receives a certain sum, the balance left being divided at Christmas equally among the survivors, in proportion to the weekly subscriptions. Some of these clubs are registered, and at a rough estimate they number about 900, with some 120,000 members. The unregistered are, however, much more numerous, though no official information is to be had of them, and it is certain that hundreds of thousands of pounds are divided in this way each Christmas.

The attempt to induce sailors and soldiers to exercise habits of thrift by the establishment of naval savings banks under the act of 1866, and military savings banks under the act of 1859, should be mentioned. The amount in the naval savings bank is generally about £300,000. As might be expected the amount does not grow. This is accounted for by the fact that the depositors leave the service and draw out their savings. About £200,000 a year, however, goes in and out of the naval banks, and £80,000 in the army banks. This sum represents a good deal of self-denial, when the margin within which it is possible to save among sailors and soldiers is considered.

Closely allied to savings banks are a number of societies which need only be briefly referred to here. The largest of them are building societies (*q.v.*) under the Act of 1874, which are a very popular form of saving, especially in certain localities. The contributions to the shares of these societies, which are paid by instalments, differ but little from the periodical payments into savings banks; and although the money is not so readily repaid, notice and other forms having to be gone through, large numbers of persons pay in and draw out money, and receive the interest on the shares in much the same way as they do on deposits in savings banks without any idea of building or buying houses. In 1906 the receipts were £43,219,548 in the United Kingdom, and the accumulated capital more than £70,000,000, with a membership of 612,424. The action of industrial and provident societies regulated under the act of parliament of 1893, must also be mentioned with reference to that part of their business which is closely allied to savings banks. These societies are divided into three classes:—(*a*) ordinary co-operative societies; (*b*) societies for carrying on various businesses, including loan and banking; (*c*) land and building societies. Most of these societies, indirectly or directly, act as savings banks, and have had considerable influence in the growth of thrift in the United Kingdom. (See FRIENDLY SOCIETIES.) In the co-operative societies the sales in 1905 amounted to more than £71,000,000, and the profits to over £5,000,000. These profits are divided in different ways among the members, and they form a saving fund of large dimensions. The societies for carrying on various businesses, such as working men's clubs, loan and banking organizations, registered under the 1893 act, numbered 286, with total receipts £2,020,569. These are not rapidly increasing, but they must be included as one exhibition of the savings of the people, and they are practically used as savings banks. The land and building societies under the act of 1893 are not the same as those above referred to, though their action as regards savings is similar. They are not under the act of 1874, but carry on a trade or business, including dealings of any kind in land. Their operations are slightly increasing. They received £336,424 from subscriptions and other sources, according to a return of 1905, and the value of the land and mortgages was £982,900. Two other classes of institutions should be referred to, the friendly and trade societies, which exist for special purposes, namely, to make provision in sickness, for death, for a want of employment, and to a limited extent for old age. They differ essentially from savings banks, as the subscriptions are parted with and cannot be withdrawn. But as the subscriptions are for certain definite needs, almost certain to be required by each member, which but for those societies would have to be provided for by direct savings in banks, they must be mentioned in treating of the subject as a whole. The amount held by the friendly societies is estimated at £50,459,060, subscribed by 13,978,790 members.

It was once stated with truth that the national debt was held by a

very small proportion of the population; but this is not so now. The various agencies which may be described as savings banks in different forms hold over £200,000,000, which is a considerable share of the national debt of Great Britain.

British Colonies.—In New South Wales there are both state and trustee institutions for savings purposes. The Government Savings Bank was established in 1871 and the Savings Bank of New South Wales in 1832. In both, sums of one shilling and any multiple of that amount may be deposited. The Government Savings Bank does not allow interest on the excess of deposits exceeding £300 except in the case of charitable institutions, friendly societies and trade unions, while the Savings Bank of New South Wales does not allow interest on the excess of deposits over the sum of £200 made by any one individual, but allows the interest on the full deposit in the case of charitable institutions, or a legally established friendly or other society. The rate of interest in the Government Savings Bank is 3 %, and in the Savings Bank of New South Wales 3½ %. The following table shows the growth of depositors and deposits:—

Year.	Government Savings Bank.		Savings Bank of New South Wales.		Total.		
	Number of Depositors.	Amount of Deposits.	Number of Depositors.	Amount of Deposits.	Number of Depositors.	Amount of Deposits.	Average Amount per Depositor.
		£		£		£	£ s. d.
1885	57,538	1,471,894	49,977	2,016,656	107,515	3,488,550	32 8 11
1895	131,703	4,121,700	71,099	3,951,875	202,802	8,073,575	39 16 2
1900	198,014	6,045,622	84,629	4,855,760	282,643	10,901,382	38 11 5
1905	270,982	8,883,651	101,383	5,545,367	372,365	14,429,018	38 15 0

The Savings Bank of New South Wales was originally administered by nine trustees, one of whom was vice-president, but by an act of 1902 the number may be extended up to eighteen. The funds of the institution, unlike those of the Government Savings Bank, can be applied to investments of a general nature, such as mortgages, government and municipal securities, &c. Victoria and South Australia have not developed the postal system, but show the largest amount per head of population of deposits. In trustee savings banks in Victoria the number of depositors in 1900–1901 was 393,026, in 1905–1906 466,752; the amount of deposits in the same years £9,662,006 and £11,764,179, showing an average amount per depositor of £24, 11s. 8d. and £25, 4s. 1d. In South Australia the total number of depositors in savings banks in 1900–1901 was 126,032, of this number 111,537 were depositors in trustee savings banks, having an amount of deposits standing to their credit of £3,782,575 out of a total of £3,795,631. The average amount per depositor was £30, 2s. 4d. In 1905–1906 there were 152,487 depositors with a total amount of deposits of £4,766,907, giving an average amount per head of £31, 5s. 3d. On the other hand, Queensland and West Australia rely almost exclusively on the post office system. In Queensland there were 81,025 depositors in 1900–1901, and 88,026 in 1905–1906. Deposits amounted to £3,896,170 in 1900–1901 and to £4,142,791 in 1905–1906, giving an average per depositor of £48, 1s. 9d. and £47, 1s. 3d. respectively. In Western Australia in 1900–1901 there were 39,318 depositors and in 1905–1906 63,573. The deposits amounted to £1,618,359 in 1900–1901 and to £2,316,161 in 1905–1906, giving an average per depositor of £41, 3s. 3d. and £36, 8s. 8d. In Tasmania the amount of deposits (including those of two joint stock companies) was in 1900–1901 £1,009,097 and in 1905–1906 £1,332,546. The depositors numbered 42,509 and 50,731, giving an average per depositor of £23, 14s. 9d. and £26, 5s. 4d. The following table shows deposits per head of population:—

State.	1900–1901.	1905–1906.
	£ s. d.	£ s. d.
N. S. Wales . . .	8 0 3	10 0 8
Victoria	8 0 6	10 6 10
Queensland . . .	7 15 2	8 7 6
South Australia . .	10 10 0	13 15 0
West Australia . .	8 11 3	9 19 3
Tasmania	5 16 9	8 8 4

In New Zealand there were in 1900–1901 212,436 post office depositors with an amount standing to their credit of £6,350,013 and in 1905–1906 276,066 depositors with deposits of £8,662,023. There are five savings banks in New Zealand not connected with the post office; in these the total amount standing to the credit of depositors in 1905–1906 was £1,111,931.

Canada.—In Canada post office savings banks were established in 1867, but government savings banks, under the management of the Finance Department, had been established in the maritime provinces some years previously. The Canadian government is pursuing the policy of transferring the accounts from the savings banks under the control of the Finance Department to the Post Office Department, the transfer taking place as the position of superintendent of each place becomes vacant. In both kinds of savings banks a deposit must not be less than $1 or exceed $1000 in any one year; nor must the total amount in deposit exceed $3000. There are 961 branches of the post office savings bank and 23 offices of the government savings bank. The following table shows the number of depositors and amount of deposits:—

Year.	Post Office.		Government (other than Post Office).	
	Depositors.	Amount standing to Credit of Depositors.	Depositors.	Amount standing to Credit of Depositors.
	No.	Dollars.	No.	Dollars.
1895	120,628	26,805,542	54,932	17,644,956
1900	150,987	37,507,456	45,773	15,642,267
1905	165,518	45,367,761	48,165	16,649,136

In addition to the post office and government savings banks there are special savings banks, such as the Caisse d'économie of Quebec and Montreal City and District Savings Banks. The chartered banks also have savings branches, but they do not make a separate return to the government of the amounts on deposit in these branches. In India, the Straits Settlements, Orange River Colony, Transvaal, Gold Coast, Sierra Leone and the Bahamas the savings banks are under the post office; in Mauritius, Seychelles, Basutoland, Falkland Islands, Natal, St Helena, Southern Nigeria, Newfoundland, St Lucia, St Vincent, Turks and Caicos Islands, Jamaica, Barbados, Grenada, St Christopher, Nevis, Antigua, Montserrat, Dominica, Virgin Islands, Bermuda, British Honduras, Cyprus, Trinidad, Tobago, Gibraltar and Malta there are government savings banks; in Gambia, treasury savings banks; in Ceylon and British Guiana there are both government and post office savings banks, while in the Cape of Good Hope, in addition to the post office savings banks, there are private savings banks, but their business is small.

France.—In France the first savings bank was instituted in Paris by royal ordinance in 1818. It was quickly imitated in all the principal departments. Some of those so started were independent undertakings, but several were founded on the initiative of municipal councils, three (Nancy, Metz, Avignon) being attached to monts-de-piété. These communal savings banks are now the rule and private banks the exception. They are regulated by a law of 1835, amended in several particulars by later legislation. They are created by decree of the president on the advice of the council of state, and at the initiative of the municipal council. Their administration is in the hands of a council consisting of the mayor of the commune and its directors, none of whom receive remuneration for their services. The funds of these institutions are, with the exception of a certain amount allowed to be retained for independent investment, handed over to the Caisse des dépôts et consignations (created in 1816 for the administration of the investment of private funds). Interest of 3½ % is allowed by the Caisse des dépôts, but out of that the savings banks retain from ¼ to ½ % for administrative expenses and the providing of a reserve fund. Both in the private and the post office savings banks the maximum amount standing in the name of a depositor must not exceed 1500 fr.

The following statement shows the progress of private savings banks[1] since 1835:—

Year.	Number of Banks including Branches.	Number of Depositors.	Amount of Deposits.	Per Head of Population.
			£	s. d.
1840	430	351,308	7,695,337	4 7
1850	565	565,995	5,396,680	3 2
1860	649	1,218,122	15,090,839	8 8
1870	1165	2,079,141	25,289,617	13 10
1880	1405	3,841,104	51,208,107	28 10
1890	1599	5,761,408	116,468,894	63 5
1900	1845	7,116,462	130,559,773	70 7
1905	2042	7,557,133	135,061,740	72 2

Germany.—In Germany the postal savings bank has not been adopted to any extent, but there is an elaborate system of state insurance, which includes life, accident and old-age policies, and to a certain extent even protection against involuntary idleness (see GERMANY).

See the official publications of the various countries, and J. H. Hamilton, *Savings and Savings Institutions* (New York, 1902).

(G. C. T. B.; T. A. I.)

[1] For statistics of the post office savings banks see POST OFFICE.

UNITED STATES

There are in the United States four kinds of savings banks: (1) Mutual or Trustee Savings Banks; (2) Stock Savings Banks; (3) Postal Savings Banks; (4) School Savings Banks.

1. *Mutual Savings Banks* are organized under state laws, and are under the supervision of an officer usually appointed by the governor. They have no capital, and do a strictly investment business. All their earnings go to the depositors, either as dividends, or to a surplus fund, which, in the event of liquidation, also belongs to the depositors. Their management is vested in a board of trustees, a self-perpetuating body who serve without pay, except for specific service such as appraising property. Executive officers and clerks are paid moderate salaries. The proportion of annual expense to each dollar of assets is sometimes less than ·0025. The rate of interest on deposits usually ranges from 3 to 4 %. Depositors have no voice in the management, except as citizens of the state, through their representatives in the state legislature. Nearly all the states limit investments carefully, though a few permit considerable latitude: in New York the deposits in saving banks are considered next to government bonds as safe investments. In that state the deposits in savings banks are exempt from taxation, but a franchise tax of 1 % annually is imposed upon the surplus. In most other states the deposits are taxed for state purposes. The amount which each person may deposit in any year or half year is sometimes limited by the by-laws, and the total sum to be received from any one depositor is usually limited by state law. Deposits are in practice generally payable on demand, though the banks reserve the right to require notice, generally from sixty to ninety days, and sometimes enforce this right in times of panic. The first savings bank incorporated in the United States was the Provident Institution for Savings, incorporated in Boston in 1816. The oldest in New York is the Bank for Savings, of New York City, incorporated in 1819. The largest deposit of any bank of this kind in the United States, $108,720,523·82, was in 1910 that of the Bowery Savings Bank of New York. Mutual savings banks are confined chiefly to the states in the eastern portion of the country. The only mutual banks outside the north-eastern states were in 1910 three in Ohio, five in Indiana, fourteen in Minnesota, one in West Virginia, one in California and two in Wisconsin.

Though the laws governing mutual banks vary in the different states, the following abstract of the New York Savings Bank Law of 1875, re-enacted in 1892, and subsequently amended, gives the main principles on which they are organized.

Thirteen or more persons may incorporate a savings bank, two-thirds of whom shall be residents of the county where the proposed bank is to be situated. When the certificate of organization is filed with the superintendent of banks, who exercises supervision over all banks chartered by the state, he is required to ascertain whether the bank is in fact needed in the community where it is to be organized, and to investigate the character and general fitness of the trustees. The present superintendent of banks requires that the incorporators of a savings bank shall defray personally the expenses of the institution until its earnings are sufficient to meet such expenses, and also return dividends at the rate of not less than 3 %. The board of trustees have entire control of the management of the bank. They elect the president and other officers. A trustee who borrows any of the bank's funds, or who becomes a surety for any other borrower, forfeits his office. Bankruptcy or an unsatisfied judgment of ninety days' standing will also void his office. Trustees are not allowed to have any interest in the profits, or to borrow the deposits or funds.

The trustees of any savings bank may invest the moneys deposited therein and the income derived therefrom as follows: (1) In the stocks or bonds or interest-bearing notes or obligations of the United States, or those for which the faith of the United States is pledged, including the bonds of the District of Columbia. (2) In the stock or bonds or interest-bearing obligations of this state. (3) In the stocks or bonds or interest-bearing obligations of any of the United States which has not within ten years defaulted in the payment of any part of any debt authorized by its legislature. (4) In the stocks or bonds of any city, county, town or village, school district bonds and union free school district bonds, issued for school purposes, or in the interest-bearing obligations of any city or county of this state. (5) In the stocks or bonds of a number of specified cities without the state, subject to the condition that if at any time the indebtedness of any of said cities, less its water debts and sinking fund, shall exceed 7 % of its valuation for purposes of taxation, its bonds and stocks shall cease to be an authorized investment. (6) In bonds and mortgages on unencumbered real property situated in this state, to the extent of 60 % of the value of such property. Not more than 65 % of the whole amount of deposits shall be so lent or invested. If the loan is on unimproved and unproductive real property, the amount lent thereon shall not be more than 40 % of its actual value. No investment in any bond and mortgage shall be made by any savings bank, except upon the report of a committee of its trustees. (7) Also, by virtue of a law passed by the legislature of 1898: In the first mortgage bonds of any railway corporation of this state, or in the mortgage bonds of any such railway corporation of an issue to retire all prior mortgage debt of such railway corporation, provided the bonds satisfy certain precautionary conditions. Not more than 25 % of the assets of any savings banks shall be loaned or invested in railroad bonds. There are other limitations of the amounts to be loaned or invested in the securities of any one railway. Street railway corporations shall not be considered railway corporations within the meaning of this section. An act passed in 1900 permits the investment of deposits in the bonds of certain railways situated in other states. These investments must conform to conditions assuring safety.

Savings banks in New York are preferred creditors of insolvent state banks and trust companies. In 1901 a law was passed providing for a tax of 1 % on the surplus of savings banks, computed on the par value of their securities. On July 1, 1910, deposits in the savings banks amounted to $1,526,935,581·84, distributed amongst 2,886,910 depositors; interest credited for the preceding year amounted to $53,828,625·03; expenses for the year 1909 were $5,000,053·55 or $2·90 for each $1000 of resources. Loans on real estate, secured by bond and mortgage, amounted to $805,053,044·63, and investments in stocks and bonds, market value, $658,872,348·85.

Other important items in the assets of these banks are: State bonds, $43,719,111·66; city bonds, $305,695,035·71; railroad bonds, $250,346,600. Deposits received for the year 1909 were $390,709,469·44.

According to reports made to the Comptroller of the Currency there were on April 28, 1909, a total of 642 Mutual Savings Banks in the United States, with $3,394,926,005 aggregate resources. The loans and mortgages of these banks amounted to $1,590,181,366·19, and their investments to $1,599,532,371, classified as follows:

United States bonds	$33,353,576·12
State, county and municipal bonds	685,099,502·18
Railroad bonds	743,425,893·93
Other stocks and bonds, including railroad and bank stocks	137,653,399·71

These banks had, on the date named, a surplus fund of $202,065,316·85, and $3,144,584,874 individual deposits. The Mutual Savings Banks hold more than 22 % of the aggregate individual deposits of all the banks in the country.

2. *Stock Savings Banks* are found in the more purely agricultural parts of the country, the southern, Mississippi Valley and western states, where only a small proportion of people earn wages in manufactures and commerce; suitable investments are not numerous, the benefits of mutual savings banks are not familiar, and the people are unwilling to accept a low rate of interest. In some states having stock banks there are no laws relating to banking, and in others the savings banks carry on their business under the same laws as commercial banks. Several of the states restrict the investments of the stock savings banks. Prior to 1865, when the issue of circulating notes by state banks was suppressed by a prohibitory tax, there was a distinction between state banks and stock savings banks; the former could issue notes, while the latter, as a rule, could not. Stock savings banks are conducted frequently as adjuncts of state and national banks, occupying the same rooms and being under the same management. Many of the national banks chartered by the Federal government maintain "savings departments," though the deposits received in these departments are on the same legal footing as other deposits and are not specially invested. Similar departments are also to be found in many trust companies and state banks of discount.

The law of the state of Iowa is typical of those states where stock banks are under public supervision. A savings bank may be organized by not less than five persons. In towns of ten thousand inhabitants or less it must have a capital of $10,000, and in towns or cities with more than ten thousand inhabitants $50,000. The usual corporate powers are granted. The amount of deposits is limited to twenty times the capital and surplus. The usual provisions for repayments of deposits are made, and in addition the savings banks are given the privilege of requiring sixty days' notice for the withdrawal of savings deposits.

The banks are allowed to invest their funds in the following securities: (1) Stocks, bonds or interest-bearing notes of the United States. (2) Stocks, bonds or evidences of debt-bearing interest of the

state of Iowa. (3) Stocks, bonds and warrants of any city, town, village or school district, or drainage district, in the state regularly issued, but the investments of any savings bank should not consist of such bonds or warrants to a greater amount than 25 % of the assets. (4) Mortgages or debts on unencumbered real estate within the state worth at least twice the amount lent. (5) It is lawful for such banks to discount, purchase, sell and make loans upon personal or public security, except shares of their own capital stock.

Property acquired by foreclosure of mortgages, &c., may not be held more than ten years. The rate of interest to be paid is left to the discretion of the trustees, and the profits, after the payment of such interest and expenses, go to capital stock. Stockholders are liable to the creditors for double their stock, and such liability continues for six months after the transfer of any stock. Directors receive no compensation. Officers and directors of the bank are required to give the same security for loans that is required of others, and such loans can only be made by the board in the absence of the party applying. The savings banks are prohibited from lending to any individual or firm more than 20 % of the capital stock. All savings banks are required to make a quarterly statement to the auditor of the state, giving in detail the statement of condition upon a given day. This statement is made under oath of the officers, and is required to be published. The state auditor is given the power to examine any savings bank at any time, and must make an examination at least once a year; and should the conditions warrant, he is required to report to the attorney-general, who institutes proceedings under the law relating to insolvent corporations. Provision is made for increasing the capital stock by a two-thirds' vote of the existing shares. The corporate existence of the banks is placed at fifty years. Michigan affords a good example of banks doing a commercial and savings bank business under a single organization, but with the savings deposits entirely segregated from other deposits and separately invested. The system has worked successfully and satisfactorily. There has been much discussion among bankers throughout the country in recent years of the propriety of enacting laws specifically providing (*a*) for the creation of savings departments in national banks, with the segregation of savings deposits, and (*b*) for the enactment of similar state laws to be applicable to state banks and trust companies maintaining savings departments. Other proposals have been made for a government (or state) guaranty of deposits, and this plan has been adopted in a few of the states.

On April 28, 1909, there were 1061 stock savings banks reporting, with aggregate resources of $677,784,099·95. Their capital was $59,506,420, and surplus and undivided profits $38,112,716·60. Individual deposits subject to check, $100,708,410·57; savings deposits, or deposits in interest or savings departments, $366,167,901·61; other deposits, including amount due banks and bankers, $109,911,859·91.

Number of Savings Banks in the United States, Number of Depositors, Amount of Savings Deposits, &c., 1900–1909.

Year.	Number of Banks.	Number of Depositors.	Deposits.	Average due each Depositor.	Average per Capita in the United States.
1900	1002	6,107,083	2,449,547,885	$401·10	$31·78
1901	1007	6,358,723	2,597,094,580	408·30	33·45
1902	1036	6,666,672	2,750,177,290	412·53	34·89
1903	1078	7,035,228	2,935,204,845	417·21	36·52
1904	1157	7,305,443	3,060,178,611	418·89	37·52
1905	1237	7,696,229	3,261,236,119	423·74	39·17
1906	1319	8,027,192	3,482,137,198	433·79	41·13
1907	1415	8,588,811	3,690,078,945	429·64	42·87
1908	1453	8,705,848	3,660,553,945	420·47	41·84
1909[1]	1703[2]	8,831,863	3,713,405,710	420·45	41·75

[1] Population estimated at 88,926,000, June 30, 1909.

[2] Not including 339 state banks and trust companies of Illinois with $204,908,505 savings deposits credited to 641,634 savings depositors. Including Illinois savings deposits and depositors the average due each depositor is $413·60 and average per capita $44·06.

On May 3, 1909, a statement was issued by Wm. Hanhart, Secretary of the Savings Bank Section of the American Bankers Association, showing "actual savings deposits in the savings banks, national banks, Trust Companies and private banks in United States," $5,560,837,016.

3. *Postal Savings Banks.*—By an act of the Federal Congress, approved June 25, 1910, Postal Savings Banks were first authorized in the United States. The management of these banks is vested in a board of trustees composed of the postmaster-general, secretary of the treasury, and attorney-general. The board of trustees shall designate such post-offices as it deems proper to be postal savings depository offices. Any person ten years or over may be a depositor; the minimum deposit is one dollar, and not more than $100 may be deposited by any one person in any one month; the maximum balance to the credit of any depositor (exclusive of interest) shall not exceed $500. Interest, 2 % annually; deposits payable on demand without notice. The deposits in the postal savings depositories are to be deposited in banks subject to national or state supervision at not less than 2½ % interest; 65 % of the deposits may be so redeposited in these banks; 30 % invested in United States securities, and 5 % held as a reserve in the United States treasury. But the 65 % fund on deposit with the banks may be withdrawn for investment in bonds or other securities of the United States, but only by direction of the president, and only when, in his judgment, the general welfare and the interests of the United States so require. At the option of the depositor, deposits may be converted into United States government bonds. In making deposits of the funds in national or state banks, the Federal government requires of those banks security in the form of public bonds or other securities as the board of trustees may prescribe. The faith of the United States is solemnly pledged to the payment of the deposits.

4. *School Savings Banks* were first established in the United States in 1885 by J. H. Thiry, at Long Island City, New York. On January 1, 1910, the system was in use in 1168 schools, distributed throughout 118 cities or villages. Out of 632,665 pupils registered in these schools, 203,458 have saved $5,051,644·60, of which $4,180,948·59 have been withdrawn, leaving a balance of $870,696·01 due depositors. (B. R.*)

SAVOIE, a frontier department of France, formed in 1860 of the old provinces of Haute Savoie, Savoie, the Tarentaise and the Maurienne, which constituted the southern portion of the duchy of Savoy. It is bounded N. by the department of Haute Savoie, E. and S.E. by Italy, S.W. by the department of the Hautes Alpes, and W. by those of the Isère and the Ain. Pop. (1901) 254,781; area 2224 sq. m. It is mainly made up of the basin of the Isère. The upper course of that river flows through the Tarentaise, receiving (right) the Arly and later (left) the Arc, which flows through the Maurienne, which is to a large extent traversed by the Mont Cenis railway. Probably the Isère formerly communicated with the Rhône past Chambéry and the Lac du Bourget. The sources of the Isère and of the Arc are separated by the ridge of the Col du Mont Iseran (9085 ft.). The loftiest points in the department are the Grande Casse (12,668 ft.), the culminating summit of the Vanoise group, the Mont Pourri (12,428 ft.), the Pointe de Charbonel (12,336 ft.), the Aiguille de la Grande Sassière (12,323 ft.), the Dent Parrachée (12,179 ft.), the Levanna (11,943 ft.) and the Aiguilles d'Arves (11,529 ft.). A small portion of the department (including both shores of the Lac du Bourget) is in the part of the duchy of Savoy neutralized in 1815. It is divided into 4 arrondissements (Chambéry, the chief town, Albertville, Moutiers-Tarentaise, and St Jean de Maurienne), 29 cantons and 329 communes. It forms the dioceses of Chambéry (an archbishopric), Moutiers and St Jean de Maurienne. The best place known to foreigners is Aix les Bains (*q.v.*), while other sulphur springs rise at Marlioz and at Challes, those of Salins being saline, and those of Brides (the best known after Aix) alkaline.

See J. J. Vernier, *Dictionnaire topographique du dép. de la Savoie* (Chambéry, 1897). (W. A. B. C.)

SAVONA, a seaport and episcopal see of Liguria, Italy, in the province of Genoa, 27 m. W.S.W. of Genoa by rail, 33 ft. above sea-level, and after Genoa and Nice the most important of the cities of the Riviera. Pop. (1906) 43,836 (town); 46,778 (commune). The greater part of the town is now modern. It is surrounded with green-clad hills and luxuriant orange groves. On the Rock of St George stands the castle built by the Genoese in 1542, on the area of the old cathedral and now used as a military prison. The cathedral (1589–1604) is a late Renaissance building with a modern dome and early Renaissance choir-stalls, pulpit, &c. In the Cappella Sistina, to the north, stands the simple, finely carved tomb erected by Sixtus IV. to his parents. Facing the cathedral is the Della Rovere palace erected by

Cardinal Giulio della Rovere (Julius II.) from the plans of Giuliano da Sangallo as a kind of university, and now occupied by the prefecture, the post-office and law-courts. S. Maria di Sastello has a large altarpiece by Foppa and Brea (of 1490). There is a municipal picture-gallery in the hospital of St Paul. The Teatro Chiabrera was erected in 1853 in honour of the lyric poet Chiabrera, who was born and buried in Savona. Four and a half miles W. is a pilgrimage church of the Madonna della Misericordia, founded in 1536. The modern harbour, dating from 1815, has since 1880 been provided with a dock excavated in the rock, 986 ft. long, 460 ft. wide and 23 ft. deep. Savona is one of the chief seats of the Italian iron industry, having iron-works and foundries, shipbuilding, railway workshops, engineering shops, brass foundry, tinplate works, sulphur mills and glass-works. It imports commodities to the value of nearly £2,000,000 yearly, half of which is coal, with petroleum, iron, cereals, &c. In 1906, 777,000 tons of shipping, of which about half was British, and most of the rest Italian, entered. There is a small export trade, chiefly in iron sheets, chemicals, wood and candied fruits. The potteries export their earthenware to all parts of Italy. There is a railway through the mountains from Savona to Turin (91 m. N.N.W.).

Savona is the ancient *Savo*, a town of the Ingauni (see ALBENGA), where, according to Livy, Mago stored his booty in the Second Punic War. A buried Roman bridge lies near the stream, which has now changed its course. The place was never of importance in Roman times, the traffic passing to Vada Sabatia (Vado), 4 m. to the W., which was a harbour, and the point to which the coast road from Rome was reconstructed in 109 B.C., and from which a road diverged across the Apennines to Placentia. In 1191 it bought up the territorial claims of the marquesses Del Carretto. Its whole history is that of a long struggle against the preponderance of Genoa. As early as the 12th century the Savonese built themselves a sufficient harbour; but in the 16th century the Genoese, fearing that Francis I. of France intended to make it a great seat of Mediterranean trade, rendered it useless by sinking at its mouth vessels filled with large stones. In 1746 it was captured by the king of Sardinia, but it was restored to Genoa by the treaty of Aix-la-Chapelle. Columbus, whose ancestors came from Savona, gave the name of the city to one of the first islands he discovered in the Antilles.

SAVONAROLA, GIROLAMO (1452–1498), Italian monk and martyr, was born at Ferrara on the 21st of September 1452, the third child of Michele Savonarola and his wife Elena Bonaccossi of Mantua. His grandfather, Michele Savonarola, a Paduan physician of much repute and learning, had settled in Ferrara, and gained a large fortune there. The younger Michele was a mere courtier and spendthrift, but Elena seems to have been a woman of superior stamp. She was tenderly loved by her famous son, and his letters prove that she retained his fullest confidence through all the vicissitudes of his career.

Girolamo was a precocious child, with an early passion for learning. His first tutor was his grandfather, the physician; and, in the hope of restoring their fallen fortunes, his parents intended him for the same profession. Even as a boy he had intense pleasure in reading St Thomas Aquinas and the Arab commentators of Aristotle, was skilled in the subtleties of the schools, wrote verses, studied music and design, and, avoiding society, loved solitary rambles on the banks of the Po. Ferrara was then a gay and bustling town of 100,000 inhabitants, its prince Borso d'Este a most magnificent potentate. To the mystic young student all festivities were repulsive, and although reared in a courtier-household he early asserted his individuality by his contempt for court life. At the age of nineteen, however, he had no thought of renouncing the world, for he was then passionately in love with the daughter of a neighbour, a Strozzi exiled from Florence. His suit was repulsed with disdain; no Strozzi, he was told, might stoop to wed a Savonarola. This blow probably decided his career; but he endured two years of misery and mental conflict before resolving to abandon his medical studies and become a monk. He was full of doubt and self-distrust; disgust for the world did not seem to him a sufficient qualification for the religious life, and his daily prayer was, "Lord! teach me the way my soul should walk." But in 1474 his doubts were dispelled by a sermon heard at Faenza. He secretly stole away to Bologna, entered the monastery of St Domenico and then acquainted his father with his reasons for the step. The world's wickedness was intolerable, he wrote; throughout Italy he beheld vice triumphant, virtue despised. Among the papers he had left behind at Ferrara was a treatise on "Contempt of the World," inveighing against the prevalent corruption and predicting the speedy vengeance of Heaven. His novitiate was marked by a fervour of humility. He sought the most menial offices, and did penance for his sins by the severest austerities. According to contemporary writers he was worn to a shadow. His gaunt features were beautified by an expression of singular force and benevolence. Luminous dark eyes sparkled and flamed beneath his thick, black brows, and his large mouth and prominent nether lip were as capable of gentle sweetness as of power and set resolve. He was of middling stature and dark complexion, His manners were simple, his speech unadorned and almost homely. His splendid oratorical power was as yet unrevealed; but his intellectual gifts being recognized his superiors charged him with the instruction of the novices. He passed six quiet years in the convent, but his poems written during that period are expressive of burning indignation against the corruptions of the church and profoundest sorrow for the calamities of his country.

In 1482 he reluctantly accepted a mission to Ferrara, and, regarding earthly affections as snares of the evil one, tried to keep aloof from his family. His preachings attracted slight attention there, no one—as he later remarked—being a prophet in his own land. An outbreak of hostilities between Ferrara and Venice, fomented by Pope Sixtus IV., soon caused his recall to Bologna. Thence he was despatched to St Mark's in Florence. Lorenzo the Magnificent was then (1482) at the height of his power and popularity. At first Savonarola was enchanted with Florence. His cloister, sanctified by memories of St Antonine and adorned with the inspired paintings of Frà Angelico, seemed to him a fore-court of heaven. But his content speedily changed to horror. The Florence streets rang with Lorenzo's ribald songs (the "canti carnascialeschi"); the smooth, cultured citizens were dead to all sense of religion or morality; and the spirit of the fashionable heathen philosophy had even infected the brotherhood of St Mark. In 1483 Savonarola was Lenten preacher in the church of St Lorenzo, but his plain, earnest exhortations attracted few hearers, while all the world thronged to Santo Spirito to enjoy the elegant rhetoric of Frà Mariano da Genazzano. Discouraged by this failure in the pulpit, Savonarola now devoted himself to teaching in the convent, but his zeal for the salvation of the apathetic townsfolk was soon to stir him to fresh efforts. Convinced of being divinely inspired, he had begun to see visions, and discovered in the Apocalypse symbols of the heavenly vengeance about to overtake this sin-laden people. In a hymn to the Saviour composed at this time he gave vent to his prophetic dismay. The papal chair was now filled by Innocent VIII., whose rule was even more infamous than that of his predecessor Sixtus IV.

Early Years.

Removal to Florence.

Savonarola's first success as a preacher was gained at St Gemignano (1484–1485), but it was only at Brescia in the following year that his power as an orator was fully revealed. In a sermon on the Apocalypse he shook men's souls by his terrible threats of the wrath to come, and drew tears from their eyes by the tender pathos of his assurances of divine mercy. A Brescian friar relates that a halo of light was seen to flash round his head, and the citizens remembered his awful prophecies when in 1512 their town was put to the sack by Gaston de Foix. Soon, at a Dominican council at Reggio, Savonarola had occasion to display his theological learning and subtlety. The famous Pico della Mirandola was particularly impressed by the friar's attainments, and is said to have urged Lorenzo de' Medici to recall him from Lombardy.

When Savonarola returned to Florence in 1490, his fame as an orator had gone there before him. The cloister garden was too small for the crowds attending his lectures, and on the 1st of August 1490 he gave his first sermon in the church of St Mark. To quote his own words, it was "a terrible sermon," and legend

adds that he foretold he should preach for eight years. And now, for the better setting forth of his doctrines, to silence pedants, and confute malignant misinterpretation, he published a collection of his writings. These proved his knowledge of the ancient philosophy he so fiercely condemned, and showed that no ignorance of the fathers caused him to seek inspiration from the Bible alone. *The Triumph of the Cross* is his principal work, but everything he wrote was animated by the ardent spirit of piety evidenced in his life. Savonarola's sole aim was to bring mankind nearer to God.

In 1491 he was invited to preach in the cathedral, Sta Maria del Fiore, and his rule over Florence may be said to begin from that date. Lorenzo sent leading citizens to him to urge him to show more respect to the head of the state. Savonarola rejected their advice and foretold the impending deaths of Lorenzo, of the pope and of the king of Naples. In the July of the same year he was elected prior of St Mark's. As the convent had been rebuilt by Cosimo, and enriched by the bounty of the Medici, it was considered the duty of the new superior to present his homage to Lorenzo. Savonarola, however, refused to conform to the usage. His election was due to God, not Lorenzo; to God alone would he promise submission. Upon this the sovereign angrily exclaimed: "This stranger comes to dwell in my house, yet will not stoop to pay me a visit." Nevertheless, disdaining to recognize the enmity of a mere monk, he tried, but in vain, conciliatory measures. The Magnifico then sought to undermine his popularity, and Frà Mariano was employed to attack him from the pulpit. But the preacher's scandalous accusations missed their mark, and disgusted his hearers without hurting his rival. Savonarola took up the challenge; his eloquence prevailed, and Frà Mariano was silenced. But the latter, while feigning indifference, was thenceforth his rancorous and determined foe.

Prior of St Mark's.

In April 1492 Lorenzo de' Medici was on his death-bed at Careggi. Oppressed by the weight of his crimes, he summoned the unyielding prior to shrive his soul. Savonarola reluctantly came, and offered absolution upon three conditions. Lorenzo asked in what they consisted. First, "You must repent and feel true faith in God's mercy." Lorenzo assented. Secondly, "You must give up your ill-gotten wealth." This, too, Lorenzo promised, after some hesitation: but upon hearing the third clause, "You must restore the liberties of Florence," Lorenzo turned his face to the wall and made no reply. Savonarola waited a few moments and then went away. And shortly after his penitent died unabsolved.

Savonarola's influence now rapidly increased. Many adherents of the late prince came over to his side, disgusted by the violence and incompetency of Piero de' Medici's rule. The same year witnessed the fulfilment of Savonarola's second prediction in the death of Innocent VIII. (July 1492); men's minds were full of anxiety, an anxiety increased by the scandalous election of Cardinal Borgia to the papal chair. The friar's utterances became more and more fervent and impassioned. It was during the delivery of one of his Advent sermons that he beheld the celebrated vision, recorded in contemporary medals and engravings, that is almost a symbol of his doctrines. A hand appeared to him bearing a flaming sword inscribed with the words: "Gladius Domini supra terram cito et velociter." He heard supernatural voices proclaiming mercy to the faithful, vengeance on the guilty, and mighty cries that the wrath of God was at hand. Then the sword bent towards the earth, the sky darkened, thunder pealed, lightning flashed, and the whole world was wasted by famine, bloodshed and pestilence. It was probably the noise of these sermons that caused the friar's temporary removal from Florence at the instance of Piero de' Medici. He was presently addressing enthusiastic congregations at Prato and Bologna. In the latter city his courage in rebuking the wife of Bentivoglio, the reigning lord, for interrupting divine service by her noisy entrance nearly cost him his life. Assassins were sent to kill him in his cell; but awed, it is said, by Savonarola's words and demeanour they fled dismayed from his presence. At the close of his last sermon the undaunted friar publicly announced the day and hour of his departure from Bologna; and his lonely journey on foot over the Apennines was safely accomplished. He was rapturously welcomed by the community of St Mark's, and at once proceeded to re-establish the discipline of the order and to sweep away abuses. For this purpose he obtained, after much difficulty, a papal brief emancipating the Dominicans of St Mark from the rule of the Lombard vicars of that order. He thus became an independent authority, no longer at the command of distant superiors. He relegated many of the brethren to a quieter retreat outside the city, only retaining in Florence those best fitted to aid in intellectual labour. To render the convent self-supporting, he opened schools for various branches of art, and promoted the study of Oriental languages. His efforts were successful; religion and learning made equal progress; St Mark's became the most popular monastery in Florence, and many citizens of noble birth flocked thither to take the vows.

Prophetic Visions.

Meanwhile Savonarola continued to denounce the abuses of the church and the guilt and corruption of mankind, and thundered forth predictions of heavenly wrath. In 1494 the duke of Milan demanded the aid of France, and King Charles VIII. brought an army across the Alps. Piero de' Medici, made alliance with the Neapolitan sovereign whose kingdom was claimed by Charles. Then, repenting this ill-judged step, he hurried in person to the French camp at Pietra Santa and humbled himself before the king. Not content with agreeing to all the latter's demands, he further promised large sums of money and the surrender of the strongholds of Pisa and Leghorn. This news drove Florence to revolt. But even at this crisis Savonarola's influence was all-powerful, and a bloodless revolution was effected. Piero Capponi's declaration that "it was time to put an end to this baby government" was the sole weapon needed to depose Piero de' Medici. The resuscitated republic instantly sent a fresh embassy to the French king, to arrange the terms of his reception in Florence. Savonarola was one of the envoys, Charles being known to entertain the greatest veneration for the friar who had so long predicted his coming and declared it to be divinely ordained. He was most respectfully received at the camp, but could obtain no definite pledges from the king, who was bent on first coming to Florence.

Returning full of hope from Pietra Santa, Savonarola might well have been dismayed by the distracted state of public affairs. Nevertheless, with the aid of Capponi, he guided the bewildered city safely through these critical days. Charles entered Florence on the 17th of November 1494, and the citizens' fears evaporated in jests on the puny exterior of the "threatened scourge." But the exorbitance of his demands soon showed that he came as a foe. Disturbances arose, and serious collision with the French troops seemed inevitable. The signory resolved to be rid of their dangerous guests; and, when Charles threatened to sound his trumpets unless the sums exacted were paid, Capponi tore up the treaty in his face and made the memorable reply: "Then we will ring our bells." The monarch was cowed, accepted moderate terms, and, yielding to Savonarola's remonstrances, left Florence on the 24th of November.

After seventy years' subjection to the Medici Florence had forgotten the art of self-government, and felt the need of a strong guiding hand. So the citizens turned to the patriot monk whose words had freed them of King Charles, and Savonarola became the lawgiver of Florence. The first thing done at his instance was to relieve the starving populace within and without the walls; shops were opened to give work to the unemployed; all taxes, especially those weighing on the lower classes, were reduced; the strictest administration of justice was enforced, and all men were exhorted to place their trust in the Lord. And, after much debate as to the constitution of the new republic, Savonarola's influence carried the day in favour of Soderini's proposal of a universal or general government, with a great council on the Venetian plan. The great council consisted of 3200 citizens of blameless reputation and over twenty-five years of age, a third of the number sitting for six months in turn in the hall of the Cinquecento expressly built for the purpose. There was also an

upper council of eighty, which in conjunction with the signory decided all questions of too important and delicate a nature for discussion in the larger assembly. These institutions were approved by the people, and gave a fair promise of justice. Savonarola's programme of the new government was comprised in the following formula:—(1) fear of God and purification of manners; (2) promotion of the public welfare in preference to private interests; (3) a general amnesty to political offenders; (4) a council on the Venetian model, but with no doge. At first the new machinery acted well; the public mind was tranquil, and the war with Pisa—not as yet of threatening proportions—was enough to occupy the Florentines and prevent internecine feuds.

Without holding any official post in the commonwealth he had created, the prior of St Mark's was the real head of the state, the dictator of Florence, and guarded the public weal with extraordinary political wisdom. At his instance the tyrannical system of arbitrary imposts and so-called voluntary loans was abolished, and replaced by a tax of 10% (*la decima*) on all real property. The laws and edicts of this period read like paraphrases of Savonarola's sermons, and indeed his counsels were always given as addenda to the religious exhortations in which he denounced the sins of his country and the pollution of the church, and urged Florence to cast off iniquity and become a truly Christian city, a pattern not only to Rome but to the world at large. His eloquence was now at the flood. Day by day his impassioned words, filled with the spirit of the Old Testament, wrought upon the minds of the Florentines and strung them to a pitch of pious emotion never before—and never since—attained by them. Their fervour was too hot to be lasting, and Savonarola's uncompromising spirit roused the hatred of political adversaries as well as of the degraded court of Rome. Even now, when his authority was at its highest, when his fame filled the land, and the vast cathedral and its precincts lacked space for the crowds flocking to hear him, his enemies were secretly preparing his downfall.

"Dictator of Florence."

Pleasure-loving Florence was completely changed. Abjuring pomps and vanities, its citizens observed the ascetic régime of the cloister; half the year was devoted to abstinence and few dared to eat meat on the fasts ordained by Savonarola. Hymns and lauds rang in the streets that had so recently echoed with Lorenzo's dissolute songs. Both sexes dressed with Puritan plainness; husbands and wives quitted their homes for convents; marriage became an awful and scarcely permitted rite; mothers suckled their own babes; and persons of all ranks—nobles, scholars and artists—renounced the world to assume the Dominican robe. Still more wonderful was Savonarola's influence over children, and their response to his appeals is a proof of the magnetic power of his goodness and purity. He organized the boys of Florence in a species of sacred militia, an inner republic, with its own magistrates and officials charged with the enforcement of his rules for the holy life. It was with the aid of these youthful enthusiasts that Savonarola arranged the religious carnival of 1496, when the citizens gave their costliest possessions in alms to the poor, and tonsured monks, crowned with flowers, sang lauds and performed wild dances for the glory of God. In the same spirit, and to point the doctrine of renunciation of worldly enjoyments, he celebrated the carnival of 1497 by the famous "burning of the vanities" (*i.e.* masks and other objects pertaining to the carnival festivities, indecent books and pictures, &c.) in the Piazza della Signoria. A Venetian merchant is known to have bid 22,000 gold florins for the doomed vanities, but the scandalized authorities not only rejected his offer but added his portrait to the pile. Nevertheless the artistic value of the objects consumed has been greatly exaggerated by some writers. There is no proof that any book or painting of real merit was sacrificed, and Savonarola was neither a foe to art nor to learning. On the contrary, so great was his respect for both that, when there was a question of selling the Medici library to pay that family's debts, he saved the collection at the expense of the convent purse.

Meanwhile events were taking a turn hostile to the prior. Alexander VI. had long regretted the enfranchisement of St Mark's from the rule of the Lombard Dominicans, and now, having seen a transcript of one of Savonarola's denunciations of his crimes, resolved to silence this daring preacher. Bribery was the first weapon employed, and a cardinal's hat was held out as a bait. But Savonarola indignantly spurned the offer, replying to it from the pulpit with the prophetic words: "No hat will I have but that of a martyr, reddened with my own blood." So long as King Charles remained in Italy Alexander's concern for his own safety prevented vigorous measures against the friar. But no Borgia ever forgot an enemy. He bided his time, and the transformation of sceptical Florence into an austerely Christian republic claiming the Saviour as its head only increased his resolve to crush the man who had wrought this marvel. The potent duke of Milan, Ludovico Sforza, and other foes were labouring for the same end, and already in July 1495 a papal brief had courteously summoned Savonarola to Rome. In terms of equal courtesy the prior declined the invitation, nor did he obey a second, less softly worded, in September. Then came a third, threatening Florence with an interdict in case of renewed refusal. Savonarola disregarded the command, but went to preach for a while in other Tuscan cities. But in Lent his celebrated sermons upon Amos were delivered in the duomo, and again he urged the necessity of reforming the church, striving by ingenious arguments to reconcile rebellion against Alexander with unalterable fidelity to the Holy See. All Italy recognized that Savonarola's voice was arousing a storm that might shake even the power of Rome. Alive to the danger, the pope knew that his foe must be crushed, and the religious carnival of 1496 afforded a good pretext for stronger proceedings against him. The threatened anathema was deferred, but a brief uniting St Mark's to a new Tuscan branch of the Dominicans now deprived Savonarola of his independent power. However, in the beginning of 1497 the Piagnoni were again in office, with the prior's staunch friend, Francesco Valori, at their head. In March the aspect of affairs changed. The Arrabbiati and the Medicean faction merged political differences in their common hatred to Savonarola. Piero de' Medici's fresh attempt to re-enter Florence failed; nevertheless his followers continued their intrigues, and party spirit increased in virulence. The citizens were growing weary of the monastic austerities imposed on them, and Alexander foresaw that his revenge was at hand.

Conflict with the Pope.

A signory openly hostile to Savonarola took office in May, and on Ascension Day his enemies ventured on active insult. His pulpit in the duomo was defiled, an ass's skin spread over the cushion, and sharp nails fixed in the board on which he would strike his hand. The outrage was discovered and remedied before the service began; and, although the Arrabbiati half filled the church and even sought to attempt his life, Savonarola kept his composure and delivered an impressive sermon. But the signory, in feigned anxiety for the public peace, besought him to suspend his discourses. Shortly afterwards the threatened bull of excommunication was launched against him, and Frà Mariano was in Rome stimulating the pope's wrath. Savonarola remained undaunted. The sentence was null and void, he said. His mission was divinely inspired; and Alexander, elected simoniacally and laden with crimes, was no true pope. Nevertheless the reading of the bull in the duomo with the appropriate, terrifying ceremonial made a deep impression on the Florentines. And now, the Arrabbiati signory putting no check on the Compagnacci, the city returned to the wanton licence of Lorenzo's reign. But in July Savonarola's friends were again in power and did their best to have his excommunication removed. Meanwhile party strife was stilled by an outbreak of the plague. During this time Rome was horror-struck by the mysterious murder of the young duke of Gandia, and the bereaved pope mourned his son with the wildest grief. Savonarola addressed to the pontiff a letter of condolence, boldly urging him to bow to the will of Heaven and repent while there was yet time.

Excommunicated.

The plague ended, Florence was plunged in fresh troubles from Medicean intrigues, and a conspiracy for the restoration

of Piero was discovered. Among the five leading citizens concerned in the plot was Bernardo del Nero, a very aged man of lofty talents and position. The gonfalonier, Francesco Valori, used his strongest influence to obtain their condemnation, and all five were put to death. It is said that at least Bernardo del Nero would have been spared had Savonarola raised his voice, but, although refraining from any active part against the prisoners, the prior would not ask mercy for them. This silence proved fatal to his popularity with moderate men, gave new adherents to the Arrabbiati, and whetted the fury of the pope, Sforza and all potentates well disposed to the Medici faction. He was now interdicted from preaching even in his own convent and again summoned to Rome. As before, the mandate was disobeyed. He refrained from public preaching, but held conferences in St Mark's with large gatherings of his disciples, and defied the interdict on Christmas Day by publicly celebrating mass and heading a procession through the cloisters.

The year 1498, in which Savonarola was to die a martyr's death, opened amid seemingly favourable auspices. The Piagnoni were again at the head of the state, and by their request the prior resumed his sermons in the duomo, while his dearest disciple, Frà Domenico Buonvicini, filled the pulpit of St Lorenzo. For the last time the carnival was again kept with strange religious festivities, and some valuable books and works of art were sacrificed in a second bonfire of "vanities." But menacing briefs poured in from Rome; the pope had read one of Savonarola's recent sermons on Exodus; the city itself was threatened with interdict, and the Florentine ambassador could barely obtain a short delay. Now too the Piagnoni quitted office; the new signory was less friendly, and the prior was persuaded by his adherents to retire to St Mark's. There he continued to preach with unabated zeal; and, since the women of Florence deplored the loss of his teachings, one day in the week was set apart for them. The signory tried to conciliate the pope by relating the wonderful spiritual effects of their preacher's words, but Alexander was obdurate. The Florentines must either silence the man themselves, or send him to be judged by a Roman tribunal.

Undismayed by personal danger, Savonarola resolved to appeal to all Christendom against the unrighteous pontiff, and despatched letters to the rulers of Europe adjuring them to assemble a council to condemn this antipope. The council of Constance, and the deposition of John XXIII., were satisfactory precedents still remembered by the world. One of these letters being intercepted and sent to Rome by the duke of Milan (it is said) proved fatal to the friar. The papal threats were now too urgent to be disregarded, and the cowed signory entreated Savonarola to put an end to his sermons. He reluctantly obeyed, and concluded his last discourse with the tenderest and most touching farewell.

The government now hoped that Alexander would be appeased and Florence allowed to breathe freely. But although silenced the prophet was doomed, and the folly of his disciples precipitated his fate. A creature of the Arrabbiati, a Franciscan friar named Francesco di Puglia, challenged Savonarola to prove the truth of his doctrines by the ordeal of fire. At first the prior treated the provocation with merited contempt, but his too zealous disciple Frà Domenico accepted the challenge. And, when the Franciscan declared that he would enter the fire with Savonarola alone, Frà Domenico protested his willingness to enter it with any one in defence of his master's cause. As Savonarola resolutely declined the trial, the Franciscan deputed a convert, one Giuliano dei Rondinelli, to go through the ordeal with Frà Domenico. There were long preliminary disputes. Savonarola, perceiving that a trap was being laid for him, discountenanced the "experiment" until his calmer judgment was at last overborne by the fanaticism of his followers. Aided by the signory, which was playing into the hands of Rome, the Arrabbiati and Compagnacci pressed the matter on, and the way was now clear for Savonarola's destruction.

The ordeal of fire.

On the 7th of April 1498 an immense throng gathered in the Piazza della Signoria to enjoy the barbarous sight. Two thick banks of combustibles 40 yds. long, with a narrow space between, had been erected in front of the palace, and five hundred soldiers kept a wide circle clear of the crowd. Some writers aver that the piles were charged with gunpowder. The Dominicans from one side, the Franciscans from the other, marched in solemn procession to the Loggia dei Lanzi, which had been divided by a hoarding into two separate compartments. The Dominicans were led by Savonarola carrying the host, which he reverently deposited on an altar prepared in his portion of the loggia. The magistrates signalled to the two champions to advance. Frà Domenico stepped forward, but neither Rondinelli nor Frà Francesco appeared. The Franciscans began to urge fantastic objections, and, when Savonarola insisted that his champion should bear the host, they cried out against the sacrilege of exposing the Redeemer's body to the flames. All was turmoil and confusion, the crowd frantic. And, although Rondinelli had not come, the signory sent angry messages to ask why the Dominicans delayed the trial. It was now late in the day, and a storm shower gave the authorities a pretext for declaring that heaven was against the ordeal. The Franciscans slipped away unobserved, but Savonarola raising the host attempted to lead his monks across the piazza in the same solemn order as before. On this the popular fury burst forth. Defrauded of their bloody diversion, the people were wild with rage. Frà Girolamo's power was suddenly at an end. Neither he nor his brethren would have lived to reach St Mark's but for the devoted help of Salviati and his men. Against the real culprits, the Franciscans, no anger was felt; the zealous prior, the prophet and lawgiver of Florence, was made the popular scapegoat. Notwithstanding the anguish that must have filled his heart, the fallen man preserved his dignity and calm. Mounting his own pulpit in St Mark's he quietly related the events of the day to the faithful assembled in the church, and then withdrew to his cell, while the mob on the square outside was clamouring for his blood.

The next morning, the signory having decreed the prior's banishment, Francesco Valori and other leading Piagnoni hurried to him to concert measures for his safety. Meanwhile the government decided on his arrest, and no sooner was this made public than the populace rushed to the attack of the convent. The doors of St Mark's were hastily secured, and Savonarola discovered that his adherents had secretly prepared arms and munitions and were ready to stand a siege. The signory sent to order all laymen to quit the cloister, and a special summons to Valori. After some hesitation the latter obeyed, hoping by his influence to rally all the Piagnoni to the rescue. But he was murdered in the street, and his palace sacked by the mob. The monks and their few remaining friends made a most desperate defence. In vain Savonarola besought them to lay down their arms. When the church was finally stormed Savonarola was seen praying at the altar, and Frà Domenico, armed with an enormous candlestick, guarding him from the blows of the mob. A few disciples dragged their beloved master to the inner library and urged him to escape by the window. He hesitated, seemed about to consent, when a cowardly monk, one Malatesta Sacramoro, cried out that the shepherd should lay down his life for his flock. Thereupon Savonarola turned, bade farewell to the brethren, and, accompanied by the faithful Domenico, quietly surrendered to his enemies. Later, betrayed by the same Malatesta, Frà Silvestro was also seized. The prisoners were conveyed to the Palazzo Vecchio, and Savonarola was lodged in the tower cell which had once harboured Cosimo de' Medici.

Arrest and Trial.

Now came an exultant brief from the pope. His well-beloved Florentines were true sons of the church, but must crown their good deeds by despatching the criminals to Rome. Sforza was equally rejoiced by the news, and the only potentate who could have perhaps saved Savonarola's life, Charles of France, had died on the day of the ordeal by fire. Thus another of the friar's prophecies was verified, and its fulfilment cost him his sole protector. The signory refused to send their prisoners to Rome,

but they did Rome's behests. Savonarola's judges were chosen from his bitterest foes. Day after day he was tortured, and in his agony, with a frame weakened by constant austerity and the mental strain of the past months, he made every admission demanded by his tormentors. But directly he was released from the rack he always withdrew the confessions uttered in the delirium of pain. These being too incoherent to serve for a legal report, a false account of the friar's avowals was drawn up and published.

Though physically unable to resist torture, Savonarola's clearness of mind returned whenever he was at peace in his cell. So long as writing materials were allowed him he employed himself in making a commentary on the Psalms, in which he restated all his doctrines. Alexander was frantically eager to see his enemy die in Rome. But the signory insisted that the false prophet should suffer death before the Florentines whom he had so long led astray. The matter was finally compromised. A second mock trial was held by two apostolic commissioners specially appointed by the pope. One of the new judges was a Venetian general of the Dominicans, the other a Spaniard. Meanwhile the trial of Brothers Domenico and Silvestro was still in progress. The former remained faithful to his master and himself. No extremity of torture could make him recant or extract a syllable to Savonarola's hurt; he steadfastly repeated his belief in the divinity of the prior's mission. Frà Silvestro on the contrary gave way at mere sight of the rack, and this seer of heavenly visions owned himself and his master guilty of every crime laid to their charge.

The two commissioners soon ended their task. They had the pope's orders that Savonarola was to die "even were he a second John the Baptist." On three successive days they "examined" the prior with worse tortures than before. But he now resisted pain better, and, although more than once a promise to recant was extorted from him, he reasserted his innocence when unbound, crying out, "My God, I denied Thee for fear of pain." On the evening of the 22nd of May sentence of death was pronounced on him and his two disciples. Savonarola listened unmoved to the awful words, and then quietly resumed his interrupted devotions. Frà Domenico exulted in the thought of dying by his master's side; Frà Silvestro, on the contrary, raved with despair.

The only favour Savonarola craved before death was a short interview with his fellow victims. This the signory unwillingly granted. The memorable meeting took place in the hall of the Cinquecento. During their forty days of confinement and torture each one had been told that the others had recanted, and the false report of Savonarola's confession had been shown to the two monks. The three were now face to face for the first time. Frà Domenico's loyalty had never wavered, and the weak Silvestro's enthusiasm rekindled at sight of his chief. Savonarola prayed with the two men, gave them his blessing, and exhorted them by the memory of their Saviour's crucifixion to submit meekly to their fate. Midnight was long past when Savonarola was led back to his cell. Jacopo Niccolini, one of a religious fraternity dedicated to consoling the last hours of condemned men, remained with him. Spent with weakness and fatigue he asked leave to rest his head on his companion's lap, and quickly fell into a quiet sleep. As Niccolini tells us, the martyr's face became serene and smiling as a child's. On awaking he addressed kind words to the compassionate brother, and then prophesied that dire calamities would befall Florence during the reign of a pope named Clement. The carefully recorded prediction was verified by the siege of 1529.

Martyrdom.

The execution took place the next morning. A scaffold, connected by a wooden bridge with the magistrates' rostrum, had been erected on the spot where the piles of the ordeal had stood. At one end of the platform was a huge cross with faggots heaped at its base. As the prisoners, clad in penitential haircloth, were led across the bridge, wanton boys thrust sharp sticks between the planks to wound their feet. First came the ceremonial of degradation. Sacerdotal robes were thrown over the victims, and then roughly stripped off by two Dominicans, the bishop of Vasona and the prior of Sta Maria Novella. To the bishop's formula, "I separate thee from the church militant and the church triumphant," Savonarola replied in firm tones, "Not from the church triumphant; that is beyond thy power." By a refinement of cruelty Savonarola was the last to suffer. His disciples' bodies already dangled from the arms of the cross before he was hung on the centre beam. Then the pile was fired. For a moment the wind blew the flames aside, leaving the corpses untouched. "A miracle," cried the weeping Piagnoni; but then the fire leapt up and ferocious yells of triumph rang from the mob. At dusk the martyrs' remains were collected in a cart and thrown into the Arno.

Savonarola's party was apparently annihilated by his death, but, when in 1529–1530 Florence was exposed to the horrors predicted by him, the most heroic defenders of his beloved if ungrateful city were Piagnoni who ruled their lives by his precepts and revered his memory as that of a saint.

Savonarola's writings may be classed in three categories:—(1) numerous sermons, collected mainly by Lorenzo Violi, one of his most enthusiastic hearers; (2) an immense number of devotional and moral essays and some theological works, of which *Il Trionfo della Croce* is the chief; (3) a few short poems and a political treatise on the government of Florence. Although his faith in the dogmas of the Roman Catholic Church never swerved, his strenuous protests against papal corruptions, his reliance on the Bible as his surest guide, and his intense moral earnestness undoubtedly connect Savonarola with the movement that heralded the Reformation.

BIBLIOGRAPHY.—A. G. Rudelbach, *Hieronymus Savonarola und seine Zeit, aus den Quellen dargestellt* (Hamburg, 1835); Karl Meier, *Girolamo Savonarola, aus grossentheils handschriftlichen Quellen dargestellt* (Berlin, 1836); Padre Vincenzo Marchese, *Storia di S. Marco di Firenze* (Florence, 1855); F. T. Perrens, *Jérôme Savonarola, sa vie, ses prédications, ses écrits* (Paris, 1853); R. R. Madden, *The Life and Martyrdom of Girolamo Savonarola*, &c. (London, 1854); Bartolommeo Aquarone, *Vita di Frà Geronimo Savonarola* (Alessandria, 1857); L. von Ranke, "Savonarola und die Florentinische Republik" in his *Hist.-biogr. Studien* (Leipzig, 1877). The standard modern work on Savonarola is Pasquale Villari's, *La Storia di Frà Girolamo Savonarola e de' suoi tempi* (Florence, 1887) based on an exhaustive study of the original authorities and containing a number of new documents (English translation by Linda Villari, London, 1889). For the orthodox Catholic view see L. Pastor's *Geschichte der Päpste*, vol. iii. (Freiburg i. B., 1886–1896) and *Zur Beurteilung Savonarolas* (1898), which are very hostile to the friar, and H. Lucas, S.J., *Girolamo Savonarola* (London, 1899). Among other recent works P. Villari and E. Casanova have published a *Scelta di prediche e scritti di Frà Girolamo Savonarola con nuovi documenti* (Florence, 1898); *Il Savonarola e la critica tedesca* (Florence, 1900), a selection of translations from the German. See also Schnitzer, *Quellen und Forschungen zur Geschichte Savonarolas* (1902). (L. V.)

SAVORY, SIR WILLIAM SCOVELL, BART. (1826–1895), British surgeon, was born on the 30th of November 1826, in London. He entered St Bartholomew's Hospital in 1844, becoming M.R.C.S. in 1847, and F.R.C.S. in 1852. From 1849 to 1859 he was demonstrator of anatomy and operative surgery at St Bartholomew's, and for many years curator of the museum, where he devoted himself to pathological and physiological work. In 1859 he succeeded Sir James Paget as lecturer on general anatomy and physiology. In 1861 he became assistant surgeon, and in 1867 surgeon, holding the latter post till 1891; and from 1869 to 1889 he was lecturer on surgery. In the College of Surgeons he was a man of the greatest influence, and was president for four successive years, 1885–1888. As Hunterian professor of comparative anatomy and physiology (1859–1861), he lectured on "General Physiology" and the "Physiology of Food." In 1884 he delivered the Bradshaw Lecture on the "Pathology of Cancer." In 1887 he delivered the Hunterian Oration. In 1879, at Cork, he had declared against "Listerism" at the meeting of the British Medical Association, "the last public expression," it has been said, "by a prominent surgeon against the now accepted methods of modern surgery." In 1887 he became surgeon-extraordinary to Queen Victoria, and in 1890 he was made a baronet. Savory, who was an able operator, but averse from exhibitions of brilliancy, was a powerful and authoritative man in his profession, his lucidity of expression being almost as valuable as his great knowledge of physiology and anatomy. He died in London on the 4th of March 1895.

SAVOY, HOUSE OF, a dynasty which ruled over the territory of Savoy and Piedmont for nine centuries, and now reigns over the kingdom of Italy. The name of Savoy was known to the Romans during the decline of the empire. In the 5th century the territory was conquered by the Burgundians, and formed part of their kingdom; nearly a hundred years later it was occupied by the Franks. It was included in Charlemagne's empire and was divided by him into counties, which evolved there as elsewhere into hereditary fiefs; but after the break-up of Charlemagne's empire, the Burgundian kingdom revived and Savoy was again absorbed in it. After the collapse of that monarchy its territories passed to the German kings, and Savoy was divided between the counts of Provence, of Albon, of Gex, of Bresse, of the Genevois, of Maurienne, the lords of Habsburg, of Zähringen, &c., and several prelates.

The founder of the house of Savoy is Umberto Biancamano (Humbert the White-handed), a feudal lord of uncertain but probably Teutonic descent, who in 1003 was count of Salmourenc in the Viennois, in 1017 of Nyon on the Lake of Geneva, and in 1024 of the Val d'Aosta on the eastern slope of the Western Alps. In 1034 he obtained part of Maurienne as a reward for helping King Conrad the Salic to make good his claims on Burgundy. He also obtained the counties of Savoy, Belley, part of the Tarantaise, and the Chablais. With these territories Umberto commanded three of the great Alpine passes, viz. the Mont Cenis and the two St Bernards. In the meanwhile his son Oddone married Adelaide, eldest daughter and heiress of Odelrico Manfredi, marquess of Susa, a descendant of Arduino of Ivrea, king of Italy, who ruled over the counties of Turin, Auriate, Asti, Bredulo, Vercelli, &c., corresponding roughly to modern Piedmont and part of Liguria (1045). Umberto died some time after 1056 and was succeeded by his son, Amadeus I., at whose death the country passed to Oddone, the husband of the countess Adelaide. Oddone thus came to rule over territories on both sides of the Alps, a fact which was to dominate the policy of Savoy until 1860; its situation between powerful neighbours accounting for its vacillating attitude, whence arose the charges of duplicity levelled against many of its rulers, while its dominion over the Alpine passes brought many advantages. Oddone died in 1060, and was succeeded by his widow Adelaide; but before her death in 1091 his son, Peter I., became count, and subsequently the latter's brother, Amadeus II. Under Humbert II. (1080) occurred the first clash with the Piedmontese communes, but he and his successors, Amadeus III. (who died on his way home from the crusades) and Thomas I. (1189), adopted a policy of conciliation towards them. Thomas, who reigned until 1222, was a Ghibelline in politics and greatly increased the importance of Savoy, for he was created Imperial Vicar and acquired important extensions of territory in the Bugey, Vaud and Romont to the west of the Alps, and Carignano, Pinerolo, Moncalieri and Vigone to the east; he also exercised sway over Geneva, Albenga, Savona and Saluzzo. At his death these territories were divided among his sons, Thomas II. obtaining Piedmont, Aimone the Chablais, Peter and Philip other fiefs, and Amadeus IV., the eldest, Savoy and a general overlordship over his brothers' estates. Peter visited England several times, one of his nieces, Eleanor of Provence, being the wife of the English king Henry III., and another, Sancha, wife of Richard, earl of Cornwall. Henry conferred great honours on Peter, creating him earl of Richmond, and gave him a palace on the Thames, known as Savoy House. Count Peter also acquired fresh territories in Vaud, and defeated Rudolph of Habsburg at Chillon. Thomas's other sons received fiefs and bishoprics abroad, and one of them, Boniface, was made archbishop of Canterbury. Thomas II., after capturing several cities and castles in Piedmont, lost them again and was made prisoner by the citizens of Turin, but was afterwards liberated. He alone of the sons of Thomas I. left male heirs, and his son Amadeus V. (1285–1323) reunited the scattered dominions of his house. When Amadeus succeeded to the throne these were divided into the county of Savoy (his own territory), the principality of Piedmont ruled by his nephew Philip, prince of Achaea (a title acquired through his wife, Isabella of Villehardouin, heiress of Achaea and the Morea), and Vaud ruled by his brother Louis. But although this division was formally recognized in 1295, Amadeus succeeded in enforcing his own supremacy over the whole country and making of it a more unified state than before, and by war, purchase or treaty he regained other fiefs which his predecessors had lost. He fought in many campaigns against the dauphins of Viennois, the counts of Genevois, the people of Sion and Geneva, the marquesses of Saluzzo and Montferrat, and the barons of Faucigny. He also acted as peacemaker between France and England, accompanied the emperor Henry VII. of Luxemburg on his expedition to Italy, reorganized the finances of the realm and reinforced the Salic law of succession. He was succeeded by his sons, Edward (1323–1329), known as "the Liberal," on account of his extravagance, and Aimone, the Peaceful (1329–1343), who strove to repair the harm done to the state's exchequer by his predecessor and proved one of the best princes of his line. Amadeus VI. (1343–1383), son of the latter (known as the *Conte Verde* or Green Count because of the costume he habitually wore at tourneys), succeeded at the age of nine. He won a reputation as a bold knight in the fields of chivalry and in the crusades, and he inaugurated a new policy for his house by devoting more attention to his Italian possessions than to those on the French side of the Alps and in Switzerland. In 1366 he led an expedition to the East against the Turks; and he arbitrated between Milan and the house of Montferrat (1379), between the Scaligeri and the Visconti, and between Venice and Genoa after the "War of Chioggia" (1381). Amadeus was the first sovereign to introduce a system of gratuitous legal assistance for the poor. He unfortunately espoused the cause of Louis, duke of Anjou, and while aiding that prince in his attempt to recover the kingdom of Naples he died of the plague, leaving his realm to his son, Amadeus VII., the *Conte Rosso* or "Red Count" (1383-1391); the latter added Nice (1388) and other territories to his domains.

Humbert the White-handed.

Oddone.

Thomas I.

Amadeus VI.

During the reign of Amadeus VIII. (1391-1440), Savoy prospered in every way. The count extended his territories both in Savoy itself and in Italy, and in 1416 was created duke by the emperor Sigismund. He was distinguished for his wisdom and justice, and in 1430 he promulgated a general statute of laws for the whole duchy, in spite of the opposition of the nobles and cities whose privileges were thereby curtailed. In 1434 he retired to the hermitage of Ripaille on the Lake of Geneva, but continued to conduct the chief affairs of the state and to mediate between foreign Powers, leaving matters of less importance to his son Louis. Five years later the council of Basel by a strange decision elected Amadeus pope, in spite of his not being a priest, and deposed Eugenius IV. Amadeus accepted the dignity, assuming the style of Felix V., and abdicated the dukedom. For nine years he remained pope, although he never went to Rome and one-half of Christendom regarded him as an anti-pope. On the death of Eugenius (1447) Thomas of Sarzana was elected as Nicholas V., and in 1449 Amadeus abdicated and returned to his hermitage at Ripaille, where he died two years later (see FELIX V.).

Amadeus VIII.

Under Louis Savoy began to decline, for he was indolent, incapable, and entirely ruled by his wife, Anne of Lusignan, daughter of the king of Cyprus, an ambitious and intriguing woman; she induced him to fit out an expensive expedition to Cyprus, which brought him no advantage save the barren title of king of Cyprus, Jerusalem and Armenia. He neglected to make good the claims which he might have enforced to the duchy of Milan on the death of Filippo Maria, the last Visconti (1447). His latter years were troubled by conspiracies and dissensions on the part of the nobles and even of his own son, Philip, count of Bresse. He went to France to seek aid of King Louis XI., but died there in 1465. In spite of his incapacity he acquired the city of Freiburg and the homage of the lords of Monaco. He was succeeded by his son, Amadeus IX. (1455–1472), who on account of ill-health left the duchy in the hands of his wife, Yolande, sister of Louis XI. This led to feuds and intrigues

on the part of the French king and of Philip of Bresse, and Savoy would probably have been dismembered but for the patriotic action of the States General. On Amadeus's death, his son Philibert I. (1472–1482) succeeded, but as he was a minor the States General appointed his mother Yolande regent. Wars and civil commotions occupied the period of his minority and Savoy lost Freiburg and many other territories. Yolande died in 1472, and the regency was disputed by various claimants; Philip of Bresse having obtained it by force, he carried off Philibert, who died in 1482 at Lyons. He was succeeded by his brother Charles I. (1482–1490), who, freed by Louis XI. from the dangerous protection of Philip of Bresse and by death from that of the French king, crushed the rebellious nobles and seized Saluzzo (1487). He did much to raise the falling fortunes of his house, but died at the age of thirty-one. Under his successor Charles II. (1490–1496), an infant in arms, the duchy was again distracted by civil war and foreign invasions. Charles died at an early age, and, having no male heirs, the aged Philip of Bresse succeeded, but reigned only for one year. Philibert II. (1497–1504) followed, but he was devoted only to pleasure and left the helm of state to his half-brother, Renato, and later to his wife, Margaret of Austria. He died without heirs and was succeeded by his brother, Charles III. During his reign Savoy abandoned its attitude of subserviency to France, adopting a policy of greater independence, and became more friendly to Austria.

Under Charles III. (1504–1553), the duchy suffered a series of misfortunes. Although the duke strove after peace at almost any price, he was nearly always involved in war and lost many possessions, including Geneva and Vaud. At his death the whole country was overrun by the hostile armies of Francis I. of France and of the Emperor Charles V., while his son and successor, Emmanuel Philibert (1553–1580), was serving in the Spanish armies. Emmanuel could not take possession of the duchy at once, but continued to serve the emperor as governor-general of the Low Countries. By his victory at St Quentin over the French in 1557 he proved himself one of the first generals of the day, and by the terms of the subsequent treaty of Cateau Cambrésis he was reinstated in most of his hereditary possessions (1559). Under Emmanuel Philibert Savoy lost all traces of constitutional government and became an absolute despotism of the type then predominating throughout the greater part of Europe. At the same time he raised his country from ruin and degradation into a prosperous and powerful monarchy. He induced both France and Spain to evacuate the fortresses which they still held in Piedmont, made a profitable exchange of territory with the Bernese, and acquired an extension of seaboard by the purchase of Tenda and Oneglia (see EMMANUEL PHILIBERT of Savoy).

Emmanuel Philibert.

His son and successor, Charles Emmanuel I., surnamed the Great, strengthened the tendency of Savoy to become less of a French and more of an Italian Power. In 1588 he wrested Saluzzo from the French, but his expeditions to Provence and Switzerland were unsuccessful. In the war between France and Spain after the accession of Henry IV., he took the Spanish side, and at the peace of Lyons (1601), although he gave up all his territories beyond the Rhone, his possession of Saluzzo was confirmed. His attempt to capture Geneva by treachery (1602) failed, and although on the death of Francesco Gonzaga, duke of Mantua and Montferrat, he seized the latter city (1612) he was forced by Spain and her allies to relinquish it. The Spaniards invaded the duchy, but after several years of hard fighting the peace of 1618 left his territory almost intact. In 1628 he sided with Spain against France; the armies of the latter overran the duchy, and Charles Emmanuel died in 1630 (see CHARLES EMMANUEL). His son, Victor Amadeus I. (1630–1637), succeeded to little more than a title, but by his alliance with France—his wife Christina being a daughter of Henry IV.—he managed to regain most of his territories. He proved a wise and popular ruler, and his early death was much deplored. His eldest son, Francis Giacinto, a minor, lived only a year, and his second son, Charles Emmanuel II., also a minor, remained under the regency of his mother.

Charles Emmanuel I.

That princess, in spite of her French origin, resisted the attempts of France, then dominated by Cardinal Richelieu, to govern Savoy, but her quarrels with her brothers-in-law led to civil war, in which the latter obtained the help of Spain, and Christina that of France. In the end the duchess succeeded in patching up these feuds and saving the dynasty, and in 1648 Charles Emmanuel II. assumed the government. The war between France and Spain continued to rage, and Savoy, on whose territory much of the fighting took place, suffered severely in consequence. By the treaty of the Pyrenees (1660) the war came to an end and Savoy regained most of the towns occupied by France. Charles died in 1675 and was succeeded by his only son, Victor Amadeus II. (1675–1732). The latter's minority was passed under the regency of his able but imperious mother, Jeanne of Savoy-Nemours. He married Anne of Orleans, daughter of Henrietta of England and niece of Louis XIV. of France. The French king treated Victor Amadeus almost as a vassal, and obliged him to persecute his Protestant (Waldensian) subjects. But the young duke, galled by Louis's overbearing arrogance, eventually asserted his independence and joined the league of Austria, Spain and Venice against him in 1690. The campaign was carried on with varying success, but usually to the advantage of Louis, and the French victory at Marsiglia and the selfish conduct of the allies induced Victor to come to terms with France, and to turn against the imperialists (1696). By the treaty of Ryswick a general peace was concluded. In the war of the Spanish Succession (1700) we find Victor at first on the French side, until, dissatisfied with the continued insolence of Louis XIV. and of Philip of Spain, he went over to the Austrians in 1704. The French invaded Piedmont, but were totally defeated at the siege of Turin by Victor Amadeus and Prince Eugene of Savoy (1706), and eventually driven from the country. By the treaty of Utrecht (1713) Victor received the long-coveted Montferrat and was made king of Sicily; but in 1718 the powers obliged him to exchange that kingdom for Sardinia, which conferred on the rulers of Savoy and Piedmont the title subsequently borne by them until they assumed that of kings of Italy. In 1730 he abdicated in favour of his son, Charles Emmanuel, retired to Chambéry, and married the countess of San Sebastiano (afterwards Marchioness of Spigno). His wife's ambitions induced him to try to regain the crown, but his son had him arrested, and he died in prison in 1732 (see VICTOR AMADEUS II.).

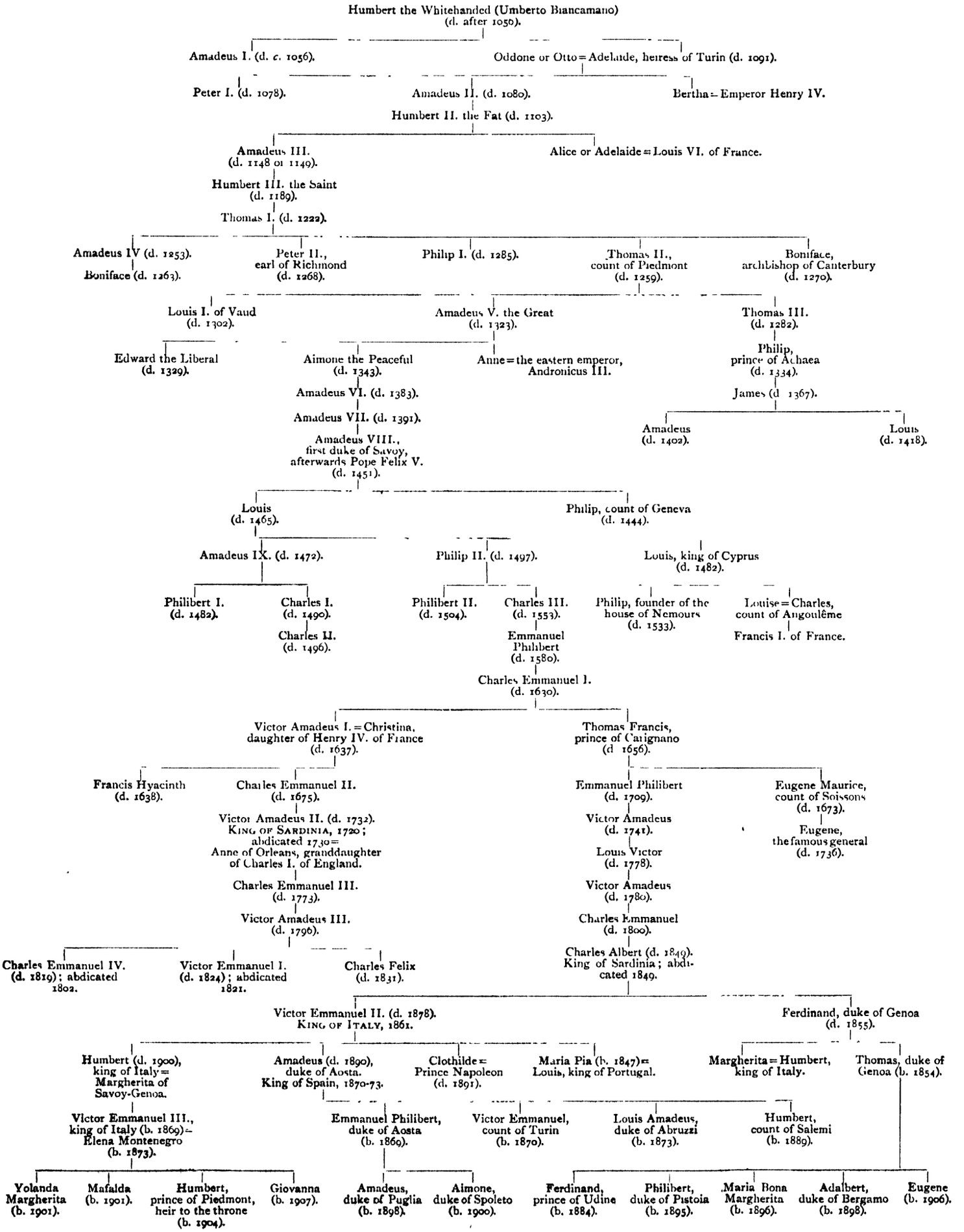
Victor Amadeus II.

The kingdom of Sardinia.

Charles Emmanuel III. (1730–1773) was a born soldier and took part in the war of the Polish Succession on the side of France against Austria, and for his victory at Guastalla (1734) was awarded the duchy of Milan, which, however, he was forced to relinquish at the peace of Vienna (1736), retaining only Novara and Tortona. In the war of the Austrian Succession, which broke out on the death of the Emperor Charles VI., he took the side of Maria Theresa (1742). By the peace of Aix-la-Chapelle in 1748, following on the defeat of the French, Savoy gained some further accessions of territory in Piedmont. The reign of Charles's son, Victor Amadeus III. (1773–1796), was a period of decadence; the king was incapable and extravagant, and he chose equally incapable ministers. On the outbreak of the French Revolution he sided with the royalists and was eventually brought into conflict with the French republic. The army being demoralized and the treasury empty, the kingdom fell an easy prey to the republican forces. Savoy became a French province, and, although the Piedmontese troops resisted bravely for four years in the face of continual defeats, Victor at last gave up the struggle as hopeless, signed the armistice of Cherasco, and died soon afterwards (1796). He was succeeded in turn by his three sons, Charles Emmanuel IV., Victor Emmanuel I., and Charles Felix. Charles Emmanuel (1796–1802), believing in Bonaparte's promises, was induced to enter into a confederation with France and give up the citadel of Turin to the French, which meant the end of his country's independence. Realizing his folly he abdicated on the 6th of December 1796, and retired to Sardinia,

The French occupation.

GENEALOGICAL TABLE OF THE HOUSE OF SAVOY.



while the French occupied the whole of Piedmont. After the defeat of the French by the Austro-Russian armies during Bonaparte's absence in Egypt, Charles Emmanuel landed at Leghorn, hoping to regain his kingdom; but Napoleon returned, and by his brilliant victory at Marengo he reaffirmed his position in Italy. The king retired to Naples, abdicated once more (1802), and entered the Society of Jesus; he died in Rome in 1819. Victor Emmanuel I. (1802–1820) remained in Sardinia until by the Final Act of the Congress of Vienna (June 9, 1815) his dominions were restored to him, with the addition of Genoa.

The Restoration.

From this time the fortunes of the house of Savoy are bound up with those of Italy (see ITALY, *History*). Victor Emmanuel I. abdicated in 1821 in favour of his brother Charles Felix (1821–1831). The latter being without a son, the succession devolved upon Charles Albert, of the cadet line of the princes of Carignano, who were descended from Thomas, youngest son of Charles Emmanuel I. Charles Albert abdicated, on the evening of his defeat at Novara (April 20, 1849), in favour of his son Victor Emmanuel II. (1849–1878), who on the 18th of February 1861 was proclaimed king of Italy. Victor Emmanuel had married in 1842 Maria Adelaide, daughter of the archduke Rainer, who bore him several children, viz. Princess Clothilde (b. 1843), who married Prince Napoleon; Humbert, prince of Piedmont (1844); Amadeus, duke of Aosta (b. 1845); Oddone, duke of Montferrat (b. 1846); and Princess Maria Pia (b. 1847). Humbert, who in 1868 had married Princess Margherita of Savoy, daughter of Victor Emmanuel's brother, the duke of Genoa, became king of Italy on his father's death in 1878. In July 1900 he was assassinated by an anarchist at Monza. He was succeeded by his only son, Victor Emmanuel III., born in 1869, who during his father's lifetime had borne the title of prince of Naples. The new king had married Princess Elena of Montenegro in 1896, by whom he has had four children, viz. Princess Yolanda Margherita (b. 1901), Princess Mafalda (b. 1902), Humbert, prince of Piedmont (b. 1904), and Princess Giovanna (b. 1907).

Humbert.

Victor Emmanuel III.

The second son of Victor Emmanuel II., Amadeus, duke of Aosta, was offered the crown of Spain by the Cortes in 1870, which he accepted, but, finding that his rule was not popular, he voluntarily abdicated in 1873 rather than cause civil war. In 1867 he married Princess Maria Vittoria dal Pozzo della Cisterna, who bore him three sons, viz. Emmanuel Philibert, duke of Aosta (b. 1869), commanding an Italian army corps; Victor Emmanuel, count of Turin; and Louis Amadeus, duke of Abruzzi, an Italian naval officer and a distinguished traveller, explorer and man of science. Amadeus's first wife having died in 1876, he married Princess Maria Letizia Bonaparte in 1888, who bore him a son, Humbert, count of Salemi (b. in 1889).

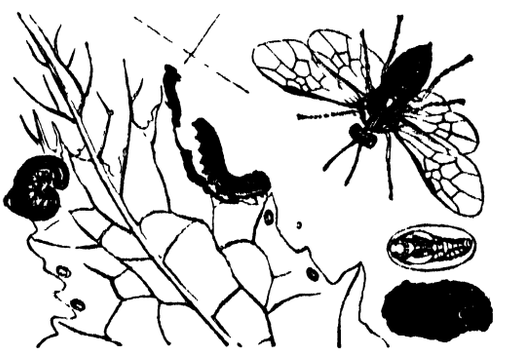
BIBLIOGRAPHY.—Luigi Cibrario, *Storia della monarchia di Savoia* (Turin, 1840), for the early history; E. Ricotti, *Storia della monarchia Piemontese*, in 6 vols. (Florence, 1861, &c.), for the period from 1504 to 1675; D. Carutti, *Storia della diplomazia della corte di Savoia* (7 vols., Rome, 1875, &c.), from 1494; Nicomede Bianchi, *Storia della monarchia Piemontese* (Turin, 1877), for the period from Victor Amadeus III. onward; *id.*, *Storia della diplomazia europea in Italia* (8 vols., Turin, 1865), very important for recent history; A. Wiel, *The Romance of the House of Savoy* (London, 1898), a popular and somewhat disjointed work. (L. V.*)

SAW, a tool for cutting wood or other material, consisting of a blade with the edge dentated or toothed and worked either by hand or by steam, water, electric or other power (see TOOLS). The word in O. Eng. is *saga* and appears, in such forms as Dutch *zaag*, Dan. *sav*, Ger. *Säge*, in Teutonic languages. The root is *sag-*, to cut, which is seen in Lat. *secare*. It is also the base of such English words as scythe, sickle, &c. It must be distinguished from "saw," a maxim, proverb, which is etymologically and in meaning a "saying," from the Teutonic base *sag-*, to say; cf. "Saga," Ger. *sagen*.

SAWANTWARI, or SAVANTVADI, a native state of Bombay, India. Area, 925 sq. m. Pop. (1901) 217,732, showing an increase of 13 % during the preceding decade. The surface is broken and rugged, interspersed with densely-wooded hills; in the valleys are gardens and groves of cocoa-nut and betel-nut palms. Sawantwari has no considerable rivers; the chief streams are the Karli on the north and the Terakhol on the south, both navigable for small craft. The climate is humid and relaxing, with an average annual rainfall of 150 in. The estimated revenue is £28,000. The chief, whose title is sar desai, is a Mahratta of the Bhonsla family, who traces back his descent to the 16th century. There are special manufactures of ornaments carved out of bison-horn, painted and inlaid lacquer-work, and gold and silver embroidery. The town of SAWANTWARI, or Vadi, is picturesquely situated on the bank of a large lake, 17 m. E. of the seaport of Vengurla. Pop. (1901) 10,213.

Before the establishment of Portuguese power Sawantwari was the highway of a great traffic between the coast and the interior; but during the 16th and 17th centuries trade suffered much from the rivalry of the Portuguese, and in the disturbances of the 18th century it almost entirely disappeared. In consequence of piracy, the whole coast-line (including the port of Vengurla) was ceded to the British in 1812.

SAW-FLY, the name given to the members of a well-known subdivision (Symphyta) of the Hymenoptera characterized by possessing a sessile abdomen which hides the base of the posterior legs. The antennae vary in their structure and in the number of their joints. Two of the processes of the ovipositor are modified to form saws, which when at rest lie in a sheath formed of two other processes which are modified into protective structures or valves. The larvae are usually caterpillars, but may be distinguished from the caterpillars of Lepidoptera (moths and butterflies) by the greater number of their abdominal prolegs; usually 6 to 8 pairs are present. When alarmed they roll themselves up in a spiral fashion; some also discharge a thin fluid from lateral pores situated above the spiracles. The females place their eggs in small incisions made by means of their saws in the soft parts of leaves. Usually one egg is placed in each slit. Some species merely attach their eggs in strings to the exterior of the leaves. With each incision a drop of fluid is usually excreted, which serves to excite a flow of sap to the wounded part. The egg is said to absorb this sap, and so to increase in size. One genus (*Nematus*) alone forms galls. These occur in the young leaves of the willow, a tree which the true gall-flies do not attack. *Nematus ventricosus* resembles the bees and wasps in the fact that the parthenogenetic ova produce only males; as a rule in the animal kingdom the absence of fertilization results in the production of females.



Turnip Saw-Fly (*Athalia spinarum*). Saw-Fly (magnified, with lines to left showing natural size), caterpillars, pupa and pupa-case.

The injury which the saw-flies inflict upon crops or young trees is almost entirely brought about by the voracious habits of the larvae. These possess well-developed mouth-appendages, by means of which they gnaw their way out of the leaf in which they have been hatched, and then eat it. In this way the turnip saw-fly (*Athalia spinarum*), not to be confused with the turnip "fly," a beetle (*Phyllotreta nemorum*), attacks the leaves of the turnip, often completely consuming the leafage of acres at a time. The pine saw-fly (*Lophyrus pini*) causes great damage to plantations of young Scotch firs, devouring the buds, the leaves and even the bark of the young shoots. Other species infest currant and gooseberry bushes, consuming the soft parts of the leaves, and leaving only the tough veins. The only remedy in most cases is to collect and kill the larvae when they first appear, or to spray the plants with some arsenical wash. The best known family of saw-flies is that of the *Tenthredinidae*, most of whose caterpillars feed on leaves. The larvae of other families—the *Cephidae* and *Siricidae*—are internal feeders, burrowing in succulent

or woody stems, and their limbs are in an extremely reduced condition.

SAWTREY, WILLIAM (d. 1401), English Lollard, was a priest at Lynn who was summoned before the bishop of Norwich for heresy in 1399. He does not appear at this time to have been seriously punished, and at the beginning of 1401 he is found in London, where his preaching again attracted the notice of the ecclesiastical authorities. The statute *De haeretico comburendo* had just been introduced for the purpose of stamping out heresy, but it had not become law when Sawtrey was summoned to St Paul's and was charged with denying transubstantiation, with refusing to adore the cross except as a symbol, and with six other heresies. He defended himself ably against Archbishop Thomas Arundel, but in February he was condemned and was degraded from the priesthood. Being the first Lollard to be put to death he was burned at St Paul's Cross in March 1401.

SAWYER, SIR ROBERT (1633–1692), English lawyer, a younger son of Sir Edmund Sawyer, auditor of the city of London, was educated at Magdalene College, Cambridge, where he distinguished himself in classical learning, being the first Craven Scholar in 1648. He acquired a good practice at the bar, and in 1673 he was elected to the House of Commons, where for a short time in 1678 he was speaker. He inclined to the side of the court in politics, but was a strong opponent of concession to the Roman Catholics, and was one of the draftsmen of the Exclusion Bill. About the same time he began to appear as counsel in important state trials; he prosecuted Sir George Wakeman and others accused of complicity in the Popish plot in 1679; in 1681, having been in that year appointed attorney-general, he appeared for the crown in the prosecutions of Stephen College and Lord Shaftesbury; in the following year in the proceedings against the charter of the city of London; and in 1683 against Lord Russell and Algernon Sidney for complicity in the Rye House plot; and he conducted the case against Titus Oates for perjury in 1685. Although James II. retained him as attorney-general, he proved himself by no means a complacent instrument of the royal prerogative; he advised the king against the legality of the dispensing power, and objected to signing the patents appointing Roman Catholics to office from which they were excluded by law. He was dismissed from the attorney-generalship in 1687, and in the following year he appeared as leading counsel for the defence of the seven bishops, whose acquittal he secured. On the flight of James II., Sawyer maintained that the throne had thereby been abdicated, and took a prominent part in the debates on the constitutional questions then brought to the front. Owing to an attack upon him in 1690 in relation to his conduct in the case of Sir Thomas Armstrong in 1684, Sawyer was expelled from the House of Commons, but was returned again for Cambridge University shortly afterwards. He died on the 30th of July 1692. Sawyer's only daughter married Thomas Herbert, 8th earl of Pembroke.

See *State Trials*, vols. vii.-xii.; Laurence Eachard, *History of England* (3 vols., London, 1707–1718), especially for Sawyer's defence of the seven bishops; Narcissus Luttrell, *Brief Relation of State Affairs, 1678–1714* (Oxford, 1857); Gilbert Burnet, *History of His Own Times* (6 vols., Oxford, 1833); and the *Histories of England* by Hallam and Lord Macaulay.

SAX, ANTOINE JOSEPH, known as ADOLPHE (1814–1894), maker of musical instruments, was born at Dinant in Belgium on the 6th of November 1814 and died in Paris in 1894. In 1835 he perfected a bass clarinet superior to any that had preceded it. He came to Paris in 1842 and succeeded in interesting many eminent men, including Berlioz and Halévy. He set up a workshop in the Rue St Georges and studied acoustics, discovering a new principle in the manufacture of wind instruments, viz. that it is the proportions given to a column of air vibrating in a sonorous tube, and these alone, that determine the character of the timbre produced: the material of the walls of the tube is not of the slightest importance so long as it offers enough resistance. Together with his genius for mechanical invention Sax seems to have combined a knowledge of self-advertisement, and his name was often prefixed to successful types of instrument for the invention of which he was not primarily responsible. In 1845 he patented his saxhorn and a family of cylinder instruments called saxotrombas. On the 22nd of June 1846 he registered the saxophone. He also effected various improvements in piston instruments, of which the most important was the substitution of a single ascending piston for a number of descending ones.

See J. P. O. Cornettant, *Histoire d'un inventeur* (1860); C. Pilard, *Les Inventions Sax* (1869).

SAXE, JOHN GODFREY (1816–1887), American poet, was born at Highgate, Vermont, on the 2nd of June 1816. He graduated at Middlebury College in 1839, and was admitted to the bar at St Albans, Vermont, in 1843. From 1850 to 1856 he edited the Burlington (Vermont) *Sentinel*, in 1859 and in 1860 was the candidate of the Democratic party for governor of Vermont, in 1860 removed to New York, and after 1872 edited the *Evening Journal* at Albany, New York, where he died on the 31st of March 1887. He was best known as a writer of humorous verse and a lecturer. His travesties and satires found many readers or listeners, and some of his love lyrics and other poems combine sparkle with real feeling. His "Rhyme of the Rail," "The Proud Miss McBride," "I'm Growing Old" and "Treasures in Heaven" were once very popular. Among his published collections are *Humorous and Satirical Poems* (1850), *The Times, The Telegraph, and other Poems* (1865), and *Leisure Day Rhymes* (1875).

SAXE, MAURICE, COMTE DE (1696–1750), marshal of France, was the natural son of Augustus II. of Saxony and the countess Aurora Königsmark, and was born at Goslar on the 28th of October 1696. In 1698 the countess sent him to Warsaw to his father, who had been elected king of Poland in the previous year, but on account of the unsettled condition of the country the greater part of his youth was spent outside its limits. This separation from his father made him independent of control and had an important effect on his future career. At the age of twelve he was present, with the army of Eugène, at the sieges of Tournay and Mons and the battle of Malplaquet, but the achievements ascribed to him in this campaign are chiefly fabulous. A proposal to send him at the close of it to a Jesuit college at Brussels was relinquished on account of the protests of his mother; and, returning to the camp of the allies in the beginning of 1710, he displayed a courage so impetuous as to call forth from Eugène the friendly admonition not to confound rashness with valour. He next served under Peter the Great against the Swedes. After receiving in 1711 formal recognition from his father, with the rank of count, he accompanied him to Pomerania, and in 1712 he took part in the siege of Stralsund. In manhood he bore a strong resemblance to his father, both in person and character. His grasp was so powerful that he could bend a horse-shoe with his hand, and to the last his energy and endurance were scarcely subdued by the illnesses resulting from his many excesses. In 1714 a marriage was arranged between him and one of the richest of his father's subjects, Johanna Victoria, Countess von Loeben, but he dissipated her fortune so rapidly that he was soon heavily in debt, and, having given her more serious grounds of complaint against him, he consented to an annulment of the marriage in 1721. Meantime, after serving in a campaign against the Turks in 1717, he had in 1719 gone to Paris to study mathematics, and in 1720 obtained a commission as *maréchal de camp*. In 1725 negotiations were entered into for his election as duke of Courland, at the instance of the duchess Anna Ivanovna, who offered him her hand. He was chosen duke in 1726, but declining marriage with the duchess found it impossible to resist her opposition to his claims, although, with the assistance of £30,000 lent him by the French actress Adrienne Lecouvreur, whose story forms the subject of Scribe and Legouvé's tragedy, he raised a force by which he maintained his authority till 1727, when he withdrew and took up his residence in Paris. On the outbreak of the war in 1734 he served under Marshal Berwick, and for a brilliant exploit at the siege at Philippsburg he was in August named lieutenant-general. On the opening of the Austrian Succession War in 1741, he took command of a division of the army sent to invade Austria, and

on the 19th November surprised Prague during the night, and took it by assault before the garrison were aware of the presence of an enemy, a *coup de main* which made him famous throughout Europe. After capturing the strong fortress of Eger on the 19th April 1742, he received leave of absence, and went to Russia to push his claims on the duchy of Courland, but obtaining no success he returned to his command. His exploits had been the sole redeeming feature in an unsuccessful campaign, and on 26th March 1743 his merits were recognized by his promotion to be marshal of France. From this time he became one of the first generals of the age. In 1744 he was chosen to command the expedition to England in behalf of the Pretender, which assembled at Dunkirk but did not proceed farther. After its abortive issue he received an independent command in the Netherlands, and by dexterous manœuvring succeeded in continually harassing the superior forces of the enemy without risking a decisive battle. In the following year he besieged Tournai and inflicted a severe defeat on the relieving army of the duke of Cumberland at Fontenoy (*q.v.*), a battle of which the issue was due entirely to his constancy and cool leadership. During the battle he was unable on account of dropsy to sit on horseback except for a few minutes, and was carried about in a wicker chariot. In recognition of his brilliant achievement the king conferred on him the castle of Chambord for life, and in April 1746 he was naturalized as a French subject. Thenceforward to the end of the war he continued to command in the Netherlands, always with success. Besides Fontenoy he added Rocoux (1746) and Lawfeldt or Val (1747) to the list of French victories, and it was under his orders that Marshal Löwendahl captured Bergen-op-Zoom. He himself won the last success of the war in capturing Maestricht in 1748. In 1747 the title formerly held by Turenne, "Marshal general of the King's camps and armies," was revived for him. But on the 30th of November 1750 he died at Chambord "of a putrid fever." In 1748 there had been born to him a daughter, one of several illegitimate children, whose great-granddaughter was George Sand.

Saxe was the author of a remarkable work on the art of war, *Mes Rêveries*, which though described by Carlyle as "a strange military farrago, dictated, as I should think, under opium," is in fact a classic. It was published posthumously in 1757 (ed. Paris, 1877). His *Lettres et mémoires choisis* appeared in 1794. His letters to his sister, the princess of Holstein, preserved at Strassburg, were destroyed by the bombardment of that place in 1870; thirty copies had, however, been printed from the original. Many previous errors in former biographies were corrected and additional information supplied in Carl von Weber's *Moritz, Graf von Sachsen, Marschall von Frankreich, nach archivalischen Quellen* (Leipzig, 1863), in St René Taillandier's *Maurice de Saxe, étude historique d'après les documents des archives de Dresde* (1865) and in C. F. Vitzthum's *Maurice de Saxe* (Leipzig, 1861). See also the military histories of the period, especially Carlyle's *Frederick the Great.*

SAXE-ALTENBURG (Ger. *Sachsen-Altenburg*), a duchy in Thuringia, forming an independent member of the German Empire and consisting of two detached and almost equal parts, separated from each other by a portion of Reuss, and bounded on the S. and W. by the grand duchy of Saxe-Weimar-Eisenach, on the N. by Prussia, and on the E. by the kingdom of Saxony. There are in addition twelve small exclaves. The total area is 511 sq. m., of which 254 are in the east, or Altenburg, division, and 257 in the west, or Saal-Eisenberg, division. The eastern district, traversed by the most westerly offshoots of the Erzgebirge and watered by the Pleisse and its tributaries, forms an undulating and fertile region, containing some of the richest agricultural soil in Germany. The western district, through which the Saale flows, is rendered hilly by the foothills of the Thuringian Forest, and in some measure makes up by its fine woods for its comparatively poor soil. The mineral wealth of Saxe-Altenburg is scanty; lignite, the chief mineral, is worked mainly in the eastern district. Nearly 60 % of the entire duchy is occupied by arable land, and about 26 % by forests, mainly consisting of conifers. Oats, rye, wheat and potatoes are the chief crops. Cattle-raising and horse-breeding are of considerable importance. About 35 % of the population are directly supported by agriculture. The manufactures of the duchy are varied, though none is of first-rate importance; woollen goods, gloves, hats, porcelain and earthenware, bricks, sewing-machines, paper, musical instruments, sausages and wooden articles are the chief products. Trade in these, and in horses, cattle and agricultural produce, is brisk. The chief seats of trade and manufacture are Altenburg the capital, Ronneburg, Schmölln, Gössnitz and Meuselwitz in the Altenburg division; and Eisenberg, Roda and Kahla in the Saal-Eisenberg division. Besides these there are the towns of Lucka, Orlamünde and Russdorf in an exclave. The duchy includes one of the most densely inhabited districts in the Thuringian states. The population in 1905 was 206,508, of whom 200,511 were Protestants and 5449 Roman Catholics. In the west division the population is wholly Teutonic, but in the east there is a strong Wendish or Slavonic element, still to be traced in the peculiar manners and costume of the country-people, though these are gradually disappearing. The Altenburg peasants are industrious and prosperous; they are said to be avaricious, but to love pleasure, and to gamble for high stakes, especially at the card game of *Skat* (*q.v.*), which many believe to have been invented here. Their holdings are rarely divided, and a common custom is the inheritance of landed property by the youngest son. They are decreasing in numbers.

Saxe-Altenburg is a limited hereditary monarchy, its constitution resting on a law of 1831, subsequently modified. The diet consists of 32 members, elected for 3 years, of whom 9 are returned by the highest taxpayers, 11 by the towns and 12 by the country districts. The franchise is enjoyed by all males over 25 years of age who pay taxes. The duke has considerable powers of initiative and veto. The executive is divided into four departments, justice, finance, the interior, and foreign and ecclesiastical affairs. The annual revenue and expenditure stand at about £230,000 each. There was a public debt in 1909 of £44,370. Saxe-Altenburg has one vote in the Reichstag and one in the Bundesrat (federal council).

History.—The district now forming the duchy of Saxe-Altenburg came into the possession of the margrave of Meissen about 1329, and later with Meissen formed part of the electorate of Saxony. On the division of the lands of the Wettins in 1485 it was assigned to the Albertine branch of the family, but in 1554 it passed by arrangement to the Ernestine branch. In 1603 Saxe-Altenburg was made into a separate duchy, but this only lasted until 1672, when the ruling family became extinct and the greater part of its lands was inherited by the duke of Saxe-Gotha. In 1825 the family ruling the duchy of Saxe-Gotha-Altenburg became extinct and another division of the Saxon lands was made. Frederick (d. 1834) exchanged the duchy of Saxe-Hildburghausen, which he had ruled since 1780, for Saxe-Altenburg, and was the founder of the present reigning house. In answer to popular demands a constitution was granted to Saxe-Altenburg in 1831, and greater concessions were extorted by the more threatening disturbances of 1848. In November of this year Duke Joseph abdicated and was succeeded by his brother George. Under George's son Ernest (1826–1908), who became duke in 1853, a period of reaction began and the result was that the constitution was made less liberal. In 1874 a long dispute over the public domains was settled, two-thirds of these being assigned to the duke in lieu of a civil list. In 1908 Ernest was succeeded by his nephew Ernest (b. 1871).

See Frommelt, *Sachsen-altenburghische Landeskunde* (Leipzig, 1838–1841); L. von Braun, *Erinnerungsblatter aus der Geschichte Altenburgs 1525–1826* (Altenburg, 1876); Mälzer, *Die Landwirtschaft im Herzogtum Altenburg* (Stuttgart, 1907); Albrecht, *Das Domänenwesen im Herzogtum Saxe-Altenburg* (Jena, 1905); and E. Löhe, *Altenburgica* (Altenburg, 1878).

SAXE-COBURG-GOTHA (Ger. *Sachsen-Koburg-Gotha*), a sovereign duchy of Germany, in Thuringia, and a constituent member of the German empire, consisting of the two formerly separate duchies of Coburg and Gotha, which lie at a distance of 14 m. from each other, and of eight small scattered exclaves, the most northerly of which is 70 m. from the most southerly. The total area is 764 sq. m., of which about 224 are in Coburg and 540 in Gotha. The duchy of Coburg is bounded on the S.E., S., and S.W. by Bavaria, and on the other sides by Saxe-

Meiningen, which, with part of Prussia, separates it from Gotha. The considerable exclave of Königsberg in Bavaria, 10 m. south, belongs to Coburg. Lying on the south slope of the Thuringian Forest, and in the Franconian plain, the duchy of Coburg is an undulating and fertile district, reaching its highest point in the Seniehshöhe (1716 ft.) near Mirsdorf. Its streams, the chief of which are the Itz, Biberach, Steinach and Rodach, all find their way into the Main. The duchy of Gotha, more than twice the size of Coburg, stretches from the south borders of Prussia along the northern slopes of the Thuringian Forest, the highest summits of which (Der grosse Beerberg, 3225 ft.; Schneekopf, 3179 ft.; and Inselsberg, 2957 ft.) rise within its borders. The more open and level district on the north is spoken of as the "open country" (*das Land*) in contrast to the wooded hills of the "forest" (*der Wald*). The Gera, Hörsel, Unstrut and other streams of this duchy flow to the Werra, or to the Saale. The climate is that of the other central states of Germany, temperate in the valleys and plains and somewhat inclement in the hilly regions.

Industries and Population.—In both duchies the chief industry is agriculture, which employs about 30 % of the entire population. According to the returns for 1905, about 50 % of the area was occupied by arable land, 10 % by meadow-land and pasture and 30 % by forest. In the same year the chief crops were oats, barley, rye, wheat, potatoes and hay. A small quantity of hemp and flax is raised, but a considerable quantity of fruit and vegetables is annually produced, and some wine, in the Coburg district of Königsberg. Cattle-breeding is important, especially in Gotha and the Itz valley in Coburg. Beehives are numerous and produce excellent honey, and poultry is reared in large numbers for export. The mineral wealth of Saxe-Coburg-Gotha is insignificant, small quantities of coal, lignite, ironstone and millstone being annually raised. There are also salt-works, and some deposits of potter's clay.

The manufactures of the duchies, especially in the mountainous parts less favourable for agriculture, are tolerably brisk, but there is no large industrial centre in the country. Iron goods and machinery, glass, earthenware, chemicals and wooden articles, including large quantities of toys, are produced; and various branches of textile industry are carried on. Coburg (pop. 1905, 24,289) and Gotha (36,893) are the chief towns of the duchies, to which they respectively give name; the latter is the capital of the united duchy. There are nine other small towns, and 320 villages and hamlets. Friedrichroda and Ruhla, the Inselsberg and the Schneekopf and other picturesque points, annually attract an increasing number of summer visitors and tourists. The population in 1905 was 242,432 (117,224 males and 125,208 females), or about 290 to the square mile. Of these 71,512 were in Coburg and 170,920 in Gotha; the relative density in either duchy being about equal. In Coburg the people belong to the Franconian and in Gotha to the Thuringian branch of the Teutonic family, and, according to religious confessions, almost the entire population is Lutheran, Roman Catholics only numbering some 3000 and Jews about 700.

Constitution and Administration.—Saxe-Coburg-Gotha is a limited hereditary monarchy, its constitution resting on a law of 1852, modified in 1874. For its own immediate affairs each duchy has a separate diet, but in more important and general matters a common diet, formed of the members of the separate diets and meeting at Coburg and Gotha alternately, exercises authority. The members are elected for four years. The Coburg diet consists of eleven members and the Gotha diet of nineteen. The franchise is extended to all male taxpayers of twenty-five years of age and upwards. The ministry has special departments for each duchy, but is under a common president. There is a sub-department for the control of ecclesiastical affairs, which are locally managed by ephories, twelve in number. The united duchy is represented in the imperial Bundesrat by one member and in the Reichstag by two members, one for each duchy. By treaty with Prussia in 1867 the troops of the duchy are incorporated with the Prussian army. The budget is voted in either duchy for four years, a distinction being made between domain revenue and state revenue. Taking both together the receipts into the exchequer on behalf of Coburg were estimated for 1909–1910 at about £100,000 and those for Gotha at about £200,000, while the common state expenditure amounted to about the same sum. The civil list of the reigning duke is fixed at £15,000 a year, in addition to half the proceeds of the Gotha domains, after £5000 has been deducted and paid into the state exchequer, and half the net revenue of the Coburg domains. Besides the civil list the duke of Saxe-Coburg-Gotha enjoys a very large private fortune, amassed chiefly by Ernest I., who sold the principality of Lichtenberg, which the congress of Vienna had bestowed upon him in recognition of his services in 1813, to Prussia for a large sum of money.

History.—The district of Coburg came into the possession of the family of Wettin in the 14th century, and after the Wettins had become electors of Saxony this part of their lands fell at the partition of 1485 to the Ernestine branch of the house. In 1572 Gotha was given to John Casimir, a son of the Saxon duke John Frederick, but when he died childless in 1633 it passed to another branch of the family. In 1680, as Saxe-Coburg, it was formed into a separate duchy for Albert, one of the seven sons of Ernest I., duke of Saxe-Gotha (d. 1675), but he died childless in 1699, when his possessions were the subject of vehement contentions among the collateral branches of the Saxon house. Eventually it was assigned to Albert's youngest brother, John Ernest (d. 1729), who called himself duke of Saxe-Coburg-Saalfeld, and who left two sons, Christian Ernest and Francis Josiah, who ruled the land together, the principle of primogeniture being introduced by the survivor of the two, Francis Josiah. Under this duke and his son and successor, Ernest Frederick, the land was plunged into bankruptcy and a commission was appointed to manage its finances. The measures adopted to redeem the country's credit were successful, but they imposed much hardship on the people and a rising took place which was only quelled by the aid of troops from electoral Saxony. Duke Francis died in December 1806 and was succeeded by his son Ernest, although the country was occupied by the French from 1807 to 1816.

Also an early possession of the Wettins, Gotha fell at the partition of 1485 to the Albertine branch of the family, but was transferred to the Ernestine branch by the capitulation of Wittenberg of 1547. In 1554 it became a separate duchy, its line of rulers being founded by Duke John Frederick, a son of the dispossessed elector of Saxony, John Frederick, and becoming extinct in 1638. In 1640 Saxe-Gotha came into the possession of Ernest the Pious, and after his death in 1675 its duke was his eldest son Frederick (d. 1691), whose family, having inherited Altenburg, became extinct in February 1825 with the death of Duke Frederick IV. This event was followed in 1826 by a redistribution of the Saxon lands. Ernest, duke of Saxe-Coburg-Saalfeld, exchanged Saalfeld for Gotha, took the title of duke of Saxe-Coburg-Gotha and became the founder of the present ruling house.

Ernest II. (1818–1893) succeeded to the duchy in 1844, and during his long reign various reforms were achieved and the union of the two parts of the duchy was made closer. This duke had no issue, and the succession passed to the children of his brother Albert, the English prince consort. In 1855 his second son, Prince Alfred, had been declared heir to the duchy, and he succeeded his uncle in 1893. When he died without sons in July 1900, the succession having been renounced by his brother, the duke of Connaught and his issue, Saxe-Coburg passed to Charles Edward, duke of Albany (b. 1884), a nephew of the late duke. For many years there had been trouble between the ruler and the people over the ownership of the extensive crown lands, it being evidently feared at one time that an English prince might renounce the throne and yet claim the lands. The matter was settled by a law of 1905, on the lines mentioned in the earlier section of this article.

See Fleischmann, *Zur Geschichte des Herzogtums Sachsen-Coburg* (Hildburghausen, 1880); A. Lotz, *Koburgische Landesgeschichte* (Coburg, 1892).

SAXE-MEININGEN (Ger. *Sachsen-Meiningen*), a duchy in Thuringia, forming an independent member of the German

empire and consisting chiefly of an irregular crescent-shaped territory, which, with an average breadth of 10 m., stretches for over 80 m. along the south-west slope of the Thuringian Forest. The convex side rests upon the duchy of Coburg and is in part bounded by Bavaria, while the concave side, turned towards the north, contains portions of four other Thuringian states and Prussia between its horns, which are 46 m. apart. The districts of Kranichfeld, 15 m. N.W., and Kamburg, 22 m. N. of the eastern horn, together with a number of smaller scattered exclaves, comprise 74 of the 953 sq. m. belonging to the duchy. The surface on the whole is hilly and is partly occupied by offshoots of the Thuringian Forest; the highest summits are found in the eastern half, where the Kieferle reaches 2849 ft. and the Blessberg 2835 ft. The chief streams are the Werra, which traverses the south and east of the duchy, and various tributaries of the Main and the Saale, so that Saxe-Meiningen belongs to the basins of the three great rivers Weser, Rhine and Elbe.

The soil is not very productive, although agriculture flourishes in the valleys and on the level ground; grain has to be imported to meet the demand. Only 41 % of the total area is devoted to agriculture, while meadow-land and pasture occupy 11 %. The chief grain crops are oats, rye and wheat, and the cultivation of potatoes is general. Tobacco, in the Werra district, hops and flax are also raised. The Werra valley and the other fertile valleys produce large quantities of fruit. The raising of cattle, pigs and sheep is a fairly important branch of industry throughout the duchy; horses are bred in Kamburg. The extensive and valuable forests, of which 75 % consist of coniferous trees, occupy 42 % of the entire area. About 42 % of the forests belong to the state and about 33 % to public bodies and institutions, leaving only 25 % for private owners. The mineral wealth of the duchy is not inconsiderable. Iron, coal and slate are the chief products, and copper and cobalt may be added. There are salt-works at Salzungen and Neusulza, the former the most important in Thuringia; and the mineral water of Friedrichshall is well known. The manufacturing industry of Saxe-Meiningen is active, especially in the districts of Sonneberg, Gräfenthal and Saalfeld. Iron goods of various kinds, glass and pottery, school slates, pencils and marbles are produced; the abundant timber fosters the manufacture of all kinds of wooden articles, especially toys; and the textile industry and the manufacture of leather goods, papier mâché and sewing-machines are also carried on.

The capital of the duchy is Meiningen; the other principal towns are Salzungen, Hildburghausen, Eisfeld, Sonneberg, Saalfeld, Pössneck and Kamburg. In 1905 the population was 268,916, of whom 30 % live in communities of more than 2000. As in the other Saxon duchies the population is almost exclusively Protestant; in 1905, 262,243 belonged to the Lutheran confession, 4845 were Roman Catholics and 1256 Jews.

Saxe-Meiningen is a limited monarchy, its constitution resting on a law of 1829, subsequently modified. The diet, elected for six years, consists of 24 members, of whom 4 are elected by the largest landowners, 4 by those who pay tax on incomes of £150 or more, and 16 by the other electors. The franchise is enjoyed by all domiciled males over twenty-five years of age who pay taxes. The government is carried on by a ministry of five, with departments for the ducal house and foreign affairs, home affairs, justice, education and public worship and finance. The revenue, £190,000 of which is drawn from the state domains, stands at about £480,000 a year. The expenditure, including a civil list of £20,000, stands at £445,000. In 1909 the state had a debt of £302,270. Saxe-Meiningen has one vote in the German federal council (Bundesrat) and sends two members to the Reichstag.

History.—The duchy of Saxe-Meiningen, or more correctly Saxe-Meiningen-Hildburghausen, was founded in 1681 by Bernard, the third son of Ernest the Pious, duke of Saxe-Gotha, and consisted originally of the western part of the present duchy, the district around Meiningen. Bernard was succeeded in 1706 by his three sons, Ernest Louis, Frederick William and Anton Ulrich, but after 1746 the only survivor was the youngest, Anton Ulrich, who reigned alone from this date until his death in 1763. By this time the duchy had increased considerably in extent, but petty wars with the other Saxon princes combined with the extravagance of the court and the desolation caused by the Seven Years' War to plunge it into distress and bankruptcy. A happier time, however, was experienced under Charlotte Amalie, Anton's widow, who ruled as regent for her sons, Charles (d. 1782) and George (d. 1806). Under the latter prince the country prospered greatly, and having introduced the principle of primogeniture, he died and was succeeded by his infant son, Bernard Ernest Freund (1800-1882), whose mother, Eleanora of Hohenlohe-Langenburg, governed in his name until 1821. The war with France at the beginning of this reign, with its attendant evils, quartering of troops, conscription and levies of money, joined with cattle disease and scanty harvests in plunging the land again into distress, from which it recovered very slowly.

In 1825 the extinction of the family ruling Saxe-Gotha made a rearrangement of the Saxon duchies necessary, and Saxe-Meiningen benefited greatly by the settlement of 1826, its area being more than doubled by the receipt of 530 sq. m. of territory. The additions consisted of the duchy of Saxe-Hildburghausen, founded in 1680 by Ernest, the sixth son of Ernest the Pious; the duchy of Saxe-Saalfeld, founded by John Ernest, the seventh son of Ernest the Pious, which had been united with Saxe-Coburg in 1735; and the districts of Themar, Kranichfeld and Kamburg. In 1823 Bernard had granted a liberal constitution to his duchy, but these additions made further changes inevitable and a new constitution was granted in 1829. Saxe-Meiningen had entered the confederation of the Rhine in 1807, but had joined the allies in 1813 and became a member of the German confederation in 1815. In 1866, unlike the other Saxon duchies, Saxe-Meiningen declared for Austria in the war with Prussia; at once the land was occupied by Prussian troops, and in September 1866 Duke Bernard abdicated and was succeeded by his son George (b. 1826), who immediately made peace with Prussia and joined the North German Confederation, his land becoming a member of the new German empire in 1871. In 1871 the dispute which had been carried on since 1831 between the duke and the diet about the rights of each to the state domains was settled by a compromise, each party receiving a share of the revenues. The heir-apparent Prince Bernard (b. 1851) has no sons, so by a law of 1896 the succession is settled upon the sons of his half-brother Prince Frederick (b. 1861).

See *Statistik des Herzogtums Sachsen-Meiningen* (Meiningen, 1892 fol.); Bruckner, *Landeskunde des Herzogtums Sachsen-Meiningen* (Meiningen, 1853); Goeckel, *Das Staatsrecht des Herzogtums Sachsen-Meiningen* (Jena, 1904); Anschütz, *Industrie, Handel und Verkehr im Herzogtum Sachsen-Meiningen* (Sonneberg, 1904); and the publications of the Verein fur sachsen-meiningische Geschichte und Landeskunde (Hildburghausen, 1888 fol.).

SAXE-WEIMAR-EISENACH (Ger. *Sachsen-Weimar-Eisenach*), a grand duchy of Germany and a sovereign and constituent state of the German empire. It is the largest of the Thuringian states, and consists of the three chief detached districts of Weimar, Eisenach and Neustadt, and twenty-four scattered exclaves, of which Allstedt, Oldisleben and Ilmenau belonging to Weimar, and Ostheim belonging to Eisenach, are the chief. The first and last named of these exclaves are 70 m. apart; and the most easterly of the other exclaves is 100 m. from the most westerly. The total area of the grand-duchy is 1397 sq. m., of which 678 are in Weimar, 465 in Eisenach and 254 in Neustadt. The population in 1905 was 388,095 (189,422 males and 198,673 females), on an average 271 to the square mile, of whom the greatest bulk are Lutherans, the Roman Catholics only numbering about 18,000, and Jews and those of other confessions about 1500 in all. Of the population about 47 % live in towns or communes exceeding 2000 inhabitants, and about 53 % are rural.

The district of Weimar, which is at once the largest division and the geographical and historical kernel of the grand-duchy, is a roughly circular territory, situated on the plateau to the

north-east of the Thuringian Forest. It is bounded on the N. and E. by Prussia, and on the S. and W. by Schwarzburg and detached portions of Saxe-Altenburg, and lies 23 m. east of the nearest part of Eisenach, and 7 m. north-west of the nearest part of Neustadt. The exclaves of Allstedt and Oldisleben lie in Prussian territory 10 m. to the north and north-west respectively; Ilmenau as far to the south-west. The surface is undulating and destitute of any striking natural features, although the valleys of the Saale and Ilm are picturesque. The Kickelhahn (2825 ft.) and the Hohe Tanne (2641 ft.) rise in Ilmenau; but the Grosser Kalm (1814 ft.) near Remda, in the extreme south, is the highest point in the main part of Weimar. The Saale flows through the east of the district and is joined by the Ilm, the Elster and the Unstrut. The chief towns are Weimar, the capital, on the Ilm; Jena, with the common university of the Thuringian states, on the Saale; Apolda, the "Manchester of Weimar," to the east; and Ilmenau, lying among the hills on the edge of the Thuringian Forest to the S.W. of Weimar.

Eisenach, the second district in size, and the first in point of natural beauty, stretches in a narrow strip from north to south on the extreme western boundary of Thuringia, and includes parts of the church lands of Fulda, of Hesse and of the former countship of Henneberg. It is bounded on the N. and W. by Prussia, on the S. by Bavaria (which also surrounds the exclave of Ostheim) and on the E. by Saxe-Meiningen and Saxe-Gotha. The north is occupied by the rounded hills of the Thuringian Forest, while the Rhön mountains extend into the southern part. The chief summits of the former group, which is more remarkable for its fine forests and picturesque scenery than for its height, are the Wartburgberg (1355 ft.), the north-western termination of the system, Ottowald (2103 ft.), the Wachstein (1900 ft.) and the Ringberg (2290 ft). The chief river is the Werra, which flows across the centre of the district from east to west, and then bending suddenly northwards, re-enters from Prussia, and traverses the north-eastern parts in an irregular course. Its chief tributaries in Eisenach are the Hörsel and the Ulster. Eisenach is the only town of importance in this division of the grand-duchy.

Neustadt, the third of the larger divisions, is distinguished neither by picturesque scenery nor historical interest. It forms an oblong territory, about 24 m. long by 16 broad, and belongs rather to the hilly district of the Vogtland than to Thuringia. It is bounded on the N. by Reuss (junior line) and Saxe-Altenburg, on the W. by Saxe-Meiningen and a Prussian exclave, on the S. by the two Reuss principalities and on the E. by the kingdom of Saxony. The Kesselberg (1310 ft.), near the town of Neustadt, is the chief eminence. This district lies in the basin of the Saale, its chief streams being the White (*Weisse*) Elster, the Weida and the Orla. Neustadt, Auma and Weida are the principal towns.

Agriculture forms the chief occupation of the inhabitants in all parts of the duchy, though in Eisenach and around Ilmenau a large proportion of the area is covered with forests. According to the return for 1900 about 55 % of the entire surface was occupied by arable land, 26 % by forest and 9 % by pasture and meadow-land. Only about 5 % was unproductive soil or moorland. In 1900 the chief crops were oats, barley, rye, wheat, potatoes, hay, beet (for sugar), flax and oil-yielding plants. Fruit grows in abundance, especially around Jena, and vines are cultivated with great success on the banks of the Saale. Of the forests, about 38 % are deciduous and 62 % coniferous trees, and the greater part of the former belong to the government. Cattle-raising is carried on to a considerable extent, especially in Eisenach and Neustadt, while the sheep-farming centres in Weimar. Poultry is also reared in considerable quantities. Although iron, copper, coal and lignite are worked, the mineral wealth is trifling. There are salt springs at Berka and Stadtsulza.

The manufacturing industries in the grand-duchy are considerable; they employ 41 % of the population. The most important is the textile industry, which centres in Apolda. The production of woollen goods (stockings, cloth, underclothing) forms the leading branch of this industry; but cotton and linen weaving and yarn-spinning are also carried on. Large quantities of earthenware and crockery are made, especially at Ilmenau. The optical instruments of Jena and the scientific instruments of Ilmenau are well known. Leather, paper, glass, cork and tobacco are among the less prominent manufactures. There are numerous breweries in the duchy. The volume of trade is not very great, although some of the productions are exported all over Europe, and in some cases to other continents as well.

Constitution.—Saxe-Weimar-Eisenach is a limited hereditary monarchy, and was the first state in Germany to receive a liberal constitution. This was granted in 1816 by Charles Augustus, the patron of Goethe, and was revised in 1850 and again in 1906. The diet consists of one chamber with thirty-eight members, of whom five are chosen by owners of land worth at least £150 a year, five by those who derive a similar income from other sources, five by the university of Jena and other public bodies, and twenty-three by the rest of the inhabitants. The deputies are elected for six years. The franchise is enjoyed by all domiciled citizens over twenty-one years of age. The government is carried on by a ministry of three, holding the portfolios of finance; of home and foreign affairs; and of religion, education and justice, with which is combined the ducal household. The duchy is represented by one vote in the Bundesrat and by two members in the Reichstag.

The Saxe-Weimar family is the oldest branch of the Ernestine line, and hence of the whole Saxon house. By a treaty with Prussia in 1867, which afterwards became the model for similar treaties between Prussia and other Thuringian states, the troops of the grand-duchy were incorporated with the Prussian army.

The budget is voted by the chamber for a period of three years. That from 1908 to 1910 estimated an annual income and an annual expenditure of about £620,000. A large income is derived from the state forests. The public debt amounted to £145,000 in 1908, but it is amply secured by real estate and invested funds. Justice is administered by two high courts (*Landesgerichte*), at Weimar and Eisenach respectively; the district of Neustadt falling under the jurisdiction of the Landesgericht at Gera; while the supreme court of appeal for the four Saxon duchies, Schwarzburg-Rudolstadt and Reuss, together with portions of Prussia, is the Oberlandesgericht at Jena.

History.—In early times Weimar with the surrounding district belonged to the counts of Orlamünde, and from the end of the 10th century until 1067 it was the seat of the counts of Weimar. In the 14th century it passed to the elector of Saxony, falling at the partition of 1485 to the Ernestine branch of the Wettin family. Although John Frederick the Magnanimous was deprived of the electorate in 1547 his sons retained Weimar; and one of them, John William (d. 1573), may be regarded as the founder of the present ruling house, but it was not until 1641 that Saxe-Weimar emerged into an independent historical position. In this year, having just inherited Coburg and Eisenach, the three brothers William, Albert and Ernest founded the three principalities of Saxe-Weimar, Saxe-Eisenach and Saxe-Gotha. Eisenach fell to Saxe-Weimar in 1644, and although the enlarged principality of Saxe-Weimar-Eisenach was temporarily split up into the lines Saxe-Weimar, Saxe-Eisenach and Saxe-Jena, it was again united under Ernest Augustus, who began to reign in 1728, and the adoption of the principle of primogeniture about this time secured it against further divisions. Ernest Augustus II., who succeeded in 1748, died in 1758, and his young widow, Anna Amelia, was appointed regent of the country and guardian of her infant son Charles Augustus. The reign of this prince, who assumed the government in 1775, is the most brilliant epoch in the history of Saxe-Weimar. An intelligent patron of literature and art, he attracted to his court the leading scholars in Germany; Goethe, Schiller and Herder were members of this illustrious band, and the little state, hitherto obscure, attracted the eyes of all Europe.[1]

The war between France and Prussia in 1806 was fraught with danger to the existence of the principality, and after the battle of Jena it was mainly the skilful conduct of the duchess Louise, the wife of Charles Augustus, that dissuaded Napoleon

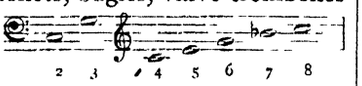
[1] See Goethe's famous lines, *Epigramme* (35):—

"Klein ist unter den Fürsten Germaniens freilich der meine;
Kurz und schmal ist sein Land, mässig nur, was er vermag.
Aber so wende nach innen, so wende nach aussen die Kräfte
Jeder; da wär' es ein Fest, Deutscher mit Deutschen zu sein."

from removing her husband from his place as a reigning prince. In 1807 Saxe-Weimar-Eisenach entered the Confederation of the Rhine and in the subsequent campaigns it suffered greatly. The Congress of Vienna in 1815 added about 660 sq. m. to its area and gave its ruler the title of grand-duke. Just after the conclusion of peace Charles Augustus gave a liberal constitution to his land; freedom of the press was also granted, but after the festival of the Wartburg on the 18th of October 1817 this was seriously curtailed. The next grand-duke, Charles Frederick, who succeeded in 1828, continued his father's work, but his reforms were not thorough enough nor rapid enough to avert disturbances in 1848, when power was given to a popular ministry and numerous reforms were carried through. Reaction set in under Charles Alexander, who became grand-duke in 1853, and the union of the crown lands and the state lands was undone, although both remained under the same public management. In 1866 the grand-duchy joined Prussia against Austria, although its troops were then garrisoning towns in the interests of the latter power; afterwards it entered the North German Confederation and the new German empire. Charles Alexander died in January 1901 and was succeeded by his grandson William Ernest (b. 1876).

See C. Kronfeld, *Landeskunde des Grossherzogtums Sachsen-Weimar-Eisenach* (Weimar, 1878–1879); and the official *Staatshandbuch für das Grossherzogtum Sachsen* (Weimar, 1904).

SAXHORN, the generic name of a family of brass wind instruments (not horns but valve-bugles) with cup-shaped mouthpieces, invented by Adolphe Sax and in use chiefly in French and Belgian military bands and in small wind-bands. The saxhorns came into being in 1843, when Sax applied a modification of the valve system invented in Germany in 1815 to the keyed bugle. The saxhorn consists of a conical tube of a calibre greater than that of French horn and trumpet, but smaller than that of the tubas or bombardons, and capable therefore of producing by overblowing the members of the harmonic series from the 2nd to the 8th, in common with the cornets, bugles, valve-trombones and the Wagner tubas. The saxhorns are furnished with three valves, by means of which



the compass is rendered chromatic, and which act as in other valve instruments, lowering the pitch of the instrument when depressed, respectively 1 tone, a semitone and 1½ tones; and further, when used in combination, 2 tones, 2½ tones and 3 tones. The Flügelhorns, the euphonium, the bombardon and the tubas are sometimes erroneously classed as saxhorns. The difference between saxhorns and bombardons or tubas consists in the calibre of the bore, which in the latter is sufficiently wide in proportion to the length to produce the fundamental note of the harmonic series an octave below the lowest note of the saxhorns. The consequence of this structural difference is important, for whereas the tube of the tubas is theoretically of the same length as an open organ pipe of the same pitch, the saxhorns require a tube twice that length to produce the same scale. For instance, a euphonium sounding 8 ft. C only needs a tube 8 ft. long, whereas the corresponding bass saxhorn requires one 16 ft. long. In Germany these structural differences have given rise to a classification of brass wind instruments as *whole* or *half* instruments (*Ganze* or *Halbe*),[1] according to whether the whole or only the half of the length of tubing is of practical use. The members of the saxhorn family are the small saxhorn in E♭, the soprano in B♭, the alto in E♭, the tenor in B♭, the bass in B♭ (an octave lower), the low bass in E♭, the contrabass in B♭, three octaves below the soprano. All the saxhorns are treated as transposing instruments.[2] A similar family, constructed with rotary valves and conical tubes of larger calibre than the saxhorns, but having the same harmonic scale, is known in Germany as Flügelhorn. (K. S.)

[1] See Dr Emil Schafhäutl's article on musical instruments in sect. iv. of *Bericht der Beurteilungscommission bei der allg. deutschen Industrieausstellung* 1854; (Munich, 1855), pp. 169–170.

[2] Georges Kastner, in *Manuel général de musique militaire* (Paris, 1848), gives full information on the saxhorns, pp. 230 et seq., 246-247, and Pls. xxii. and xxiii.

SAXIFRAGACEAE, in botany, a small natural order of Dicotyledons belonging to the sub-class Polypetalae and containing 27 genera with about 350 species distributed through the Arctic and north temperate zone, often alpine. It is represented in Britain by its largest genus *Saxifrage* (*q.v.*), *Chrysosplenium* (golden saxifrage) and *Parnassia* (grass of Parnassus). The plants are herbs, generally with scattered exstipulate leaves with a broad leaf-base. The small flowers are generally arranged in cymose inflorescences and are bisexual, regular and hypogynous, perigynous or more frequently more or less epigynous, this variation in the relative position of the ovary occurring in one and the same genus *Saxifraga* (fig. 1). The flowers are 5-merous, more rarely 4-merous, having 5 (or 4) sepals, 5 (or 4) free petals, two 5- or 4-merous whorls of free stamens which are obdiplostemonous, *i.e.* those of the outer whorl are opposite to the petals, and two carpels (see fig. 2). The carpels are sometimes free, more generally united at the base, or sometimes completely joined to form a one- or two-chambered ovary with two free styles. The fruit is a many-seeded capsule.



FIG. 1.—*Saxifraga umbrosa*, London Pride, about half natural size. 1, Flower enlarged. 2, Vertical section of ovary with sepals, more enlarged.

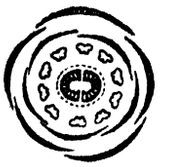


FIG. 2.—Diagram of a saxifrage (*Saxifraga tridactylites*). The calyx and corolla each consist of five parts, there are ten stamens in two series, and a pistil of two carpels.

More than half the species (200) are contained in the genus *Saxifrage* (*q.v.*). *Chrysosplenium*, with 39 species, two of which are British,

has a very similar distribution. The North American genus *Heuchera* has sometimes apetalous flowers. *Astilbe* has 6 species in temperate Asia and north-eastern North America; *A. japonica* is commonly grown in the spring as a pot-plant, and often misnamed Spiraea.

The order is frequently much extended to include other groups of genera differing in habit and more or less in general conformation from those to which the order is here confined, and which are then regarded as forming one of several tribes. Among these is the order *Ribesiaceae*, comprising one single genus *Ribes*, to which belong the gooseberry (*R. Grossularia*) and currants of gardens. These are shrubs with racemes of flowers which have only one whorl of stamens (isostemonous), an inferior unilocular ovary with two parietal placentas, and fruit a berry. Another is the Hydrangeaceae, to which belong *Hydrangea* (*q.v.*), *Deutzia* and *Philadelphus*, all well-known garden plants; *P. coronarius* is the so-called Syringa or mock-orange. They are shrubs or trees with simple generally opposite leaves, 5-merous flowers with epigynous stamens and a 3- to 5-locular ovary.

Escallonia, which represents a small group of genera with leathery gland-dotted leaves, is also often included.

SAXIFRAGE (*Saxifraga*), a genus of plants which gives its name to the order of which it is a member. There are nearly 200 species distributed in the temperate and arctic parts of the northern hemisphere, frequently at considerable heights on the mountains, and also found on the Andes. They are mostly herbs with perennial rootstocks and leaves in tufts or scattered on the flower-stalks. The arrangement of the flowers is very various, as also are the size and colour of the flowers themselves. They have a flat or more or less cup-shaped receptacle, from the margin of which spring five sepals, five petals and ten (or rarely five) stamens. The pistil is often partly adherent to the receptacle, and is divided above into two styles; the ovules are numerous, attached to axile placentas; and the seed-vessel is capsular. Fifteen species are natives of Britain, some alpine plants of great beauty (*S. oppositifolia*, *S. nivalis*, *S. aizoides*, &c.), and others, like *S. granulata*, frequenting meadows and low ground, while *S. tridactylites* may be found on almost any dry wall. *S. umbrosa* is London Pride or St Patrick's Cabbage, a common garden plant, a native of the Spanish Peninsula and also of the mountains of W. and S.W. Ireland. Many species are in cultivation, including the *Bergenias* or *Megaseas* with their large fleshy leaves and copious panicles of rosy or pink flowers, the numerous alpine species, such as *S. pyramidalis*, *S. cotyledon*, &c., with tall panicles studded with white flowers, and many others, most of them adapted for rockwork.

SAXO GRAMMATICUS (*c.* 1150–*c.* 1206), Danish historian and poet, belonged to a family of warriors, his father and grandfather having served under Valdemar I., king of Denmark (d. 1182). Brought up for the clerical profession, Saxo entered the service of Archbishop Absalon about 1180, and remained in that capacity until the death of Absalon in 1201. It was at the archbishop's instigation that he began, about 1185, to write the history of the Danish Christian kings from the time of Sweyn Astridson (d. 1076), but later Absalon prevailed on him to write also the history of the earlier heathen times, and to combine both into a great work, *Gesta Danorum*, or *Historia Danica*. The archbishop died before the work was finished, and therefore the preface, written about 1208, dedicates the work to his successor Archbishop Andreas, and to King Valdemar II. Nothing else is known about Saxo's life and person; a chronicle of 1265 calls him "mirae et urbanae eloquentiae clericus"; and an epitome of his work from about 1340 describes him as "egregius grammaticus, origine Sialandicus." That he was a native of Zealand is probably correct, inasmuch as, whereas he often criticizes the Jutlanders and the Scanians, he frequently praises the Zealanders. The surname of "Grammaticus" is probably of later origin, scarcely earlier than 1500, apparently owing to a mistake. The title of "provost of Röskilde," given him in the 16th century, is also probably incorrect, the historian being confounded with an older contemporary, the provost of the same name. Saxo, from his apprenticeship as the archbishop's secretary, had acquired a brilliant but somewhat euphuistic Latin style, and wrote fine Latin verses, but otherwise he does not seem to have had any very great learning or extensive reading. His models of style were Valerius Maximus, Justin and Martianus Capella, especially the last. Occasionally he mentions Bede, Dudo of St Quentin and Paulus Diaconus, but he does not seem to have studied them or any other historical works thoroughly. His sources are partly Danish traditions and songs, partly the statements of Archbishop Absalon, partly the accounts of Icelanders and, lastly, some few earlier sources, lists of Danish kings and short chronicles, which furnished him with some reliable chronological facts. He considered traditions as history, and therefore made it his chief business to recount and arrange these, and his work is a loosely connected series of biographies of Danish kings and heroes.

The first nine books of the *Gesta Danorum* comprise traditions of kings and heroes of the half-mythical time up to about 950. Here we have traditions about Fredfrode, about Amleth (Hamlet) and Fenge, about Hrolfr Kraki, Hadding, the giant Starkather, Harald Hildetann and Ragnarr Lodbrok. In this earlier history Saxo has also embodied myths of national gods who in tradition had become Danish kings, for instance, Balder and Hother, and of foreign heroes, likewise incorporated in Danish history, as the Gothic Jarmunrik (A.S. Eormenric), the Anglian Vermund (A.S. Gármund) and Uffe (A.S. Offa), the German Hedin and Hild, and others. Frequently the narrative is interrupted by translations of poems, which Saxo has used as authentic sources, although they are often only a few generations older than himself. In the later books (x.-xvi.) of his work he follows to a greater extent historical accounts, and the more he approaches his own time the fuller and the more trustworthy his relation becomes; especially brilliant is his treatment of the history of King Valdemar and of Absalon. But his patriotism often makes him partial to his countrymen, and his want of critical sense often blinds him to the historical truth.

Saxo's work was widely read during the middle ages, and several extracts of it were made for smaller chronicles. It was published for the first time, from a MS. afterwards lost, in Paris, 1514, by the Danish humanist Christiern Pedersen; this edition was reprinted at Basel, 1534, and at Frankfort, 1576. Of later editions may be mentioned that of Stephen Stephanius (Söro, 1644), the second volume of which contains the little-known, but valuable, *Stephanii notae uberiores in historiam Danicam Saxonis Grammatici*, and which was reproduced, though without the notes, by C. A. Klotz (Leipzig, 1771); and that of P. E. Müller completed by J. M. Velschow (Copenhagen, 1839–1858). The last complete edition is that of Alfred Holder (Strassburg, 1886), while a large part was edited by G. Waitz in the *Mon. Germ. historica*, xxix. pp. 43-161 (1892). No complete MS. any longer exists; yet of late small fragments have been found of three MSS. The most remarkable of these is the fragment found at Angers, in France, written in the later part of the 13th century. It is now in the library of Copenhagen.

There are Danish translations by A. G. Vedel (Copenhagen, 1575, and again 1851), and by F. Winkel-Horn (1896–1898). There is an English translation by O. Elton and F. Y. Powell (London, 1894).

See A. Potthast, *Bibliotheca historica medii aevi* (Berlin, 1896), where full references will be found.

SAXONS, a Teutonic people mentioned for the first time by Ptolemy about the middle of the 2nd century. At that time they are said to have inhabited the neck of the Cimbric peninsula, by which we have probably to understand the modern province of Schleswig, together with three islands lying off its western coast. We next hear of them in connexion with piratical expeditions in the North Sea about the year 286. These raids became more frequent during the 4th century, and at the beginning of the 5th century the northern coast of Gaul and the south-east coast of Britain were known as *litora Saxonica*, owing either to their liability to the attacks of the Saxons or, as some think, to the establishment of Saxon colonies there. During the same period the Saxons appear to have conquered a considerable portion of north-west Germany. According to their own traditions they landed at Hadeln in the neighbourhood of Cuxhaven and seized the surrounding districts from the Thuringians. It is clear that by the middle of the 4th century they had advanced

westwards into the basin of the Yssel, from whence they drove the Frankish Salii into Batavia. In the following centuries we find them in possession of the whole of the basin of the Ems, except the coast district, while that of the Weser with all its tributaries belonged to them as far south as the Diemel, where they bordered on the Hessian Franks, the ancient Chatti. The conquest of the Boructuari who dwelt between the Lippe and the Ruhr marks the extent of their progress towards the south-west. This took place shortly before the end of the 7th century. They frequently came into conflict with the Franks and on several occasions had to submit to their supremacy, notably after their defeat by Clothaire I. in 553. No thorough conquest was, however, carried out until the time of Charlemagne, who, between the years 772 and 785, annexed the whole region as far as the Elbe, destroying in 772 the Irminsul, their great sanctuary, near Marsberg on the Diemel. Up to this time they had remained entirely heathen. In the 8th century and later we find the Saxons divided into three geographical districts known as Westfalahi (a name preserved in Westphalia), Angrarii and Ostfalahi, each of which had in several respects special customs of its own. They were ruled by a number of independent princes, but it is said that they had a national council which met annually at a place called Marklo on the Weser. At the beginning of the following century Charles also conquered the Saxons known as Nordalbingi in western Holstein, a district which had perhaps been occupied by a southward movement from the original home of the tribe.

It is doubtful how far the Saxons who invaded Britain were really distinct from the Angli, for all their affinities both in language and custom are with the latter and not with the Saxons (Old Saxons) of the continent. During the 5th century we hear also of Saxon settlements on the coasts of Gaul. The most important were those at the mouth of the Loire founded in the time of Childeric, Clovis's father, and at Bayeux, in a district which remained in their possession until towards the close of the 6th century. From the 6th century onwards, however, we hear practically nothing of the Saxons as a seafaring people. Almost all the southern coast of the North Sea had now come into the possession of the Frisians, and one can hardly help concluding that most of the maritime Saxons had either voluntarily or by conquest become incorporated in that kingdom.

See Ptolemy ii. 11; Eutropius ix. 21; Zosimus iii. 6; Ammianus Marcellinus xxvi. 4. 5, xxvii. 8. 5, xxviii. 2. 12, 7. 8, xxx. 5. 1 and 4; *Notitia dignitatum*; Gregory of Tours, *Historia Francorum*, ii. 19, iv. 10. 14, v. 27, x. 9; Bede, *Hist. Eccl.* v. 10 ff.; *Annales Einhardi*; *Translatio S. Alexandri*; Hucbald, *Vita S. Lebuini*; Widukind, *Res Gestae Saxonicae*, i. 1 ff. (F. G. M. B.)

SAXONY, a kingdom of Germany, ranking among the constituent states of the empire, fifth in area, third in population and first in density of population, bounded on the S. by Bohemia, on the W. by Bavaria and the Thuringian states and on the W., N. and E. by Prussia. Its frontiers have a circuit of 760 m. and, with the exception of the two small exclaves of Ziegelheim in Saxe-Altenburg and Liebschwitz on the border of the principality of Reuss, it forms a compact whole of a triangular shape, its base extending from N.E. to S.W., and its apex pointing N.W. Its greatest length is 130 m.; its greatest breadth 93 m., and the total area is 5787 sq. m. Except in the south, towards Bohemia, where the Erzgebirge forms at once the limit of the kingdom and of the empire, the boundaries are entirely political.

Physical Features.—Saxony belongs almost entirely to the central mountain region of Germany, only the districts along the north border and around Leipzig descending into the great north-European plain. The average elevation of the country, however, is not great, and it is more properly described as hilly than as mountainous. The chief mountain range is the Erzgebirge, stretching for 90 m. along the south border, and reaching in the Fichtelbergs (3979 ft. and 3953 ft.) the highest elevation in the kingdom. The west and south-west half of Saxony is more or less occupied by the ramifications and subsidiary groups of this range, one of which is known from its position as the Central Saxon chain, and another lower group still farther north as the Oschatz group. The south-east angle of Saxony is occupied by the mountains of Upper Lusatia (highest summit 2600 ft.), which form the link between the Erzgebirge and Riesengebirge in the great Sudetic chain. North-west from this group, and along both banks of the Elbe, which divides it from the Erzgebirge, extends the picturesque mountain region known as the Saxon Switzerland. The action of water and ice upon the soft sandstone of which the hills here are chiefly composed has produced deep gorges and isolated fantastic peaks, which, however, though both beautiful and interesting, by no means recall the characteristics of Swiss scenery. The highest summit attains a height of 1830 ft.; but the more interesting peaks, as the Lilienstein, Konigstein and the Bastei, are lower. With the trifling exception of the south-east of Bautzen, which sends its waters by the Neisse to the Oder, Saxony lies wholly in the basin of the Elbe, which has a navigable course of 72 m. from south-east to north-west through the kingdom. Comparatively few of the numerous smaller streams of Saxony flow directly to the Elbe, and the larger tributaries only join it beyond the Saxon borders. The Mulde, formed of two branches, is the second river of Saxony; others are the Black Elster, the White Elster, the Pleisse and the Spree. There are no lakes of any size, but mineral springs are very abundant. The best known is at Bad Elster in the Vogtland.

Climate. The climate of Saxony is generally healthy. It is mildest in the valleys of the Elbe, Mulde and Pleisse and severest in the Erzgebirge, where the district near Johanngeorgenstadt is known as Saxon Siberia. The average temperature, like that of central Germany as a whole, varies from 48° to 50° Fahr.; in the Elbe valley the mean in summer is from 62° to 64° and in the winter about 30°, in the Erzgebirge the mean temperature in summer is from 55° to 57°, and in winter 23° to 24°. The Erzgebirge is also the rainiest district, 27½ to 33½ in. falling yearly; the amount decreases as one proceeds northward, and Leipzig, with an average annual rainfall of 17 in., enjoys the driest climate.

Population. In 1905 the population of Saxony was 4,508,601, or 7·4 % of the total population of the German empire, on 2·7 % of its area. Except the free towns, Saxony is the most densely peopled member of the empire, and its population is increasing at a more rapid rate than is the case in any of the larger German states. The growth of the population since 1815, when the kingdom received its present limits, has been as follows: (1815) 1,178,802; (1830) 1,402,066; (1840) 1,706,275; (1864) 2,344,094; (1875) 2,760,586; (1895) 3,787,688; (1900) 4,202,216. The preponderating industrial activity of the kingdom fosters the tendency of the population to concentrate in towns, and no German state, with the exception of the Hanseatic towns, has so large a proportion of urban population, this forming 52·97 % of the whole. The people of Saxony are chiefly of pure Teutonic stock; a proportion are Germanized Slavs, and to the south of Bautzen there is a large settlement of above 50,000 Wends, who retain their peculiar customs and language.

The following table shows the area and population of the whole kingdom and of each of the five chief governmental districts, or *Kreishauptmannschaften*, into which it is divided:—

Governmental District.	Area in Eng. sq. m.	Pop. 1900.	Pop. 1905	Density per sq. m., 1905.
Dresden . .	1074	1,216,489	1,284,397	707·2
Leipzig . .	1378	1,060,632	1,140,423	832
Bautzen . .	953	405,173	426,420	447·4
Chemnitz .	799	792,393	851,130	1065·2
Zwickau . .	983	727,529	800,231	814·1
Total	5787	4,202,216	4,508,601	779·1

The chief towns are Dresden (pop. 1905, 514,283), Leipzig (502,570), Chemnitz (244,405), Plauen (105,182), Zwickau (68,225), Zittau (34,679), Meissen (32,175), Freiberg (30,869), Bautzen (29,372), Meerane (24,994), Glauchau (24,556), Reichenbach (24,911), Crimmitzschau (23,340), Werdau (19,476), Pirna (19,200).

Communications.—The roads in Saxony are numerous and good. The first railway between Leipzig and Dresden, due entirely to private enterprise, was opened in part in April 1837, and finished in 1840, with a length of 71 m. In 1850 there were 250; in 1870, 685; in 1880, 1184; and in 1905, 1920 m., together with 25 m of private line, all worked by the state. There are no canals in the kingdom, and the only navigable river is the Elbe.

Agriculture.—Saxony is one of the most fertile parts of Germany, and is agriculturally among the most advanced nations of the world. The lowest lands are the most productive, and fertility diminishes as we ascend towards the south, until on the bleak crest of the Erzgebirge cultivation ceases altogether. Saxon agriculture, though dating its origin from the Wends, was long impeded by antiquated customs, while the land was subdivided into small parcels and subjected to vexatious rights. But in 1834 a law was passed providing for the union of the scattered lands belonging to each proprietor, and that may be considered the dawn of modern Saxon agriculture. The richest grain districts are near Meissen, Grimma, Bautzen, Döbeln and Pirna. The chief crop is rye, but oats are hardly second to it. Wheat and barley are grown in considerably less quantity. Very large quantities of potatoes are grown, especially in the Vogtland. Beet is chiefly grown as feeding stuff for cattle, and not for sugar. Flax is grown in the Erzgebirge and Lusatian mountains,

where the manufacture of linen was at one time a flourishing domestic industry. Saxony owes its unusual wealth in fruit partly to the care of the elector Augustus I., who is said never to have stirred abroad without fruit seeds for distribution among the peasants and farmers. Enormous quantities of cherries, plums and apples are annually borne by the trees round Leipzig, Dresden and Colditz. The cultivation of the vine in Saxony is respectable for its antiquity, though the yield is insignificant. Wine is said to have been grown here in the 11th century; the Saxon vineyards, chiefly on the banks of the Elbe near Meissen and Dresden, have of late years, owing to the ravages of the phylloxera, become almost extinct.

Live Stock.—The breeding of horses is carried on to a very limited extent in Saxony. Cattle rearing, which has been an industry since the advent of the Wends in the 6th century, is important on the extensive pastures of the Erzgebirge and in the Vogtland. In 1765 the regent Prince Xaver imported 300 merino sheep from Spain, and so improved the native breed by this new strain that Saxon sheep were eagerly imported by foreign nations to improve their flocks, and "Saxon electoral wool" became one of the best brands in the market. Sheep farming, however, has considerably declined within the last few decades. Swine furnish a very large proportion of the flesh diet of the people. Geese abound particularly round Leipzig and in Upper Lusatia, poultry about Bautzen. Bee-keeping flourishes on the heaths on the right bank of the Elbe.

Game and Fish.—Game is fairly abundant; hares and partridges are found in the plains to the north-west, capercailzie in the neighbourhood of Tharandt and Schwarzenberg, and deer in the forests near Dresden. The Elbe produces excellent pike, salmon and eels, its tributaries trout in considerable quantities, while the marshy ponds lying on the left bank furnish a good supply of carp, a fish held in great esteem by the inhabitants.

Forests.—The forests of Saxony are extensive and have long been well cared for both by government and by private proprietors. The famous school of forestry at Tharandt was founded in 1811. The Vogtland is the most densely wooded portion of the kingdom, and next comes the Erzgebirge. About 857,000 acres, or 85 % of the whole forest land, are planted with conifers; and about 143,000 acres, or 15 %, with deciduous trees, among which beeches and birches are the commonest. About 35 % of the total belongs to state.

Mining.—Silver was raised in the 12th century, and argentiferous lead is still the most valuable ore mined; tin, iron and cobalt rank next, and coal is one of the chief exports. Copper, zinc and bismuth are also worked. The country is divided into four mining districts: Freiberg, where silver and lead are the chief products; Altenberg, where tin is mainly raised; Schneeberg, yielding cobalt, nickel and ironstone; and Johanngeorgenstadt, with ironstone and silver mines. There were, in 1907, 143 mines, including coal, in operation, employing 31,455 hands. The total value of metal raised in Saxony in 1907 was £7,036,000; in 1870 it was £314,916. The coal is found principally in two fields—one near Zwickau, and the other in the governmental district of Dresden. Brown coal or lignite is found chiefly in the north and north-west, but not in sufficiently large quantities to be exported; the total value of the output in 1907 was nearly £3,500,000. Peat is especially abundant on the Erzgebirge Immense quantities of bricks are made all over the country. Excellent sandstone for building is found on the hills of the Elbe. Fine porcelain clay occurs near Meissen, and coarser varieties elsewhere. A few precious stones are found among the southern mountains.

Industries.—The central-European position of the kingdom has fostered its commerce; and its manufactures have been encouraged by the abundant water-power throughout the kingdom. Nearly one-half of the motive power used in Saxon factories is supplied by the streams, of which the Mulde, in this respect, is the chief. The early foundation of the Leipzig fairs, and the enlightened policy of the rulers of the country, have also done much to develop its commercial and industrial resources. Next to agriculture which supports about 20 % of the population, by far the most important industry is the textile. Saxony carries on 26 % of the whole textile industry in Germany, a share far in excess of its proportionate population. Prussia, which has more than nine times as many inhabitants, carries on 45 %, and no other state more than 8 %. The chief seats of the manufacture are Zwickau, Chemnitz, Glauchau, Meerane, Hohenstein, Kamenz, Pulsnitz and Bischofswerda. The centre of the cotton manufacture (especially of cotton hosiery) is Chemnitz; cotton-muslins are made throughout the Vogtland, ribbons at Pulsnitz and its neighbourhood. Woollen cloth and buckskin are woven at Kamenz, Bischofswerda and Grossenhain, all in the north-east, woollen and half-woollen underclothing at Chemnitz, Glauchau, Meerane and Reichenbach; while Bautzen and Limbach produce woollen stockings. Linen is manufactured chiefly in the mountains of Lusatia, where the looms are still to some extent found in the homes of the weavers. The coarser kinds only are now made, owing to the keen English competition in the finer varieties. Damask is produced at Gross-Schönau and Neu-Schönau. Lace-making, discovered or introduced by Barbara Uttmänn in the latter half of the 16th century, and now fostered by government schools, was long an important domestic industry among the villages of the Erzgebirge, and has attained to a great industry in Plauen. Straw-plaiting occupies 6000 hands on the mountain slopes between Gottleuba and Lockwitz. Waxcloth is manufactured at Leipzig, and artificial flowers at Leipzig and Dresden. Stoneware and earthenware are made at Chemnitz, Zwickau, Bautzen and Meissen, porcelain ("Dresden china") at Meissen, chemicals in and near Leipzig. Döbeln, Werdau and Lossnitz are the chief seats of the Saxon leather trade; cigars are very extensively made in the town and district of Leipzig, and hats and pianofortes at Leipzig, Dresden and Chemnitz. Paper is made chiefly in the west of the kingdom, but does not keep pace with the demand. Machinery of all kinds is produced, from the sewing-machines of Dresden to the steam-locomotives and marine-engines of Chemnitz. The last-named place, though the centre of the iron-manufacture of Saxony, has to import every pound of iron by railway. The leading branch is the machinery used in the industries of the country—mining, paper-making and weaving. The very large printing trade of Leipzig encourages the manufacture of printing-presses in that city. In 1902–1903 Saxony contained 601 active breweries and 572 distilleries. The smelting and refining of the metal ores is also an important industry.

The principal exports are wool, woollen, cotton, linen goods, machinery, china, pianofortes, cigarettes, flannels, stockings, curtains and lace, cloth from Reichenbach and Zittau, watches of superlative value from Glashütte and toys from the Vogtland.

Constitution.—Saxony is a constitutional monarchy and a member of the German empire, with four votes in the *Bundesrath* (federal council) and twenty-three in the *Reichstag* (imperial diet). The constitution rests on a law promulgated on the 4th of September 1831, and subsequently amended. The crown is hereditary in the Albertine line of the house of Wettin, with reversion to the Ernestine line, of which the duke of Saxe-Weimar is now the head. The king enjoys a civil list of 3,674,927 marks or about £185,000, while the appanages of the crown, including the payments to the other members of the royal house, amount to £29,544 more.

The legislature (Ständeversammlung) is bicameral the constitution of the co-ordinate chambers being finally settled by a law of 1868 amending the enactment of 1831. The first chamber consists of the adult princes of the blood, two representatives of the Lutheran and one of the Roman Catholic Church, a representative of Leipzig university, the proprietor (or a deputy) of the *Herrschaft* of Wildenfels, a proprietor of the mediatized domains, two of *Standesherrschaften*, one of those of four estates in fee, the superintendent at Leipzig, a deputy of the collegiate institution at Wurzen, 12 deputies elected by owners of nobiliar estates, ten landed proprietors and five other members nominated by the king and the burgomasters of eight towns. The second chamber consists of 43 members from the towns and 48 from the country, elected for six years. All male citizens twenty-five years old and upwards who pay 3 marks per annum in taxes have the suffrage; and all above thirty years of age who pay 30 marks in annual taxes are eligible as members of the lower house. With the exception of the hereditary and some of the ex-officio members of the first chamber, the members of the diet are entitled to an allowance for their daily expenses, as well as their travelling expenses. The executive consists of a responsible ministry (Gesammt Ministerium), with the six departments of justice, finance, home affairs, war, public worship and education, and foreign affairs. The minister of the royal household does not belong to the cabinet. The constitution also provides for the formation of a kind of privy council (Staatsrat), consisting of the cabinet ministers and other members appointed by the king.

For administrative purposes Saxony is divided into five Kreishauptmannschaften, or governmental departments, subdivided into twenty-seven Amtshauptmannschaften. The cities of Dresden, Leipzig, Chemnitz, Plauen and Zwickau, form departments by themselves. The supreme court of law for both civil and criminal cases is the Oberlandesgericht at Dresden, subordinate to which are seven other courts in the other principal towns. The German imperial code was adopted by Saxony in 1879. Leipzig is the seat of the supreme court of the German empire.

The Saxon army is modelled on that of Prussia. It forms the XII. and XIX. army corps in the imperial German army, with headquarters at Dresden and Leipzig respectively.

Church.—About 94 % of the inhabitants of Saxony are Protestants; about 12,500 are Jews, and about 4·7 %, including the royal family, are Roman Catholics. The Evangelical-Lutheran, or State, church has as its head the minister *de evangelicis* so long as the king is Roman Catholic; and its management is vested in the Evangelical Consistory at Dresden. Its representative assembly consisting of 35 clergymen and 42 laymen is called a synod (*Synode*). The Reformed Church has consistories in Dresden and Leipzig. The Roman Catholic Church has enjoyed the patronage of the reigning family since 1697, though it was only the peace of Posen in 1806 which placed it on a level with the Lutherans. By the peace of Prague, which transferred Upper Lusatia to Saxony in 1635, stipulations were made in favour of the Roman Catholics of that region, who are ecclesiastically in the jurisdiction of the cathedral chapter of St Peter at Bautzen, the dean of which has ex-officio a seat in the first chamber

of the diet. The other districts are managed by an apostolic vicar at Dresden, under the direction of the minister of public worship. Two nunneries in Lusatia are the only conventual establishments in Saxony, and no others may be founded. Among the smaller religious sects the Moravian Brethren, whose chief seat is at Herrnhut, are perhaps the most interesting. In 1868 civil rights were declared to be independent of religious confession.

Education.—Saxony claims to be one of the most highly educated countries in Europe, and its foundations of schools and universities were among the earliest in Germany. Of the four universities founded by the Saxon electors at Leipzig, Jena, Wittenberg, later transferred to Halle, and Erfurt, now extinct, only the first is included in the present kingdom of Saxony. The endowed schools (Fürstenschulen) at Meissen and Grimma have long enjoyed a high reputation. There are over 4000 schools; and education is compulsory. Saxony is particularly well-equipped with technical schools, the textile industries being especially fostered by numerous schools of weaving, embroidery and lace-making; but the mining academy at Freiberg and the school of forestry at Tharandt are probably the most widely known. The conservatory of music at Leipzig enjoys a world-wide reputation; not less the art collections at Dresden.

Finance.—The Saxon financial period embraces a space of two years. For 1908–1909 the "ordinary" budget showed an income of £17,352,833, balanced by the expenditure. The chief sources of income are taxes, state-railways and public forests and domains. The chief expenditure was on the interest and sinking fund of the national debt. The national debt, incurred almost wholly in making and buying railways and telegraphs, and carrying out other public works, amounted at the end of 1909 to £44,841,880.

See the annual *Jahrbuch fur Stat stik des Königreichs Sachsen* (Dresden); P. E. Richter, *Literatur des Landes und Volkskunde des Königreichs Sachsen* (Dresden, 1903); Zemmrich, *Landeskunde des Königreichs Sachsen* (Leipzig, 1906); and Pelz, *Geologie des Königreichs Sachsen* (Leipzig, 1904).

History.—The name of Saxony has been borne by two distinct blocks of territory. The first was the district in the north-west of Germany, inhabited originally by the Saxons, which became a duchy and attained its greatest size and prosperity under Henry the Lion in the 12th century. In 1180 it was broken up, and the name of Saxony disappeared from the greater part of it, remaining only with the districts around Lauenburg and Wittenberg. Five centuries later Lauenburg was incorporated with Hanover, and Wittenberg is the nucleus of modern Saxony, the name being thus transferred from the west to the east of Germany. In 1423 Meissen and Thuringia were united with Saxe-Wittenberg under Frederick of Meissen, and gradually the name of Saxony spread over all the lands ruled by this prince and his descendants.

The earlier Saxony was the district lying between the Elbe and the Saale on the east, the Eider on the north and the Rhine on the west, with a fluctuating boundary on the south. During the 8th century it was inhabited by the Saxons (*q.v.*), and about this time was first called *Saxonia*, and afterwards Saxony. For many years the Saxons had been troublesome to the Franks, their neighbours to the east and south, and the intermittent campaigns undertaken against them by Charles Martel and Pippin the Short had scarcely impaired their independence. This struggle was renewed by Charlemagne in 772, and a warfare of thirty-two years' duration was marked by the readiness of the Saxons to take advantage of the difficulties of Charles in other parts of Europe, and by the missionary character which the Frankish king imparted to the war. The subjugation of the Saxons, who were divided into four main branches, was rendered more difficult by the absence of any common ruler, and of a central power answerable for the allegiance of the separate tribes. Einhard, the friend and biographer of Charles, sums up this struggle as follows:—"It is hard to say how often the Saxons, conquered and humbled, submitted to the king, promised to fulfil his commands, delivered over the required hostages without delay, received the officials sent to them, and were often rendered so tame and pliable that they gave up the service of their heathen gods and agreed to accept Christianity. But just as quickly as they showed themselves ready to do this, did they also always break their promises, so that one could not really say which of these two courses may truly have been easier to them, and from the beginning of the war scarcely a year passed without bringing such change of mind."

In 772 the war was decided upon, and Charles marched from Worms into the land of the Engrians or Angrians. The frontier fortress of Eresburg which stood on the site of the modern Marburg was taken, the *Irminsul* was destroyed, and the treasures of gold and silver were seized. The *Irminsul* was a wooden pillar erected to represent the world-sustaining ash Yggdrasil, and was the centre of the worship of the whole Saxon people. Having received hostages Charles left the country; but in 774 while he was in Italy the Saxons retook Eresburg, and crossing the frontier attacked the church of St Boniface at Fritzlar and ravaged the land of the Franks. The king retaliated by sending troops of cavalry to devastate Saxony, and declared at Quierzy he would exterminate his foes unless they accepted Christianity. In pursuance of this resolve he marched against them early in 775, captured the fortress of Sigiburg on the Ruhr, regained and rebuilt Eresburg and left Frankish garrisons in the land. The Engrians, together with the Eastphalians and the Westphalians who dwelt on either side of them, made a formal submission and many of them were baptized; but about the same time some Frankish troops met with a serious reverse at Lübbecke near Minden. Charles thereupon again took the field, and after ravaging Saxony returned home under the impression that the war was over. In 776, however, the Saxons were again in arms and retook Eresburg; but they failed to capture Sigiburg, and showed themselves penitent when the king appeared among them. Eresburg was regarrisoned, a new fortress named Carlsburg was erected on the banks of the Lippe, and terms of peace were arranged. In 777 Charles held an assembly at Paderborn, henceforth his headquarters during this war, which was attended by most of the Saxon chiefs. Hostages were given, oaths of fealty renewed, while many accepted Christianity, and the rudiments of an ecclesiastical system were established. The peace did not last long. A certain Widukind, or Wittekind, who had doubtless taken part in the earlier struggle, returned from exile in Denmark, and under his leadership the Saxon revolt broke out afresh in 778. The valley of the Rhine from Coblenz to Deutz was ravaged, and the advance of winter prevented Charles from sending more than a flying column to drive back the Saxons. But in 779 he renewed the attack, and after an important Frankish victory at Bocholt the Westphalians again did homage. The civil and ecclesiastical organization of the country was improved, and in 782 the king held an assembly at the source of the Lippe and took further measures to extend his influence. The land was divided into counties, which, however, were given to Saxon chiefs to administer, and it was probably on this occasion that the *capitulatio de partibus Saxoniae* was issued. This capitulary ordered the celebration of baptism and other Christian rites and ceremonies in addition to the payment of tithes, and forbade the observance of pagan customs on pain of death.

This attack on the religion and property of the Saxons aroused intense indignation, and provoked the rising of 782 which marks the beginning of the second period of the war. The work of devastation was renewed, the priests were driven out, and on the Süntel mountains near Minden, the Frankish forces were almost annihilated. Charles collected a large army, and by his orders 4500 men who had surrendered were beheaded at Verden. This act made the Saxons more furious than ever, but in 783 Charles inflicted two defeats upon them at Detmold and on the river Hase, and ravaged their territory from the Weser to the Elbe. This work was continued during the following year by the king and his eldest son Charles, and the Christmas of 784 was spent by the royal family at Eresburg, whence Charles directed various plundering expeditions. The work of conversion was renewed, and an important event took place in 785 when Widukind, assured of his personal safety, surrendered and was baptized at Attigny together with many of his companions. Saxony at last seemed to be subdued, and Saxon warriors took service in the Frankish armies. But in 792 some Frankish troops were killed at the mouth of the Elbe, and a similar disaster in the following year was the signal for a renewal of the ravages with great violence, when churches were destroyed, priests killed, or driven away, and many of the people returned to

heathenism. These events compelled Charles to leave the Avar war and return to Saxony in 794; and until 799 each year had its Saxon campaign. At the same time in 794, as a fresh experiment in policy, every third man was transported; while the king was assisted in his work of conquest by the Abotrites who inhabited a district east of the Elbe. The resistance Charles met with was not serious, and these expeditions took the form of plundering raids. Oaths and hostages were exacted; and many Saxon youths were educated in the land of the Franks as Christians, and sent back into Saxony to spread Christianity and Frankish influence. The southern part of the country was now fairly tranquil, and the later campaigns were directed mainly against the Nordalbingians, the branch of the Saxons living north of the Elbe, who suffered a severe reverse near Bornhöved in 798. Further transportations were carried out, and in 797 Charles issued another *capitulary* which mitigated the severe provisions of the *capitulary* of 782; and about 802 the Saxon law was committed to writing. The Nordalbingians were still restless, and it is recorded that their land was devastated in 802. Two years later a final campaign was undertaken, when a large number of these people were transported into the country of the Franks and their land was given to the Abotrites.

The conversion of the Saxons to Christianity, which during this time had been steadily progressing, was continued in the reign of the emperor Louis I., the Pious, who, however, took very little interest in this part of his empire. Bishoprics were founded at Bremen, Münster, Verden, Minden, Paderborn, Osnabrück, Hildesheim and Hamburg, and one founded at Seligenstadt was removed to Halberstadt. Some of these bishopries were under the authority of the archepiscopal see of Cologne, others under that of Mainz, and this arrangement was unaltered when in 834 Hamburg was raised to an archbishopric. In 847 the bishopric of Bremen was united with Hamburg, but the authority of this archbishopric extended mainly over the districts north and east of the Elbe. The abbey of Corvey, where rested the bones of St Vitus, the patron saint of Saxony, soon became a centre of learning for the country, and the Saxons undertook with the eagerness of converts the conversion of their heathen neighbours. After a period of tranquillity a reaction set in against Frankish influences, and in 840 the freemen and *liti* separated themselves from the nobles, formed a league, or *stellinga*, and obtained a promise from the emperor Lothair I. that he would restore their ancient constitution. This rising, which was probably caused by the exaction of tithes and the oppression of Frankish officials, aimed also at restoring the heathen religion, and was put down in 842 by king Louis the German, who claimed authority over this part of the Carolingian empire.

The influences of civilization and the settlement of Frankish colonists in various parts of Saxony facilitated its incorporation with the Carolingian empire, with which its history is for some time identified. By the treaty of Verdun in 843 Saxony fell to Louis the German, but he paid little attention to the northern part of his kingdom which was harassed by the Normans and the Slavs. About 850, however, he appointed a margrave to defend the *Limes Saxoniae*, a narrow strip of land on the eastern frontier, and this office was given to one Liudolf who had large estates in Saxony, and who was probably descended from an Engrian noble named Bruno. Liudolf, who is sometimes called "duke of the East Saxons," carried on a vigorous warfare against the Slavs and extended his influence over other parts of Saxony. He died in 866, and was succeeded by his son Bruno, who was killed fighting the Normans in 880. Liudolf's second son, Otto the Illustrious, was recognized as duke of Saxony by King Conrad I., and on the death of Burkhard, margrave of Thuringia in 908, obtained authority over that country also. He made himself practically independent in Saxony, played an important part in the affairs of the Empire, and is said to have refused the German throne in 911. He died in 912 and was succeeded by his son Henry I., the Fowler. Between this prince and Conrad I., who wished to curb the increasing power of the Saxon duke, a quarrel took place; but Henry not only retained his hold over Saxony and Thuringia, but on Conrad's death in 919 was elected German king. He extended the Saxon frontier almost to the Oder, improved the Saxon forces by training and equipment, established new marks, and erected forts on the frontiers for which he provided regular garrisons. Towns were walled, where it was decreed markets and assemblies should be held, churches and monasteries were founded, civilization was extended and learning encouraged. Henry's son, Otto the Great, was crowned emperor in 962, and his descendants held this dignity until the death of the emperor Otto III. in 1002. Otto retained Saxony in his own hands for a time, though in 938 he had some difficulty in suppressing a revolt led by his half-brother Thankmar. The Slavs were driven back, the domestic policy of Henry the Fowler was continued, the Saxon court became a centre of learning visited by Italian scholars, and in 968 an archbishopric was founded at Magdeburg for the lands east of the Elbe. In 960 Otto gave to a trusted relative Hermann, afterwards called Billung, certain duties and privileges on the eastern frontier, and from time to time appointed him as his representative in Saxony. Hermann gradually extended his authority, and when he died in 973 was followed by his son Bernard I., who was undoubtedly duke of Saxony in 986. When Henry II. was chosen German king in 1002 he met the Saxons at Merseburg, and on promising to observe their laws Bernard gave him the sacred lance, thus entrusting Saxony to his care. Bernard was succeeded by his son Bernard II., who took up a hostile attitude towards the German kings, Conrad II. and Henry III. His son and successor Ordulf, who became duke in 1059, carried on a long and obstinate struggle with Adalbert, archbishop of Bremen, who was compelled to cede one-third of his possessions to Ordulf's son Magnus in 1066. The emperor Henry III. sought to win the allegiance of the Saxons by residing among them, and built a castle at Goslar and the Harzburg; and the emperor Henry IV. also spent much time in Saxony.

In 1070 Otto of Nordheim, duke of Bavaria, who held large estates in this country, being accused of a plot to murder Henry, was placed under the ban, his possessions were declared forfeited and his estates plundered. Otto, in alliance with Magnus, won considerable support in Saxony, but after some fighting both submitted and were imprisoned; and Magnus was still in confinement when on his father's death in 1072 he became titular duke of Saxony. As he refused to give up his duchy be was kept in prison, while Henry confiscated the estates of powerful nobles, demanded the restoration of ducal lands by the bishops, and garrisoned newly-erected forts with Swabians, who provisioned themselves from the surrounding country. These proceedings aroused suspicion and discontent, which were increased when the emperor assembled an army, ostensibly to attack the Slavs. The Saxon nobles refused to join the host until their grievances were redressed, and in 1073 a league was formed at Wormesleben. When the insurgents under Duke Otto were joined by the Thuringians, Henry was compelled in 1074 to release Magnus and to make a number of concessions as the price of the peace of Gerstungen; which, however, was short-lived, as the peasants employed in pursuance of its terms in demolishing the forts, desecrated the churches and violated the ducal tombs. Henry, having obtained help from the princes of the Rhineland, attacked and defeated the Saxons at Hohenburg near Langensalza, rebuilt the forts, and pardoned Otto, whom he appointed administrator of the country. The Saxons, however, were not quite subdued; risings took place from time to time, and the opponents of Henry IV. found considerable support in Saxony. During the century which followed the death of Hermann Billung, there had been constant warfare with the Slavs, but although the emperors had often taken the field, the Saxons had been driven back to the Elbe, which was at this time their eastern boundary. In 1106 Magnus died, and the German king Henry V. bestowed the duchy upon Lothair, count of Supplinburg, whose wife Richenza inherited the Saxon estates of her grandfather Otto of Nordheim, on the death of her brother Otto in 1116. Lothair quickly made himself independent, defeated Henry at Welfesholz in 1115, and prosecuted the war against the Slavs with vigour. In 1125 he became German

king, and in 1137 gave Saxony to Henry the Proud, duke of Bavaria, who had married his daughter Gertrude, and whose mother Wulfhild was a daughter of Magnus Billung. The succeeding German king Conrad III. refused to allow Henry to hold two duchies, and gave Saxony to Albert the Bear, margrave of Brandenburg, who like his rival was a grandson of Magnus Billung. Albert's attempts to obtain possession failed, and after Henry's death in 1139 he formally renounced Saxony in favour of Henry's son, Henry the Lion (*q.v.*). The new duke improved its internal condition, increased its political importance, and pushed its eastern frontier towards the Oder. In 1180, however, he was placed under the imperial ban and Saxony was broken up. Henry retained Brunswick and Luneburg; Westphalia, as the western portion of the duchy was called, was given to Philip, archbishop of Cologne, and a large part of the land was divided among nine bishops and a number of counts who thus became immediate vassals of the emperor. The title duke of Saxony was given to Bernard, the sixth son of Albert the Bear, together with the small territories of Lauenburg and Wittenberg, which were thus the only portions of the former duchy which now bore the name of Saxony. Bernard, whose paternal grandmother, Eilicke, was a daughter of Magnus Billung, took a prominent part in German affairs, but lost Lauenburg which was seized by Waldemar II., king of Denmark. Dying in 1212, Bernard was succeeded in Wittenberg by his younger son Albert I., who recovered Lauenburg after the defeat of Waldemar at Bornhöved in 1227. Albert died in 1260, and soon after his death his two sons divided his territories, when the elder son John took Lauenburg which was sometimes called lower Saxony, and the younger, Albert II., took Wittenberg or upper Saxony. Both retained the ducal title and claimed the electoral privilege, a claim which the Lauenburg line refused to abandon when it was awarded to the Wittenberg line by the Golden Bull of 1356.

Saxe-Lauenburg was governed by John until his death in 1285, when it passed to his three sons John II., Albert III. and Eric I. As Albert had no sons the duchy was soon divided into two parts, until on the death of duke Eric III., a grandson of John II., in 1401, it was reunited by Eric IV., a grandson of Eric I. When Eric IV. died in 1412 he was succeeded by his son Eric V., who made strenuous but vain efforts to obtain the electoral duchy of Saxe-Wittenberg, which fell vacant on the death of the elector Albert III. in 1422. Eric died in 1436 and was followed by his brother Bernard IV., whose claim to exercise the electoral vote was quashed by the electors in 1438; and who was succeeded by his son John IV. in 1463. The next duke, John's son Magnus I., spent much time in struggles with the archbishop of Bremen and the bishop of Ratzeburg; he also assisted the progress of the Reformation in Lauenburg. Magnus, who was formally invested with the duchy by the emperor Charles V. in 1530, was the first duke to abandon the claim to the electoral privilege. After his death in 1543 his son Francis I. reigned for the succeeding twenty-eight years, and his grandsons, Magnus II. and Francis II., until 1619. Francis, who did something to improve the administration of his duchy, was succeeded in turn by his two sons and his two grandsons; but on the death of Julius Francis, the younger of his grandsons, in 1689 the family became extinct.

Several claimants to Saxe-Lauenburg thereupon appeared, the most prominent of whom were George William, duke of Lüneburg-Celle, and John George III., elector of Saxony. George William based his claim upon a treaty of mutual succession made in 1369 between his ancestor Magnus II., duke of Brunswick, and the reigning dukes of Saxe-Lauenburg. John George had a double claim. Duke Magnus I. had promised that in case of the extinction of his family Lauenburg should pass to the family of Wettin, an arrangement which had been confirmed by the emperor Maximilian I. in 1507. Secondly, John George himself had concluded a similar treaty with Julius Francis in 1671. In 1689 the elector received the homage of the people of Lauenburg. George William, however, took Ratzeburg, and held it against the troops of a third claimant, Christian V., king of Denmark; and in 1702 he bought off the claim of John George, his successor being invested with the duchy in 1728. Since that date its history has been identified with that of Hanover (*q.v.*).

In Saxe-Wittenberg Albert II. was succeeded in 1298 by his son Rudolph I., who in 1314 gave his vote to Frederick, duke of Austria, in the disputed election for the German throne between that prince and Louis of Bavaria, afterwards the emperor Louis IV.; and when the latter ignored his claims on the margraviate of Brandenburg Rudolph shared in the attempt to depose him, and to elect Charles of Luxemburg, afterwards the emperor Charles IV., as German king. Rudolph was followed in 1356 by his son Rudolph II., who had fought at the battle of Crécy; and who in turn was succeeded in 1370 by his half-brother Wenceslaus. This prince succeeded after some fighting in temporarily obtaining the duchy of Lüneburg for his house; he took part in the election of Wenceslaus as German king in 1376; and was followed in 1388 by his eldest son Rudolph III. Lavish expenditure during the progress of the council of Constance reduced Rudolph to poverty, and on the death in 1422 of his brother Albert III., who succeeded him in 1419, this branch of the Ascanian family became extinct.

A new era in the history of Saxony dates from 1423, the year when the emperor Sigismund bestowed the vacant electoral duchy of Saxe-Wittenberg upon Frederick, margrave of Meissen. Frederick was a member of the family of Wettin, which since his day has played a prominent part in the history of Europe, and he owed his new dignity to the money and other assistance which he had given to the emperor during the Hussite war. The new and more honourable title of elector of Saxony now superseded his other titles, and the name Saxony gradually spread over his other possessions, which included Meissen and Thuringia as well as Saxe-Wittenberg, and thus the earlier history of the electorate and kingdom of Saxony is the early history of the mark of Meissen, the name of which now lingers only in a solitary town on the Elbe.

Frederick's new position as elector, combined with his personal qualities to make him one of the most powerful princes in Germany, and had the principle of primogeniture been established in his country, Saxony and not Prussia might have been the leading power to-day in the German empire. He died in 1428, just before his lands were ravaged by the Hussites in 1429 and 1430. The division of his territory between his two sons, the elector Frederick II. and William, occasioned a destructive internecine war, a kind of strife which had many precedents in the earlier history of Meissen and Thuringia. It was in 1455 during this war that the knight Kunz von Kaufungen carried into execution his daring plan of stealing the two sons of the elector Frederick, Ernest and Albert, but he was only momentarily successful, the princes soon escaping from his hands. These two sons succeeded to their father's possessions in 1464, and for twenty years ruled together peaceably. The land prospered rapidly during this respite from the horrors of war. Encouraged by an improved coinage, trade made great advances, and other benefits also accrued from the discovery of silver on the Schneeberg. Several of the important ecclesiastical principalities of North Germany were about this time held by members of the Saxon ruling house, and the external influence of the electorate corresponded to its internal prosperity. But matters were not allowed to continue thus. The childless death of their uncle William in 1482 brought Thuringia to the two princes, and Albert insisted on a division of their common possessions. The important partition of Leipzig accordingly took place in 1485, and resulted in the foundation of the two main lines of the Saxon house. The lands were never again united. Ernest, the elder brother obtained Saxe-Wittenberg with the electoral dignity, Thuringia and the Saxon Vogtland; while Albert received Meissen, Osterland being divided between them. Something was still held in common, and the division was probably made intricate to render war difficult and dangerous.

The elector Ernest was succeeded in 1486 by his son, Frederick the Wise, one of the most illustrious princes in German history.

Under him Saxony was perhaps the most influential state in the Empire, and became the cradle of the Reformation. He died in 1525 while the Peasants' War was desolating his land, and was succeeded by his brother John, who was an enthusiastic supporter of the reformed faith and who shared with Philip, landgrave of Hesse, the leadership of the league of Schmalkalden. John's son and successor, John Frederick the Magnanimous, who became elector in 1532, might with equal propriety have been surnamed the Unfortunate. He took part in the war of the league of Schmalkalden, but in 1547 he was captured at Mühlberg by the emperor Charles V. and was forced to sign the capitulation of Wittenberg. This deed transferred the electoral title and a large part of the electoral lands from the Ernestine to the Albertine branch of the house, whose astute representative, Maurice, had taken the imperial side during the war. Only a few scattered territories were reserved for John Frederick's sons, although these were increased by the treaty of Naumburg in 1554, and on them were founded the Ernestine duchies of Saxe-Gotha, Saxe-Weimar, Saxe-Coburg, Saxe-Meiningen and Saxe-Altenburg. For the second time in the history of the Saxon electorate the younger line secured the higher dignity, for the Wittenberg line was junior to the Lauenburg line. The Albertine line is now the royal line of Saxony.

Maurice, who became elector of Saxony in consequence of the capitulation of Wittenberg, was a grandson of Albert, the founder of his line. His predecessors in ruling Albertine Saxony had been his father, Henry, who only reigned for two years, and his uncle George. The latter, a zealous Roman Catholic, had vainly tried to stem the tide of the Reformation in his dominions; Henry, on the other hand, was an equally devoted Protestant. Maurice, who succeeded his father in 1541, was also a Protestant, but he did not allow his religious faith to blind him to his political interests. His ruling motive was ambition to increase both his own power and the importance of his country. He refused to join the other Protestant princes in the league of Schmalkalden, but made a secret treaty with Charles V. Then suddenly invading the Ernestine lands while the elector John Frederick was campaigning against the imperialists on the Danube, he forced that prince to return hastily to Saxony, and thus weakened the forces opposed to the emperor. Although compelled to retreat, his fidelity to Charles V. was rewarded, as we have already seen, by the capitulation of Wittenberg. All the lands torn from John Frederick were not, however, assigned to Maurice; he was forced to acknowledge the superiority of Bohemia over the Vogtland and the Silesian duchy of Sagan. Moreover, Roman Catholic prelates were reinstated in the bishoprics of Meissen, Merseburg and Naumburg-Zeitz. Recognizing now as a Protestant prince that the best alliance for securing his new possessions was not with the emperor, but with the other Protestant princes, Maurice began to withdraw from the former and to conciliate the latter. In 1552, suddenly marching against Charles at Innsbruck, he drove him to flight and then extorted from him the religious peace of Passau. Thus at the close of his life he came to be regarded as the champion of German national and religious freedom.

Amid the distractions of outward affairs, Maurice had not neglected the internal interests of Saxony. To its educational advantages, already conspicuous, he added the three *Fürstenschulen* at Pforta, Grimma and Meissen, and for administrative purposes, especially for the collection of taxes, he divided the country into the four circles of the Electorate, Thuringia, Meissen and Leipzig. During his reign coal-mining began in Saxony. In another direction over two hundred religious houses were suppressed, the funds being partly applied to educational purposes. The country had four universities, those of Leipzig, Wittenberg, Jena and Erfurt; books began to increase rapidly, and, by virtue of Luther's translation of the Bible, the Saxon dialect became the ruling dialect of Germany.

Augustus I., brother and successor of Maurice, was one of the best domestic rulers that Saxony ever had. He increased the area of the country by the "circles" of Neustädt and the Vogtland, and by parts of Henneberg and the silver-yielding Mansfeld, and he devoted his long reign to the development of its resources. He visited all parts of the country himself, and personally encouraged agriculture; he introduced a more economical mode of mining and smelting silver; he favoured the importation of finer breeds of sheep and cattle; and he brought foreign weavers from abroad to teach the Saxons. Under him lace-making began on the Erzgebirge, and cloth-making flourished at Zwickau. With all his virtues, however, Augustus was an intolerant Lutheran, and used very severe means to exterminate the Calvinists; in his electorate he is said to have expelled 111 Calvinist preachers in a single month. Under his son Christian I., who succeeded in 1586, the chief power was wielded by the chancellor Nikolas Crell (*q.v.*), who strongly favoured Calvinism; but, when Christian II. came to the throne in 1591, Crell was sacrificed to the Lutheran nobles. The duke of Saxe-Weimar was made regent, and continued the persecution of crypto-Calvinism. Christian II. was succeeded in 1611 by his brother John George I., under whom the country was devastated by the Thirty Years' War. John George was an amiable but weak prince, totally unfitted to direct the fortunes of a nation in time of danger. He refused the proffered crown of Bohemia, and, when the Bohemian Protestants elected a Calvinist prince, he assisted the emperor against them with men and money. The edict of restitution, however, in 1629, opened his eyes to the emperor's projects, and he joined Gustavus Adolphus. Saxony now became the theatre of war. The first battle on Saxon soil was fought in 1631 at Breitenfeld, where the bravery of the Swedes made up for the flight of the Saxons. Wallenstein entered Saxony in 1632, and his lieutenants plundered, burned and murdered through the length and breadth of the land. After the death of Gustavus Adolphus at the battle of Lützen, not far from Leipzig, in 1632, the elector, who was at heart an imperialist, detached himself from the Swedish alliance, and in 1635 concluded the peace of Prague with the emperor. By this peace he was confirmed in the possession of Upper and Lower Lusatia, a district of 180 sq. m. and half a million inhabitants, which had already been pledged to him as a reward for his services against the Bohemians.

Saxony had now to suffer from the Swedes a repetition of the devastations of Wallenstein. No other country in Germany was so scourged by this terrible war. Immense tracts were rendered desolate, and whole villages vanished from the map; in eight years the population sank from three to one and a half millions. When the war was ended by the peace of Westphalia in 1648, Saxony found that its influence had begun to decline in Germany. Its alliance with the Catholic party deprived it of its place at the head of the Protestant German states, which was now taken by Brandenburg. John George's will made the decline of the electorate even more inevitable by detaching from it the three duchies of Saxe-Weissenfels, Saxe-Merseburg and Saxe-Zeitz as appanages for his younger sons. By 1746, however, these lines were all extinct, and their possessions had returned to the main line. Saxe-Neustädt was a short-lived branch from Saxe-Zeitz, extinct in 1714. The next three electors, who each bore the name of John George, had uneventful reigns. The first made some efforts to heal the wounds of his country; the second wasted the lives of his people in foreign wars against the Turks; and the third was the last Protestant elector of Saxony. John George IV. was succeeded in 1694 by his brother Frederick Augustus I., or Augustus the Strong. This prince was elected king of Poland as Augustus II. in 1697, but any weight which the royal title might have given him in the Empire was more than counterbalanced by the fact that he became a Roman Catholic in order to qualify for the new dignity. The connexion with Poland was disastrous for Saxony. In order to defray the expenses of his wars with Charles XII. Augustus pawned and sold large districts of Saxon territory, while he drained the electorate of both men and money. For a year before the peace of Altranstädt in 1706, when Augustus gave up the crown of Poland, Saxony was occupied by a Swedish army, which had to be supported at an immense expense.

The wars and extravagance of the elector-king, who regained the Polish crown in 1709, are said to have cost Saxony a hundred million thalers. From this reign dates the privy council (*Geheimes Kabinet*), which lasted till 1830. The caste privileges of the estates (*Stände*) were increased by Augustus, a fact which tended to alienate them more from the people, and so to decrease their power. Johann Friedrich Böttger made his famous discovery in 1710, and the manufacture of porcelain was begun at Meissen, and in this reign the Moravian Brethren made their settlement at Herrnhut. Frederick Augustus II., who succeeded his father in the electorate in 1733, and was afterwards elected to the throne of Poland as Augustus III., was an indolent prince, wholly under the influence of Count Heinrich von Bruhl (*q.v.*). Under his ill-omened auspices Saxony sided with Prussia in the First Silesian War, and with Austria in the other two. It gained nothing in the first, lost much in the second, and in the third, the Seven Years' War (1756–1763), suffered renewed miseries. The country was deserted by its king and his minister, who retired to Poland. By the end of the war it had lost 90,000 men and a hundred million thalers; its coinage was debased and its trade ruined; and the whole country was in a state of frantic disorder. The elector died seven months after his return from Poland; Brühl died twenty-three days later. The connexion with Poland was now at an end. The elector's son and successor, Frederick Christian, survived his father only two months, dying also in 1763, leaving a son, Frederick Augustus III., a boy of thirteen. Prince Xaver, the elector's uncle, was appointed guardian, and he set himself to the work of healing the wounds of the country. The foundation of the famous school of mining at Freiberg, and the improvement of the Saxon breed of sheep by the importation of merino sheep from Spain, were due to his care.

Frederick assumed the government in 1768, and in his long and eventful reign, which saw the electorate elevated to the dignity of a kingdom, though deprived of more than half its area, he won the surname of the Just. As he was the first king of Saxony, he is usually styled Frederick Augustus I. The first ten years of his active reign passed in peace and quiet; agriculture, manufactures and industries were fostered, economical reforms instituted, and the heavy public debt of forty million thalers was steadily reduced. In 1770 torture was abolished. When the Bavarian succession fell open in 1777, Frederick Augustus joined Prussia in protesting against the absorption of Bavaria by Austria, and Saxon troops took part in the bloodless "potato-war." The elector commuted his claims in right of his mother, the Bavarian princess Maria Antonia, for six million florins, which he spent chiefly in redeeming Saxon territory that had been pawned to other German states. When Saxony joined the *Furstenbund* in 1785, it had an area of 15,185 sq. m. and a population of nearly 2,000,000, but its various parts had not yet been combined into a homogeneous whole, for the two Lusatias, Querfurt, Henneberg and the ecclesiastical foundations of Naumburg and Merseburg had each a separate diet and government, independent of the diet of the electorate proper. In 1791 Frederick declined the crown of Poland, although it was now offered as hereditary even in the female line. He remembered how unfortunate for Saxony the former Polish connexion had been, and he mistrusted the attitude of Russia towards the proffered kingdom. Next year saw the beginning of the great struggle between France and Germany. Frederick's first policy was one of selfish abstention, and from 1793 until 1796, when he concluded a definite treaty of neutrality with France, he limited his contribution to the war to the bare contingent due from him as a prince of the Empire. When war broke out in 1806 against Napoleon, 22,000 Saxon troops shared the defeat of the Prussians at Jena, but the elector immediately afterwards snatched at Napoleon's offer of neutrality, and abandoned his former ally. At the peace of Posen (11th December 1806) Frederick assumed the title of king of Saxony, and entered the Confederation of the Rhine as an independent sovereign, promising a contingent of 20,000 men to Napoleon.

No change followed in the internal affairs of the new kingdom, except that Roman Catholics were admitted to equal privileges with Protestants. Its foreign policy was dictated by the will of Napoleon, of whose irresistibility the king was too easily convinced. In 1807 his submission was rewarded with the duchy of Warsaw (to which Cracow and part of Galicia were added in 1809) and the district of Cottbus, though he had to surrender some of his former territory to the new kingdom of Westphalia. The king of Saxony's faith in Napoleon was shaken by the disasters of the Russian campaign, in which 21,000 Saxon troops had shared; when, however, the allies invaded Saxony in the spring of 1813, he refused to declare against Napoleon and fled to Prague, though he withdrew his contingent from the French army. Whatever misgivings he may have had were, however, removed by Napoleon's victory at Lützen (May 2, 1813), and the Saxon king and the Saxon army were once more at the disposal of the French. After the battle of Bautzen, Napoleon's headquarters were successively at Dresden and Leipzig. During the battle of Leipzig in October 1813, the popular Saxon feeling was displayed by the desertion of the Saxon troops to the side of the allies. Frederick was taken prisoner in Leipzig, and the government of his kingdom was assumed for a year by the Russians. Saxony was now regarded as a conquered country. Nothing but Austria's vehement desire to keep a powerful neighbour at a distance from her boundaries preserved it from being completely annexed by the Prussians, who had succeeded the Russians in the government. At the congress of Vienna the claim of Prussia to annex the whole kingdom was supported by Russia, and opposed by Austria, France and Great Britain, the question all but leading to a complete break-up of the alliance (see VIENNA, CONGRESS OF). As it was, the congress assigned the northern portion, consisting of 7800 sq. m., with 864,404 inhabitants, to Prussia, leaving 5790 sq. m., with a population of 1,182,744, to Frederick, who was permitted to retain his royal title. On the 8th of June 1815 King Frederick joined the new German Confederation.

From the partition in 1815 to the war of 1866 the history of Saxony is mainly a narrative of the slow growth of constitutionalism and popular liberty within its limits. Its influence on the general history of Europe ceased when the old Empire was dissolved. In the new German Empire it is too completely overshadowed by Prussia to have any objective importance by itself. Frederick lived twelve years after the division of his kingdom. The commercial and industrial interests of the country continued to be fostered, but only a few of the most unavoidable political reforms were granted. Religious equality was extended to the Reformed Church in 1818, and the separate diet of Upper Lusatia was abolished. Frederick Augustus was succeeded in 1827 by his brother Antony, to the great disappointment of the people, who had expected a more liberal era under Prince Frederick Augustus, the king's nephew. Antony announced his intention of following the lines laid down by his predecessor. He accorded at first only a few trifling reforms, which were far from removing the popular discontent, while he retained the unpopular minister, Count Detlew von Einsiedel (1773–1861), and continued the encouragement of the Roman Catholics. The old feudal arrangement of the diet, with its inconvenient divisions, was retained, and the privy council continued to be the depository of power. An active opposition began to make itself evident in the diet and in the press, and in 1830, under the influence of the July revolution in Paris, riots broke out in Leipzig and Dresden. Einsiedel was now dismissed, Prince Frederick Augustus, son of Maximilian, who resigned the succession, became co-regent, and a constitution was promised. After consultation with the diet the king promulgated, on the 4th of September 1831, a new constitution which is the basis of the present government. An offer from Metternich of Austrian arms to repress the discontent by force had been refused. The feudal estates were replaced by two chambers, largely elective, and the privy council by a responsible ministry of six departments. Bernhard von Lindenau was the head of the first responsible cabinet, and the first constitutional assembly sat from the 27th of January 1833 till the 30th of October 1834.

While Saxony's political liberty was thus enlarged, its commerce and credit were stimulated by its adhesion to the Prussian *Zollverein* and by the construction of railways. Antony had died in 1836, and Frederick Augustus II. became sole king. Growing interest in politics produced dissatisfaction with the compromise of 1831, and the Liberal opposition grew in numbers and influence. The burning questions were the publicity of legal proceedings and the freedom of the press; and on these the government sustained its first crushing defeat in the lower chamber in 1842. In 1843 Lindenau was forced by the action of the aristocratic party to resign, and was replaced by Julius Traugotte von Könneritz (1792–1866), a statesman of reactionary views. This increased the opposition of the Liberal middle classes to the government. Religious considerations arising out of the attitude of the government towards the "German Catholics," and a new constitution for the Protestant Church, began to mingle with purely political questions, and Prince John, as the supposed head of the Jesuit party, was insulted at a review of the communal guards at Leipzig in 1845. The military rashly interfered, and several innocent spectators were shot. The bitterness which this occurrence provoked was intensified by a political reaction which was initiated about the same time under Könneritz. Warned by the sympathy excited in Saxony by the revolutionary events at Paris in 1848, the king dismissed his reactionary ministry, and a Liberal cabinet took its place in March 1848. The disputed points were now conceded to the country. The privileges of the nobles were curtailed; the administration of justice was put on a better footing; the press was unshackled; publicity in legal proceedings was granted; trial by jury was introduced for some special cases; and the German Catholics were recognized. The feudal character of the first chamber was abolished, and its members made mainly elective from among the highest tax-payers, while an almost universal suffrage was introduced for the second chamber. The first demand of the overwhelmingly democratic diet returned under this reform bill was that the king should accept the German constitution elaborated by the Frankfort parliament. Frederick, alleging the danger of acting without the concurrence of Prussia, refused, and dissolved the diet. A public demonstration at Dresden in favour of the Frankfort constitution was prohibited as illegal on the 2nd of May 1849. This at once awoke the popular fury. The mob seized the town and barricaded the streets; Dresden was almost destitute of troops; and the king fled to the Königstein. The rebels then proceeded to appoint a provisional government, consisting of Tzschirner, Heubner and Todt, though the true leader of the insurrection was the Russian Bakunin. Meanwhile Prussian troops had arrived to aid the government, and after two days' fierce street fighting the rising was quelled. The bond with Prussia now became closer, and Frederick entered with Prussia and Hanover into the temporary "alliance of the three kings." He was not sincere, however, in desiring to exclude Austria, and in 1850 accepted the invitation of that power to send deputies to the restored federal diet at Frankfort. The first chamber immediately protested against this step, and refused to consider the question of a pressing loan. The king retorted by dissolving the diet and summoning the old estates abolished in 1848. When a quorum, with some difficulty, was obtained, another period of retrograde legislation set in. The king himself was carried away with the reactionary current, and the people remained for the time indifferent. Beust became minister for both home and foreign affairs in 1852, and under his guidance the policy of Saxony became more and more hostile to Prussia and friendly to Austria.

The sudden death of the king, by a fall from his carriage in Tirol in 1854, left the throne to his brother John, a learned and accomplished prince, whose name is known in German literature as a translator and annotator of Dante. His brother's ministers kept their portfolios, but their views gradually became somewhat liberalized with the spirit of the times. Beust, however, still retained his federalistic and philo-Austrian views. When war was declared between Prussia and Austria in 1866, Saxony declined the former's offer of neutrality, and, when a Prussian force crossed the border, the Saxon army under the king and the crown prince joined the Austrians in Bohemia. The entire kingdom, with the solitary exception of the Konigstein, was occupied by the Prussians. On the conclusion of peace Saxony lost no territory, but had to pay a war indemnity of ten million thalers, and was compelled to enter the North German Confederation.

During the peace negotiations Beust had resigned and entered the Austrian service, and on the 15th of November the king in his speech from the throne announced his intention of being faithful to the new Confederation as he had been to the old. On the 7th of February 1867 a military convention was signed with Prussia which, while leaving to Saxony a certain control in matters of administration, placed the army under the king of Prussia; from the 1st of July it formed the XII. army corps of the North German Confederation under the command of Crown-Prince Albert. The postal and telegraph systems were also placed under the control of Prussia, and the representation of the Saxon crown at foreign courts was merged in that of the Confederation. A new electoral law of the same year reformed the Saxon diet by abolishing the old distinction between the various "estates" and lowering the qualification for the franchise; the result was a Liberal majority in the Lower House and a period of civil and ecclesiastical reform. John was succeeded in 1873 by his elder son Albert (1832–1902) who had added to his military reputation during the war of 1870. Under this prince the course of politics in Saxony presented little of general interest, except perhaps the spread of the doctrines of Social Democracy, which was especially remarkable in Saxony. The number of Social Democratic delegates in a diet of 80 members rose from 5 in 1885 to 14 in 1895. So alarming did the growth appear, that the other parties combined, and on the 28th of March 1896 a new electoral law was passed, introducing indirect election and a franchise based on a triple division of classes determined by the amount paid in direct taxation. This resulted in 1901 in the complete elimination of the Socialists from the diet. On the 7th of June 1902 King Albert died, and was succeeded by his brother as King George. The most conspicuous event of his reign was the flight in December 1902 of the crown-princess Louise with a M. Giron, who had been French tutor to her children, which resulted in a grave scandal and a divorce. More important, however, was the extraordinary situation created by the electoral law of 1896. This law had in effect secured the misrepresentation of the mass of the people in the diet, the representation of the country population at the expense of that of the towns, of the interests of agriculture as opposed to those of industry. A widespread agitation was the outcome, and the temper of the people, of what became known as the "Red Kingdom," was displayed in the elections of 1903 to the German imperial parliament, when, under the system of universal suffrage, of 23 members returned 22 were Social Democrats. This led to proposals for a slight modification in the franchise for the Saxon diet (1904), which were not accepted. In the elections of 1906, however, only 8 of the Social Democrats succeeded in retaining their seats. In 1907 the government announced their intention of modifying the electoral system in Saxony by the adding of representation for certain professions to that of the three classes of the electorate. This was, however, far from satisfying the parties of the extreme Left, and the strength of Social Democracy in Saxony was even more strikingly displayed in 1909 when, in spite of plural voting, under a complicated franchise, 25 Socialist members were returned to the Saxon diet.

King George died on the 15th of October 1904 and was succeeded by his son as King Frederick Augustus III.

The Saxon Duchies.—The political history of the parts of Saxony left by the capitulation of Wittenberg to the Ernestine line, which occupy the region now generally styled Thuringia (Thüringen), is mainly a recital of partitions, reunions, redivisions and fresh combinations of territory among the various sons of the successive dukes. The principle of primogeniture was not introduced until the end of the 17th century, so that the Protestant Saxon dynasty, instead of

building up a single compact kingdom for itself, has split into four petty duchies, of no political influence whatever. In 1547 the ex-elector John Frederick the Magnanimous was allowed to retain Weimar, Jena, Eisenach, Gotha, Henneberg and Saalfeld. Altenburg and a few other districts were added to the Ernestine possessions by the treaty of Naumburg in 1554, and other additions were made from other sources. John Frederick, who had retained and transmitted to his descendants the title of duke of Saxony, forbade his sons to divide their inheritance; but his wishes were respected only until after the death of his eldest son in 1565. The two survivors then founded separate jurisdictions at Weimar and Coburg, though arrangements were made to exchange territories every three years. In 1596 Saxe-Coburg gave off the branch Saxe-Eisenach; and in 1603 Saxe-Weimar gave off Saxe-Altenburg, the elder Weimar line ending and the younger beginning with the latter date. By 1638 Weimar had absorbed both Coburg and Eisenach; Altenburg remained till 1672. John, duke of Saxe-Weimar, who died in 1605, is regarded as the common ancestor of the present Ernestine lines. In 1640 his three surviving sons ruled the duchies of Weimar, Eisenach and Gotha. Eisenach fell in in 1644 and Altenburg in 1672, thus leaving the dukes of Saxe-Weimar and Saxe-Gotha to become the ancestors of the modern ruling houses. Saxe-Weimar was still repeatedly divided; in 1668 a Saxe-Marksuhl appears, and about 1672 a Saxe-Jena and a new Saxe-Eisenach. All these, however, were extinct by 1741, and their possessions returned to the main line, which had adopted the principle of primogeniture in 1719.

Saxe-Gotha was even more subdivided; and the climax was reached about 1680, when Gotha, Coburg, Meiningen, Romhild, Eisenberg, Hildburghausen and Saalfeld were each the capital of a duchy. By the beginning of 1825 only the first three of these and Hildburghausen remained, the lands of the others having been divided after much quarrelling. In that year the Gotha line expired, and a general redistribution of the lands of the "Nexus Gothanus," as this group of duchies was called, was arranged on the 12th of November 1826. The duke of Hildburghausen gave up his lands entirely for Altenburg and became duke of Saxe-Altenburg; the duke of Coburg exchanged Saalfeld for Gotha and became duke of Saxe-Coburg-Gotha; and the duke of Saxe-Meiningen received Hildburghausen, Saalfeld and some other territories, and added Hildburghausen to his title. The existing duchies are separately noticed.

The chief authority for the early history of Saxony is Widukind, whose *Res gestae Saxonicae* is printed, together with the works of other chroniclers, in the *Monumenta Germanica historica. Scriptores.* Modern authorities are C. W. Böttiger, *Geschichte des Kurstaates und Königreichs Sachsen*, new ed. by T. Flathe (1867–1873); Sturmhöfel, *Geschichte der sächsischen Lande und ihrer Herrscher* (Chemnitz, 1897–1898); and Tutzschmann, *Atlas zur Geschichte der sächsischen Länder* (Grimma, 1852). Collections which may be consulted are: *Codex diplomaticus Saxoniae regiae* (Leipzig, 1862–1879); the *Archiv für die sächsische Geschichte*, edited by R. von Weber (Leipzig, 1862–1879); and the *Bibliothek der sächsische Geschichte und Landeskunde*, edited by G. Buchholz (Leipzig, 1903). See also GERMANY: *Bibliography*, and the articles on the various dukes, electors and kings of Saxony.

SAXONY (Ger. *Provinz Sachsen*), one of the central provinces of the kingdom of Prussia, consists mainly of what was formerly the northern part of the kingdom of Saxony, which was ceded to Prussia in 1815, but also comprises part of the duchy of Magdeburg and other districts, the connexion of which with Prussia is of earlier date. The area of the province is 9751 sq. m. It is bounded W. by Hesse-Nassau, Hanover and Brunswick, N. by Hanover and Brandenburg, E. by Brandenburg and Silesia, and S. by the kingdom of Saxony and the small Thuringian states. It is, however, very irregular in form, entirely surrounding parts of Brunswick and the Thuringian states, and itself possessing several exclaves, while the northern portion is almost severed from the southern by the duchy of Anhalt.

The major part belongs to the great North-German plain, but the western and south-western districts include parts of the Harz, with the Brocken, its highest summit, and the Thuringian Forest. About nine-tenths of Prussian Saxony belongs to the basin of the Elbe, the chief feeders of which within the province are the Saale, with its tributary the Unstrut, and the Mulde, but a small district on the west drains into the Weser.

Saxony is on the whole the most fertile province of Prussia and excels all the others in its produce of wheat and beetroot for sugar, but the nature of its soil is very unequal. The best crop-producing districts lie near the base of the Harz Mountains, such as the "Magdeburger Börde" (between Magdeburg and the Saale) and the "Goldene Aue," and rich pasture lands occur in the river valleys, but the sandy plains of the Altmark, in the north part of the province, yield but a scanty return.

Of the total area 61 % is occupied by arable land, 8 % by meadows and pastures and 21 % by forests. Wheat and rye are exported in considerable quantities. The beetroot for sugar is grown chiefly in the district to the north of the Harz, as far as the Ohre, and on the banks of the Saale; and the amount of sugar produced is nearly as much as that of all the rest of Prussia together. Flax, hops and oil seeds are also cultivated, and large quantities of excellent fruit are grown at the foot of the Harz and in the valleys of the Unstrut and the Saale. The market-gardening of Erfurt and Quedlinburg is well known throughout Germany. The province is comparatively poor in timber, though there are some fine forests in the Harz and other hilly districts. Cattle-rearing is carried on with success in the river valleys, and more goats are met with here than in any other part of Prussia.

The principal underground wealth of Prussian Saxony consists of its salt and its brown coal, of both of which it possesses larger stores than any other part of the German empire. The chief rock-salt mines and brine springs are at Stassfurt, Schönebeck and Halle. The brown coal region extends from Oschersleben by Kalbe to Weissenfels; it is also found in the neighbourhood of Aschersleben, Bitterfeld and Wittenberg. Prussian Saxony also possesses three-fourths of the wealth of Germany in copper. The copper mines are found chiefly in the Harz district. The other mineral resources include silver (one-third of the total German yield), pit-coal, pyrites, alum, plaster of Paris, sulphur, alabaster and several varieties of good building-stone. Numerous mineral springs occur in the Harz.

In addition to the production of sugar the most important industries are the manufactures of cloth, leather, iron and steel wares, chiefly at Erfurt, Suhl and Sömmerda; spirits at Nordhausen, chemicals at Stassfurt and Schönebeck, and starch. Beer is also brewed extensively. Trade is facilitated by the great waterway of the Elbe as well as by a complete system of railways. The chief articles are wool, grain, sugar, salt, lignite and the principal manufactured products named above.

The population of the province of Saxony in 1905 was 2,979,221, an average of 305 persons to the square mile; they were almost equally divided between urban population and rural. There were 2,730,098 Protestants, 230,860 Roman Catholics and 8050 Jews. The bulk of the inhabitants are of unmixed German stock, but many of those in the east part have Wendish blood in their veins.

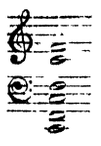
Prussian Saxony is divided into the three government districts of Magdeburg, Merseburg and Erfurt. The principal towns are Magdeburg, Halle, Erfurt, Halberstadt, Nordhausen, Mühlhausen, Aschersleben, Weissenfels and Zeitz. Magdeburg is the headquarters of an army corps. The provincial chambers meet at Merseburg. The province sends twenty members to the Reichstag and thirty-eight to the Prussian Abgeordnetenhaus (house of representatives). Magdeburg is the seat of an Evangelical consistory; the Roman Catholics belong to the diocese of Paderborn. The university of Halle holds high rank among German seats of learning.

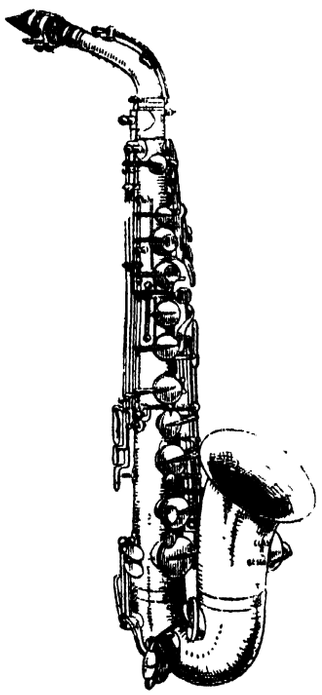
See the *Handbuch der Provinz Sachsen* (Magdeburg, 1900); and Jacobs, *Geschichte der in der preussischen Provinz Sachsen vereinigten Gebieten* (Gotha, 1884).

SAXOPHONE (Ger. *Saxophon*, Ital. *sassofone*), a modern hybrid musical instrument invented by Adolphe Sax, having the clarinet mouthpiece with single reed applied to a conical brass tube. In general appearance the saxophone resembles the bass clarinet, but the tube of the latter is cylindrical and of wood; both instruments are doubled up near the bell, which is shaped somewhat like the flower of the gloxinia. The mouthpiece in both is fixed to a serpentine tube at right angles to the main bore. On the saxophone, owing to its conical bore, the production of sound materially differs from that of the clarinet, and resembles that of the oboe. The reed mouthpiece in combination with a conical tube allows the performer to give the ordinary harmonic series unbroken, which means in practice that the octave or second member of the harmonic series is first overblown when the pressure of the breath and the tension of the lips on the reed are proportionally increased. The saxophone is therefore one of the class known as octave instruments. The fundamental note given out by the tube when the lateral holes are closed is that of an open organ pipe of the same length, whereas when, as in the clarinet family, the reed mouthpiece is combined with a cylindrical bore, the tube behaves as though it were closed at one end, and its notes are an octave lower in pitch. Hence the bass clarinet to give the same note as a bass saxophone would need to be only half as long. The closed pipe, moreover, can only overblow the uneven numbers of the harmonic series, and therefore first gives the 12th instead of the octave, which

necessitates an entirely different arrangement of holes and keys and a different scheme of fingering.

The bore of the saxophone is large, and there are from 18 to 20 keys covering holes of large diameter to produce the fundamental scale. The first 15 semitones are obtained by opening successive keys, the rest of the compass by means of octave keys enabling the performer to sound the harmonic octave of the fundamental scale. The compass of the various saxophones extends over 2 octaves and a fifth with chromatic intervals, being one octave less than the clarinet. The complete family consists of the accompanying members. The treble clef is used in notation, and all saxophones are transposing instruments, the music being written in a higher key, according to the difference in pitch between the fundamental note of the instrument and the standard C of the notation. The keys given above are of the orchestral saxophones; the instruments used in military bands are a tone lower. The quality of tone of this family of instruments is inferior to that of the clarinets and has affinities with that of the harmonium. According to Berlioz it has vague analogies with the timbre of 'cello, clarinet and cor anglais, with, however, a brazen tinge. To a clockmaker of Lisieux named Desfontenelles, who made a clarinet with a conical bore and an upturned bell in 1807, is due the combination of single reed mouthpiece with a conical tube. In 1840 Adolphe Sax, in trying to produce a clarinet that would overblow an octave like the flute and oboe, invented the saxophone, which at once leapt into popularity in France and Belgium, where the alto, tenor and baryton have superseded the bassoon in almost all the military bands. Many modern French composers, Meyerbeer, Massenet, Ambroise Thomas and others, have scored for it in their operas. Kastner introduced it into the orchestra in Paris in 1844 in *Le Dernier Roi de Juda*. The saxophone has been adopted in England at the Royal Military School of Music at Kneller Hall. (K. S.)




(Besson & Co., Ltd.)

SAY, JEAN BAPTISTE (1767–1832), French economist, was born at Lyons on the 5th of January 1767. His father, Jean Étienne Say, was of a Protestant family which had originally belonged to Nîmes, but had removed to Geneva for some time in consequence of the revocation of the edict of Nantes. Young Say was intended to follow a commercial career, and was sent, with his brother Horace, to England, and lived first at Croydon, in the house of a merchant, to whom he acted as clerk, and afterwards in London, where he was in the service of another employer. When, on the death of the latter, he returned to France, he was employed in the office of a life assurance company directed by E. Clavière, afterwards known in politics. Clavière called his attention to the *Wealth of Nations*, and the study of that work revealed to him his vocation. His first literary attempt was a pamphlet on the liberty of the press, published in 1789. He worked under Mirabeau on the *Courrier de Provence*. In 1792 he took part as a volunteer in the campaign of Champagne; in 1793 he assumed, in conformity with the Revolutionary fashion, the pre-name of *Atticus*, and became secretary to Clavière, then finance minister. He married in 1793 Mlle Deloche, daughter of a former *avocat au conseil*; the young pair were greatly straitened in means in consequence of the depreciation of the assignats. From 1794 to 1800 Say edited a periodical entitled *La Décade philosophique, littéraire, et politique*, in which he expounded the doctrines of Adam Smith. He had by this time established his reputation as a publicist, and, when the consular government was established in the year VIII (1799), he was selected as one of the hundred members of the tribunate, and resigned, in consequence, the direction of the *Décade*. He published in 1800 *Olbie, ou essai sur les moyens de réformer les mœurs d'une nation*.

In 1803 appeared his principal work, the *Traité d'économie politique*. In 1804, having shown his unwillingness to sacrifice his convictions for the purpose of furthering the designs of Napoleon, he was removed from the office of tribune, being at the same time nominated to a lucrative post, which, however, he thought it his duty to resign. He then turned to industrial pursuits, and, having made himself acquainted with the processes of the cotton manufacture, founded at Auchy, in the Pas de Calais, a spinning-mill which employed four or five hundred persons, principally women and children. He devoted his leisure to the improvement of his economic treatise, which had for some time been out of print, but which the censorship did not permit him to republish; and in 1814 he availed himself (to use his own words) of the sort of liberty arising from the entrance of the allied powers into France to bring out a second edition of the work, dedicated to the emperor Alexander, who had professed himself his pupil. In the same year the French government sent him to study the economic condition of Great Britain. The results of his observations during his journey through England and Scotland appeared in a tract *De l'Angleterre et des Anglais*; and his conversations with distinguished men in those countries contributed to greater correctness in the exposition of principles in the third edition of the *Traité*, which appeared in 1817. A chair of industrial economy was founded for him in 1819 at the Conservatoire des Arts et Métiers. In 1831 he was made professor of political economy at the Collège de France. He published in 1828–1830 his *Cours complet d'économie politique pratique*, which is in the main an expansion of the *Traité*, with practical applications. In his later years he became subject to attacks of nervous apoplexy. He lost his wife in January 1830; and from that time his health constantly declined. When the revolution of that year broke out, he was named a member of the council-general of the department of the Seine, but found it necessary to resign. He died at Paris on the 15th of November 1832.

Say was essentially a propagandist, not an originator. His great service to mankind lay in the fact that he disseminated throughout Europe by means of the French language, and popularized by his clear and easy style, the economic doctrines of Adam Smith. It is true that his French panegyrists (and he is not himself free from censure on this score) are unjust in their estimate of Smith as an expositor and extol too highly the merits of Say. On the side of the philosophy of science his observations are usually commonplace or superficial. Thus he accepts the shallow dictum of Condillac that *toute science se réduit à une langue bien faite*. He recognizes political economy and statistics as alike sciences, and represents the distinction between them as having never been made before him, though he quotes what Smith had said of political arithmetic. While deserving the praise of honesty, sincerity and independence, he is inferior to his predecessor in breadth of view on moral and political questions. In his general conception of human affairs there is a tendency to regard too exclusively the material side of things, which made him pre-eminently the economist of the French liberal *bourgeoisie*. He is inspired with the dislike and jealousy of governments so often felt and expressed by thinkers formed in the social atmosphere of the 18th century. Soldiers are for him not merely unproductive labourers, as Smith called them; they are rather "destructive labourers." Taxes are uncompensated payments; they may be described as of the nature of robbery.

Say is considered to have brought out the importance of capital as a factor in production more distinctly than the English economists, who unduly emphasized labour. The special doctrines most commonly mentioned as due to him are—(1) that of "immaterial products," and (2) what is called his "théorie des débouchés." Objecting, as Germain Garnier had, to Smith's distinction between productive and unproductive labour, he maintains that, production consisting in the creation or addition of a utility, all useful labour is productive. He is thus led to recognize immaterial products, whose characteristic quality is that they are consumed immediately and are incapable of accumulation; under this head are to be ranged the *services* rendered either by a person, a capital or a portion of

land, as, *e.g.*, the advantages derived from medical attendance, or from a hired house or from a beautiful view. But in working out the consequences of this view Say is not free from obscurities and inconsistencies; and by his comprehension of these immaterial products within the domain of economics he is confirmed in the error of regarding that science as filling the whole sphere which really belongs to sociology. His "théorie des débouchés" amounts to this, that, products being, in last analysis, purchased only with products, the extent of the markets (or outlets) for home products is proportional to the quantity of foreign productions; when the sale of any commodity is dull, it is because there is not a sufficient number, or rather value, of other commodities produced with which it could be purchased. Another proposition on which Say insists is that every value is consumed and is created only to be consumed. Values can therefore be accumulated only by being reproduced in the course or, as often happens, by the very act of consumption; hence his distinction between reproductive and unproductive consumption. We find in him other corrections or new presentations of views previously accepted, and some useful suggestions for the improvement of nomenclature.

Say's writings occupy vols. ix.-xii. of Guillaumin's *Collection des principaux économistes*. Among them are, in addition to those already mentioned, *Catéchisme d'économie politique* (1815); *Petit Volume contenant quelques aperçus des hommes et de la société, lettres à Malthus sur différens sujets d'economie politique* (1820); *Épitomé des principes de l'économie politique* (1831). A volume of *Mélanges et correspondance* was published posthumously by Charles Comte, author of the *Traité de législation*, who was his son-in-law. To the above must be added an edition of Storch's *Cours d'économie politique*, which Say published in 1823 without Storch's authorization, with notes embodying a "critique amère et virulente," a proceeding which Storch justly resented.

The last edition of the *Traité d'économie politique* which appeared during the life of the author was the 5th (1826); the 6th, with the author's final corrections, was edited by the eldest son, Horace Émile Say, himself known as an economist, in 1846. The work was translated into English "from the 4th edition of the French" by C. R. Prinsep (1821), into German by Ludwig Heinrich von Jakob (1807) and by C. Ed. Morstadt (1818 and 1830), and, as Say himself informs us, into Spanish by José Queypo. The *Cours d'économie politique pratique*, from which Morstadt had given extracts, was translated into German by Max Stirner (1845). The *Catéchisme* and the *Petit Volume* have also been translated into several European languages. An English version of the *Lettres à Malthus* appears in vol. xvii. of the *Pamphleteer* (1821). See also *Jean Baptiste Say*, by A. Liesse (Paris, 1901). (J. K. I.)

SAY, [JEAN BAPTISTE] LÉON (1826–1896), French statesman and economist, was born in Paris on the 6th of June 1826. The family was a most remarkable one. His grandfather JEAN BAPTISTE SAY (*q.v.*) was a well-known economist. His brother LOUIS AUGUSTE SAY (1774–1840), director of a sugar refinery at Nantes, wrote several books against his theories. His son HORACE ÉMILE SAY (1794–1860), the father of Léon Say, was educated at Geneva, and had travelled in America before establishing himself in business in Paris, where he became president of the Chamber of Commerce in 1848. His careful investigations into the condition of industry at Paris gained for him a seat in the Academy of political and moral sciences, 1857.

Léon Say thus inherited zeal for economic studies, of which he gave proof by publishing at the age of twenty-two a brief *Histoire de la caisse d'escompte*. He was at first destined for the law, next entered a bank, and finally obtained a post in the administration of the Chemin de fer du Nord. Meanwhile he became a regular contributor to the *Journal des débats*, where he established his reputation by a series of brilliant attacks on the financial administration of the prefect of the Seine, Haussmann. He displayed talent for interesting popular audiences in economic questions. His sympathies, like those of his grandfather, were with the British school of economists; he was, indeed, the hereditary defender of free-trade principles in France. He had, moreover, an intimate acquaintance with the English language and institutions, and translated into French Goschen's *Theory of Foreign Exchanges*. He was one of the pioneers of the co-operative movement in France. Elected to the Assembly of 1871 by the departments of Seine and Seine-et-Oise, he adopted the former, and took his seat among the Moderate Liberals, to whose principles he adhered throughout his life. He was immediately chosen as reporter of the commission on the state of the national finances, and in this capacity prepared two elaborate statements. Thiers, though opposing their publication on grounds of public expediency, was much struck by the ability displayed in them, and on the 5th of June appointed Say prefect of the Seine. The fall of the empire, the siege of Paris, and the Commune had reduced the administration of the capital to chaos, and the task of reconstruction severely tried the new prefect's power of organization. This was, however, a gift with which he was pre-eminently endowed; and he only quitted his post to assume, in December 1872, the ministry of finance—a remarkable tribute to his abilities from Thiers, who himself held strongly protectionist views. In all other respects Say regarded himself as the disciple of Thiers, who, in his last public utterance, designated Say as one of the younger men who would carry on his work. He fell from office with Thiers on the 24th of May 1873, and was elected president of the Left Centre group, as whose candidate he unsuccessfully contested the presidency of the Chamber with Buffet. In spite of their divergence of views, he consented, at the urgent request of President MacMahon, to take office in March 1875 in the Buffet Cabinet; but the reactionary policy of the premier led to a dispute between him and Say both in the press and in the constituencies, and brought about Buffet's resignation. Say continued to hold the ministry of finance under Dufaure and Jules Simon, and again in the Dufaure ministry of December 1877, and its successor, the Waddington ministry, till December 1879. During this long period, in which he was practically the autocratic ruler of the French finances, he had first to complete the payment of the war indemnity—an operation which, thanks largely to his consummate knowledge of foreign exchanges, was effected long before the prescribed time. It was at a conference held between Say, Gambetta and M. de Freycinet in 1878 that the great scheme of public works introduced by the latter was adopted. Say's general financial policy was to ameliorate the incidence of taxation. As a pendant to his free-trade principles, he believed that the surest way of enriching the country, and therefore the Treasury, was to remove all restrictions on internal commerce. He accordingly reduced the rate of postage, repealed the duties on many articles of prime utility, such as paper, and fought strongly, though unsuccessfully, against the system of *octrois*. On the 30th of April 1880 he accepted the post of ambassador in London for the purpose of negotiating a commercial treaty between France and England, but the presidency of the Senate falling vacant, he was elected to it on the 25th of May, having meanwhile secured a preliminary understanding, the most important feature of which was a reduction of the duty on the cheaper class of French wines. In January 1882 he became minister of finance in the Freycinet Cabinet, which was defeated in the following July on the Egyptian question. Say's influence over the rising generation grew less; his "academic Liberalism" was regarded as old-fashioned; Socialism, which he never ceased to attack, obtained even greater power, and free-trade was discarded in favour of M. Méline's policy of protection, against which Say vainly organized the *Ligue contre le renchérissement du pain*. He had, however, a large share in the successful opposition to the income-tax, which he considered likely to discourage individual effort and thrift. In 1889 he quitted the Senate to enter the Chamber as member for Pau, in the belief that his efforts for Liberalism were more urgently needed in the popular Assembly. Throughout his career he was indefatigable both as a writer and as a lecturer on economics, and in both capacities exerted a far wider influence than in parliament. Special mention must be made of his work, as editor and contributor, on the *Dictionnaire des finances* and *Nouveau Dictionnaire d'économie politique*. His style was easy and lucid, and he was often employed in drawing up important official documents, such as the famous presidential message of December 1877. He was for many years the most prominent member of the Académie des Sciences Morales et Politiques, and in 1886 succeeded to Edmond About's seat in the Académie Française. He died in Paris on the 21st of April 1896. A selection of his most important writings and speeches has since been published in four volumes under the title of

Les Finances de la France sous la troisième république (1898–1901).

See Georges Michel, *Léon Say* (Paris, 1899); Georges Picot, *Léon Say, notice historique* (Paris, 1901), with a bibliography.

SAY, a town on the right bank of the river Niger in 13° 4′ N. and 2° 30′ E., in the French colony of Upper Senegal and Niger. In the agreement of 1890 between Great Britain and France for the delimitation of their respective spheres of influence in West Africa, Say was taken as the western end of an imaginary line which ran eastward to Barrua on Lake Chad. To the north the "light soil" of the Sahara—a phrase used by Lord Salisbury in explaining the nature of the agreement in the House of Lords—was recognized as French; to the south the Sokoto empire (northern Nigeria) fell to Great Britain. By the convention of 1898 Say, however, and a considerable tract of territory south and east of the town were ceded to France. (See AFRICA, § 5.)

SAYAD, a descendant of Ali, the son-in-law of Mahomet, by Fatima, Mahomet's daughter. Many of the Pathan tribes in the North-West Frontier Province of India, such as the Bangash of Kohat and the Mishwanis of the Hazara border, claim Sayad origin. The apostles who completed the conversion of the Pathans to Islam were called Sayads if they came from the west, and Sheikhs if they came from the east; hence doubtless many false claims to Sayad origin. In Afghanistan the Sayads have much of the commerce in their hands, as their holy character allows them to pass unharmed where other Pathans would be murdered.

The Sayads gave a short-lived dynasty to India, which reigned at Delhi during the first half of the 15th century. Their name again figures in Indian history at the break up of the Mogul empire, when two Sayad brothers created and dethroned emperors at their will (1714–1720). In 1901 the total number of Sayads in all India was returned at 1,339,734. They include many well-known and influential families. The first Mahommedan appointed to the Council of India and the first appointed to the Privy Council were both Sayads.

SAYAN MOUNTAINS, a range of Asia, forming the eastern continuation of the Sailughem or Altai range, stretching from 89° E. to 106° E. Orographically they are the N. border-ridge of the plateau of N.W. Mongolia, and separate that region from Siberia. The geology is imperfectly known. While the general elevation is 7000 to 9000 ft., the individual peaks, consisting largely of granites and metamorphic slates, reach altitudes of 10,000 ft. and 11,450 ft., *e.g.* in Munko Sardyk; while the principal passes lie 6000 to 7500 ft. above the sea, *e.g.* Muztagh 7480 ft., Mongol 6500 ft., Tenghyz 7480 ft. and Obo-sarym 6100 ft. In 92° E. the system is pierced by the Bel-kem or upper Yenisei, and in 106°, at its eastern extremity, it terminates above the depression of the Selenga-Orkhon valley. From the Mongolian plateau the ascent is on the whole gentle, but from the plains of Siberia it is much steeper, despite the fact that the range is masked by a broad belt of subsidiary ranges of an Alpine character, *e.g.* the Usinsk, Oya, Tunka, Kitoi and Byelaya ranges. Between the breach of the Yenisei and the Kosso-gol (lake) in 100° 30′ E. the system bears also the name of Yerghik-taiga. The flora is on the whole poor, although the higher regions carry good forests of larch, pitch pine, cedar, birch and alder, with rhododendrons and species of *Berberis* and *Ribes*. Lichens and mosses clothe many of the boulders that are scattered over the upper slopes.

SAYBROOK, a township of Middlesex county, Connecticut, U.S.A., at the mouth and on the W. bank of the Connecticut river, about 100 m. E.N.E. of New York City and about 40 m. S. of Hartford. Pop. (1890) 1484, (1900) 1634. The post office of the township is named Deep River. Mainly confined to Saybrook Point, jutting out into the river, is the township of Old Saybrook (pop. in 1900, 1431), separated from the township of Saybrook in 1852, but actually the mother colony; its post village is called Saybrook. It is served by the New York, New Haven & Hartford railway, the Valley branch of which here separates from the Shore Line branch. It is a beautiful place, with several old buildings, notably the Hart mansion built about 1783 by Captain Elisha Hart, whose seven daughters here entertained Washington Irving, J. R. Drake and Fitz-Greene Halleck. Com. Isaac Hull and his nephew Joseph Bartine Hull married two of the daughters, and the younger of these in 1874 left the house to the township of Old Saybrook, which refused the gift. Fenwick (pop. in 1900, 23), the smallest borough in the state, is a part of Old Saybrook township, in which there are summer residences. The first settlement was made on Saybrook Point late in 1635 by John Winthrop, commissioned governor for one year by the company of which the principal shareholders were Lord Saye and Sele, Lord Brooke, Sir Richard Saltonstall, John Pym and John Hampden, and which had a grant from the earl of Warwick. The English settlers forestalled the Dutch, who attempted to land here in November. A palisade was built across the narrowest part of the neck of the point by Lion Gardiner, who built a fort (burned in 1647) and planned a settlement, to which for a time it was thought Lord Saye and Sele, Lord Brooke, John Hampden, Oliver Cromwell, and other independents would immigrate. Gardiner called the place Saybrook from the names of its principal proprietors. He had practical control until 1639, when he was displaced by George Fenwick (d. 1657), whose wife, called Lady Fenwick (she was the widow of Sir John Botelier), died here in 1646, and who in 1644 sold[1] to Connecticut the proprietors' rights.

In 1646 the First Church of Christ was organized; a church building was erected in 1647, and in 1680–1681 another, in which in September 1708, at the call of the General Assembly, met a Congregational Synod of 16 members which reaffirmed the Savoy Confession of Faith and the Heads of Agreement adopted in England in 1691 by Congregationalists and Presbyterians, and drew up the Saybrook Platform of discipline, providing for the promotion of harmony and order, the regular introduction of candidates into the ministry and the establishment of associations and consociations, the latter being tribunals with final and appellate jurisdiction. This platform was approved by the General Assembly, and churches organized under it were declared to be established by law. This establishment continued in full force until 1784. A granite boulder (1901) marks the site of the first home of Yale University, established here in 1701 as the Collegiate School of Connecticut; until 1716, when it was removed to New Haven, most of the school's commencements were held here and all its exercises after 1707–1708, before which time most of the actual teaching was done in Killingworth, now Clinton, Connecticut. Saybrook was the home of David Bushnell (1742–1824), who devised in 1776 a submarine torpedo and a tortoise-shaped diving boat, the "American Turtle," which were tried without success against the British in the War of American Independence.

The original township of Saybrook contained the present townships of Old Saybrook, Westbrook (1840), Essex (1854, taken from Old Saybrook), Saybrook and Chester (1836), and, on the east side of the river, parts of the present Lyme (1665), Old Lyme (1855, from Lyme), and East Lyme (1839, from Lyme and Waterford).

SAYCE, ARCHIBALD HENRY (1846–), British Orientalist, was born at Shirehampton on the 25th of September 1846, son of the Rev. H. S. Sayce, vicar of Caldicot. He was educated at Bath, and at Queen's College, Oxford, of which he became fellow in 1869. In 1891 he was elected professor of Assyriology at Oxford. He threw his whole energies into the study of biblical and other Oriental subjects, and though his conclusions have in a number of cases been considerably modified (*e.g.* in chronology and transliteration) by the work of other scholars (see *e.g.* BABYLONIA AND ASSYRIA) it is impossible to overestimate his services to Oriental scholarship. He travelled widely in the East and continued in later life annual trips up the Nile. An interesting example of the importance of his pioneer work is the fact that there has been a strong tendency to revert to the views which he advanced on the question of the Hittites in his early Oxford lectures. He was a member of the Old Testament Revision Company in 1874–1884; deputy professor of comparative philology in Oxford 1876–1890; Hibbert Lecturer 1887; Gifford Lecturer 1900–1902.

[1] The sale was probably illegal as it was never confirmed; and it does not appear that the earl of Warwick had ever had title to the land to convey to the company of which Fenwick was agent. For a conjectural explanation of the history of the Warwick patent see Forrest Morgan, "The Solution of an Old Historic Mystery," in the *Magazine of History* for July, August, September and October 1909.

Of his numerous publications the following are of special importance:—*Assyrian Grammar for Comparative Purposes* (1872); *Principles of Comparative Philology* (1874); *Babylonian Literature* (1877); *Introduction to the Science of Language* (1879); *Monuments of the Hittites* (1881); *Herodotus i.-iii.* (1883); *Ancient Empires of the East* (1884); *Introduction to Ezra, Nehemiah and Esther* (1885); *Assyria* (1885); *Hibbert Lectures on Babylonian Religion* (1887); *The Hittites* (1889); *Races of the Old Testament* (1891); *Higher Criticism and the Verdict of the Monuments* (1894); *Patriarchal Palestine* (1895); *The Egypt of the Hebrews and Herodotus* (1895); *Early History of the Hebrews* (1897); *Israel and the Surrounding Nations* (1898); *Babylonians and Assyrians* (1900); *Egyptian and Babylonian Religion* (1903); *Archaeology of the Cuneiform Inscr.* (1907). He also contributed important articles to the 9th, 10th and 11th editions of the *Encyclopaedia Britannica* and edited a number of Oriental works.

SAYE AND SELE, WILLIAM FIENNES, 1ST VISCOUNT (1582–1662), was the only son of Richard Fiennes, 7th Baron Saye and Sele, and was descended from James Fiennes, Lord Saye and Sele, who was lord chamberlain and lord treasurer under Henry VI. and was beheaded by the rebels under Jack Cade on the 4th of July 1450. Born on the 28th of May 1582 Fiennes, like many of his family, was educated at New College, Oxford; he succeeded to his father's barony in 1613, and in parliament opposed the policy of James I., undergoing a brief imprisonment for objecting to a benevolence in 1622; and he showed great animus towards Lord Bacon. In 1624, owing probably to his temporary friendship with the duke of Buckingham, he was advanced to the rank of a viscount, but notwithstanding this he remained during the early parliaments of Charles I. champion of the popular cause, and was in Clarendon's words "the oracle of those who were called Puritans in the worst sense, and steered all their counsels and designs." Afterwards his energies found a new outlet in helping to colonize Providence Island, and in interesting himself in other and similar enterprises in America. Although Saye resisted the levy of ship-money, he accompanied Charles on his march against the Scots in 1639; but, with only one other peer, he refused to take the oath binding him to fight for the king to "the utmost of my power and hazard of my life." Then Charles I. sought to win his favour by making him a privy councillor and master of the court of wards. When the Civil War broke out, however, Saye was on the committee of safety, was made lord-lieutenant of Gloucestershire, Oxfordshire and Cheshire, and raising a regiment occupied Oxford. He was a member of the committee of both kingdoms; was mainly responsible for passing the self-denying ordinance through the House of Lords; and in 1647 stood up for the army in its struggle with the parliament. In 1648, both at the treaty of Newport and elsewhere, Saye was anxious that Charles should come to terms, and he retired into private life after the execution of the king, becoming a privy councillor again upon the restoration of Charles II. He died at his residence, Broughton Castle near Banbury, on the 14th of April 1662. On several occasions Saye outwitted the advisers of Charles I. by his strict compliance with legal forms. He was a thorough aristocrat, and his ideas for the government of colonies in America included the establishment of an hereditary aristocracy. His eldest son James (*c.* 1603–1674) succeeded him as 2nd viscount; other sons were the parliamentarians Nathaniel Fiennes (*q.v.*) and John Fiennes. The viscounty of Saye and Sele became extinct in 1781, and the barony is now held by the descendants of John Twisleton (d. 1682) and his wife Elizabeth (d. 1674), a daughter of the 2nd viscount. Saybrook (*q.v.*) in Connecticut is named after Viscount Saye and Lord Brooke.

SAYER (or SAYERS), **JAMES** (1748–1823), English caricaturist, was a native of Yarmouth, and son of a merchant captain. He began as clerk in an attorney's office, and was for a time a member of the borough council. In 1780 the death of his father put him in possession of a small fortune, and he came to London. As a political caricaturist he was a supporter of William Pitt. His plate of "Carlo Khan's triumphal entry into Leadenhall Street" was allowed by C. J. Fox, against whom it was directed, to have damaged him severely in public opinion. Indeed Sayer was always at his best when attacking Fox, whose strongly marked features he rendered with remarkable power, and always so as to make them convey expressions of defiant impudence or of anger. Pitt, who showed no wish to help literature or art in any other case, provided Sayer with a place as marshal of the Exchequer court. He died in Curzon Street, Mayfair, on the 20th of April 1823.

Sayer's "Carlo Khan" has been frequently reproduced. But he can only be judged with confidence after examining the collection in the British Museum, or other public libraries. His drawings, made originally with pencil on oil paper, were etched for him by the Brethertons. They were then sold in collections of the size of a large octavo copybook, under such titles as *Illustrious Heads* (1794) or *Outlines of the Opposition* (1795). Sayer left a complete gallery of small full-length pictures of the public men of his time, slightly caricatured. In his great plates he is inferior to Gillray, and he never has the grace of Rowlandson, but he is less exaggerated than either, and nearer the truth.

SAYERS, TOM (1826–1865), English pugilist, was born at Brighton on the 25th of May 1826. By trade a bricklayer, he began his career as a prize fighter in 1849 and won battle after battle, his single defeat being at the hands of Nat Langham in October 1853. In 1857 he gained the championship. His fight with the American, John C. Heenan, the Benicia Boy, a much heavier man than himself, is perhaps the most famous in the history of the English prize ring. It took place at Farnborough on the 17th of April 1860 and lasted two hours and six minutes, thirty-seven rounds being fought. After Sayers's right arm had been injured the crowd pressed into the ring and the fight was declared a draw. £3000 was raised by public subscription for Sayers, who withdrew from the ring and died on the 8th of November 1865. The champion was 5 ft. 8½ in. in height and his fighting weight was under 11 stone. An account of the fight between Sayers and Heenan is given by Frederick Locker-Lampson in *My Confidences* (1896).

SAYRE, a borough of Bradford county, Pennsylvania, U.S.A., on the North Branch of the Susquehanna river, about 95 m. (by rail) N.N.W. of Wilkes-Barré, and just S. of the New York state boundary. Pop. (1900) 5243, of whom 337 were foreign-born. Sayre is served by the main line and by a branch of the Lehigh Valley railway, and is connected by electric railway with Waverly, New York, and with the adjacent borough of Athens, Pennsylvania (pop. in 1900, 3749), which manufactures furniture, carriages and wagons. Sayre, Athens, South Waverly and Waverly form virtually one industrial community. The borough of Sayre is the seat of the Robert Packer Hospital (1885) and has two parks. It is the trade centre of an agricultural and dairying region, and has metal works and other factories; but its industrial importance is due primarily to the locomotive and car shops of the Lehigh Valley railway. It was named in honour of Robert Heysham Sayre (1824–1907), long chief-engineer of this railway. Sayre was settled in 1880 and was incorporated as a borough in 1891.

SAYYID AHMAD KHAN, SIR (1817–1898), Mahommedan educationist and reformer, was born at Delhi, India, in 1817. He belonged to a family which had come to India with the Mahommedan conquest, and had held important offices under the Mogul emperors. Although his imperfect acquaintance with English prevented his attainment of higher office than that of a judge of a small cause court, he earned the title of the recognized leader of the Mahommedan community. To the British he rendered loyal service, and when the mutiny reached Bijnor in Rohilkand in May 1857 the British residents owed their lives to his courage and tact. His faithfulness to his religion was pronounced, and in 1876 he defended the cause of Islam in *A Series of Essays on Mahommed*, written in London. He used these advantages to act as interpreter between the Mahommedans and their rulers, and to rouse his co-religionists to a sense of the benefits of modern education. The task was no light one; for during the first half of the 19th century the Mahommedans had kept themselves aloof from English education, and therefore from taking their proper part in the British administration, being content to study Persian and Arabic in their own mosques. Sayyid Ahmad set himself to alter their resolution. He established a translation society, which became the Scientific Society of Aligarh. He wrote letters from England to draw the hearts of the East to the West. In 1873 he founded

the Mahommedan Anglo-Oriental College at Aligarh, and raised funds for the buildings of which Lord Lytton laid the foundation-stone. He stimulated a similar movement elsewhere, and among other cities Karachi, Bombay and Hyderabad caught the infection of his spirit. Thus he effected a revolution in the attitude of Mahommedans towards modern education. He was made K.C.S.I., and became a member of the legislative councils of India and Allahabad, and of the education commission. He died at Aligarh on the 2nd of March 1898.

See Lieut.-Colonel G. F. I. Graham, *The Life and Work of Sir Sayyad Ahmed Khan* (1885). (W. L.-W.)

SBEITLA (anc. *Sufetula*), a ruined city of Tunisia, 66 m. S.W. of Kairawan. Long buried beneath the sand, this is the most beautiful and extensive of the Roman cities in the regency. It stands at the foot of a hill by a river, here perennial, but at a short distance beyond lost in the sands. The chief ruin is a rectangular walled enclosure, 238 ft. by 198 ft., known as the Hieron, having three small and one large entrance. The great gateway is a fine monumental arch in fair preservation, with an inscription to Antoninus Pius. Facing the arch, within the Hieron, their rear walls forming one side of the enclosure, are three temples, connected with one another by arches, and forming one design. The length of the entire façade is 118 ft. The principal chamber of the central temple, which is of the Composite order, is 44 ft. long; those of the side temples, in the Corinthian style, are smaller. The walls of the middle temple are ornamented with engaged columns; those of the other buildings with pilasters. The porticos have fallen, and their broken monolithic columns, with fragments of cornices and other masonry, lie piled within the enclosure, which is still partly paved. (In 1901 a violent storm further damaged the temples and forced the gateway out of the perpendicular.) The other ruins include a triumphal arch of Constantine, a still serviceable bridge and a square keep or tower of late date.

The early history of Sufetula is preserved only in certain inscriptions. Under Antoninus and Marcus Aurelius it appears to have been a flourishing city, the district, now desolate, being then very fertile and covered with forests of olives. It was partly rebuilt during the Byzantine occupation and became a centre of Christianity. At the time of the Arab invasion it was the capital of the exarch Gregorius, and outside its walls the battle was fought in which he was slain; his daughter, who is said by the Arab historians to have fought by the side of her father, became the wife of one of the Arab leaders. The invaders besieged, captured and sacked Sufetula, and it is not afterwards mentioned in history. It was not until the close of the 19th century that the ruins were thoroughly examined by French savants.

See A. Graham, *Roman Africa* (London, 1902); Sir R. L. Playfair, *Travels in the Footsteps of Bruce* (London, 1877).

SCABBARD, the sheath of a sword. The early forms of the word given in the *Promptorium parvulorum* are *scauberk*, *scaubert* or *scauberd*. The termination is certainly from the Teutonic *bergen*, to protect, as seen in "hauberk," "hawberk" (*i.e. halsberg*), literally a protection for the neck and shoulders, hence the "long tunic of mail" of the 12th century (see ARMS AND ARMOUR). The first part is doubtful; Skeat takes it as representing the O. Fr. *escale*, mod. *écaille*, shell, Ger. *Schale*; the word would therefore mean an outer sheath or shell that covers or protects.

SCABBLING, or SCAPPLING, in building, the process of reducing a stone to a rough square by the axe or hammer; in Kent the rag-stone masons call this knobbling (see MASONRY).

SCABIES. or ITCH, a skin disease due to an animal parasite, the *Sarcoptes scabei* (see MITE), which burrows under the epidermis at any part of the body, but hardly ever in the face or scalp of adults; it usually begins at the clefts of the fingers, where its presence may be inferred from several scattered pimples, which will probably have been torn at their summits by the scratching of the patient, or have been otherwise converted into vesicles or pustules. The remedy is soap and water, and sulphur ointment.

SCAEVOLA, the name of a famous family of ancient Rome, the most important members of which were:—

1. GAIUS MUCIUS SCAEVOLA, a legendary hero, who volunteered to assassinate Lars Porsena when he was besieging Rome. Making his way through the enemy's lines to the royal tent, but not knowing Porsena by sight, he slew his secretary by mistake. Before the royal tribunal Mucius declared that he was one of 300 noble youths who had sworn to take the king's life, and that he had been chosen by lot to make the attempt first. Threatened with death or torture, Mucius thrust his right hand into the fire blazing upon an altar, and held it there until it was consumed. The king, deeply impressed and dreading a further attempt upon his life, ordered Mucius to be liberated, made peace with the Romans and withdrew his forces. Mucius was rewarded with a grant of land beyond the Tiber, known as the "Mucia Prata" in the time of Dionysius of Halicarnassus, and received the name of Scaevola ("left-handed"). Dionysius says nothing of the incident of the fire, and attributes Porsena's alarm partly to the loss of a band of marauders in an ambuscade. The story is presumably an attempt to explain the name Scaevola, coloured by national and family vanity (Livy ii. 12; Dion. Halic. v. 27-30). The Mucius of the legend is described as a patrician; the following were undoubtedly plebeians.

2. PUBLIUS MUCIUS SCAEVOLA, Roman orator and jurist, consul 133 B.C. during the time of the Gracchan disturbances. He was not opposed to moderate reforms, and refused to use violence against Tiberius Gracchus, although called upon in the senate "to protect the state and put down the tyrant." After the murder of Gracchus, however, he expressed his approval of the act. He was an opponent of the younger Scipio Africanus, for which he was attacked by the satirist Lucilius (Persius i. 115; Juvenal i. 154). In 130 he succeeded his brother Mucianus as pontifex maximus. During his tenure of office he published a digest in 80 books of the official annals kept by himself and his predecessors, which were afterwards discontinued as unnecessary, their place being taken by the works of private annalists. He was chiefly distinguished for his knowledge of law, which he held to be indispensable to a successful pontifex. Cicero frequently mentions him as a lawyer of repute, and he is cited several times by the jurists whose works were used in the compilation of the Digest. He was also a famous player at ball and the game called Duodecim Scripta; after he had lost a game, he was able to recall the moves and throws in their order.[1]

See A. H. J. Greenidge, *History of Rome*.

3. QUINTUS MUCIUS SCAEVOLA, son of (2), usually called "Pontifex Maximus," to distinguish him from (4), consul in 95 B.C. with his friend L. Licinius Crassus the orator. He and his colleague brought forward the *lex Licinia Mucia de civibus regundis*, whereby any non-burgess who was convicted of having usurped the rights of citizenship was to be expelled from Rome, and any non-burgess was forbidden under pain of a heavy penalty to apply for the citizenship. Its object was undoubtedly to purify the elections and to prevent the undue influence of the Italians in the comitia. The indignation aroused by it was one of the chief causes of the Social War (see Mommsen's *Hist. of Rome*). After his consulship Scaevola was governor of the province of Asia, in which capacity he distinguished himself by his just dealing and his severe measures against the unscrupulous farmers of taxes (*publicani*). The latter, finding themselves unable to touch Mucius, attacked him in the person of his legate, Publius Rutilius Rufus (*q.v.*). In honour of his memory the Greeks of Asia set aside a day for the celebration of festivities and games called Mucia. He was subsequently appointed Pontifex Maximus, and, in accordance with a custom that had prevailed since the first plebeian appointment to that office (about 150 years before), was always ready to give gratuitous legal advice. His antechamber was thronged, and even the chief men of the state and such distinguished orators as Servius Sulpicius consulted him. He kept a firm hand over the priestly colleges and insisted upon the strict observance of definite regulations, although he was by no means bigoted in his views. He held that there were two kinds of religion, philosophical and traditional. The second was to be preferred for the sake of the unreasoning multitude, who ought to be taught to set a higher

[1] Some authorities hold that Quintilian (*Inst. Orat.* xi. 2, 38) refers to Scaevola (3).

value upon the gods, while people of intellect had no need of religion at all. He was proscribed by the Marian party, and in 82, when the younger Marius, after his defeat by Sulla at Sacriportus, gave orders for the evacuation of Rome and the massacre of the chief men of the opposite party, Scaevola, while attempting to reconcile the opposing factions, was slain at the altar of Vesta and his body thrown into the Tiber. He had already escaped an attempt made upon his life by Gaius Fimbria at the funeral of the elder Marius in 86.

Scaevola was the founder of the scientific study of Roman law and the author of a systematic treatise on the subject, in eighteen books, frequently quoted and followed by subsequent writers. It was a compilation of legislative enactments, judicial precedents and authorities, from older collections, partly also from oral tradition. A small handbook called "Ὅροι (*Definitions*) is the oldest work from which any excerpts are made in the *Digest*, and the first example of a special kind of judicial literature (*libri definitionum* or *regularum*). It consisted of short rules of law and explanations of legal terms and phrases. A number of speeches by him, praised by Cicero for their elegance of diction, were in existence in ancient times.

4. QUINTUS MUCIUS SCAEVOLA (*c.* 159–88 B.C.), uncle of (3), from whom he is distinguished by the appellation of "Augur." He was instructed in law by his father, and in philosophy by the famous Stoic Panaetius of Rhodes. In 121 he was governor of Asia. Accused of extortion on his return, he defended himself and, though no orator, secured his acquittal by his legal knowledge and common sense. In 117 he was consul. He did not take a prominent part in the Senate, but his brief, unpolished remarks sometimes made a great impression. He was a great authority on law, and at an advanced age he gave instruction to Cicero and Atticus. He had a high appreciation of Marius, and when Sulla assembled the senate, to obtain from it a declaration that Marius was the enemy of his country, Scaevola refused his assent. He married Laelia (the daughter of Gaius Laelius, the friend of the younger Scipio), by whom he had a son and two daughters, one of whom became the wife of Licinius Crassus the orator. Scaevola is one of the interlocutors in Cicero's *De oratore*, *De amicitia* and *De republica*.

For the legal importance of the Scaevolas, see A. Schneider, *Die drei Scaevola Ciceros* (Munich, 1879), with full references to ancient and modern authorities.

SCAFELL (pronounced and sometimes written Scaw Fell), a mountain of Cumberland, England, in the Lake District. The name is specially applied to the southern point (3162 ft. in height) of a certain range or mass, but Scafell Pike, separated from Scafell by the steep narrow ridge of Mickledore, is the highest point in England (3210 ft.). The ridge continues N.E. to Great End (2984 ft.), which falls abruptly to a flat terrace, on which lies Sprinkling Tarn. The terrace is traversed by the path between Sty Head Pass (1600 ft.) and Esk Hause (2490 ft.). The range thus defined may be termed the Scafell mass. Northwest from the Pike the lesser height of Lingmell (2649 ft.) is thrown out like a bastion, and the steep flank of the range, scored with the deep gully of Piers Gill, sweeps down to the head of Wasdale. On the east an even steeper wall, with splendid crags, falls to Eskdale. Above Mickledore ridge Scafell rises nearly sheer, the rock scored with bold clefts; here are some of the ascents most in favour with the mountaineers. Some of these tax climbers to the utmost; and the mountain has been the scene of several accidents.

SCAFFOLD, SCAFFOLDING (from the O. Fr. *escafaut*, originally *escafalt*, modern *échafaud*, a corruption of the Italian or Spanish *catafalco*, a platform, especially a canopy over a bier, a catafalque; this word is composed of O. Span. *catar*, O. Ital. *catare*, to view, Lat. *captare*, to watch, observe, and *balco*, balcony), properly a platform or stage, particularly one of a temporary character erected for viewing or displaying some spectacle, and hence applied to the raised structure on which the execution of a criminal or condemned person is carried out. (See CAPITAL PUNISHMENT, &c.). The word "scaffold" or "scaffolding" is used in a technical sense of an obstruction formed in a blast furnace by the fitting together of lumps which form a comparatively solid skeleton mass inside the furnace, preventing the charge from descending properly. The most general modern application of the word, however, is, in building, to the temporary structure of platforms erected or suspended at convenient heights to afford workmen easy access to their work. Such scaffolds may be divided into four principal classes—bricklayers' scaffolds, masons' scaffolds, gantries and derrick towers or stages. The first two are constructed with upright and horizontal poles lashed together. Gantries and derricks are built up of squared timber, and the different members are connected by iron bolts and dogs.

Bricklayers' scaffold.

The bricklayers' scaffold is constructed of standards, ledgers and putlogs, and the connexions are made with lashings of rope, though wire ropes or chains are sometimes used. The standards are a series of upright fir poles 30 to 50 ft. in length, either (1) sunk about 2 ft. into the ground, (2) fixed in barrels filled with earth lightly rammed, or (3) placed upon a "sole plate" of timber with a square formed of small fillets of wood round the base to prevent movement. The standards are placed 6 to 9 ft. apart, and about 5 ft. away from the building. At every 5 ft. ledgers are tied to the standards to support the putlogs, which in turn support the platform of planks. The ledgers are poles lashed horizontally to the standards; upon these, putlogs, usually of birch wood 3 in. square in section, are laid about 3 or 4 ft. apart, with one end resting on the ledger and the other in a recess in the wall. The outer end should be lashed to the ledger. Boards are then laid upon these putlogs parallel with the face of the wall. Two thicknesses of boards are laid when the work is heavy. If the scaffold is erected in an exposed position or is more than 30 ft. high, it should be stiffened by cross braces of poles running diagonally across the face of the structure and firmly lashed to all the main timbers touched. Ties should also be taken back from the face of the scaffold through apertures in the walls of the building and firmly secured. These ties should be connected with every fourth standard and start at a height between 20 and 30 ft. from the ground. Instead of, or in addition to, these ties light shores may be taken from the face of the scaffold outwards from the building. As the work is carried up the boarding and many of the putlogs are removed to the stage above, some putlogs, however, being left tied to the lower ledgers to stiffen the scaffold. In the case of thick walls a scaffold is required inside as well as outside the building, and when this is the case the two structures are tied together and stiffened by short connecting poles through the window and door openings.

Masons' scaffold.

The mason requires an independent scaffold. He cannot rest the inner ends of his putlogs in the wall as the bricklayer does, for this would disfigure the stonework, so he erects another and parallel framework of standards and ledgers within a few inches of the wall-face upon which to support them. The two portions are tied together with cross braces, and the whole of the timbering is made capable of taking heavier weights than are required in the case of the bricklayer.

Materials.

Scaffolding poles are of Northern pine obtained chiefly from the Baltic ports. They consist of small trees up to 30 to 40 ft. long and of not more than 9 in. in diameter. They are sold with the bark on, but this should be removed before use. Such material forms the standards and ledgers. The putlogs are usually pieces of birch from 3 to 4 in. square in section, and 5 to 6 ft. long. In order to have the fibres uncut they should be split, not sawn. Scaffold boards are made in 8- to 12-ft. lengths, 7 or 9 in. wide, and 1½ in. or 2 in. thick. They should be of yellow deal, but they are more often cut from spruce. The corners are cut off and the ends bound with stout hoop-iron to prevent splitting. The cords used for lashing are made of jute and hemp fibre. The best and strongest cords are those of white Manilla hemp. The fibres for scaffold cords are often dipped in hot tar before being made up into rope. The ropes generally used by the scaffolder are either "shroud laid," having three strands of fibres wound tightly around a core, or "three strand," which are similar but without a core.

Erection.

The erection of scaffolding demands nerve and physical strength, as well as skill and discretion. The timbers near the ground are fixed by hand labour alone; the higher poles are raised by pulley and rope. The wedges used for tightening cordage are driven in between the pole and the rope. They should be of oak or other hard wood, about 12 in. long and semicircular in cross section, and should taper off from one end to the other. Practically the only tool used by the scaffolder is his hatchet, made with a

hammer-head for driving spikes and wedges; the wooden handle he often uses as a lever to tighten knots and cords. Scaffolds should not be too heavily loaded, and the weight of materials should be distributed as much as possible. This applies especially to bricklayers' scaffolds, for heavy concentrated loads, even if not sufficient to cause the scaffold to fail, tend to injure the brickwork.

In Scotland and the north of England much work is done from inside by means of platforms of boards placed upon the floor joists When the work gets so advanced that it cannot be reached from the floor, trestles and platforms are used. For executing special external features, such as stone carving or plaster moulding, a scaffold will be thrown out on cantilevers projecting through openings in the wall and tied down inside the building. The materials are usually hoisted by derrick cranes.

Gantries.

" Gantry " is the term applied to a staging of squared timber used for the easy transmission of heavy material. The name has, however, come to be used generally for strong stagings of squared timber whether used for moving loads or not. Taking the general meaning of the term, gantries may be divided into three classes: (1) Gantries supporting a traveller; (2) Travelling gantries, in which the whole stage moves along rails placed on the ground; (3) Elevated platforms which serve as a base upon which to erect pole scaffolding.

A gantry to support a traveller (fig. 1) consists of two sets of framing placed at a convenient distance apart, say 8 ft. or more, and standing independently of each other. These frames consist of standards or uprights standing upon a sleeper or sill resting in a continuous line upon the ground. The tops of the standards are levelled to receive the head or runner. Struts are taken from cleats fixed at a convenient point in the sides of the standards, and meet in pairs under the middle of the head; sometimes a straining-piece is introduced between them. Struts are also taken outwards from the uprights and bedded on foot-blocks or bolted to small piles driven into the ground. The space between the two frames must be kept free from struts and ties of any description so as to leave a free passage for the material while being lifted and moved. The different members are connected by iron dogs and bolts; dogs are used wherever possible, as they form a strong connexion and do not spoil the

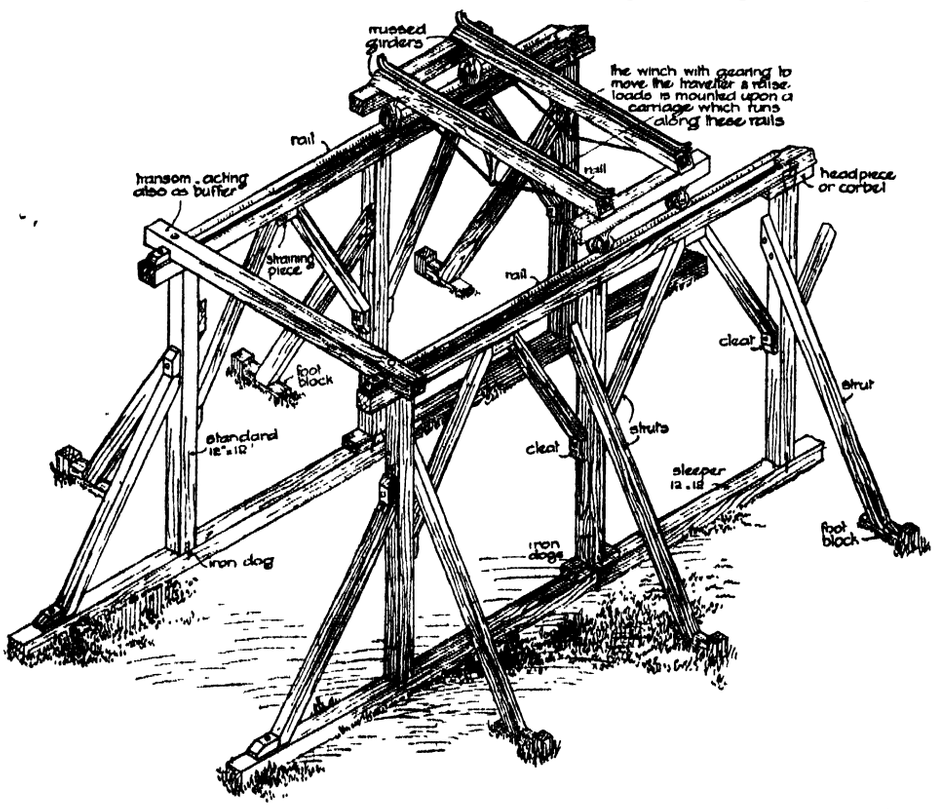


FIG. 1.

wood for other purposes as bolt-holes do. They should be placed on both sides of the timbers to be connected. The size of the timbers varies according to the height of the structure and the weight intended to be carried. The standards may be from 6 to 12 in. squared in section, and the heads and sills are of similar size; the struts and braces are usually somewhat smaller. The traveller consists usually of two wood girders trussed with iron rods and mounted on flanged wheels so as to run along the

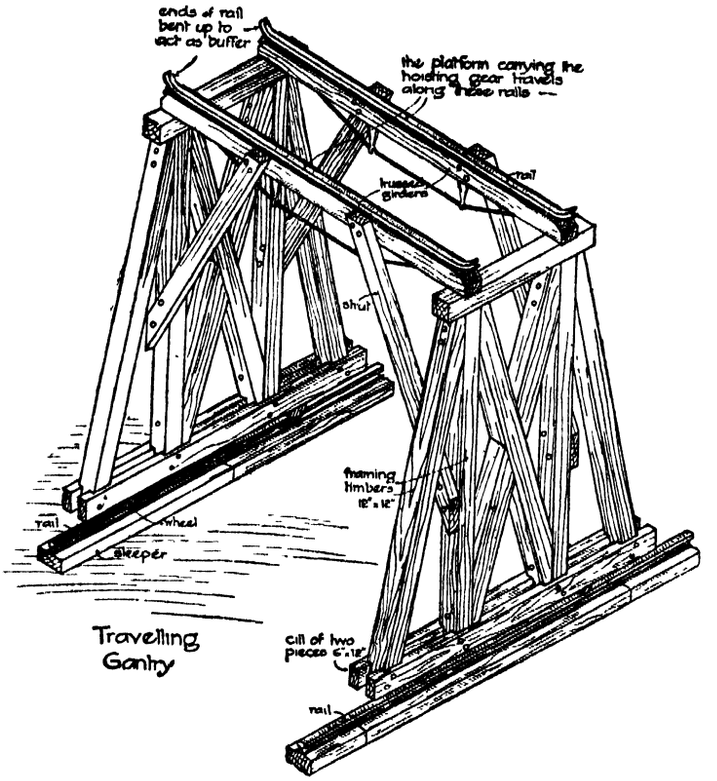


FIG. 2.

rails fixed to the head-piece. Along each girder also, a rail is provided upon which moves the hoisting gear; this is worked either by hand or steam power. The ends of the rails are turned up to form a stop for the traveller or crab.

A travelling gantry (fig. 2) runs along rails placed on the ground, and consists of two strong trusses braced and bolted together and supporting the two trussed girders which take the crab-winch. The latter is mounted on wheels, and by simple gearing is caused to run along the rails fixed on the upper side of the girders. This is a most useful form of gantry, and requires a very small amount of timber for its construction. The travelling frame is, however, very heavy, and such an apparatus is usually fitted with a steam winch, the power from which, besides lifting the materials, can also be applied to move the traveller. Gantries built on this principle have been used successfully in building or repairing lofty and wide-spanned steel or other roofs. After the collapse of the steel " bow-string " roof of Charing Cross station (London) in December 1905, huge travelling gantries running along rails laid upon the station platforms were employed, and these provided an efficient and economical means of access to the damaged portions; as section by section the work was removed the gantries were shifted along to the next bay. These gantries were 60 ft. in height. One, used to strip and remove the coverings of the roof, was 32 ft. deep, weighed 200 tons and moved upon 24 steel flanged wheels; the other, 40 ft. deep and with 32 wheels, weighed 250 tons and was used to take down the structural steel work of the roof. Four cranes were erected upon the staging to lower the material as it was removed. The amount of timber used in these gantries was 22,400 cubic ft.

In the erection of the Williamsburg Bridge over East river, New York, for which 19,000 tons of steel were used, " framed timber falsework " was built up of squared timber to a height of 100 ft. and 90 ft. wide at the top. The span was 355 ft. The timbering was in three storeys or stages, and each " bent " had 8 vertical and 4 battering posts. The bents were 20 ft. apart and were connected

at the top by 10 lines of 12-in. by 14-in. stringers, and the lower sills were 12 in. square. The cross braces were 8 by 10 in. and 6 by 12 in. The vertical standards or posts rested on sills, and under each one also at its base was a timber foundation 4 ft. square. Two travelling gantry towers, 22 ft. by 25 ft. and 40 ft. high, mounted on double-flanged wheels, ran on rails at the top of the falsework and carried long derrick booms fitted with pulleys for raising the materials necessary for the bridge. Beside the cranes they carried cars with the power plant, gasoline tank, water tanks and air compressor and apparatus for the pneumatic riveting hammers.

"Elevated platforms" are generally used in conducting building operations in towns where the importance of the traffic renders it necessary to keep the footway clear. They consist of two sets of standards, sill and head, one set being erected close to the building and the other about 8 or 10 ft. away. These stages are formed of square timber, framed and braced in a similar manner to gantries designed to support a traveller, but, instead of external shores or braces the uprights are braced across to each other, care being taken to fix the braces at such a height as to allow free passage beneath them. Joists are placed across from head to head, and a double layer of scaffold boards is laid to form the floor, the double thickness being necessary to prevent materials dropping through the joints upon the heads of passers-by. When the gantry abuts on the road, a heavy timber fender splayed at each end should be placed so as to ward off the traffic. Sometimes the scaffold is carried up several stages in this way and is then called "staging," but more often the gantry consists of only one stage and forms the foundation upon which light pole or other scaffolding is erected. At the level of the platform a fanguard is often thrown out for a distance of about 6 ft. or more and closely boarded to protect the public from falling materials and the workmen from accident.

Derrick towers.

Derrick "gantries" or "towers" (fig. 3) are skeleton towers of timber erected in a central position on a site to support a platform at such a height as to enable an electric or steam power derrick crane placed upon it to clear the highest portions of the building. The crane revolves upon a base through nearly three parts of the circumference of a circle, and in addition to this the jib of the crane is capable of an "up and down" motion which enables it to command any spot within a radius of three-quarters of the length of the jib. For a single crane, a derrick tower with three legs is built, and the crane is placed over one of these, stayed back to the other two and then counterbalanced by heavy weights. Each leg is usually from 6 ft. to 10 ft. square on plan, the "king" leg (that is, the leg supporting the crane) being larger than the "queen" legs. The three legs are placed from 20 to 30 ft. apart in the form of an equilateral or isosceles triangle. When two cranes are used, as is the case when important operations are to be conducted over the entire area of a circle, a four-legged square derrick tower is constructed, and a crane set upon a platform over each of two opposite legs. The ground upon which it is proposed to erect the towers must be well chosen for its solidity, and often requires to be well rammed. The foundation usually consists of a platform of 9-in. by 3-in. deals under each leg. The corner posts may be of three 9-in. by 3-in. deals bolted together, but those for the king leg may advantageously be larger. They are connected at every 8 or 10 ft. of their height by means of cross pieces or transoms from 9 by 3 in. to 9 by 6 in. in size, and each bay thus formed is filled in on all four sides with diagonal bracing of the same or slightly smaller timber. Up the centre of the king leg, from the bottom to the top, is carried an extra standard of timber to take the weight of the crane. It may be a balk of whole timber, 12 or 14 in. square, or may consist of deals bolted together up to 16 in. square. This central standard must be well braced and strutted from the four corners to prevent any tendency to bending.

When the towers have reached the desired height the king leg is connected to each of the queen legs by a trussed girder, the two queen legs may be connected with each other either by a similar trussed girder or by a single balk of timber which can be supported by struts if the span is considerable. For the connecting girders a balk of timber reaching from king to queen legs is placed on each of the two topmost transoms, which may be from 4 to 8 ft. apart, the depth of the top bays often being modified to the required depth of the connecting beams. Upright struts are fixed at intervals of about 5 ft. between the two balks, which are also connected by long iron bolts and cross braces filled into each bay. The top balks project 6 or 10 ft. beyond the king leg and form the support for a working platform of deals. Struts are thrown out from the sides of the leg to support the ends of the balks. Upon the platform are laid two "sleepers" of balk timber extending from beneath the bed of the crane and passing over the centre of each queen leg. The "mast," a vertical member composed either of a single timber or two pieces strutted and braced, is erected upon the revolving crane bed, and the "jib," which is similar in construction to the mast, is attached to the base of the latter by a pivoted hinge. The jib is raised and lowered by a rope fixed near the end of the jib and running to the engine by way of a pulley wheel at the top of the mast. The rope or chain used for lifting the materials passes over a pulley at the end of the jib and thence to the winch over a pulley at the top of the mast. In the operation of lifting it is obvious that a great strain is put upon the mast and a considerable overturning force is exerted by the leverage of the weight lifted at the end of the jib. To counterbalance this, two timber "stays" or "guys" are taken from the mast head, one to the centre of each queen leg, and there secured. From these points two heavy chains are taken down the centre of

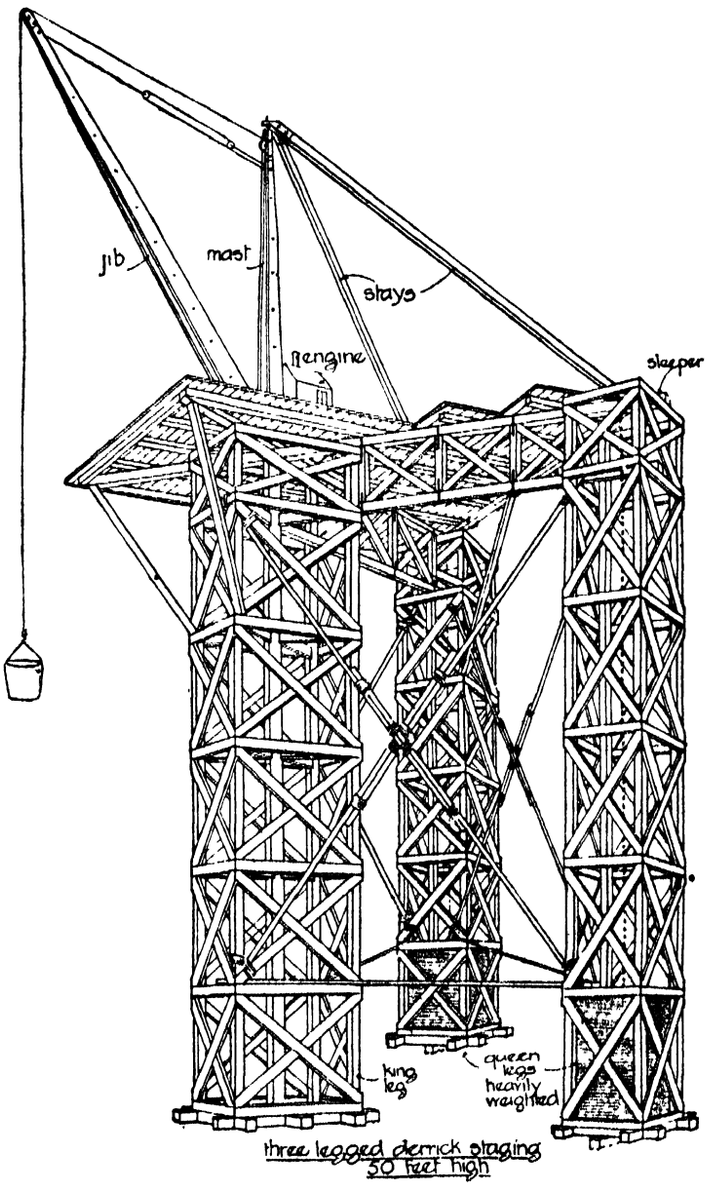


FIG. 3.

each queen leg and anchored to the platform at their bases, which are each loaded with a quantity of bricks, stone or other heavy material equal in weight to at least twice any load to be lifted by the crane. A coupling screw link should be provided in the length of each anchor chain so that it may be kept at a proper tension, for if allowed to get slack a sudden jerk might cause it to snap. The coupling screws should be placed in an accessible place near the ground, where they may easily be seen and tightened when necessary. The legs of the structure should be cross braced with each other, either by ties of steel bars with tightening screws, or, as is more usual, with scaffold-pole or squared timber-braces crossing each other at right angles and lashed or bolted to the framework.

In the case of a three-towered gantry it is necessary to ballast only the two queen legs. The weighting of the king leg, as is sometimes done, is quite unnecessary, and even injurious, for in soft or moderately hard ground the added weight combined with that of the crane engine and load may cause a serious settlement. With a square gantry having four legs, all four should be weighted, and in calculating

the ballast necessary for the crane towers the weight of the engine should be considered. Access to the platform is obtained by ladders fixed either inside or outside one of the queen legs. With the exception of the boards forming the working platform, which are usually spiked down, the timbers of a tower gantry should all be connected by screw bolts and nuts.

Cradles and swinging scaffolds.

Swinging scaffolds are useful for executing light repairs to a building. Perhaps the simplest form of swinging scaffold is the "boatswain's boat," so called from its being chiefly used for the painting or examination of the sides of ships, but it is dangerous to work from and a light wind will cause it to swing to and fro, and owing to the extremely awkward position occupied by the workman there is difficulty in doing good work from it. A better, safer and more comfortable arrangement, the "painter's boat" (fig. 4), is suspended by blocks and falls from two cantilever "jibs" fixed in the upper part of the building. The positions of the jibs are altered as required. The ends of the suspension ropes are fastened securely to the cradle, and by altering their length the workmen can adjust it to the proper height for working. These boats are usually constructed with a framework of iron and fitted with edge boards and guard rails all round. Like the "boatswain's boat" they sway considerably in the wind.

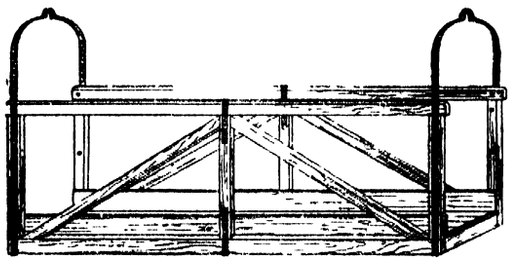


FIG. 4.

An improved form of cradle has been patented which is swung on block runners working along a tight wire cable stretched between two jibs. Block tackle is used to raise or lower the cradle, and horizontal movement also is obtained by light guy lines working over pulleys at the jibs and secured to the tops of the suspension ropes. All adjustments can be made from the cradle with perfect safety. The guy lines steady the boat to some extent and prevent it from swinging in the wind.

Scaffolding for chimneys.

Tall chimney shafts may be erected by internal scaffolding only, or by a combination of external and internal staging. The latter method is often adopted when the lower part of the shaft is designed with ornamental brickwork, string courses, panels, &c., and it is important that this work should be carefully finished. An external scaffold is therefore carried up until plain work not more than 2 or 2½ bricks thick is reached, when the remainder can be completed by "overhand" work from an internal scaffold. The offsets made in the brickwork on the inside are used to support the timbering. For the repair of tall chimneys, light ladders are erected one above the other by a steeplejack and his assistants, each being lashed to the one below it and secured to the brickwork by dog-hooks driven in the joints. When the top of the chimney is reached balk timbers are raised by pulleys and laid across the top. From these are swung cradles from which the defective work is made good. If the work or weather demand a more stable scaffold, a light but strong framework of putlogs held together with iron bolts is fixed on each side of the shaft with iron holdfasts, and a platform of boards is laid upon them. For circular chimneys pieces of timber cut to a curve to fit the brickwork are clamped with iron to the putlogs to prevent them from bending when the bolts connecting the two frames are screwed up.

Accidents.

In England, the Factory and Workshop Act of 1901 empowers the secretary of state to make regulations respecting any dangerous "machinery, plant, process, or description of manual labour." No regulations affecting the building trade have been made, however, but a memorandum was issued in 1902 by the Home Office with the following suggestions for the prevention of scaffold accidents:—

1. All working platforms above the height of 10 ft., taken from the adjacent ground level, should, before employment takes place thereon, be provided throughout their entire length, on the outside and at the ends,

(*a*) with a guard rail fixed at a height of 3 ft. 6 in. above the scaffold boards. Openings may be left for workmen to land from the ladders and for the landing of materials;

(*b*) with boards fixed so that their bottom edges are resting on or abutting to the scaffold boards. The boards so fixed should rise above the working platform not less than 7 ins. Openings may be left for the landing of the workmen from the ladders.

2. All "runs" or similar means of communication between different portions of a scaffold or building should be not less than 18 in. wide. If composed of two or more boards they should be fastened together in such a manner as to prevent unequal sagging.

3. Scaffold boards forming part of a working platform should be supported at each end by a putlog, and should not project more than 6 in. beyond it unless lapped by another board, which should rest partly on or over the same putlog and partly upon putlogs other than those upon which the supported board rests.

In such cases where the scaffold boards rest upon brackets, the foregoing suggestion should read as if the word bracket replaced the word putlog.

N.B. Experiments have shown that a board with not more than a 6 in. projection over a putlog can be considered safe from trapping or tilting.

4. All supports to centring should be carried from a solid foundation.

5. In places where the scaffolding has been sublet to a contractor, the employer should satisfy himself, before allowing work to proceed thereon, that the foregoing suggestions have been complied with, and that the material used in the construction of the scaffold is sound.

See J. F. Hurst, *Tredgold's Carpentry*; A. G. H. Thatcher, *Scaffolding*. (J. Br.)

SCALA NUOVA (Turk. *Kush-Adasi*), also known as New Ephesus, a well-protected harbour on the west coast of Asia Minor in the vilayet of Aidin, opposite Samos. The site of the ancient Marathesium is close by on the S. It is connected with the railway station of Ayassoluk by a diligence service. Before the opening of the Smyrna-Aidin railway its roadstead was frequented by vessels trading with the Anatolian coast, and it has often been proposed to connect it with the railway system by a branch line, and thus enable it to compete with Smyrna. In the absence of this the town is rapidly on the decline. The population is not over 7000. The trade is of merely local interest. (D. G. H.)

SCALD, an ancient Scandinavian bard who recited or sang at feasts compositions in honour of chiefs and famous men and their deeds. This word represents the Icel. *skāld*, Dan. *skald*, Swed. *skjald*, the regular term for a poet. Authorities differ as to its derivation. It seems certain that the word was originally derogatory in sense; some connect it with *skālda*, a pole, on which libels were cut. Others, *e.g.* Skeat, refer it to Swed. *skalla*, Icel. *skjalla*, to make a loud noise or clatter, and take the original sense to have been a "loud talker." This would link the word with "scold," to rail at, find fault with, which is formed from Dutch *schold*, past tense of *scheldan*, cf. Ger. *schelten*, in the same sense.

Of different origin is the verb "scald," to burn or injure the skin or flesh by hot liquid or steam (see BURNS AND SCALDS); also to cleanse an object, or to remove hair, bristles, feathers &c., from an animal, by exposure to moist heat, such as boiling water, steam, &c. This word is derived from the O. Fr. *escalder*, *eschauder*, mod. *échauder*, Lat. *excaldare*, to wash with hot water (*caldus*, *calidus*, hot).

SCALE (1) A small thin flake, plate or shell. The word in O. Eng. is *sceale*, so *bean-sceale*, the husk or pod of a bean; cognate forms are found in Ger. *Schale*, O.H.G. *Scale*, from which the O. Fr. *escale*, modern *écale*, is borrowed. The ultimate root is seen in the closely allied "shell," and also in skull, scalp, shale and skill, and means to peel off, separate, divide. The word is used specifically (1) in botany, of the rudimentary flake-like leaf forming the covering of the leaf-buds of deciduous trees and of the bracts of the cone in conifers; (2) in zoology, of the flat, hard structures of the epidermis or exoskeleton in fishes, reptiles. Thus in ichthyology the various types of scales are classed as *cycloid* (Gr. κύκλος, circle), where the growth is in layers, equally from the anterior and posterior edges; *ctenoid* (Gr. κτήν, comb), where the posterior edge is toothed; *ganoid* (Gr. γάνος, shining), with a hard enamelled surface and usually rhomboidal in shape, and *placoid* (Gr. πλάξ, tablet), as in the ossified papillae of the cutis of the shark. In reptiles the term is applied to the structures which form the covering of the true reptiles, snakes and lizards. In entomology the downy covering

of the wings of lepidoptera consists of minute scales, really modifications of hairs, covered with fine lines, giving the bright colours. Another form in O. Eng. *scále* is found glossing the Lat. *lanx*, flat bowl or dish, and is thus used of the dishes or cups of a balance (*bilanx*), the instrument itself being also called "scales."

2. Properly a ladder, flight of steps, now only used in the derived "scaling ladder." The word is derived from the Lat. *scala* (originally *scandla*, from *scandere* to climb). There are many transferred senses of the word, *e.g.* the distinguishing marks for purposes of measurement on a rule or other measuring instrument; hence a graduated measure or a system of proportional measurement or numeration, and particularly, in music, a series of tones at definite standard intervals (see HARMONY, MUSICAL NOTATION).

SCALE INSECT, a name given to insects belonging to the family *Coccidae* of the homopterous division of the Hemiptera and deriving their name from the formation by the females of a waxy secretion which often hardens into a protective scale beneath which the insects live. Honey-dew, a sweet sticky substance is also secreted by some members of the family. The females are always wingless, but are provided with antennae, legs and well-developed mouth-parts. In some cases these organs are retained, in some they are lost in the encysted condition. The males, on the contrary, although sometimes wingless, are, as a rule, provided with a pair of large forewings and greatly reduced hindwings; their antennae and legs are longer than in the other sex, but the mouth-parts are reduced and functionless (see ECONOMIC ENTOMOLOGY).

SCALIGER, the Latinized name of the great Della Scala family (see VERONA). It has also been borne by two scholars of extraordinary eminence.

1. JULIUS CAESAR SCALIGER (1484–1558), so distinguished by his learning and talents that, according to A. de Thou, no one of the ancients could be placed above him and the age in which he lived could not show his equal, was, according to his own account, a scion of the house of La Scala, for a hundred and fifty years princes of Verona, and was born in 1484 at the castle of La Rocca on the Lago de Garda. At the age of twelve his kinsman the emperor Maximilian placed him among his pages. He remained for seventeen years in the service of the emperor, distinguishing himself as a soldier and as a captain. But he was unmindful neither of letters, in which he had the most eminent scholars of the day as his instructors, nor of art, which he studied with considerable success under Albrecht Dürer. In 1512 at the battle of Ravenna, where his father and elder brother were killed, he displayed prodigies of valour, and received the highest honours of chivalry from his imperial cousin, who conferred upon him with his own hands the spurs, the collar and the eagle of gold. But this was the only reward he obtained. He left the service of Maximilian, and after a brief employment by another kinsman, the duke of Ferrara, he decided to quit the military life, and in 1514 entered as a student at the university of Bologna. He determined to take holy orders, in the expectation that he would become cardinal, and then pope, when he would wrest from the Venetians his principality of Verona, of which the republic had despoiled his ancestors. But, though he soon gave up this design, he remained at the university until 1519. The next six years he passed at the castle of Vico Nuovo, in Piedmont, as a guest of the family of La Rovère, at first dividing his time between military expeditions in the summer, and study, chiefly of medicine and natural history, in the winter, until a severe attack of rheumatic gout brought his military career to a close. Henceforth his life was wholly devoted to study. In 1525 he accompanied M. A. de la Rovère, bishop of Agen, to that city as his physician. Such is the outline of his own account of his early life. It was not until some time after his death that the enemies of his son first alleged that he was not of the family of La Scala, but was the son of Benedetto Bordone, an illuminator or schoolmaster of Verona; that he was educated at Padua, where he took the degree of M.D.; and that his story of his life and adventures before arriving at Agen was a tissue of fables. It certainly is supported by no other evidence than his own statements, some of which are inconsistent with well-ascertained facts (see below *ad fin.*).

The remaining thirty-two years of his life were passed almost wholly at Agen, in the full light of contemporary history. They were without adventure, almost without incident, but it was in them that he achieved so much distinction that at his death in 1558 he had the highest scientific and literary reputation of any man in Europe. A few days after his arrival at Agen he fell in love with a charming orphan of thirteen, Andiette de Roques Lobejac. Her friends objected to her marriage with an unknown adventurer, but in 1528 he had obtained so much success as a physician that the objections of her family were overcome, and at forty-five he married Andiette, who was then sixteen. The marriage proved a complete success; it was followed by twenty-nine years of almost uninterrupted happiness, and by the birth of fifteen children.

A charge of heresy in 1538, of which he was acquitted by his friendly judges, one of whom was his friend Arnoul Le Ferron, was almost the only event of interest during these years, except the publication of his books, and the quarrels and criticisms to which they gave rise. In 1531 he printed his first oration against Erasmus, in defence of Cicero and the Ciceronians. It is a piece of vigorous invective, displaying, like all his subsequent writings, an astonishing command of Latin, and much brilliant rhetoric, but full of vulgar abuse, and completely missing the point of the *Ciceronianus* of Erasmus. The writer's indignation at finding it treated with silent contempt by the great scholar, who thought it was the work of a personal enemy—Aleander—caused him to write a second oration, more violent, more abusive, with more self-glorification, but with less real merit than the first. The orations were followed by a prodigious quantity of Latin verse, which appeared in successive volumes in 1533, 1534, 1539, 1546 and 1547; of these, a friendly critic, Mark Pattison, is obliged to approve the judgment of Huet, who says, "par ses poésies brutes et informes Scaliger a déshonoré le Parnasse"; yet their numerous editions show that they commended themselves not only to his contemporaries, but to succeeding scholars. A brief tract on comic metres (*De comicis dimensionibus*) and a work *De causis linguae Latinae*—the earliest Latin grammar on scientific principles and following a scientific method—were his only other purely literary works published in his lifetime. His *Poetice* appeared in 1561 after his death. With many paradoxes, with many criticisms which are below contempt, and many indecent displays of personal animosity—especially in his reference to Étienne Dolet, over whose death he gloated with brutal malignity—it yet contains acute criticism, and showed for the first time what such a treatise ought to be, and how it ought to be written.

But it is as a philosopher and a man of science that J. C. Scaliger ought to be judged. Classical studies he regarded as an agreeable relaxation from severer pursuits. Whatever the truth or fable of the first forty years of his life, he had certainly been a close and accurate observer, and had made himself acquainted with many curious and little-known phenomena, which he had stored up in a most tenacious memory. His scientific writings are all in the form of commentaries, and it was not until his seventieth year that (with the exception of a brief tract on the *De insomniis* of Hippocrates) he felt that any of them were sufficiently complete to be given to the world. In 1556 he printed his *Dialogue* on the *De plantis* attributed to Aristotle, and in 1557 his *Exercitationes* on the work of Jerome Cardan, *De subtilitate*. His other scientific works, *Commentaries* on Theophrastus' *De causis plantarum* and Aristotle's *History of Animals*, he left in a more or less unfinished state, and they were not printed until after his death. They are all marked by arrogant dogmatism, violence of language, a constant tendency to self-glorification, strangely combined with extensive real knowledge, with acute reasoning, with an observation of facts and details almost unparalleled. But he is only the naturalist of his own time. That he anticipated in any manner the inductive philosophy cannot be contended; his botanical studies did not lead him, like his contemporary Konrad von Gesner, to any idea of a

natural system of classification, and he rejected with the utmost arrogance and violence of language the discoveries of Copernicus. In metaphysics and in natural history Aristotle was a law to him, and in medicine Galen, but he was not a slave to the text or the details of either. He has thoroughly mastered their principles, and is able to see when his masters are not true to themselves. He corrects Aristotle by himself. He is in that stage of learning when the attempt is made to harmonize the written word with the actual facts of nature, and the result is that his works have no real scientific value. Their interest is only historical. His *Exercitationes* upon the *De subtilitate* of Cardan (1557) is the book by which Scaliger is best known as a philosopher. Its numerous editions bear witness to its popularity, and until the final fall of Aristotle's physics it continued a popular text-book. We are astonished at the encyclopaedic wealth of knowledge which the *Exercitationes* display, at the vigour of the author's style, at the accuracy of his observations, but are obliged to agree with G. Naudé that he has committed more faults than he has discovered in Cardan, and with Charles Nisard that his object seems to be to deny all that Cardan affirms and to affirm all that Cardan denies. Yet Leibnitz and Sir William Hamilton recognize him as the best modern exponent of the physics and metaphysics of Aristotle. He died at Agen on the 21st of October 1558.

2. Joseph Justus Scaliger (1540–1609), the greatest scholar of modern times, was the tenth child and third son of Julius Caesar Scaliger and Andiette de Roques Lobejac. Born at Agen in 1540, he was sent when twelve years of age, with two younger brothers, to the college of Guienne at Bordeaux, then under the direction of Jean Gelida. An outbreak of the plague in 1555 caused the boys to return home, and for the next few years Joseph was his father's constant companion and amanuensis. The composition of Latin verse was the chief amusement of Julius in his later years, and he daily dictated to his son from eighty to a hundred lines, and sometimes more. Joseph was also required each day to write a Latin theme or declamation, though in other respects he seems to have been left to his own devices. But the companionship of his father was worth more to Joseph than any mere instruction. He learned from him to be not a mere scholar, but something more—an acute observer, never losing sight of the actual world, and aiming not so much at correcting texts as at laying the foundation of a science of historical criticism.

After his father's death, he spent four years at the university of Paris, where he began the study of Greek under Turnebus. But after two months he found he was not in a position to profit by the lectures of the greatest Greek scholar of the time. He determined to teach himself. He read Homer in twenty-one days, and then went through all the other Greek poets, orators and historians, forming a grammar for himself as he went along. From Greek, at the suggestion of G. Postel, he proceeded to attack Hebrew, and then Arabic; of both he acquired a respectable knowledge, though not the critical mastery which he possessed in Latin and Greek. The name of Jean Dorat then stood as high as that of Turnebus as a Greek scholar, and far higher as a professor. As a teacher he was able not only to impart knowledge, but to kindle enthusiasm. It was to Dorat that Scaliger owed the home which he found for the next thirty years of his life. In 1563 the professor recommended him to Louis de Chastaigner, the young lord of La Roche Pozay, as a companion in his travels. A close friendship sprang up between the two young men, which remained unbroken till the death of Louis in 1595. The travellers first went to Rome. Here they found Marc Antoine Muretus, who, when at Bordeaux and Toulouse, had been a great favourite and occasional visitor of Julius Caesar at Agen. Muretus soon recognized Scaliger's merits, and introduced him to all the men that were worth knowing. After visiting a large part of Italy, the travellers passed to England and Scotland, taking as it would seem La Roche Pozay on their way, for Scaliger's preface to his first book, the *Conjectanea in Varronem*, is dated there in December 1564. Scaliger formed an unfavourable opinion of the English. Their inhuman disposition, and inhospitable treatment of foreigners, especially impressed him. He was also disappointed in finding few Greek manuscripts and few learned men. It was not until a much later period that he became intimate with Richard Thompson and other Englishmen. In the course of his travels he had become a Protestant. On his return to France he spent three years with the Chastaigners, accompanying them to their different châteaux in Poitou, as the calls of the civil war required. In 1570 he accepted the invitation of Cujas, and proceeded to Valence to study jurisprudence under the greatest living jurist. Here he remained three years, profiting not only by the lectures but even more by the library of Cujas, which filled no fewer than seven or eight rooms and included five hundred manuscripts.

The massacre of St Bartholomew—occurring as he was about to accompany the bishop of Valence on an embassy to Poland—induced him with other Huguenots to retire to Geneva, where he was received with open arms, and was appointed a professor in the academy. He lectured on the *Organon* of Aristotle and the *De finibus* of Cicero with much satisfaction to the students but with little to himself. He hated lecturing, and was bored with the importunities of the fanatical preachers; and in 1574 he returned to France, and made his home for the next twenty years with Chastaigner. Of his life during this period we have interesting details and notices in the *Lettres françaises inédites de Joseph Scaliger*, edited by M. Tamizey de Larroque (Agen, 1881). Constantly moving through Poitou and the Limousin, as the exigencies of the civil war required, occasionally taking his turn as a guard, at least on one occasion trailing a pike on an expedition against the Leaguers, with no access to libraries, and frequently separated even from his own books, his life during this period seems most unsuited to study. He had, however, what so few contemporary scholars possessed—leisure, and freedom from pecuniary cares. It was during this period of his life that he composed and published the books which showed that with him a new school of historical criticism had arisen. His editions of the *Catalecta* (1575), of Festus (1575), of Catullus, Tibullus and Propertius (1577), are the work of a man who not only writes books of instruction for learners, but is determined himself to discover the real meaning and force of his author. He was the first to lay down and apply sound rules of criticism and emendation, and to change textual criticism from a series of haphazard guesses into a "rational procedure subject to fixed laws" (Pattison). But these works, while proving Scaliger's right to the foremost place among his contemporaries as Latin scholar and critic, did not go beyond mere scholarship. It was reserved for his edition of Manilius (1579), and his *De emendatione temporum* (1583), to revolutionize all the received ideas of ancient chronology—to show that ancient history is not confined to that of the Greeks and Romans, but also comprises that of the Persians, the Babylonians and the Egyptians, hitherto neglected as absolutely worthless, and that of the Jews, hitherto treated as a thing apart, and that the historical narratives and fragments of each of these, and their several systems of chronology, must be critically compared, if any true and general conclusions are to be reached. It is this which places Scaliger on so immeasurably higher an eminence than any of his contemporaries. Yet, while the scholars of his time admitted his pre-eminence, neither they nor those who immediately followed seem to have appreciated his real merit, but to have considered his emendatory criticism, and his skill in Greek, as constituting his claim to special greatness. His commentary on Manilius is really a treatise on the astronomy of the ancients, and it forms an introduction to the *De emendatione temporum*, in which he examines by the light of modern and Copernican science the ancient system as applied to epochs, calendars and computations of time, showing upon what principles they were based.

In the remaining twenty-four years of his life he at once corrected and enlarged the basis which he had laid in the *De emendatione*. With incredible patience, sometimes with a happy audacity of conjecture which itself is almost genius, he succeeded in reconstructing the lost *Chronicle* of Eusebius—one of the most precious remains of antiquity, and of the highest value for ancient chronology. This he printed in 1606 in his

Thesaurus temporum, in which he collected, restored and arranged every chronological relic extant in Greek or Latin. When in 1590 Lipsius retired from Leiden, the university and its protectors, the states-general of Holland and the prince of Orange, resolved to obtain Scaliger as his successor. He declined their offer. He hated lecturing, and there were those among his friends who erroneously believed that with the success of Henry IV. learning would flourish, and Protestantism be no bar to advancement. The invitation was renewed in the most flattering manner a year later. Scaliger would not be required to lecture. The university only wished for his presence. He would be in all respects the master of his time. This offer Scaliger provisionally accepted. About the middle of 1593 he started for Holland, where he passed the remaining thirteen years of his life, never returning to France. His reception at Leiden was all that he could wish. A handsome income was assured to him. He was treated with the highest consideration. His rank as a prince of Verona was recognized. Placed midway between The Hague and Amsterdam, he was able to obtain, besides the learned circle of Leiden, the advantages of the best society of both these capitals. For Scaliger was no hermit buried among his books; he was fond of social intercourse and was himself a good talker.

For the first seven years of his residence at Leiden his reputation was at its highest point. His literary dictatorship was unquestioned. From his throne at Leiden he ruled the learned world; a word from him could make or mar a rising reputation; and he was surrounded by young men eager to listen to and profit by his conversation. He encouraged Grotius when only a youth of sixteen to edit Capella; the early death of the younger Douza he wept as that of a beloved son; Daniel Heinsius, from being his favourite pupil, became his most intimate friend. But Scaliger had made numerous enemies. He hated ignorance, but he hated still more half-learning, and most of all dishonesty in argument or in quotation. Himself the soul of honour and truthfulness, he had no toleration for the disingenuous arguments and the mis-statements of facts of those who wrote to support a theory or to defend an unsound cause. His pungent sarcasms were soon carried to the persons of whom they were uttered, and his pen was not less bitter than his tongue. He resembles his father in his arrogant tone towards those whom he despises and those whom he hates, and he despises and hates all who differ from him. He is conscious of his power, and not always sufficiently cautious or sufficiently gentle in its exercise. Nor was he always right. He trusted much to his memory, which was occasionally treacherous. His emendations, if frequently happy, were sometimes absurd. In laying the foundations of a science of ancient chronology he relied sometimes upon groundless, sometimes even upon absurd hypotheses, frequently upon an imperfect induction of facts. Sometimes he misunderstood the astronomical science of the ancients, sometimes that of Copernicus and Tycho Brahe. And he was no mathematician. But his enemies were not merely those whose errors he had exposed and whose hostility he had excited by the violence of his language. The results of his system of historical criticism had been adverse to the Catholic controversialists and to the authenticity of many of the documents upon which they had been accustomed to rely. The Jesuits, who aspired to be the source of all scholarship and criticism, perceived that the writings and authority of Scaliger were the most formidable barrier to their claims. It was the day of conversions. Muretus in the latter part of his life professed the strictest orthodoxy; J. Lipsius had been reconciled to the Church of Rome; Casaubon was supposed to be wavering; but Scaliger was known to be hopeless, and as long as his supremacy was unquestioned the Protestants had the victory in learning and scholarship. A determined attempt must be made, if not to answer his criticisms, or to disprove his statements, yet to attack him as a man, and to destroy his reputation. This was no easy task, for his moral character was absolutely spotless.

After several scurrilous attacks by the Jesuit party, in which coarseness and violence were more conspicuous than ability, in 1607 a new and more successful attempt was made. Scaliger's weak point was his pride. In 1594, in an evil hour for his happiness and his reputation, he published his *Epistola de vetustate et splendore gentis Scaligerae et J. C. Scaligeri vita*. In 1607 Gaspar Scioppius, then in the service of the Jesuits, whom he afterwards so bitterly libelled, published his *Scaliger hypobolimaeus* ("The Supposititious Scaliger"), a quarto volume of more than four hundred pages, written with consummate ability, in an admirable and incisive style, with the entire disregard for truth which Scioppius always displayed, and with all the power of his accomplished sarcasm. Every piece of scandal which could be raked together respecting Scaliger or his family is to be found there. The author professes to point out five hundred lies in the *Epistola de vetustate* of Scaliger, but the main argument of the book is to show the falsity of his pretensions to be of the family of La Scala, and of the narrative of his father's early life. "No stronger proof," says Mark Pattison, "can be given of the impressions produced by this powerful philippic, dedicated to the defamation of an individual, than that it has been the source from which the biography of Scaliger, as it now stands in our biographical collections, has mainly flowed." To Scaliger the blow was crushing. Whatever the case as to Julius, Joseph had undoubtedly believed himself a prince of Verona, and in his *Epistola* had put forth with the most perfect good faith, and without inquiry, all that he had heard from his father. He immediately wrote a reply to Scioppius, entitled *Confutatio fabulae Burdonum*. It is written, for Scaliger, with unusual moderation and good taste, but perhaps for that very reason had not the success which its author wished and even expected. In the opinion of the highest authority, Mark Pattison, "as a refutation of Scioppius it is most complete"; but there are certainly grounds for dissenting, though with diffidence, from this judgment. Scaliger undoubtedly shows that Scioppius committed more blunders than he corrected, that his book literally bristles with pure lies and baseless calumnies; but he does not succeed in adducing a single proof either of his father's descent from the La Scala family, or of any single event narrated by Julius as happening to himself or any member of his family prior to his arrival at Agen. Nor does he even attempt a refutation of the crucial point, which Scioppius had proved, as far as a negative can be proved—namely, that William, the last prince of Verona, had no son Nicholas, the alleged grandfather of Julius, nor indeed any son who could have been such grandfather. But whether complete or not, the *Confutatio* had no success; the attack of the Jesuits was successful, far more so than they could possibly have hoped. Scioppius was wont to boast that his book had killed Scaliger. It certainly embittered the few remaining months of his life, and it is not improbable that the mortification which he suffered may have shortened his days. The *Confutatio* was his last work. Five months after it appeared, "on the 21st of January 1609, at four in the morning, he fell asleep in Heinsius's arms. The aspiring spirit ascended before the Infinite. The most richly stored intellect which had ever spent itself in acquiring knowledge was in the presence of the Omniscient" (Pattison).

Of Joseph Scaliger the only biography in any way adequate is that of Jacob Bernays (Berlin, 1855). It was reviewed by Mark Pattison in the *Quarterly Review*, vol. cviii. (1860), since reprinted in the *Essays*, i. (1889), 132-195. Pattison had made many manuscript collections for a life of Joseph Scaliger on a much more extensive scale, which he left unfinished. In writing the above article, Professor Christie had access to and made much use of these MSS., which include a life of Julius Caesar Scaliger. The fragments of the life of Joseph Scaliger have been printed in the *Essays*, i. 196-243. For the life of Joseph, besides the letters published by M. Tamizey de Larroque (Agen, 1881), the two old collections of Latin and French letters and the two *Scaligerana* are the most important sources of information. For the life of Julius Caesar the letters edited by his son, those subsequently published in 1620 by the President de Maussac, the *Scaligerana*, and his own writings, which are full of autobiographical matter, are the chief authorities. M. de Bourousse de Laffore's *Étude sur Jules César de Lescale* (Agen, 1860) and M. Magen's *Documents sur Julius Caesar Scaliger et sa famille* (Agen, 1873) add important details for the lives of both father and son. The lives by Charles Nisard—that of Julius in *Les Gladiateurs de la république des lettres*, and that of Joseph in

Le Triumvirat littéraire au seizième siècle—are equally unworthy of their author and their subjects. Julius is simply held up to ridicule, while the life of Joseph is almost wholly based on the book of Scioppius and the *Scaligerana*. A complete list of the works of Joseph will be found in his life by Bernays. See also J. E. Sandys, *History of Classical Scholarship*, iii. (1908), 199-204. (R. C. C.; J. E. S.*)

SCALP (O. Dutch *schelpe*, a shell), in anatomy, the whole covering of the top of the head from the skin to the bone. Five layers are recognized in the scalp, and these, from without inward, are: (1) skin, (2) superficial fascia, (3) aponeurosis or epicranium, (4) lymph space, (5) periosteum or pericranium.

The skin of the scalp is thick and remarkable for the large number of hair follicles contained in it. The superficial fascia consists of dense bundles of fibrous tissue which pass from the skin to the third layer or aponeurosis and bind the two structures together so closely that when one of them is moved the other must needs be moved too. The fibrous bundles are separated by pellets of fat, and it is in this second layer that the vessels and nerves of the scalp are found. Here, as elsewhere, the vessels are arteries, veins and lymphatics, and the arteries are specially remarkable, firstly, for their tortuosity, which is an adaptation to so movable a part; secondly, for their anastomosing across the middle line with their fellows of the opposite side, an arrangement which is not usual in the body; and, thirdly, for the fact that, when cut, their ends are held open by the dense fibrous tissue already spoken of, so that bleeding is more free in the scalp than it is from arteries of the same size elsewhere in the body.

The veins do not follow the twists of the arteries but run a straight course; for this reason there is often a considerable distance between an artery and its companion vein. Accompanying the veins are the larger lymphatic vessels, though there are no lymphatic glands actually in the scalp. From the forehead region the lymphatics accompany the facial vein down the side of the face and usually reach their first gland in the submaxillary region, so that in the case of a poisoned wound of the forehead sympathetic swelling or suppuration would take place below the jaw. From the region of the temple the lymphatics drain into a small gland lying just in front of the ear, while those from the region behind the ear drain into some glands lying close to the mastoid process. In the occipital region a small gland (or glands) is found at the edge of the scalp close to the point at which the occipital artery reaches it, that is to say about a third of the distance from the external occipital protuberance to the tip of the mastoid process (see SKULL).

The nerve supply of the scalp in its anterior part is from the fifth cranial or trigeminal nerve (see NERVES, CRANIAL); in the forehead region the supratrochlear and supraorbital branches come out of the orbit from the first or ophthalmic division of the fifth, while farther back, in the anterior part of the temporal region, the temporal branch of the second or maxillary division of the same nerve is found. Farther back still, in front of the ear, is the area of the auriculo-temporal nerve, a branch of the third or mandibular division of the fifth cranial.

Behind the ear the scalp is supplied with sensation by two branches of the cervical plexus of nerves, the great auricular and the small occipital (see NERVES, SPINAL), while behind these, and reaching as far as the mid line posteriorly, the great occipital, derived from the posterior primary division of the second cervical nerve, is distributed. Sometimes the posterior primary division of the third cervical nerve reaches the scalp still nearer the middle line behind.

The third layer of the scalp or *epicranium* is formed by the two fleshy bellies of the occipito-frontalis muscle and the flattened tendon or aponeurosis between them. Of these two bellies the anterior (*frontalis*) is the larger, and, when it acts, throws the skin of the forehead into those transverse puckers which are characteristic of a puzzled frame of mind. The much smaller *occipitalis* or posterior) belly usually merely fixes the aponeurosis or the frontalis to act, though some people have the power of alternately contracting the two muscles and so wagging their scalps backward and forward as monkeys do. Both fleshy bellies of the occipito-frontalis are innervated by the seventh or facial nerve which supplies all the muscles of expression.

Deep to the occipito-frontalis and its aponeurosis or epicranium is the fourth layer, which consists of very lax areolar tissue constituting what is now known in anatomy as a lymph space. The length and laxity of this tissue allow great freedom of movement to the more superficial layers, and it is this layer which is torn through when a Red Indian scalps his foe. So lax is the tissue here that any collection of blood or pus is quickly distributed throughout its whole area, and, owing to the absence of tension as well as of nerves, very little pain accompanies any such effusion.

The fifth and deepest layer of the scalp is the *pericranium* or the external periosteum of the skull bones. This, until the sutures of the skull close in middle life, is continuous with the dura mater which forms the internal periosteum, and for this reason any subpericranial effusion is localized to the area of the skull bone over which it happens to lie. Moreover, any suppurative process may extend through the sutures to the meninges of the brain. (F. G. P.)

Surgery of the Scalp.—In connexion with the treatment of surgical and other wounds of the scalp, it used to be thought that it was dangerous to treat them by suturing, because of the risk of the intervention of abscess or erysipelas. Now that one knows, however, that these two conditions are dependent upon the presence of septic micro-organisms, the surgeon deals with the scalp as with other parts of the body, cleansing the surface before performing an operation upon it, and doing his best to free the region of all germs when he is called upon to treat a wound already inflicted on it. Unless the surgeon could render the scalp aseptic, it would be almost impossible for him to undertake any operation upon the interior of the skull. Before opening the skull, therefore, the scalp is cleanly shaved and dealt with by turpentine, soap and water and other antiseptics. A large horse-shoe shaped flap is then turned down by an incision right to the bone, and on the conclusion of the operation the flap is replaced in position and secured by stitches.

As the result of septic infection by an accidental wound, abscess is likely to form beneath the scalp, and if it is left to increase in size unchecked it may detach a large area of the scalp. As soon, therefore, as it is thought that matter is forming beneath the scalp, an incision should be made down to the bone, and provision taken for insuring free drainage.

Naevi of the scalp are best treated by electrolysis or by removal by dissection. If they are supplied by large blood-vessels, each artery should be under-pinned or tied before the removal by dissection is undertaken.

Sebaceous cysts of the scalp should be removed by incision under the ether-spray whilst they are still small, the whole of the cyst-wall being torn out, for unless the cyst is entirely removed, the tumour is likely to reform. If the sebaceous cyst is left it may cause a thinning of the overlying skin and, effecting its own discharge, may become the source of chronic suppuration. In some cases the chronic abscess of a sebaceous cyst becomes the starting-point of malignant disease. (E. O.*)

SCALPING, the custom of removing the skin of the skull, with hair attached. Though generally associated with the North American Indians, the practice has been common in Europe, Asia and Africa. The underlying idea, as of similar mutilations of those slain in battle, is the warrior's wish to preserve a portable proof or trophy of his prowess. Scalping was the usual form of mutilation from the earliest times. Herodotus (iv. 64) describes the practice among the Scythians. The Abbé Emmanuel H. D. Domenech (*Seven Years' Residence in the Great Deserts of North America*, ch. 39) quotes the *decalvare* of the ancient Germans, the *capillos et cutem detrahere* of the code of the Visigoths, and the *Annals* of Flodoard, to prove that the Anglo-Saxons and the Franks still scalped about A.D. 879. In Africa it was, and doubtless is, as prevalent as are all barbarous mutilations.

Among the North American Indians scalping was always in the nature of a rite. It was common to those tribes east of the Rocky Mountains, in the south-west and upper Columbia; but unknown apparently among the Eskimo, along the north-west coast, and on the Pacific coast west of the Cascade range and the Sierras, except among some few Californian tribes, or here and there in Mexico and southward. Properly the scalp could only be taken after a fair fight; in more recent times there seems to have been no such restriction. To facilitate the operation the braves wore long war-locks or scalping-tufts, as an

implied challenge. These locks were braided with bright ribbons or ornamented with a feather. After the successful warrior's return the scalp or scalps captured were dried, mounted and consecrated by a solemn dance. Some tribes hung the scalps to their bridles, others to their shields, while some ornamented with them the outer seams of their leggings. Scalping was sometimes adopted by the whites in their wars with the Redskins, and bounties have been offered for scalps several times in American history.

SCAMILLI IMPARES ("unequal steps," Fr. *escabeaux inégales*; Ger. *Schutzstege*), in architecture, a term quoted by Vitruvius when referring to the rise given to the stylobate in the centre of the front and sides of a Greek temple. His explanation is not clear; he states (iii. 4) that, if set out level, the stylobate would have the appearance of being sunk in the centre, so that it is necessary that there should be an addition by means of small steps (*scamilli impares*). In book v. chap. 9, he again refers to the addition on the stylobate. The interpretation of his meaning by Penrose and other authorities is generally assumed to be the addition which it was necessary to leave on the lower frusta of the Doric column, or on the lower portion of the base of the Ionic column, so as to give them a proper bearing on the curved surface of the stylobate; when levelling ground, however, it is sometimes the custom to fix at intervals small bricks or tiles which are piled up until the upper surfaces of all of them are absolutely level. If, as an alternative, these piles were so arranged as to rise towards the centre, instead of a level a slightly curved surface might be obtained, and the term "unequal steps" would apply to them. This was the opinion of M. Bernouf, a French author, who points out that *scamillus* is a diminutive of *scamnum*, a small step (Fr. *petit banc*), which in some parts of France is employed when levelling the surface of areas or courts. According to Penrose the rise of the curved stylobate of the Parthenon had already been obtained in the stereobate carrying it, long before the problem of bedding the columns on the curve had arisen.

SCAMMONY, a plant, *Convolvulus scammonia* (Gr. σκαμωνία), native to the countries of the eastern part of the Mediterranean basin; it grows in bushy waste places, from Syria in the south to the Crimea in the north, its range extending westward to the Greek islands, but not to northern Africa or Italy. It is a twining perennial, bearing flowers like those of *Convolvulus arvensis*, and having irregularly arrow-shaped leaves and a thick fleshy root. The dried juice, "virgin scammony," obtained by incision of the living root, has been used in medicine as *scammonium*,[1] but the variable quality of the drug has led to the employment of *scammoniae resina*, which is obtained from the dried root by digestion with alcohol.

The active principle is the glucoside scammonin or jalapin, $C_{34}H_{56}O_{16}$. The dose of scammonium is 5 to 10 grains, of scammony resin 3 to 8 grains. Like certain other resins, scammony is inert until it has passed from the stomach into the duodenum, where it meets the bile, a chemical reaction occurring between it and the taurocholate and glycocholate of sodium, whereby it is converted into a powerful purgative. Its action is essentially that of a hydragogue, and is exercised upon practically the entire length of the alimentary canal. The drug is not a cholagogue, nor does it markedly affect the muscular coat of the bowel, but it causes a great increase of secretion from the intestinal glands. It acts in about four hours. In large doses it is, of course, a violent gastro-intestinal irritant. In consonance with the statement that scammony acts only after admixture with the bile, is the fact that hypodermic or intravenous injection of the drug produces no purgation, or indeed any other result. The drug frequently kills both the round-worm and the tape-worm, especially the former, and is therefore an anthelmintic. It is not largely used, but is very effective in the treatment of severe constipation, especially in children.

SCAMP, an idle, worthless rascal; in earlier (18th cent.) usage especially applied as a cant term for a highway robber, a foot-pad, later of one who incurs debts and decamps without paying them. The word appears to be derived from a shortened form of "scamper," to run away, decamp, to move quickly or nimbly; which is generally taken to be a military slang word adapted from Dutch *schampen*, to escape; O.Fr. *escamper*; Ital. *scampare*; Lat. *ex*, out of, *campus*, field of battle, hence a vagabond deserter. This word must be distinguished from "scamp," to do work in a hasty, careless manner, which is apparently a variant of "skimp," "skimpy," and is to be referred to the root seen in O. Nor. *skammr*, short; Eng. "scant."

[1] It was formerly called diagrydion, probably from δάκρυ, a tear, in allusion to the manner in which the juice exudes from the incised root.

SCANDAL, disgrace, discredit, shame, caused by the report or knowledge of wrongdoing, hence defamation or gossip, especially malicious or idle; or such action as causes public offence or disrepute. (For the law relating to scandal, more generally termed "defamation" see LIBEL AND SLANDER.) The Greek word σκάνδαλον, stumbling-block, cause of offence or temptation, is used in the Septuagint and the New Testament. Classical Greek had the word σκανδάληθρον only, properly the spring of a baited trap; the origin probably being the root seen in Latin *scandere*, to climb, get up. While the Latin *scandalum* has given such direct derivatives as Spanish and Portuguese *escandalo*, Dutch *schandaal*, Eng. "scandal," &c., it is also the source of the synonymous "slander," Middle Eng. *sclaundre*, O. Fr. *esclandre*, *escandle*.

A particular form of defamation was *scandalum magnatum*, "slander of great men," words, that is, spoken defaming a peer spiritual or temporal, judge or dignitary of the realm. Action lay for such defamation under the statutes of 3 Edw. I. c. 34, 2 Rich II. c. 5, and 12 Rich. II. c. 11 whereby damages could be recovered, even in cases where no action would lie, if the defamation were of an ordinary subject, and that without proof of special damage. These statutes, though long obsolete, were only abolished in 1887 (Statute Law Revision Act).

SCANDERBEG, or ISKENDER BEY (1403–1467), known also as "the Dragon of Albania," the national hero of the Albanians, was the son of John (Giovanni) Castriota, lord of Kroia and of the Mirdite country in northern Albania, and of a Servian princess named Vaisava. His actual name was George (Giorgio) Castriota, and the name of Iskender Bey (Prince Alexander) was given to him by the Turks in complimentary reference to Alexander the Great. In 1423, when Murad II. invaded Epirus, George Castriota, with his three brothers, was handed over as a hostage to the Turks and sent to be trained in the service of the seraglio. His brilliant qualities of mind and body at once gained him the favour of the sultan; he became a Mussulman, was promoted to high military command and, though barely nineteen years of age, to the government of a sanjak. He remained in the Ottoman service for twenty years, dissembling his resentment when, on the death of his father, his principality was annexed and his brothers poisoned. In 1443, however, his opportunity came with Janos Hunyadi's victory at Nish. He seized Kroia by stratagem, proclaimed himself a Christian, and gathered the wild Albanian clansmen about him. In the inaccessible fastnesses of Albania he maintained a guerilla warfare against the Turks during nearly twenty-five years, easily routing the armies sent against him, and is said to have slain three thousand Turks with his own hand. In 1461 Murad's successor Mahommed II. acknowledged him by a temporary truce as lord of Albania and Epirus. He died in 1467 at Alessio, and his tomb was long the object of a superstitious veneration on the part of the Turks.

Scanderbeg's resistance to the Turkish advance was invaluable to the cause of Christianity, but the union which he had maintained in Albania did not survive him. He was succeeded in Kroia by his son, Giovanni Castriota, who in 1474 sold the principality to the Venetians, by whom four years later it was re-sold to the Turks.

See Georges T. Petrovitch, *Scander-beg (Georges Castriota)*; *Essai de bibliographie raisonnée*; *Ouvrages sur Scander-beg écrits en langues française, anglaise, allemande, latine, italienne, &c.* (Paris, 1881); Pisko, *Skanderbeg, historische Studie* (Vienna, 1895).

SCANDINAVIAN CIVILIZATION. The date of man's first appearance in Scandinavia is still an open question. But for all practical purposes Scandinavian archaeology only begins with the Neolithic or Later Stone Age, since the country must have been covered with ice during the preceding period, the Palaeolithic or Early Stone Age, when parts of Europe were already inhabited. Thus the expressions Earlier and Later Stone Age in Scandinavian archaeology merely refer to subdivisions

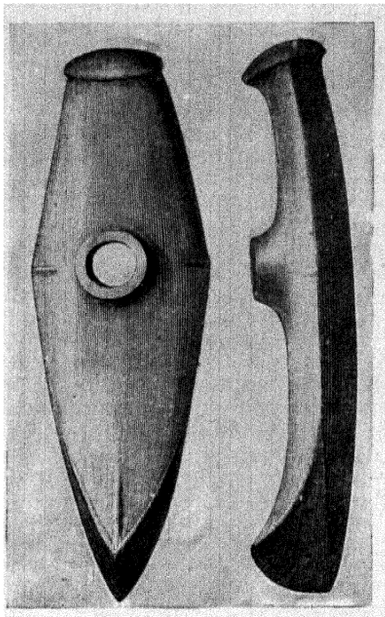
of the Neolithic Period. Men have left traces of their occupation of Denmark from the time when firs were still the prevailing trees in that country, and a few tools of elk and reindeer horn appear to belong to an even earlier period. Sweden and Norway were probably not inhabited until later, though it seems that men were present in Sweden while the Baltic was still a fresh-water lake. The dates assigned to this period vary very greatly: S. Müller suggests before 3000 B.C., while O. Montelius places it at 8000 years before our era. Besides the elk- and reindeer-horn tools mentioned above, a few rough flint implements seem to be the earliest traces of man in Scandinavia. In Norway and Sweden these are only found in the extreme south. The *kjökkenmøddinger* or *skaldynger*, variously called in English kitchen-middens, refuse-heaps, or shell-mounds, are characteristic of Denmark in the next period. In these we find remains of primitive meals, consisting chiefly of oyster, mussel and other shells, and the bones of various fish, birds and animals, including deer, wild boar, seals, wolves and aurochs. It appears that the race which left these relics must have lived by hunting and fishing, and that they were probably semi-nomadic. They were evidently unacquainted with agriculture and had no domestic animals other than the dog. These refuse heaps are almost always found by the sea-shore or close to a lake. Some of them extend over an area of as much as 700 yds. by 20 yds. width, but their depth is usually not more than 3 to 10 ft. There are frequent traces of fire and hearth places, so that we may conclude that the food was both prepared and eaten on the spot. The flint implements consist of flakes or knives, awls and axes of various kinds, all made by a process of rough chipping. These are supplemented by articles of bone, horn and clay, including arrow or spear points, axes of horn, and bone combs. Earthenware vessels must have been much used, but only fragments have been found, made, of course, without the use of the wheel. Rare attempts at decoration consist of a few cuts or impressions round the top. The only ornaments found are the pierced teeth of animals and shells. In Norway and Sweden implements similar to those of the Danish shell-mounds have been found, but usually without the organic remains, except at Viste, near Stavanger, excavated in 1907. The first Swedish shell-mound was discovered in the north of Bohuslän in 1905, but is of a later type than the Danish. The remains at Nöstvet in the Christiania fjord show traces of a considerable population. Ground slate implements are found scattered all along the coasts of Norway and Sweden, and are attributed to a nomadic people, whose arctic culture persisted much longer in these countries than in the much earlier flint civilization of the kitchen-middens in Denmark. To this race are attributed a few rock-carvings and other sculptured representations of animals in a highly naturalistic style, almost equal to that of the palaeolithic cave-carvings of France, and showing close affinity with the artistic productions of the regions on the eastern side of the Baltic.

Later Stone Age.—The remains of the Later Stone Age show a very much more advanced civilization of a pastoral and later of an agricultural type, with domestic animals, such as cattle, horses, pigs, sheep and goats. As the number of "transition" finds, showing a gradual development from the older forms, is very small, and as, moreover, settlements of the kitchen-midden type are known to have existed right through the later Stone Age, or even longer, there is some ground for assuming that the earlier flint implements of Denmark were the product of an aboriginal race, gradually ousted and driven north by Aryans, immigrating with a superior culture.

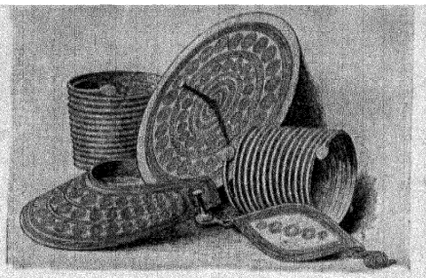
By far the greatest proportion of the remains of the Stone Age are found in Denmark. While there are not more than five to six hundred Stone-Age graves known in Sweden, and only two or three in Norway, there are between three and four thousand on the island of Seeland alone. Besides Seeland, Lolland, Falster and the north-eastern part of Jutland appear to have been thickly inhabited during the Later Stone Age. In Sweden the southernmost part, Skåne and Bohuslän, were probably the first to be inhabited: and then Vestergötland and Dal. Skåne has yielded more than three-fourths of all the Later Stone Age objects found in Sweden. Norway is not, as might be supposed from the absence of graves, entirely deficient in the objects of this period, but they are comparatively few in number, though quite on a par in technique with those of Sweden. As already indicated, the great difference between the culture of the shell-mounds and that of the Later Stone Age is the method of disposing of the dead. The dead of the former period, it is assumed, were placed in simple graves in the earth, while characteristic of the latter period are the megalithic graves found in profusion in Denmark and Sweden.

The earliest form, and that most common in Denmark, is the four-sided dolmen, formed by four or six large upright stones on which rests a huge rock, the whole being partly covered by a mound. These graves usually contain a number of skeletons. The next is the passage grave, a chamber approached by a passage, both built of great blocks of rough-hewn rock. The roof of the largest of these, near Falköping in Sweden, is formed of nine blocks of granite, and the whole attains a length of nearly 60 ft. Later again are stone cists, consisting of a comparatively small space walled in and roofed by thin blocks of stone, surrounded by a low mound. These graves seldom contain more than one skeleton, and mark the end of the Stone Age. Inhumation was practised throughout the period, though the bones found in the great graves are often marked by fire owing to the practice, apparently prevalent, of lighting fires in the grave chambers. The chambers are often full of remains up to within a foot of the roof, and in some cases parts of as many as a hundred skeletons have been found.

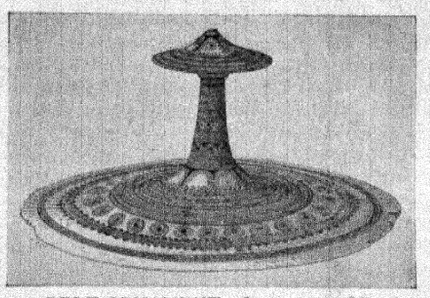
In the mounds surrounding the tombs animal bones and shells are frequently found, indicating feasts and sacrifices. It seems as if many of the graves, especially in Sweden, had at some time been considered as places for sacrifice, to judge by the saucerlike hollows constantly found on the upper side of the covering stones. The finds of tools, weapons, ornaments and pottery contribute greatly to our knowledge of the period, but probably the best specimens were not placed in graves, as we find the finest work elsewhere. The pottery is of good material and form, though still made without the aid of the potter's wheel. The indentations of the pattern are frequently filled in with a white chalk-like substance. Many of the vessels are rounded at the bottom, and perforations or handles show that they are meant to hang. Wood was no doubt much used, but it is only by a fortunate chance that wooden vessels and a wooden spoon have been preserved to us in Denmark. It is probable that wool was used as well as skins for clothing, but if so it must be supposed that the spinning and weaving implements were of too perishable a material to have come down to us. Awls are constantly found, but not needles. Bone pins were used for fastening the clothes. The ornaments were chiefly pierced teeth of various wild animals, and objects of amber and bone, many of them in the form of minute axes. Amber was much used during the earlier part of this age, but it is seldom found later on, probably because its value as an article of export had by then been realized. The Swedish archaeologist, O. Montelius, distinguishes four subdivisions in this period, towards the end of which the implements show a mastery over material unequalled in the rest of Europe, but it must not be supposed that this was attained at once. The tools include chisels, borers, knives, saws and axes, but the finest workmanship seems to have been reserved for weapons. Arrow-heads and spear-points of flint have chipped blades of marvellous fineness and symmetry. Daggers with handle and blade all made of one piece of flint are characteristic of the Northern Stone Age, and show how much weight was laid on ornamental appearance, since wooden handles would have been equally effective and far less troublesome to make. The battle-axes are of many forms, perfectly symmetrical and beautifully ground and polished. Those of other stone than flint have holes bored through them for the shaft. Wooden shafts were usually attached at right angles to the flint axes. Of these latter the thin-necked axe is the most characteristic. The distribution of flint implements reveals a considerable trading activity, as flint-bearing strata only occur in certain parts of Denmark and in Skåne, whence it must have been distributed over the whole of Southern Sweden through the channels of commerce. Considerable commercial activity must also have prevailed between the Scandinavians and their southern neighbours.



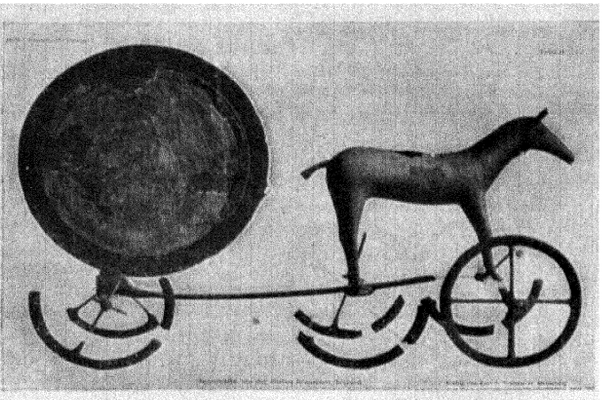
–STONE AXE. Later Stone Age, Sweden.



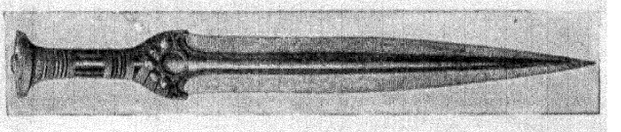
2.—WOMEN'S ORNAMENTS. Early Bronze Age.



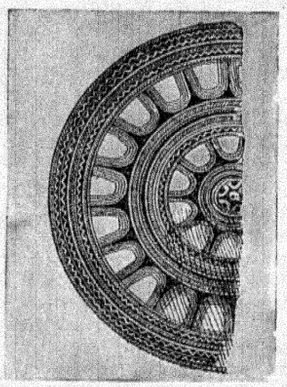
3.—BELT ORNAMENT. Latter part of Earlier Bronze Age.



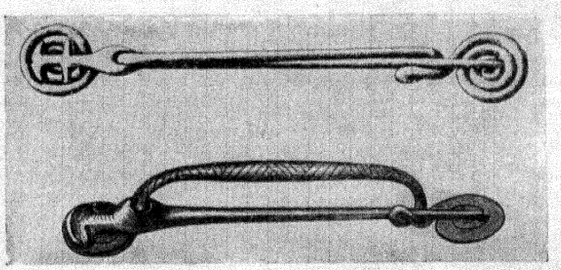
4.—SUN CHARIOT. Older Bronze Age, Denmark.



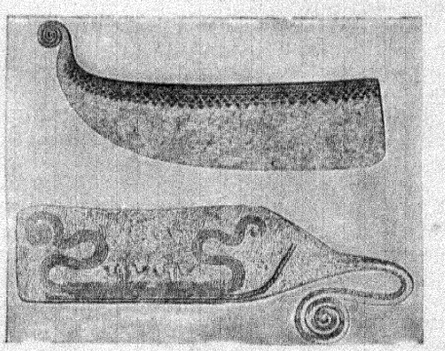
5.—SWORD. Second period of Earlier Bronze Age.



6.—TOP OF A SMALL BRONZE CASKET.
Latter part of Earlier Bronze Age.



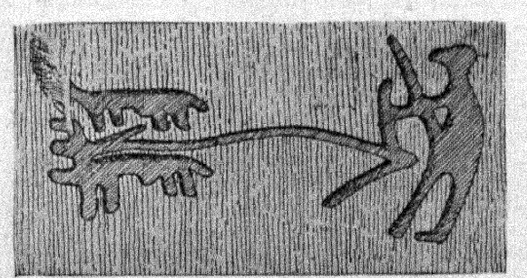
7.—FIBULÆ. Earlier and later forms, Bronze Age, Norway.



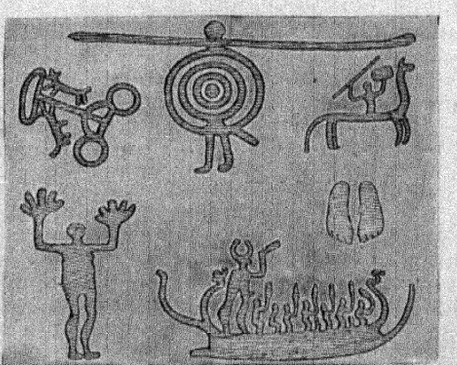
8.—BRONZE KNIVES OR RAZORS.
Later Bronze Age, earlier and later forms.



(Photo, B. S. Phillpotts.)
9.—PART OF A ROCK CARVING (the grooves are filled in with chalk). Bronze Age.



10.—PART OF A ROCK CARVING, showing man ploughing.



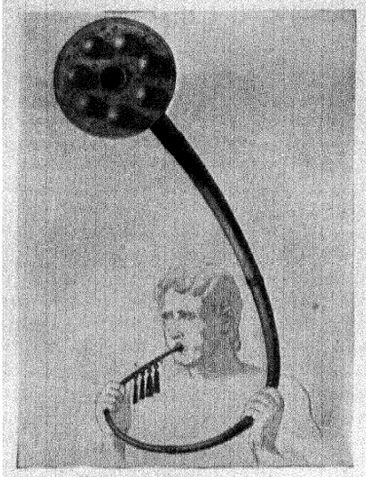
11.—ROCK CARVINGS. Sweden, Later Bronze Age.



12.—BRONZE CLASP. Later Bronze Age, Norway.

Fig. 1 from O. Montelius, *Civilisation primitive en Suède*; figs. 2, 6, 10, 11 from S. Muller, *Vor Oldtid*; [illegible]

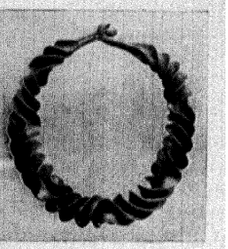
SCANDINAVIAN CIVILIZATION



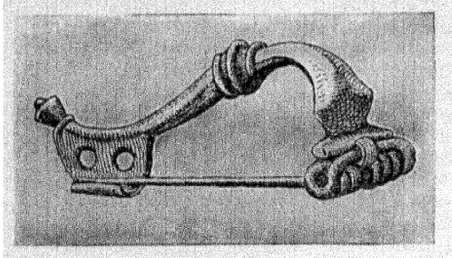
1.—BRONZE TRUMPET. Denmark, Later Bronze Age.



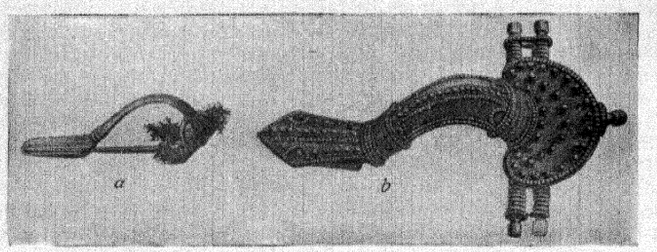
2.—BRONZE HANGING VESSEL. Later Bronze Age.



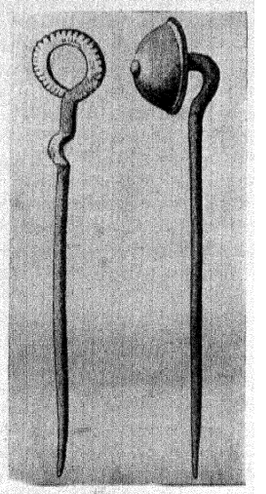
3.—TORQUE. Denmark, Later Bronze Age.



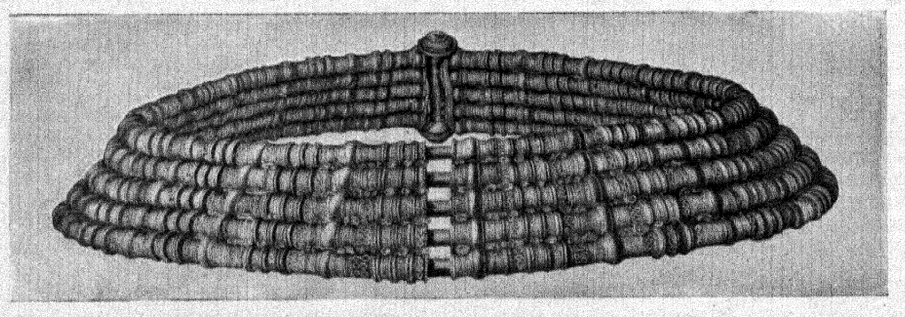
4.—FIBULA. Roman Period.



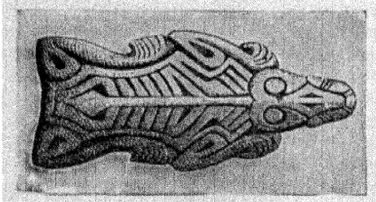
5.—FIBULÆ. Period of National Migrations, Denmark.



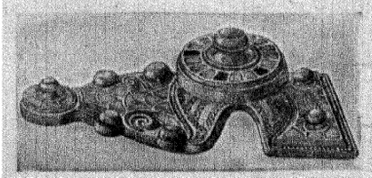
6.—IRON PINS. Pre-Roman Period, Denmark.



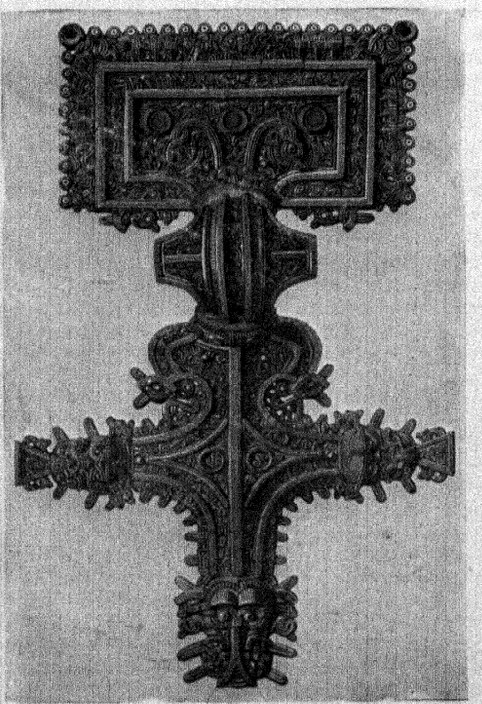
7.—GOLD COLLAR. First period of Later Iron Age.



8.—BROOCH. Post-Roman Period, Denmark.



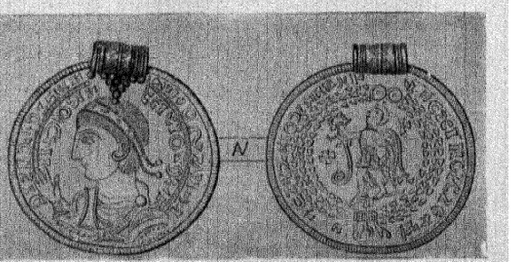
9.—BROOCH SET WITH GARNETS. Post-Roman Period, Denmark.



10.—SILVER GILT BROOCH (length over 9 inches). Period of National Migrations, Norway.



11.—BRONZE PLATE FOR A BELT, showing Animal Figures. Post-Roman Period.



12.—GOLD BRACTEATE, "barbarian" imitation of a Roman Coin. First period of Later Iron Age, Sweden.

Figs. 1, 3-6, 8, 9, 11 from S. Müller, *Vor Oldtid*; Figs. 2, 7, 12 from O. Montelius, *Civ. Sweden*; Fig. 10 from G. Gustafson, *Norges Oldtid*.

Traces of dwelling-houses with hearth-places show that the usual form was a round or slightly oval hut, constructed of wattles, plastered inside and out with clay. The floor was usually partly or entirely paved.

The Bronze Age.—Towards the close of the *Later Stone Age* a few objects of copper are found in the North. Copper is, however, soon superseded by bronze, which was probably imported ready alloyed into Scandinavia, though the special Scandinavian forms, as well as the presence of a number of moulds, conclusively prove that the casting of the metal was done in the North. It is supposed that the Bronze Age, which can be divided into two main periods, began in Scandinavia about 2000-1750 B.C. The earliest implements are clearly copies of the Stone Age work, betraying the ignorance of the makers as to the adaptability of the new material. Some bronze axes are exactly the shape of stone axes, but gradually we see the blade grow wider, the neck narrower, the outer sides of the haft turn back over the wooden shaft, which is still cloven, and finally before the end of the earlier period we have the "socketed celt," in which the tongue has disappeared and the wooden shaft is fixed in a cylinder of bronze, with a metal loop at the side through which the fastening passed. The unsocketed celt has also undergone modifications. By the end of the earlier period swords have been evolved from daggers, and brooches and clasps, besides beautiful vases and hanging vessels, are made of the metal. Gold is also known and used. Fine linear decoration, usually in spirals or zig-zags, is applied. The forms are extremely artistic, and the technique higher than in almost any other European country. Perhaps the most magnificent relic of this earlier period is the bronze "sun-chariot" and horse from Trundholm in Seeland. The disk supposed to represent the sun is overlaid with gold and beautifully decorated with spiral designs. The later period is clearly marked off from the earlier by the method of disposing of the dead, since in the earlier period the dead were still buried unburned, often in stone cists or oak coffins, while in the latter period cremation was practised, and the remains placed in small stone or wooden boxes, or in plain earthenware urns. Some of these urns are clearly imitations of the house of the period, and show that it was still round in form. The graves are covered by a cairn or mound. Miniature weapons are often found in the urns, but the objects placed in or beside the urn reveal little care in their selection: it is obvious that a few gifts were deposited with the dead, rather than the complete outfit of necessaries which are found in earlier periods. During this period decoration becomes more complicated: the spirals are often fringed with tangential lines, and the ends of knives, rings, &c., are frequently rolled up into spiral volutes. Bands of wavy lines are a common form of ornament. Amber and a dark-brown resinous matter are often inlaid. Ornaments show a tendency to exaggeration of size, as is seen in the massive neck and arm-rings, the brooches, pins and clasps.

We are fortunate in knowing more about the Scandinavian Bronze Age than the mere remains, plentiful though they are, could tell us. In some parts of Sweden and Norway rude carvings on bare granite rocks, executed in a stiff and conventional style, have been identified as belonging to this period, and from these, in combination with the finds, we can deduce a considerable fund of information. Horses were used for riding, driving and ploughing. From the impress left on earthenware vessels we find that wheat, barley and oats were cultivated. Large boats, almost invariably without mast or sail, are very frequently depicted. The human figures on the carvings are unfortunately represented in such a primitive manner that little could be known of the details of their clothing but for some unique finds in Denmark, where the oak coffins of the earlier period have preserved hair and clothing for over 3000 years. Thus we know that the garb of the Bronze Age man consisted of a thick glossy cap, replaced by a helmet in time of war, a woollen tunic which left the shoulders bare, a cloak and leather shoes fastened on by strips of cloth crossed up the ankle. A buckle for the belt, pins for the cloak, and one bracelet were his only ornaments. From the small bronze knife and the tweezers found in men's graves it has been deduced that shaving was usual, and a small pointed instrument also found in the graves is regarded as evidence for tattooing. The women wore a fine hair net and comb, a curiously clumsily-cut bodice with sleeves to the elbow, and a long skirt gathered round the waist by a belt with a large ornament in front. A heavy necklace, two bracelets and a dagger appear to have been usual. The people were tall and had light hair. With regard to the distribution of Bronze Age finds, it may be said that Götaland, Skåne and the district round Stockholm yield the richest harvest in Sweden, while in Norway the mass of finds are in the Christiania and the Stavanger districts. A notable feature of the period is the number of finds made in bogs. Many were clearly buried there for safe keeping, but others are usually explained as votive offerings.

Iron Age.—The approximate date for the first beginnings of this period in the North is still a matter of controversy; Montelius placing it at about 500 B.C., while Sophus Müller, of Denmark, would put it at least a century and a half later. It has been divided into four main subdivisions, of which the first, lasting till about the beginning of our era, is usually called the Pre-Roman Period. The beginnings of this age are most clearly traced on the island of Bornholm, where cemeteries are found containing from 10 to 1000 graves. These graves, called *Brandpletter*, are closely similar to the contemporary graves on the Continent, and consist of burnt bones embedded in charcoal and black mould. In this are found iron brooches (of the safety-pin type), buckles and a few fragments of pottery. More typically Northern cemeteries show small mounds covering each grave, in which an urn contains the burnt bones. These graves also yield but few remains, and the wealth of objects from this period come from bog and field finds, as for instance some magnificent chariots, overlaid with decorated bronze plates, from a bog near Ringkjöbing, Denmark. Ornaments were usually of massive bronze or occasionally of iron, and gold seems to have been comparatively scarce, perhaps owing to the disturbed state of central Europe. All but the very beginning of the period shows the influence of the La-Tène (*q.v.*) civilization. The succeeding Roman period begins in the 1st century A.D. and extends, according to Swedish and Norwegian archaeologists, to about 400. In Denmark the latter half of the period is termed that of "National Migrations." A number of Roman objects are found—coins, glass and bronze vessels, &c. From the fact that Skåne, Bornholm, Öland and Gotland are the chief finding-places, it appears that most of the objects must have been brought, through war or trade, from the south-east, by way of the great trade-route along the Vistula. Gotland alone has yielded nearly four thousand Roman coins, while Bornholm equals the whole of the rest of Denmark with 500, and Norway has only yielded three. A certain number of Roman objects seem, however, to have reached Denmark from the Rhine Provinces. The graves show a variety new to Scandinavia: in some parts cremation continues to be practised, in other localities, notably in Jutland and Seeland, inhumation reappears. Characteristic of both forms of burial is the practice of placing a number of vessels containing food and drink in the grave. Weapons are seldom found in graves, but a complete knowledge of them is afforded by such finds as that at Thorsbjerg in Schleswig and Vimose in Fünen, the latter yielding no less than 3500 objects to the National Museum. These are the debris of great battlefields from about the 4th century, and it is usually supposed that the victors dedicated the spoil to some god, as everything was left almost untouched.

From this ample evidence we learn that the spear or lance was the most common weapon, and after that the sword, used now for striking as well as thrusting, and with a short cross-piece. The hilt is often superbly decorated, frequently with silver, which is now much used. Coats of ring-mail are found. Helmets and shields are extraordinarily thin, almost flimsy, possibly in imitation of the inferior Roman goods of the period, possibly in the case of the shields, at any rate, because they were only intended to protect from arrows or spears flung from a distance, or because dependence was mainly placed on the strength of the boss. Numbers of bits and other fragments of harness prove the use of horses in war. A similar find at Nydam in Schleswig yielded two of the oldest boats that have come down to us: one of oak, 75 ft. long, built for 28 rowers, and another of firwood. The timbers were fastened with iron nails, but some early boats from Norway and Sweden show a more primitive method of attaching the timbers with fastenings of baste.

Besides the deserted battlegrounds, the more usual type of votive offering is found, such as the silver cauldron from Gundestrup, or the two magnificent gold horns, one more than 2 ft. in length, discovered at Gallehus in Schleswig. Further indications of religious

customs are afforded by a curious find in Jutland, where between 20 and 30 earthenware vessels each contained a slaughtered lamb. With these were found remains of rude altars.

Of domestic arts, weaving and dyeing seem to have been carried to a high degree of perfection. The art of pottery has also advanced, especially in Jutland, where we find a multiplicity of forms, with decoration in bands of slanting lines. It was during this period that the Scandinavians acquired the Runic alphabet from the southern Germanic tribes. The specifically Northern variant of this alphabet does not appear till later. Inscriptions from this period, cut into stone monuments, are found in Norway and Sweden.

The next period (the first of the Later Stone Age), called in Denmark the Post-Roman, and in Sweden and Norway the "Period of National Migrations," brings us from A.D. 400 to about 700. In Denmark these centuries are very obscure, owing to the fact that the graves there are usually difficult to find, being without mounds and unfurnished with goods. Bornholm, where inhumation is greatly on the increase, is again the chief centre for grave-finds. Some few graves contain the personal equipment of the dead: sword, spear, axe, shield, knife and whetstone, and occasionally the skeletons of horse and dog. The vessels for food and drink are no longer found. At Old Upsala, Vendel and Ultuna, all in Upland, great interest attaches to the first ship-graves. These become common in Norway, fairly frequent in Sweden, and even in Finland, but only one grave containing remains of a boat has so far been found in Denmark. The details of the earlier Swedish ship-burials are somewhat obscured for us because the ship and all its contents have been burnt, but we can see that in these the dead man sits at the stern, as if about to set forth on a journey, while in later graves of the Viking Period, both burnt and unburnt, the corpse seems to have been laid on a bed in a chamber built amidships for the purpose. All the larger ship-burials are remarkable for the large number of animal bones found, including those of horses, oxen, pigs, sheep and fowls.

The gold ornaments of the period are its chief glory: indeed the wealth of gold, especially in Sweden, has suggested the title "Gold Age" for these centuries. The favourite ornaments of the period were the so-called bracteates, worn as pendants, and imitated from Roman coins, but often stamped on one side only and decorated in the Northern style. Magnificent brooches of engraved or filigree work, some with a plate at the hinge end at right angles to the pin, others oval, often representing an animal seen from above, are among the finest productions of the time. The decoration of conventionalized animal forms is a marked feature, and, though characteristic of all the Germanic races at this time, is best executed in the north. When worked in filigree the animals' limbs become more and more attenuated and snake-like, or, on the other hand, when engraved, show less and less connexion with each other, but the artist's aim, a good decorative effect, is attained, even though there is a certain barbaric absence of restraint in design.

In the *Viking Age*, from about 800 to the introduction of Christianity in the 10th and 11th centuries, Norway, hitherto the poorest in antiquities, springs into prominence. A wealth of objects is found in the graves, and especially in some of the larger ship-graves, such as those of Gokstad, Tune, Myklebostad and Oseberg (also in the Norwegian ship-grave at Groix, Brittany). Fortunately a number of these ships are unburnt, and in view of the importance of seafaring in the Viking Age, it is worth noting that a mast with square sail of woollen material is common. One ten-oared vessel from this period is of exactly the same build as those used to this day in the district where it was excavated. A number of shield bosses are often found in the vessels, and it is clear that shields were hung round the bulwarks exactly as Icelandic sources describe. The prow and stern-post are often beautifully carved. Sometimes the remains of as many as 12 horses are found in one of these graves, besides those of a number of dogs. The presence of anvils, pincers and other tools, as well as weapons and ornaments, is noteworthy, indicating that the art of metal-work was held in esteem even among chiefs, as indeed is known from literary sources. During this period, moreover, iron ore was extracted, smelted and worked in Scandinavia. The weapons found are swords, knives, sickles, battle-axes, spears and arrows. The sword is two-edged, with a wooden hilt often beautifully decorated with silver. The axe is very broad-bladed, and evidently of great importance, being often the only weapon found in graves. Helmets and coats of mail are not found in Norway, but are comparatively common in Sweden.

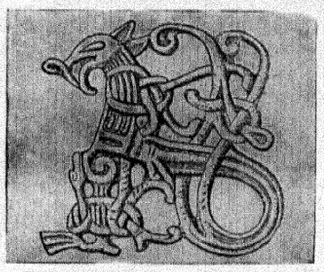
We owe much of our knowledge of this period to the unburnt burials which were fortunately usual. In Denmark grave-chambers of wood, such as those at Jellinge, stand nearest to the ship-graves. In Sweden the great number of graves surrounding the ancient town of Birka (mod. Björkö), should be noticed. Most graves have a round, oblong or triangular howe raised over them. A feature of the period are the tall, rudely-hewn *bauta-stones*, set up over graves containing burnt bones, or sometimes merely to the memory of the dead. Large upright stones are sometimes set round a grave in a circle, or in the shape of a ship, with pointed bow and stern. It is noticeable that the graves are often in close proximity to the modern cemeteries. In this period women are also occasionally buried in a boat or ship, as in the case of one of the finest ship-graves, that at Oseberg. Women's graves often contain splendid ornaments, though gold and silver are rare in grave-finds, and the large oval-headed pins and the oblong or trefoil-shaped clasps found in them are usually of bronze, while in other finds silver ornaments are common. Silver is as characteristic of this period as gold of the preceding one, Denmark alone yielding no less than 25 important silver finds, some of them consisting of necklaces of very fine filigree work, or of dexterously woven silver wires. The style of decoration is the same as the preceding period, but bolder, less refined and often heavy. Ornaments are often set with garnets. The influence of Irish art is discernible, as in the spirals which terminate the limbs of the animal forms, and in the frequent interlacing designs; and we are not surprised to find a number of objects of Irish manufacture in Norway. On the other hand, English leaf decoration is imitated, and Carolingian models appear to have served for certain grotesque forms, such as dragons, winged lions, &c. Sweden shows the same influences at work, though the Swedes still had most dealings with the eastern Baltic countries, and with the Scandinavian kingdom of Novgorod. "Cufic" coins, struck in Persia and Turkestan, are found together with those of Germany and England. It is clear proof of Gotland's commercial importance that it is still the richest treasure-ground in this respect, even for English coins. Evidence for the eastern communications of Sweden is afforded by Runic inscriptions, some of which state that the chief whom the stone commemorates fell in Finland or Esthonia. Runic inscriptions with the later, entirely Northern alphabet are now common all over Scandinavia. The stones, especially the later Swedish ones, are often carved with spiral and animal designs, and some represent mythical scenes such as the adventures of Sigurd Fafnisbane, depicted on a stone from Södermannland. The houses of this period were usually built of wood, and consisted, as we know from literary evidence, of a large hall with various outbuildings. The descriptions in Icelandic sagas of tapestry hangings are borne out by the discovery of traces of hangings in grave-chambers, especially those at Jellinge in Denmark. Some fragments of cloth, showing designs in various colours, testify to a considerable degree of skill in weaving, and figured silk material is found in some of the ship-graves. Traces of feather mattresses and wooden beds are found in some of these graves, and dice and playing-pieces resembling draughtsmen frequently occur. The remains of humbler dwellings have been found, some of them resembling a type of cottage still to be seen in southern Sweden, built of wattles, plastered inside and out.

Another feature of the Viking Age consists in the great earthworks, many of them standing to this day. Such are the famous Danevirke, stretching right across Schleswig, the work of Queen Thyra, who lies in one of the great howes at Jellinge, and the so-called *bygdeborge* in Norway, some of which are assigned to Viking times.

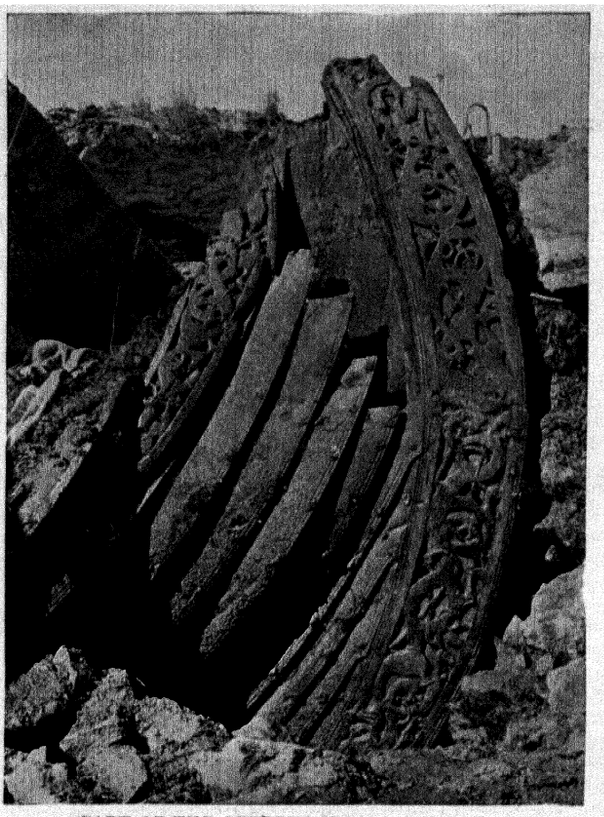
AUTHORITIES.—O. Montelius, *Kulturgeschichte Schwedens von den ältesten Zeiten* (Leipzig, 1906). An earlier Swedish edition of this book has been translated into English by F. H. Woods: *Civilization of Sweden in Heathen Times* (London, 1888); S. Müller, *Nordische Alterthumskunde; Deutsche Ausgabe, von O. L. Jiriczek* (Strassburg, 1897), and *Ordnung af Danmarks Oldsager, Système Préhistorique du Danemark* (Copenhagen and Paris); J. J. Worsaae, *The Industrial Arts of Denmark* (London, 1882); G. Gustafson, *Norges Oldtid* (Christiania, 1906); O. Rygh, *Norwegian Antiquities* (French and Norwegian text) (London and Christiania, 1880); A. Hansen, *Landnâm i Norge* (Christiania, 1904); E. Vedel, *Bornholms Oldtidsminder* (Copenhagen, 1886); J. Undset, *Das Erste Auftreten des Eisens in Nord-Europa*; J. Mestorf, *Urnenfriedhöfe in Schleswig-Holstein* (Hamburg, 1886) and *Vorgeschichtliche Alterthümer aus Schleswig-Holstein* (Hamburg, 1885); B. Salin, *Die altgermanische Thierornamentik, übersetzt von J. Mestorf* (Stockholm, 1904). Also articles by the above, and by H. Schetelig, H. Hildebrand, H. Stolpe and others, in various periodicals, especially *Bergens Museums Aarbog* (Bergen), *Aarsberetninger fra Foreningen til norske Fortidsmindesmaerkers Bevaring* (Christiania), *Aarböger for nordisk Oldkyndighed* (Copenhagen), *Antiqvarisk Tidskrift för Sverige* (Stockholm), the *Månadsblad* of the *Kgl. Vitterhets Historie och Antiqvitets Akademie* (Stockholm), *Fornvännen*, published since 1906 by the same society, *Svenska Fornminnesföreningens Tidskrift* (Stockholm), *Ymer* (Stockholm). The guides to the various Scandinavian museums are of great value. Some of them can be obtained in English. The importance of the Kiel Museum, with its



1.—AXE INLAID WITH SILVER. Viking Age, Denmark.



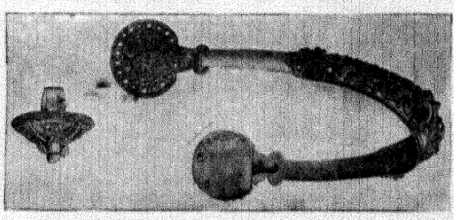
2.—TYPICAL MOTIF, ANIMAL FORM AND SNAKE, from bronze clasp. Viking Age, Denmark.



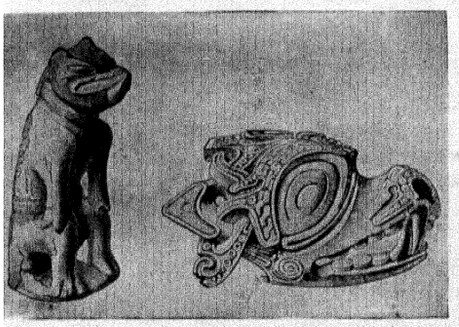
3.—PART OF THE OSEBERG VIKING SHIP. Norway.
Photo lent by Prof. G. H. Gustafson.



4.—OAK CARVING FROM THE GOKSTAD SHIP. Viking Age, Norway.

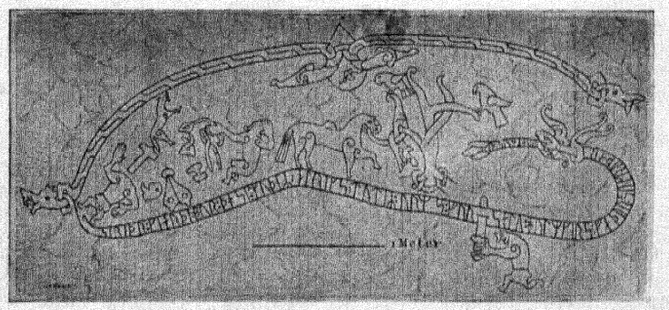


5.—GOLD SPUR. Viking Age, Norway.



6.—BONE PLAYING PIECE.

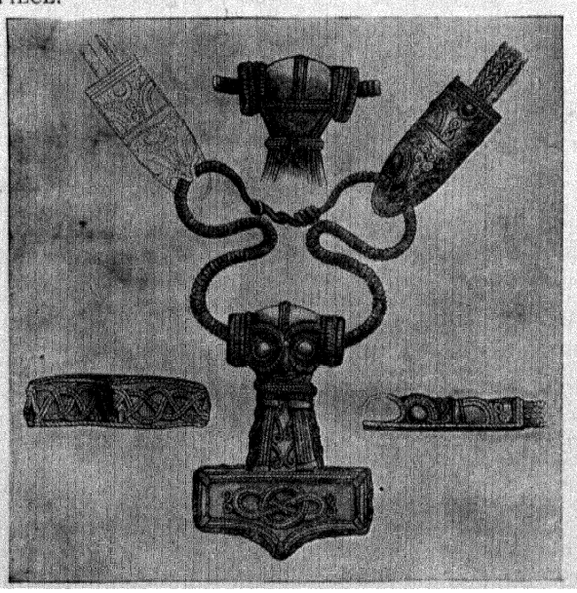
GILT BRONZE KNOB FOR HARNESS. Viking Age, Norway.



7.—SCENES FROM THE LIFE OF SIGURD AND RUNIC INSCRIPTION. Viking Age, Sweden.



8.—RUNIC STONE, from Jellinge, Jutland, showing Christian influence.



9.—SILVER THOR'S HAMMER. Viking Age, Sweden.





Figs. 1, 2, 8 from S. Müller, *Nordisk Oldkunst*; Figs. 3, 4, 5, 6, 10 from G. Gustafson, *Norges* [illegible] *Swed*

guide by J. Mestorf, *Vorgeschichtliche Alterthümer aus Schleswig-Holstein*, should not be overlooked. The *Saga Book of the Viking Club* (London) contains excellent articles, chiefly by H. Schetelig and H. Kjær. (B. S. P.)

SCANDINAVIAN LANGUAGES.[1] By this expression we understand the closely allied languages which are and have been spoken by the Teutonic population in Scandinavia, and by the inhabitants of the countries that have been wholly or partially peopled from it. The territory of these languages embraces: Sweden, except the most northerly part (chiefly Lapland and inland parts of Vesterbotten, where Finnish and Lappish exclusively or chiefly prevail); certain islands and districts on the coast of western and southern Finland, as well as Åland; a small tract on the coast of Esthonia, where Swedish is spoken, as it is also to some extent in the Esthonian islands of Dagö, Nargö, Nukkö, Odensholm, Ormsö and Rågö; Gammalsvenskby ("Galsvenskbi") in southern Russia (government of Kherson), a village colonized from Dagö; the Livonian island of Runö, where Swedish is spoken, as it formerly was on the islands of Kynö, Mannö, Moon and Ösel; Norway, except certain regions, especially in the northern part of the country, peopled by Finns and Lapps (mainly in the diocese of Tromsö); Denmark, with the Faeroes, Iceland and Greenland, where, however, Danish is only spoken by a very small part of the population; the northern half of Schleswig; and, finally, several Scandinavian colonies in the United States of North America (especially in Minnesota and Illinois). Scandinavian dialects have besides been spoken for varying periods in the following places: Norwegian in certain parts of Ireland (A.D. 800–1250) and northern Scotland, in the Isle of Man (800–1450), the Hebrides (800–1400), the Shetland Islands (800–1800) and the Orkneys (800–1800); Danish in the whole of Schleswig, in the north-eastern part of England (the Danelagh, *q.v.*, 875–1175), and in Normandy (900–1100, or a little longer); Swedish in Russia (862–1300, or a little longer);[2] Icelandic in Greenland (985–about 1450).

Territory.

At what epoch the Teutonic population settled in Scandinavia we cannot as yet even approximately decide. It is quite certain, however, that it already existed there before the Christian era—most probably as early as the beginning of the so-called Later Stone Age (5000 B.C., but see SCANDINAVIAN CIVILIZATION), if not still earlier. If this view be correct, the Scandinavian languages have had an existence of seven thousand years at least. But it is only from the beginning of the Christian era that we can get any information concerning the language of the old Scandinavians, which seems by that time not only to have spread over Denmark and great parts of southern and middle Sweden and of Norway, but also to have reached Finland (at least Nyland) and Esthonia. In spite of its extension over this considerable geographical area, the language appears to have been fairly homogeneous throughout the whole territory. Consequently, it may be regarded as a uniform language, the mother of the younger Scandinavian tongues, and accordingly has been named the primitive Scandinavian (*urnordisk*) language. The oldest sources of our knowledge of this tongue are the words which were borrowed during the first centuries of the Christian era by the Lapps from the inhabitants of central Sweden and Norway, and by the Finns from their neighbours in Finland and Esthonia (partly, it is true, also from their Gothic neighbours in Russia and the Baltic provinces), and which have been preserved in Finnish and Lappish down to our own days.[3] These borrowed words, denoting chiefly utensils belonging to a fairly advanced stage of culture, amount to several hundreds, with a phonetic form of a very primitive stamp; as Finn. *terva* (O. Swed. *tiæra*, Ger. *teer*), tar; *airo* (O. Swed. *ar.*), oar; *kansa* (O.H.G. *hansa*), society; *napakaira* (O.H.G. *nabagêr*, O. Swed. *navar*), auger; *ansas* (Got. *ans*, O. Swed. *as*), beam; Lapp *sajet* (Got. *saian*, O. Swed. *sa*), sow; *garves* (O.H.G. *garawêr*, O. Sw. *gör*), finished; *divres* (O. Sax. *diuri*, O. Swed. *dyr*), dear; *saipo* (O.H.G. *seifa*), soap. These words, with those mentioned by contemporary Roman and Greek authors, as well as the most ancient runic inscriptions mentioned below, are the oldest existing traces of any Teutonic language. Wrested from their context, however, they throw but little light on the nature of the original northern tongue. But an equally old series of linguistic monuments has come down to us dating from a little before the end of the so-called Early Iron Age (about A.D. 400)—the knowledge and the use of the oldest runic alphabet (with twenty-four characters) having at that period been propagated among the Scandinavians by the southern Teutonic tribes. In fact we still possess, preserved down to our own times, primitive northern runic inscriptions, the oldest upon the utensils found at Vi in Schleswig and Thorsbjerg in Denmark, dating back to about A.D. 250–300, which, together with the MS. fragments of Ulfilas' Gothic translation of the Bible, about two hundred years later in date, constitute the oldest genuine monuments of any Teutonic tongue.

Age.

The primitive Scandinavian language.

Borrowed words.

Runic inscriptions.

These runic inscriptions are for the most part found on stone monuments (sometimes on rocks) and bracteates (gold coins stamped on one side and used for ornaments), as well as on metallic and wooden utensils, weapons and ornaments.[4] Up to 1908 there had been discovered more than one hundred, but of these only about one-half give us any information concerning the language, and most of them are only too short. The longest of those satisfactorily interpreted, the stone-monument of Tune, in south-eastern Norway, contains only sixteen words. Their language is perhaps somewhat later in character than that of the oldest words borrowed by the Lapps and Finns, voiced *s*, for example, is changed into a kind of *r* (cf. *dagaR* = Goth. *dags*, day; but Finn. *armas* = Goth. *arms*, poor). On the other hand, in all essential matters it is much earlier in character than the language of contemporary Gothic manuscripts, and no doubt approaches more nearly than any Teutonic idiom the primitive form of the Teutonic tongue. For the sake of comparison, we give a Gothic translation of one of the oldest of the primitive Scandinavian inscriptions, that on the golden horn of Gallehus, found on the Danish-German frontier, and dating from about A.D. 300:—

Scand.: EK HLEWAGASTI*R*. HOLTINGA*R*. HORNA. TAWIDO;
Goth.: *ik Hliugasts Hultiggs haurn tawida*;
Engl.: I, HlewagastiR, from Holta, made the horn;

as well as the inscription on the stone monument of Järsberg in western Sweden, which is about 250 years later:—

Scand.: UBA*R* HITE. HARABANA*R* WIT IAH EK ERILA*R* RUNO*R* WARITU;
Goth.: *Ubs Hita, Hrabns wit jah ik Airils rûnôs writu*;
Engl.: UbaR (erected the monument in memory of) HitaR. We both, HarabanaR and I ErilaR, wrote the runes.

Although very brief, and not yet thoroughly interpreted,[5] these primitive Scandinavian inscriptions are nevertheless sufficient to enable us to determine with some certainty the relation which the language in which they are written bears to other languages. Thus it is proved that it belongs to the Teutonic family of the Indo-European stock of languages, of which it constitutes an independent and individual branch. Its nearest relation being the Gothic, these two branches were formerly sometimes taken together under the general denomination *Eastern Teutonic*, as opposed to the other Teutonic idioms (German, English, Dutch, &c.), which were then called *Western Teutonic*.

Relation to other languages.

The most essential point of correspondence between the Gothic and Scandinavian branches is the insertion in certain cases of *gg* before *w* and *j* (*ggj* in Gothic was changed into *ddj*), as in gen. plur. O.H.G. *zweio*, O. Eng. *tweâ* (two), compared with O. Icel., O. Norw. *tueggia*, O. Swed., O. Dan. *twæggiae*, Goth. *twaddjê*; and, still, in German *treu*, Eng. *true*, compared with Swed., Norw., Dan. *trygg*, Icel. *tryggr*, Goth.

[1] For details see A. Noreen, "Geschichte der nordischen Sprachen" (*Grundriss der germanischen Philologie*, 2nd ed., 1897).

[2] V. Thomsen, *The Relations between Ancient Russia and Scandinavia* (1877).

[3] W. Thomsen, *Über den Einfluss der Germ. Sprachen auf die Finnisch-Lappischen* (1870); E. N. Setälä, "Zur Herkunft und Chronologie der älteren germanischen Lehnwörter" in *Journal de la Société Finno-ougrienne*, xviii. (1906).

[4] See the plates in G. Stephens's *Handbook of Old Northern Runic Monuments* (1884), and S. Bugge's *Norges Indskrifter med de ældre Runer* I. (1891–1903).

[5] For the interpretations we are principally indebted to Prof. S. Bugge's ingenious investigations, who in 1865 satisfactorily succeeded in deciphering the inscription of the golden horn, and by this means gained a fixed starting-point for further researches. A short review of their most important results is given by A. Noreen, *Altisländische Grammatik* (3rd ed., 1903), appendix.

triggws. However, even in the primitive Scandinavian age the difference between Gothic and Scandinavian is more clearly marked than the resemblance; thus, for example—just to hint only at some of the oldest and most essential differences—Goth. nom. sing. ending in *-s* corresponds to primitive Scandinavian *-aR*, *-iR* (as Goth. *dags*, day, *gasts*, guest = Scand. *dagaR*, *gastiR*); Goth. gen. sing. in *-is* to Scand. *-as* (as Goth. *dagis*, day's = Scand. *dagas*); Goth. dat. sing. in *-a* to Scand. *-e* (as Goth. *kaurna*, corn = Scand. *kurne*); Goth. 1st pers. sing. pret. in *-da* to Scand. *-do* (as Goth. *tawida*, did = Scand. *tawido*).

Already before the beginning of the so-called Viking period (since about A.D. 800) the primitive Scandinavian language had undergone a considerable transformation, as is proved, for example, by the remarkable runic stone at Istaby in the south of Sweden, with the inscription (about A.D. 650):—

Transformation.

AFĄTR HARIWULĄFĄ HAÞUWULĄFR HAERUWULĄFIR WĄRAIT RUNAR ÞAIAR;

Engl.: In memory of HariwulfR, HaÞuwulfR, son of HeruwulfR, wrote these runes.

Here, *e.g.* we find nom. sing. in *-aR* changed into *-r* (cf. *haÞuwulafR* with *holtingaR* on the golden horn), and the plural ending *-oR* into *-aR* (cf. *runaR* with *runoR* on the Järsberg-stone). At the beginning of the Viking period the Scandinavian language seems to have undergone an extraordinarily rapid development, which almost completely transformed its character. This change is especially noticeable in the dropping of unaccented vowels, and in the introduction of a certain vowel harmony of different kinds (*Umlaut*, vowel changes, caused by a following *i* (*j*) or *u* (*w*), as *kwāði* for *kwādi*, poem, and "Brechung," as *healpa* instead of *helpa*, to help), different assimilations of consonants (as *ll*, *nn* for *lÞ*, *nÞ*; *ll*, *nn*, *rr* and *ss* for *lR*, *nR*, *rR* and *sR*), dropping of *w* before *o* and *u* (as *orð*, *ulfr* for *worð*, word, *wulfR*, wolf), simplified inflection of the verbs, a new passive formed by means of affixing the reflexive pronoun *sik* or *seR* to the active form (as *kalla-sk*, *kalla-ss*, to call one's self, to be called), &c.

At this epoch, therefore, the primitive Scandinavian language must be considered as no longer existing. The centuries A.D. 700–1000 form a period of transition as regards the language as well as the alphabet which it employed. We possess some inscriptions belonging to this period in which the old runic alphabet of twenty-four characters is still used, and the language of which closely resembles that of the primitive Scandinavian monuments, as, for example, those on the stones of Stentoften (about 700) and Björketorp (about 750), both from southern Sweden, being the longest inscriptions yet found with the old runic alphabet. On the other hand, inscriptions have come down to us dating from about A.D. 800, in which the later and exclusively Scandinavian alphabet of sixteen characters has almost completely superseded the earlier alphabet from which it was developed, while the language not only differs widely from the original Scandinavian, but also exhibits dialectical peculiarities suggesting the existence of a Danish-Swedish language as opposed to Norwegian, as the form *ruulf* on the stone at *Flemlöse* in Denmark, which in a Norwegian inscription would have been written *hruulf* corresponding to *Hrolf* in Old Norwegian literature. These differences, however, are still unimportant, and the Scandinavians still considered their language as one and the same throughout Scandinavia, and named it *Dǫnsk tunga*, Danish tongue. But when Iceland was colonized (*c.* 900), chiefly from western Norway, a separate (western) Norwegian dialect gradually sprang up, at first of course only differing slightly from the mother-tongue. It was not until the definitive introduction of Christianity (about A.D. 1000) that the language was so far differentiated as to enable us to distinguish, in runic inscriptions and in the literature which was then arising, four different dialects, which have ever since existed as the four literary languages—Icelandic, Norwegian, Swedish and Danish. Of these the latter two, often comprehended within the name of *Eastern Scandinavian*, as well as the former two, *Western Scandinavian*, or, to use the Old Scandinavians' own name, *Norrǫnt mál*, Northern tongue, are very nearly related to each other. The most important differences between the two branches, as seen in the oldest preserved documents, are the following: (1) In E. Scand. far fewer cases of "Umlaut," as *vāre*, W. Scand. *vǽre*, were; *land*, W. Scand. *lond* (from *landu*), lands; (2) E. Scand. "Brechung" of *y* into *iu* (or *io*) before *ng(w)*, *nk(w)*, as *siunga*, W. Scand. *syngua* (from *singwa*), to sing; (3) in E. Scand. *mp*, *nk*, *nt* are in many cases not assimilated into *pp*, *kk*, *tt*, as *krumpin*, W. Scand. *kroppenn*, shrunken; *ænkia*, W. Scand. *ekkia*, widow; *bant*, W. Scand. *batt*, he bound; (4) in E. Scand. the dative of the definite plural ends in *-umin* instead of W. Scand. *-onom*, as in *handumin*, *hǫndonom*, (to) the hands; (5) in E. Scand. the simplification of the verbal inflectional endings is far further advanced, and the passive ends in *-s(s)* for *-sk*, as in *kallas(s)*, W. Scand. *kallask*, to be called. In several of these points, and indeed generally speaking, the Western Scandinavian languages have preserved the more primitive forms, which also are found in the oldest Eastern Scandinavian runic inscriptions, dating from a period before the beginning of the literature, as well as in many modern Eastern Scandinavian dialects. For, having regard to the Scandinavian dialects generally, we must adopt quite a different classification from that indicated by the dialects which are represented in the literature. We now pass on to review the latter and their history.

Dialects.

Differences between Eastern and Western Scandinavian.

I. ICELANDIC.—In ancient times Icelandic was by far the most important of the Scandinavian languages, in form as well as in literature. To avoid ambiguity, the language before the Reformation (about 1530) is often called Old Icelandic.

1. *Old Icelandic* was spoken not only in Iceland, but also in Greenland, where, as already mentioned, Icelandic colonists lived for a lengthened period. Our knowledge of its character is almost exclusively derived from the remarkably voluminous literature,[1] dating from the first half of the 12th century, and written in the Latin alphabet, adapted to the special requirements of this language. No traces are found of any older runic literature. Indeed, Old Icelandic possesses only very few runic monuments (about forty-five), all of them almost worthless from a philological point of view. The oldest, the inscriptions on the church door of Valþjófstaður, and that of a tombstone at Hjarðarholt, date from the beginning of the 13th century, and they are consequently later than the oldest preserved manuscripts[2] in the Latin alphabet, some of which are as old as the last half of the 12th century. A small fragment (Cod. AM. 237, fol.) of a *Book of Homilies* (of which a short specimen is given below) is considered the oldest of all. About contemporary with this is the oldest part of an inventory entitled *Reykjaholts máldagi*. From the end of the 12th century we possess a fragment (Cod. Reg. old sign. 1812) of the only existing Old Icelandic *glossary*, and from the first years of the 13th century the *Stockholm Book of Homilies* (Cod. Holm. 15, 4to), which from a philological point of view is of the greatest importance, chiefly on account of its very accurate orthography, which is especially noticeable in the indication of quantity; from the early part of the same century comes the fragment (Cod. AM. 325, 2, 4to) entitled *Ágrip* ("abridgment" of the history of Norway), probably a copy of a Norwegian original, also orthographically important. Among later manuscripts we may mention, as philologically interesting, the *Annales Regii* (Cod. Reg. 2087) from the beginning of the 14th century, orthographically of great value; the rich manuscript of miscellanies, *Hauksbók* (Codd. AM. 371, 544, 675, 4to), a great part of which is written with Haukr Erlendsson's (d. 1334) own hand; and, above all, three short essays, in which some Icelanders have tried to write a grammatical and orthographical treatise on their own mother-tongue, all three appearing as an appendix to the manuscripts of the *Prose Edda*. The oldest and most important of these essays (preserved in the Cod. Worm. from the last half of the 14th century) is by an unknown author of about 1140, the second (the oldest known manuscript of which is preserved in the Cod. Ups., *c.* 1300) is by an unknown author of about 1250; the third (the oldest manuscript in Cod. AM. 748, 4to, of the beginning of the 14th century) is by Snorri's nephew Olafr Hvítaskáld (d. 1259), and is no doubt based partly upon a lost work of the first grammarian of Iceland, Þóroddr Rúnameistari (who flourished at the beginning of the 12th century), partly and chiefly upon Priscian and Donatus.[3]

Old Icelandic.

[1] A complete catalogue of the literature edited hitherto is given by Th. Möbius, *Catalogus Librorum Islandicorum et Norvegicorum Aetatis Mediae* (1856), and *Verzeichniss der . . . altisländischen und altnorwegischen . . . von 1855 bis 1879 erschienenen Schriften* (1880). Cf. ICELAND.

[2] An account of the oldest Icelandic manuscripts (to about 1230) is given by J. Hoffory in the *Gött. Gel. Anz.* (1884), p. 478 sq.

[3] A short review of the most important Old Icelandic manuscripts (and their editions), classed according to subjects, is given by O. Brenner, *Altnordisches Handbuch*, pp. 13 sq. The principal collections of manuscripts are—(1) the Arnamagnaean (AM.) in Copenhagen, founded by Arni Magnússon (d. 1730); (2) the collection of the Royal Library (Reg.) in Copenhagen, founded by T. Torfaeus

The oldest form of the Icelandic language is, however, not preserved in the above-mentioned earliest manuscripts of the later half of the 12th century, which are written in the language of their own age, but in far later ones of the 13th century, which contain poems by the oldest Icelandic poets, such as the renowned Egill Skallagrímsson (about 950) and the unknown authors of the so-called Edda-songs. In spite of the late date of the manuscripts, the metrical form has been the means of preserving a good deal of the ancient language. But, as already remarked, during the 10th and 11th centuries this dialect differs but little from Norwegian, though in the 12th this is no longer the case.

Form of the language.

We may here contrast a specimen of the above-mentioned oldest Icelandic manuscript with an almost contemporary Norwegian one (Cod. AM. 619; see below):—

Icel.—En þat es vitanda, at allt ma andlega merkiasc oc fyllasc í oss, þat es til kirkio bunings eþa þionosto þarf at haua, ef ver liuom sva hreinlega at vér sem verþer at callasc goþs mustere.

Norw.—En þat er vitanda, at allt ma andlega merkiasc oc fyllasc i os, þat er til kirkiu bunings eða til þionasto þarf at hafa, ef vér lifum sva ræinlega, at vér sem verðir at kallasc guðs mysteri.

Engl.—And that is to be known that all that is needed for the decoration of the church or the service may, spiritually, be found and imitated within us, if we live so cleanly that we are worthy to be called God's temple.

Apart from the fact that the language is, generally speaking, archaic, we find in the Icelandic text two of the oldest and most essential characteristics of Icelandic as opposed to Norwegian, viz. the more complete vowel assimilation (*þionosto*, *þionasto*; cf. also, *e.g.* Icel. *kǫllopom*, Norw. *kallaðum*, we called) and the retention of initial *h* before *r* (*hreinlega*, *ræinlega*), *l* and *n*. Other differences, some of which occur at this period, others a little later, are—in Icel. longthening of *a*, *o*, *u* before *lf*, *lg*, *lk*, *lm* and *lp* (as Icel. *hálfr*, Norw. and oldest Icel. *halfr*, half); later still, also of *a*, *i*, *u* and *y* before *ng* and *nk*; Icel. *æ* and *ey* for older *ǿ* and *ǫy* (as in Icel. *dæma*, *heyra*, Norw. and oldest Icel. *dǿma*, to deem, *hǫyra*, to hear); Icel. termination of 2nd plur. of verbs in *-ð* (*þ*) or *-t*, but Norw. often in *-r* (as Icel. *takið*, *-t*, Norw. *takir*, you take). These points may be sufficient to characterize the language of the earlier "classical" period of Icelandic (about 1150–1350). At the middle of the 13th century the written language undergoes material changes, owing in a great measure, perhaps, to the powerful influence of Snorri Sturloson. Thus in unaccented syllables *i* now appears for older *e*, and *u* (at first only when followed by one or more consonants belonging to the same syllable) for *o*; the passive ends in *-z* for *-sk*. The other differences from Norwegian, mentioned above as occurring later, are now completely established. With the beginning of the 14th century there appear several new linguistic phenomena: a *u* is inserted between final *r* and a preceding consonant (as in *rikur*, mighty); *ǫ* (pronounced as an open *o*) passes into *o* (the character *o* was not introduced till the 16th century), or before *ng*, *nk* into *au* (as *long fiǫll*, pronounced *laung fiöll*); *e* before *ng*, *nk* passes into *ei*; a little later *é* passes into *ie*, and the passive changes its termination from *-z*, oldest *-sk*, into *-zt* (or *-zst*) (as in *kallazt*, to be called). The post-classical period of Old Icelandic (1350–1530), which is, from a literary point of view, of but little importance, already shows marked differences that are characteristic of Modern Icelandic; *kn* has, except in the northern dialects, passed into *hn*, as in *knútr*, knot; as early as the 15th century we find *ddl* for *ll* and *rl* (as *falla*, pronounced *faddla*, to fall), *ddn* for *nn* and *rn* (as *horn*, pron. *hoddn*, horn), and a little later the passive ends in *-st*, *e.g.* *kallast*, to be called.

Although dialectical differences are not altogether wanting, they do not occur to any great extent in the Old Icelandic literary language. Thus, in some manuscripts we find *ft* replaced by *fst* (*oft*, *ofst*, often); in manuscripts from the western part of the island there appears in the 13th and 14th centuries a tendency to change *lf*, *rf* into *lb*, *rb* (*tolf*, *tolb*, twelve; *þǫrf*, *þǫrb*, want), &c. To what extent the language of Greenland differed from that of Iceland we cannot judge from the few runic monuments which have come down to us from that colony.

Dialects.

Apart from the comparatively inconsiderable attempts at a grammatical treatment of Old Icelandic in the middle ages which we have mentioned above, grammar as a science can only be said to have begun in the 17th century. The first grammar, written by the Icelander Runolphus Jonas (d. 1654), dates from 1651. His contemporary and compatriot Gudmund Andreae (d. 1654) compiled the first dictionary, which was not, however, edited till 1683 (by the Dane Petrus Resenius, d. 1688). The first scholars who studied Old Icelandic systematically were R. K. Rask (1787–1832), whose works[1] laid the foundation to our knowledge of the language, and his great contemporary Jac. Grimm, in whose *Deutsche Grammatik* (1819 seq.) particular attention is paid to Icelandic. Those who since the time of Rask and Grimm have principally deserved well of Icelandic grammar are—among the Norwegians, the ingenious and learned P. A. Munch (d. 1863), to whom we really owe the normalized orthography that has hitherto been most in use in editing Old Icelandic texts, and the solid worker at the syntax, M. Nygaard; the learned Icelander K. Gíslason (d. 1891), whose works are chiefly devoted to phonetic researches;[2] the Danish scholars, K. J. Lyngby (d. 1871), the author of an essay which is of fundamental importance in Icelandic orthography and phonetics, and L. F. A. Wimmer, who has rendered great services to the study of the etymology. The latest and greatest Icelandic grammar is by the Swede A. Noreen.[3] As lexicographers the first rank is held by the Icelanders S. Egilsson (d. 1852),[4] G. Vigfússon (d. 1889),[5] and J. Þorkelsson (d. 1904),[6] the Norwegian J. Fritzner (d. 1893),[7] the Swede L. Larsson,[8] and the German H. Gering.[9]

Grammatical treatment.

2. *Modern Icelandic* is generally dated from the introduction of the Reformation into Iceland; the book first printed, the New Testament of 1540, may be considered as the earliest Modern Icelandic document. Although, on account of the exceedingly conservative tendency of Icelandic orthography, the language of Modern Icelandic literature still seems to be almost identical with the language of the 17th century, it has in reality undergone a constant and active development, and, phonetically regarded, has changed considerably. Indeed, energetic efforts to bring about an orthography more in accordance with phonetics were made during the years 1835 1847 by the magazine entitled *Fjölnir*, where we find such authors as Jónas Hallgrímsson and Konr. Gíslason; but these attempts proved abortive. Of more remarkable etymological changes in Modern Icelandic we may note the following: *y*, *ý* and *ey* at the beginning of the 17th century coincided with *i*, *í* and *ei*; the long vowels *á*, *æ* and *ó* have passed into the diphthongs *au* (at least about 1650), *ai* (about 1700), *ou*, *e.g.* *mál*, language, *mæla*, to speak, *stǿll*, chair; *g* before *i*, *j* is changed into *dj* (after a consonant) or *j* (after a vowel), *e.g* *liggia*, to lie, *eigi*, not; in certain other cases *g* has passed into *gw* or *w*, *e.g.* *lágur*, low, *ljúga*, to lie; initial *g* before *n* is silent, *e.g.* *(g)naga*, to gnaw; *ps*, *pt* have passed into *fs*, *ft*; *bb*, *dd*, *gg* are pronounced as *bp*, *dt*, *gk*, and *ll*, *rl*, *nn*, *rn* now in most positions (not, however, before *d*, *t* and *s*, and in pet names) as *dtl*, *dtn*, as *fjall*, mountain, *bjorn*, bear; *f* before *n* is now pronounced as *bp*, as *hrafn*, raven, &c. Both in vocabulary and syntax we find early, *e.g.* in the lawbook *Jónsbók*, printed in 1578(-1580), Danish exercising an important influence, as might be expected from political circumstances. In the 18th century, however, we meet with purist tendencies. As one of the leading men of this century may be mentioned the poet Eggert Ólafsson (d. 1768), whose poems were not printed till 1832. Worthy of mention in the history of Modern Icelandic language are the learned societies which appeared in the same century, of which the first, under the name of "Hið ósýnilega," was established in 1760. At this time archaic tendencies, going back to the Old Icelandic of the 13th and 14th centuries, were continually gaining ground. In the 19th century the following won especial renown in Icelandic literature: Bjarne Þórarensen (d. 1841), Iceland's greatest lyric poet, and Jónas Hallgrímsson (d. 1845), perhaps its most prominent prose-author in modern times.

Modern Icelandic.

Form of the language.

The dialectical differences in Modern Icelandic are comparatively trifling and chiefly phonetic. The Westland dialect has, for example, preserved the Old Icelandic long *a*, while the other dialects have changed it to the diphthong *au*; in the Northland dialect initial *kn* is preserved, in the others changed into *hn*; in the northern and western parts of the island Old Icelandic *hv* appears as *kv*, in a part of south-eastern Iceland as *χ*, in the other dialects as *χw*, *e.g.* *hvolpur*, whelp. As a matter of curiosity it may be noted that on the western and eastern coasts traces are found of a French-Icelandic language, which arose from the long sojourn of French fishermen there.

Dialects.

Owing to the exclusive interest taken in the ancient language, but little attention is given even now to the grammatical treatment of Modern Icelandic. Some notices of the language of the 17th century may be obtained from the above-mentioned grammar of Runolphus Jonas (1651), and for the language of the 18th from Rask's grammatical works. For the language of our own time there is hardly anything to refer to but F. Jónsson's very short *Islandsk Sproglære* (1905); cf. also B. Magnússon Ólsen's valuable paper "Zur neuisländischen Grammatik" (*Germania*, xxvii., 1882). A dictionary of merit was that of

Grammatical treatment.

(d. 1719) and Brynjólfr Sveinsson (d. 1674); (3) the Delagardian collection (Delag. or Ups.) at Upsala, founded in 1651 by Magnus Gabriel de la Gardie; (4) the Stockholm collection (Holm.), founded by Jón Rugman (in 1662) and Jón Eggertson (in 1682).

[1] *E.g.* *Veiledning til det Islandske sprog* (1811); in a new, much-improved Swedish edition, *Anvisning till Isländskan* (1818).

[2] Especially *Um frumparta íslenzkrar túngu í fornöld* (1846).

[3] *Altisländische und altnorwegische Grammatik unter Berücksichtigung des Urnordischen* (1884), 3 *Aufl.* (1903).

[4] *Lexicon poeticum* (1854–1860).

[5] *An Icelandic-English Dictionary*, based on the MS. collections of the late R. Cleasby (1869–1874).

[6] *Supplement til Islandske ordbøger* (1876, 1879–1885 and 1899).

[7] *Ordbog over det Gamle Norske sprog* (1862–1867, new ed. 1883, seq.).

[8] *Ordförrådet i de älsta isländska handskrifterna* (1891).

[9] *Vollständiges Wörterbuch zu den Liedern der Edda* (1903)

Björn Haldorsen (d. 1794), edited in 1814 by Rask. Cleasby-Vigfússon's dictionary mentioned above also pays some attention to the modern language. A really convenient Modern Icelandic dictionary is still wanting, the desideratum being only partly supplied by J. Thorkelsson's excellent *Supplement til islandske ordbøger*, iii. (1890–1894).

II. NORWEGIAN OR NORSE.—The *Old Norwegian* language (till the Reformation) was not, like the modern language, confined to Norway and the Faeroes, but was, as already stated, for some time spoken in parts of Ireland and the north of Scotland, the Isle of Man, the Hebrides, Shetland and Orkney (in the last two groups of islands it continued to survive down to the end of the 18th century), and also in certain parts of western Sweden as at present defined (Bohuslän, Särna in Dalarna, Jämtland and Härjedalen).

Old Norwegian.

Our knowledge of it is due only in a small measure to runic inscriptions, for these are comparatively few in number (about 150), and of trifling importance from a philological point of view, especially as they almost wholly belong to the period between 1050 and 1350,[1] and consequently are contemporary with or at least not much earlier than the earliest literature. The most important are the detailed one of Karlevi on Öland, wherein a Norwegian poet (towards 1000) in so-called "dróttkuætt" metre celebrates a Danish chief buried there, and that of Frösö in Jämtland, which (about 1050) mentions the christianizing of the province. The whole literature preserved is written in the Latin alphabet. The earliest manuscripts are not much later than the oldest Old Icelandic ones, and of the greatest interest. On the whole, however, the earliest Norwegian literature is in quality as well as in quantity incomparably inferior to the Icelandic. It amounts merely to about a score of different works, and of these but few are of any literary value. A small fragment (Cod. AM. 655, 4to, Fragm. ix., A, B, C), a collection of legends, no doubt written a little before 1200, is regarded as the earliest extant manuscript. From the very beginning of the 13th century we have the *Norwegian Book of Homilies* (Cod. AM. 619, 4to) and several fragments of law-books (*e.g.* the older *Gulaþingslaw* and the older *Eiðsivaþingslaw*). Of later manuscripts the so-called legendary *Olafssaga* (Cod. Delag. 8, fol.), from about 1250, deserves mention. The chief manuscript (Cod. AM. 243 B., fol.) of the principal work in Old Norwegian literature, the *Speculum regale* or *Konungsskuggsid* ("Mirror for Kings,") is again a little later. The masses of charters which—occurring throughout the whole middle age of Norway from the beginning of the 13th century—afford much information, especially concerning the dialectical differences of the language, are likewise of great philological importance.

Form of the language.

As in Old Icelandic so in Old Norwegian we do not find the most primitive forms in the oldest MSS. that have come down to us; for that purpose we must recur to somewhat later ones, containing old poems from times as remote as the days of Þorbiorn Hornklofi (end of the 9th century). It has already been stated that the language at this epoch differed so little from other Scandinavian dialects that it could scarcely yet be called by a distinctive name, and also that, as Icelandic separated itself from the Norwegian mother-tongue (about 900), the difference between the two languages was at first infinitely small—as far, of course, as the literary language is concerned. From the 13th century, however, they exhibit more marked differences; for, while Icelandic develops to a great extent independently, Norwegian, owing to geographical and political circumstances, is considerably influenced by the Eastern Scandinavian languages. The most important differences between Icelandic and Norwegian at the epoch of the oldest MSS. (about 1200) have already been noted. The tendency in Norwegian to reduce the use of the so-called *u*-Umlaut has already been mentioned. On the other hand, there appears in Norwegian in the 13th century another kind of vowel-assimilation, almost unknown to Icelandic, the vowel in terminations being in some degree influenced by the vowel of the preceding syllable. Thus, for instance, we find in some manuscripts (as the above-mentioned legendary *Olafssaga*) that the vowels *e*, *o*, *ø* and long *a*, *æ* are followed in terminations by *e*, *o*; *i*, *u*, *y*, and short *a*, *æ*, on the other hand, by *i*, *u*—as in *bøner*, prayers, *konor*, women; but *tiðir*, times, *tungur*, tongues. The same fact occurs in certain Old Swedish manuscripts. When Norway had been united later with Sweden under one crown (1319) we meet pure Suecisms in the Norwegian literary language. In addition to this, the 14th century exhibits several differences from the old language: *rl*, *rn* are sometimes assimilated into *ll*, *nn*—as *kall* (elder *karl*), man, *konn* (*korn*), corn, *prestanner* (*prestarnir*), the priests; *i* passes into *y* before *r*, *l*—as *hyrðir* (*hirðir*), shepherd, *lykyl* (*lykill*), key; final *-r* after a consonant is changed into *-ar*, *-er*, *-ir*, *-or*, *-ur* or *-ær*, sometimes only *-a*, *-e*, *-æ*,—as *hester* (*hestr*), horse, *bøker* (*bøkr*), books, the names *þolleifær* (*þorleifr*), *Guðlæifæ* (*Guðleifr*). About the beginning of the 15th century initial *hv* occurs for old *hv* (not, however, in pronouns, which take *hv* only in western Norway), as the local name *Qviteseið* (*hvítr*, white). During the 15th century, Norway being united with Denmark, and at intervals also with Sweden, a great many Danisms and a few Suecisms are imported into the language. As Suecisms we may mention the termination *-in* of the 2nd pers. plur. instead of *-ir*, *-ið* (as *vilin*, you will). The most important Danisms are the following: *b*, *d* and *g* are substituted for *p*, *t* and *k*—as in the local names *Nabø* (earlier *Napa*), *Tvedæ sogn* (*þveita sókn*); *-a* in terminations passes into *-e*—as *høre* (*høyra*), to hear, *søghe* (*søkia*), to seek; single Danish words are introduced—as *iek* (*ek*), I, *se* (*sið*), to see; *spørge* (*spyria*), to ask, &c. Towards the end of the middle ages the Danish influence shows an immense increase, which marks the gradual decline of Norwegian literature, until at last Norwegian as a literary language is completely supplanted by Danish. During the 15th century Norway has hardly any literature except charters, and as early as the end of that century by far the greatest number of these are written in almost pure Danish. In the 16th century, again, charters written in Norwegian occur only as rare exceptions, and from the Reformation onward, when the Bible and the old laws were translated into Danish, not into Norwegian, Danish was not only the undisputed literary language of Norway, but also the colloquial language of dwellers in towns and of those who had learned to read.

Dialects.

Dialectical differences, as above hinted, occur in great number in the Norwegian charters of the 13th, 14th and 15th centuries. Especially marked is the difference between the language of western Norway, which, in many respects, shows a development parallel to that of Icelandic, and the language of eastern Norway, which exhibits still more striking correspondences with contemporary Old Swedish. The most remarkable characteristics of the eastern dialects of this epoch are the following:—*a* is changed into *æ* in the pronouns *þænn*, this, *þæt*, that, and the particle *þær*, there (the latter as early as the 13th century), and later on (in the 14th century) also in terminations after a long root syllable—as *sendæ*, to send, *høyræ*, to hear (but *gera*, to do, *vita*, to know); *ia* passes (as in Old Swedish and Old Danish) into *iæ*—as *hiærta* (Icel. *hiarta*), heart; *y* sometimes passes into *iu* before *r*, *l*—as *hiurder*, shepherd, *lykiul*, key, instead of *hyrðir*, *lykyl* (older still, *hirðir*, *lykill*; see above); final *-r* after a consonant often passes into *-ar*, *-ær*, sometimes only into *-a*, *-æ*—as *prestar* (*prestr*), priest; *bøkar* (*bøkr*), books; dat. sing. *brøðæ* (*brøðr*), (to a) brother; *tl* passes into *tsl*, *sl*—as *lisla* (*litla*), (the) little, the name *Atsle*, *Asle* (*Atle*); *rs* gives a "thick" *s*-sound (written *ls*)—as *Bærdols*, genitive of the name *Bergþórr*; *nd*, *ld* are assimilated into *nn*, *ll*—as *bann* (*band*), band, the local name *Vestfoll* (*Vestfold*); and (as far back as the 13th century) traces occur of the vowel assimilation, "tiljævning," that is so highly characteristic of the modern Norwegian dialects—as *vuko*, *vuku*, for *vaku* (Icel. *vǫko*, *-u*), accusative singular of *vaka*, wake, *mykyll* for *mykill*, much. On the other hand, as characteristics of the western dialects may be noted the following: final *-r* after a consonant passes into *-ur*, *-or*, or *-ir*, *-er*—as *vetur* (*vetr*), winter, *rettur* (*réttr*), right, *aftor* (*aftr*), again; *sl* passes into *tl*—as *sytla* (*sýsla*), charge; *hw* is changed into *kw* also in pronouns—as *kuer* (*huerr*), who, *kuassu* (*huersu*), how.

This splitting of the language into dialects seems to have continued to gain ground, probably with greater rapidity as a Norwegian literary language no longer existed. Thus it is very likely that the present dialectical division was in all essentials accomplished about the year 1600; for, judging from the first work on Norwegian dialectology,[2] the Søndfjord (Western Norway) dialect at least possessed at that time most of its present features. A little clog-calendar of the year 1644 seems to prove the same regarding the Valders (Southern Norway) dialect. How far the Old Norwegian dialects on the Faroes, in Ireland and Scotland, on the Scottish islands, and on the Isle of Man differed from the mother-tongue it is impossible to decide, on account of the few remnants of these dialects which exist apart from local names, viz. some charters (from the beginning of the 15th century onward) from the Faeroes, Shetland and the Orkneys, and a few runic inscriptions from the Orkneys (thirty in number), and the Isle of Man (about thirty in number.[3] These runic inscriptions, however, on account of their imperfect orthography, throw but little light on the subject. Of the Orkney dialect we know at least that initial *hl*, *hn*, *hr* still preserved *h* in the 13th century—that is, at least two hundred years longer than in Norway.

Grammatical treatment.

Old Norwegian grammar has hitherto always been taken up in connexion with Old Icelandic, and confined to notes and appendices inserted in works on Icelandic grammar. A systematic treatise on Old Norwegian grammar is still wanting, with the exception of a short work by the Danish scholar N. M. Petersen (d. 1862), which, although brief and decidedly antiquated, deserves all praise. Among those who in recent days have above all deserved well for the investigation of the Old Norwegian may be mentioned, as to the grammar, the Swede E. Wadstein and the Norwegian M. Hægstad; as to the lexicography, the Norwegian E. Hertzberg, for the law terms, and O. Rygh (d. 1899), for the local names, while the personal names are collected by the Swede E. H. Lind. A most valuable collection of materials

[1] The latest rune-stones are from the end of the 14th century. Owing to influence of the learned, such stones appear again in the 17th century, *e.g.* in Telemarken.

[2] C. Jensen's *Norsk dictionarium eller glosebog* (1646).

[3] See P. M. C. Kermode, *Manx Crosses* (1907).

for judging of the dialectical varieties exists in the Norwegian charters, carefully and accurately edited by the Norwegian scholars C. Lange (d. 1861), C. R. Unger (d. 1897) and H. J. Huitfeldt-Kaas.[1]

III. SWEDISH.—The Pre-Reformation language is called Old Swedish.

1. *Old Swedish.*—The territory of the Old Swedish comprehended—(1) Sweden, except the most northerly part, where Lappish (and Finnish ?) was spoken, the most southerly (Skåne, Halland and Blekinge, and certain parts of western Sweden; (2) extensive maritime tracts of Finland, Esthonia and Livonia, with their surrounding islands; and (3) certain places in Russia, where Swedish was spoken for a considerable time. The oldest but also the most meagre sources of our knowledge of Old Swedish are those words, almost exclusively personal names (nearly one hundred), which were introduced into the Russian language at the foundation of the Russian realm by Swedes (in 862), and which are for the most part somewhat influenced by Russian phonetic laws, preserved in two Russian documents of the years 911 and 944—as *Igor.* (O. Sw. *Ingvar*), *Rurik* (*Hrørikr*), *Oleg* (*Hialge*, secondary form of *Helge*), *Olga* (*Hialga*, *Helga*). Of about the same date, but of an infinitely greater importance, are the runic inscriptions, amounting in number to about two thousand, which have been found cut on stones (rarely wood, metal or other materials) almost all over Sweden, though they occur most frequently (about half of the total number) in the province of Uppland, next to which come Södermanland, with nearly three hundred inscriptions, then Östergötland, and Gotland, with more than two hundred each. For the most part they occur on tombstones or monuments in memory of deceased relatives; rarely they are public notices. Their form is often metrical, in part at least. Most of them are anonymous, in so far that we do not know the name of the engraver, though, as a rule, the name of the man who ordered them is recorded. Of the engravers named, about seventy in number, the three most productive are Ubir, Bali and Asmundr Karasun, all three principally working in Upland; the first-mentioned name is signed on nearly eighty, the others on about thirty and forty stones respectively. These inscriptions vary very much in age, belonging to all centuries of Old Swedish, but by far the greatest number of them date from the 11th and 12th centuries. From heathen times—as well as from the last two centuries of the middle ages—we have comparatively few. The oldest are perhaps the Ingelstad inscription in Östergötland, the Sparlösa inscription in Västergötland, and the Gursten one found in the north of Småland, all probably from the end of the 9th century. The rune-stone from Rök in Östergötland probably dates from about A.D. 900. Its inscription surpasses all the others both in length (more than 750 runes) and in the importance of its contents, which are equally interesting as regards philology and the history of culture; it is a fragment (partly in metrical form) of an Old Swedish heroic tale. From about the year 1040 we possess the inscriptions of Asmundr Karasun, and the so-called Ingvar monuments (more than twenty in number), erected most of them in Södermanland, in honour of the men who fell in a great war in eastern Europe under the command of a certain Ingvar; the stones cut by Bali belong to the time *c.* 1060. Somewhat later are the inscriptions cut by Ubir, and from the beginning of the 12th century is the remarkable inscription on the door-ring of the church of Forsa in Helsingland, containing the oldest Scandinavian statute now preserved, as well as other inscriptions from the same province, written in a particular variety of the common runic alphabet, the so-called "staflösa" (staffless, without the perpendicular staff) runes, as the long genealogical inscription on the Malstad-stone. The inscriptions of the following centuries are of far less philological interest, because after the 13th century there exists another and more fruitful source for Old Swedish, viz. a literature in the proper sense of the word. Of runic literature nothing has been preserved to our days. The literature in the Latin letters is both in quality and extent incomparably inferior to Old Icelandic, though it, at least in quantity, considerably surpasses Old Norwegian. In age, however, it is inferior to both of them, beginning only in the 13th century. The oldest of the extant manuscripts is a fragment of the Older Västgötalaw, written about the year 1250. A complete codex (Cod. Holm. B 59) of the same law dates from about 1285, and is philologically of the greatest importance. Of other works of value from a philological point of view we only mention a codex of the *Södermannalaw* (Cod. Holm. B 53) of about 1325, a codex of the *Upplandslaw* (Cod. Ups. 12), the two manuscripts containing a collection of legends generally named *Cod. Bureanus* (written a little after 1350) and *Cod. Bildstenianus* (between 1420 and 1450), and the great Oxenstiernian manuscript, which consists chiefly of a collection of legends written for the most part in 1385. The very numerous Old Swedish charters, from 1343 downwards, are also of great importance.[2]

Old Swedish.

Old Swedish, during its earliest pre-literary period (800–1225), retains quite as original a character as contemporary Old Icelandic and Old Norwegian. The first part of the inscription of the Rökstone running thus— *Form of the language.*

AFT UAMUÞ STANTA RUNAR ÞAR . IN UARIN FAÞI
FAÞIR AFT FAIKIAN SUNU,[3]

and probably pronounced—

aft Wǻmōð standa rūnaR þāR; en Warinn fāði faðiR aft
fæighiạn sunu,

would, no doubt, have had the same form in contemporary Icelandic, except the last word, which would probably have had the less original form *sun*. The formal changes of the Swedish language during this period are, generally speaking, such as appear about the same time in all the members of the group—as the change of soft R into common *r* (the Rök-stone *runaR*, later *runar*, runes; this appeared earliest after dental consonants, later after an accented vowel), and the change of *sþ* into *st* (in the 10th century *raisþi*, later *ræisti*, raised); or they are, at least, common to it with Norwegian—as the dropping of *h* before *l*, *n* and *r* (in the 10th century *hrauR*, younger, *rør*, cairn), and the changing of nasal vowels (the long ones latest) into non-nasalized. But the case is altogether different during what we may call the classical period of Old Swedish (1225–1375), the time of the later runic inscriptions and the oldest literature. During this period the language is already distinctly separate from the (literary) Icelandic-Norwegian (though not yet very much from Danish). The words of the *Older Västgötalaw*—

FALDER KLOCKÆ NIDER I HOVOÞ MANNI, BŌTI SOPCN MARCHUM ÞRIM,
EN HAN FAR BANÆ AF—[4]

would in contemporary Icelandic be—

fellr klukka niðr í hofuð manni, bæti sókn mǫrkum þrim,
ef hann fær bana af.

These few words exhibit instances of the following innovations in Swedish:—*d* is inserted between *ll* (*nn*) and a following *r* (as *b* between *m* and *l*, *r*, and *p* between *m* and *t*, *n*—as *hambrar*, Icel. *hamrar*, hammers, *sampt*, Icel. *samt*, together with); an auxiliary vowel is inserted between final *r* and a preceding consonant; *a* in terminations is often changed into *æ*; a *u* in the final syllable causes no change of a preceding *a*; the present tense takes the vowel of the infinitive (and the preterite subjunctive that of preterite indicative plural). Other important changes, appearing at the same time, but probably, partly at least, of a somewhat older date, are the following:—all diphthongs are contracted (as *øgha*, Icel. *auga*, eye; *drøma*, Icel. *dreyma*, to dream; *stēn*, Icel. *steinn*, stone—traces of which we find as early as the 12th century); *é* has passed into *æ* (as *knæ*, Icel. *kné*, knee); *ia* into *iæ*, as in Eastern Norwegian (as *hiærta*, Icel. *hiarta*, heart); *iu* into *ȳ* after *r*, and a consonant + *l* (as *flȳgha*, Icel. *fliúga*, to fly); the forms of the three persons singular of verbs have assimilated (except in the so-called strong preterite); the 2nd person plural ends in *-in* for *-ið*, *-uð*. The transition to the 14th century is marked by important changes:—short *y*, *e.g.*, passed into *ø* in many positions (as *dør* for *dyr*, door, &c.); there appeared a so-called law of vowel balance, according to which the vowels *i* and *u* are always found in terminations after a short root syllable, and—at least when no consonant follows—*e* and *o* after a long one (as *Guþi*, to God, *til salu*, for sale, but *i garþe*, in the court, *for visso*, assuredly), and the forms of the dative and the accusative of pronouns gradually became the same. The number of borrowed words is as yet very limited, and is chiefly confined to ecclesiastical words of Latin and Greek origin, introduced along with Christianity (as *kors*, cross, *brēf*, epistle, *skōle*, school, *præster*, priest, *almōsa*, alms). At the middle of the 14th century the literary language undergoes a remarkable reform, developing at the same time to a "*riksspråk*," a uniform language, common to a certain degree to the whole country. The chief characteristics of this later Old Swedish (1375–1526) are the following:—the long *a* has passed into *å* (that is, an open *o*), and *io* (except before *g*, *k*, *rdh*, *rt*) into *iø* (as *siø*, sea, lake), *g* and *k* (*sk*) before palatal vowels are softened into *dj* and *tj* (*stj*); *k* and *t* in unaccented syllables often pass into *gh*, *dh* (as *Swērighe* for *Swērike*, Sweden, *litedh* for *litit*, a little); the articles *thæn* (or *hin*), the, and (a little later) *en*, a, come into use; the dual pronouns vanish; the relative *ær*, that, is changed with *sum*; the present participle takes a secondary form in *-s* (as *gangandis*, beside *gangande*, going). A little later the following changes appear:—a short vowel is lengthened before a single consonant, first when the consonant belongs to the same syllable (as *hat*, hate), afterwards also when it belongs to the following one (as *hata*, to hate); an auxiliary vowel is inserted between *l* or *n* and a preceding consonant (as *gavel*, gable, *øken*, desert); short *i* often passes into *e* (as *leva*, to live); *th* passes into *t*; a new conjugation is formed which has no infinitive termination, but doubles the sign of the preterite (as *bō*, *bōdde*, *bōtt*, to dwell, dwelt, dwelt). Owing to the political and commercial state of the country the language at this period is deluged with borrowed words of Low German origin, mostly social and industrial terms, such as the great number of verbs in *-ēra* (*e.g.* *kantāra*, to

[1] *Diplomatarium Norvegicum* (1847, sqq.), 16 vols. have appeared.

[2] The Old Swedish monuments are for the most part published in the following collections:—*Svenska fornskriftsällskapets samlingar*, 132 parts (1844–1907); C. J. Schlyter, *Samling af Sveriges gamla lagar*, vols. i.-vii. and x.-xii. (1827–1869); *Svensht Diplomatarium* (6 vols., 1829–1878, new series, 4 vols., 1875–1904).

[3] In memory of Wámód these runes stand; and Warinn, his father, wrote them in memory of his son (by destiny) condemned to death.

[4] If the bell fall down on anybody's head, the parish pays a fine of three marks should he die from it.

handle), the substantives in *-erī* (*røverī*, robbery), *-inna* (*førstinna*, princess), *-hēt* (*fromhēt*, piety), *be-* (*betala*, to pay), and a great many others (*klēn*, weak, *smaka*, to taste, *grōver*, big, *pung*, purse, *tukt*, discipline, *brūka*, to use, *twist*, quarrel, *støvel*, boot, *arbēta*, to work, *frōkoster*, lunch, &c.). Owing to the political circumstances, we find towards the end of the period a very powerful Danish influence, which extends also to phonetics and etymology, so that, for example, nearly all the terminal vowels are supplanted by the uniform Danish *e*, the hard consonants *p*, *t*, *k* by *b*, *d*, *g* as in Danish, the second person plural of the imperative ends in *-er*, besides *-en* (as *tagher*, for *taghen*, older *takin*).

Dialectical differences incontestably occur in the runic inscriptions as well as in the literature; in the former, however, most of them are hidden from our eyes by the character of the writing, which is, from a phonetic point of view, highly unsatisfactory, indicating the most different sounds by the same sign (for example, *o*, *u*, *y* and *ö* are denoted by one and the same rune); in the literature again they are reduced to a minimum by the awakening desire to form a uniform literary language for the whole country, and by the literary productivity and consequent predominant influence of certain provinces (as Östergötland). Only one distinct dialect has been handed down to us, that of the island of Gotland, which differs so essentially from the Old Swedish of the mainland that it has with good reason been characterized, under the name *Forngutniska*, as in a certain sense a separate language. Materials for its study are very abundant: on one hand we possess more than two hundred runic inscriptions, among them a very remarkable one from the beginning of the 13th century, counting upwards of four hundred runes, cut on a font (now in Aakirkeby on the island of Bornholm), and representing the life of Christ in a series of pictures and words; on the other hand a literature has been preserved consisting of a runic calendar from 1328, the law of the island (the oldest manuscript is from about 1350), a piece of traditional history and a gild statue. The language is distinguished from the Old Swedish of the mainland especially by the following characteristics:—the old diphthongs are preserved (*e.g. auga*, eye, *droyma*, to dream, *stain*, stone), and a triphthong has arisen by the change of *iu* into *iau* (as *fliauga*, to fly); the long vowels *æ* and *ø* have passed into *ē* and *ȳ* (as *mēla*, to speak, *dȳma*, to deem); short *o* rarely occurs except before *r*, being in other positions changed into *u*; *w* is dropped before *r* (as *raiþi*, wrath); the genitive singular of feminines in *-a* ends in *-ur* for *-u* (as *kirkiur*, of the church). Owing to the entire absence of documentary evidence it is impossible to determine how far the dialects east of the Baltic, which no doubt had a separate individuality, differed from the mother-tongue.

Dialects.

Forngutniska.

The first to pay attention to the study of Old Swedish[1] was the Swedish savant J. Buraeus (d. 1652), who by several works (from 1599 onwards) called attention to and excited a lively interest in the runic monuments, and, by his edition (1634) of the excellent Old Swedish work *Um Styrilse Kununga ok Høfþinga*, in Old Swedish literature also. His no longer extant *Specimen Primariae Linguae Scantzianae* (1636) gave but a very short review of Old Swedish inflections, but is remarkable as the first essay of its kind, and is perhaps the oldest attempt in modern times at a grammatical treatment of any old Germanic language. The study of runes was very popular in the 17th century; M. Celsius (d. 1679) deciphered the "staffless" runes and J. Hadorph (d. 1693), who also did good work in editing Old Swedish texts, copied more than a thousand runic inscriptions, published by J. Göransson as *Bautil* (1750). During the 18th century, again, Old Swedish was almost completely neglected; but in the 19th century the study of runes was well represented by the collection (*Runurkunder*, 1833) of the Swede Liljegren (d. 1837) and by the Norwegian S. Bugge's ingenious interpretation and grammatical treatment of some of the most remarkable inscriptions, especially that of Rök. Old Swedish literature has also been made the object of grammatical researches. A first outline of a history of the Swedish language is to be found in the work of N. M. Petersen (1830), and a scheme of an Old Swedish grammar in P. A. Munch's essay, *Fornswenskans och Fornnorskans språkbyggnad* (1849); but Old Swedish grammar was never treated as an independent branch of science until the appearance of J. E. Rydqvist's (d. 1877) monumental work *Svenska språkets lagar* (in 6 vols., 1850–1883), which was followed in Sweden by a whole literature on the same subject. Thus phonetics, which were comparatively neglected by Rydqvist, have been investigated with great success, especially by L. F. Läffler and A. Kock; while the other parts of grammar have been treated of above all by K. F. Söderwall. His principal work, *Ordbok öfver Svenska medeltidsspråket* (1884 sq.), gives the list of words in the later Old Swedish language, and—taken along with the *Ordbok till samlingen af Sveriges gamla lagar* (1877), by C. J. Schlyter, the well-known editor of Old Swedish texts, which contains the vocabulary of the oldest literature—it worthily meets the demand for an Old Swedish dictionary. An Old Swedish grammar, answering the requirements of modern philology, is edited by A. Noreen.[2]

The study of Old Swedish.

[1] See A. Noreen, "Aperçu de l'histoire de la science linguistique suédoise" (*Le Muséon*, ii., 1883).

[2] *Altschwedische Grammatik* (1897–1904).

2. *Modern Swedish.*—The first complete translation of the Bible, edited in 1541 by the brothers Olaus and Laurentius Petri, and generally called the Bible of Gustavus I., may be regarded as the earliest important monument of this. Owing to religious and political circumstances, and to the learned influence of humanism, theological and historico-political works preponderate in the Swedish literature of the following period, which therefore affords but scanty material for philological research. It is not until the middle of the 17th century that Swedish literature adequately exemplifies the language, for at that period literature first began to be cultivated as a fine art, and its principal representatives, such as Stiernhielm, Columbus and Spegel, were in reality the first to study it as a means of expression and to develop its resources. Amongst the authors of the 18th century we have to mention in the first place Dalin, who was to some extent the creator of the prose style of that epoch; while of the end of the century Kellgren and Bellman are the most noteworthy examples, representing the higher and the more familiar style of poetry respectively. The language of the 19th century, or at any rate of the middle of it, is best represented in the works of Wallin and Tegnér, which, on account of their enormous circulation, have had a greater influence than those of any other authors.

Modern Swedish.

As to the language itself the earliest Modern Swedish texts, as Gustavus I.'s Bible, differ considerably from the latest Old Swedish ones.[3] We find a decided tendency to exterminate Danisms and reintroduce native and partially antiquated forms. At the same time there appear several traces of a later state of the language: all genitives (singular and plural), *e.g.*, end in *-s*, which in earlier times was the proper ending of certain declensions only. In spite of the archaistic efforts of many writers, both in forms and in vocabulary, the language nevertheless underwent rapid changes during the 16th and 17th centuries. Thus *sj* and *stj* (original as well as derived from *sk* before a palatal vowel) assimilate into a simple *sh-* sound; *dj* (original as well as derived from *g* before a palatal vowel), at least at the end of the 17th century, dropped its *d*-sound (compare such spellings as *diufwer*, *giättar*, *envogé*, for *jufver*, udder, *jättar*, giants, *envové*, envoy); *hj* passes into *j* (such spellings are found as *jort* for *hjort*, hart, and *hjärpe* for *järpe*, hazel grouse); *b* and *p* inserted in such words as *himblar*, heavens, *hambrar*, hammers, *jämpn*, even, *sampt*, together with, are dropped; the first person plural of the verb takes the form of the third person (as *vi fara*, *foro*, for *vi farom*, *forom*, we go, went); by the side of the pronoun *I*, you, there arises a secondary form *Ni*, in full use in the spoken language about 1650; the adjective gradually loses all the case-inflections; in substantives the nominative, dative and accusative take the same form as early as the middle of the 17th century; in the declension with suffixed article the old method of expressing number and case both in the substantive and the article is changed, so that the substantive alone takes the number-inflection and the article alone the case-ending; neuter substantives ending in a vowel, which previously had no plural ending, take the plural ending *-n*, some *-er*—as *bi-n*, bees, *bageri-er*, bakeries. About the year 1700 the Old Swedish inflection may, in general, be considered as almost completely given up, although a work of such importance in the history of the language as Charles XII.'s Bible (so-called) of 1703, by a kind of conscious archaism has preserved a good many of the old forms. To these archaistic tendencies of certain authors at the end of the 17th century we owe the great number of Old Swedish and Icelandic borrowed words then introduced into the language—as *fager*, fair, *härja*, to ravage, *later*, manners, *snille*, genius, *tarna*, girl, *tima*, to happen, &c. In addition to this, owing to humanistic influence, learned expressions were borrowed from Latin during the whole 16th and 17th centuries; and from German, chiefly at the Reformation and during the Thirty Years' War, numberless words were introduced—as *tapper*, brave, *prakt*, magnificence, *hurtig*, brisk, &c.; among these may be noted especially a great number of words beginning in *an-*, *er-*, *för-* and *ge-*. Owing to the constantly increasing political and literary predominance of France, French words were largely borrowed in the 17th century, and to an equally great extent in the 18th; such are *affär*, business, *respekt*, respect, *talang*, talent, *charmant*, charming, &c. In the 19th century, especially about the middle of it, we again meet with conscious and energetic efforts after purism both in the formation of new words and in the adoption of words from the old language (*id*, diligence, *mäla*, to speak, *fylking*, battle-array, &c.), and from the dialects (*bliga*, to gaze, *flis*, flake, *skrabbig*, bad, &c.). Consequently the present vocabulary differs to a very great extent from that of the literature of the 17th century. As for the sounds and grammatical forms, on the other hand, comparatively few important changes have taken place during the last two centuries. In the 18th century, however, the aspirates *dh* and *gh* passed into *d* and *g* (after *l* and *r* into *j*)—as *lag* for *lagh*, law, *bröd* for *brödh*, bread; *hw* passed into *v* (in dialects already about the year 1400)—as *valp* for *hwalper*, whelp; *lj* likewise into *j*—thus *ljuster*, leister, occurs written *juster*. In our time *rd*, *rl*, *rn*, *rs* and *rt* are passing into simple sounds ("supradental"

Form of the language.

[3] The printed characters are also considerably changed by the introduction of the new letters *å* (with the translation of the New Testament of 1526), and *ä*, *ö* (both already in the first print in Swedish of 1495) for *aa*, *æ*, *ø*.

d, *l*, *n*, *s* and *t*), while the singular of the verbs is gradually supplanting the plural. A vigorous reform, slowly but firmly carried on almost uniformly during all periods of the Swedish language, is the throwing back of the principal accent to the beginning of the word in cases where previously it stood nearer the end, a tendency that is characteristic of all the Scandinavian languages, but no doubt especially of Swedish. In the primitive Scandinavian age the accent was removed in most simple words; the originally accented syllable, however, preserved a musically high pitch and stress. Thus there arose two essentially different accentuations—the one, with unaccentuated final syllable, as in Icel. *stígr* (Gr. στείχεις), thou goest, the comparative *betre* (cf. Gr. θάσσων from ταχύς), better, the other, with secondary stress and high pitch on the final, as in Icel. pret. plur. *buðo* (Sans. *bubudhús*), we bade, part. pret. *bitenn* (Sans. *bhinnás*), bitten. The same change afterwards took place in those compound words that had the principal accent on the second member, so that such contrasts as German *úrteil* and *erteílen* were gradually brought into conformity with the former accentuation. At the present day it is quite exceptionally (and chiefly in borrowed words of later date) that the principal accent in Swedish is on any other syllable than the first, as in *lekámen*, body, *välsígna*, to bless.

The study of Modern Swedish.

The scientific study of Modern Swedish[1] dates from Sweden's glorious epoch, the last half of the 17th century. The first regular Swedish grammar was written in 1684 (not edited till 1884) in Latin by E. Aurivillius; the first in Swedish is by N. Tiällman (1696). But little, however, of value was produced before the great work of Rydqvist mentioned above, which, although chiefly dealing with the old language, throws a flood of light on the modern also. Among the works of late years we must call special attention to the researches into the history of the language by K. F. Söderwall, F. A. Tamm, A. Kock and E. Hellquist. The grammar of the modern language is, as regards certain parts, treated in a praiseworthy manner by, among others, J. A. Aurén, J. A. Lyttkens and F. A. Wulff (in several common works), E. Tegnér, G. Cederschiöld and F. A. Tamm (d. 1905). A good though short account of phonology and inflections is given in H. Sweet's essay on "Sounds and Forms of Spoken Swedish" (*Trans. Phil. Soc.*, 1877–1879). A comprehensive and detailed grammar (*Vårt språk*) has been edited (since 1903) by A. Noreen. Attempts to construct a dictionary were made in the 16th century, the earliest being the anonymous *Variarum rerum vocabula cum Sueca interpretatione*, in 1538, and the *Synonymorum libellus* by Elaus Petri Helsingius, in 1587, both of which, however, followed German originals. The first regular dictionary is by H. Spegel, 1712; and in 1769 J. Ihre (d. 1780), probably the greatest philological genius of Sweden, published his *Glossarium Suiogoticum*, which still remains one of the most copious Swedish dictionaries in existence. In the 19th century the diligent lexicographer A. F. Dalin published a useful work. The Swedish Academy has been editing (since 1893) a gigantic dictionary on about the same plan as Dr Murray's *New English Dictionary*. Another such large work is *Sverges Ortnamn* (the local names of Sweden) edited since 1906 by the Royal Committee for investigation of the Swedish place-names.

IV. DANISH, like Swedish, is divided into the two great Pre- and Post-Reformation epochs of Old and Modern Danish.

Old Danish.

1. *Old Danish.*—The territory of Old Danish included not only the present Denmark, but also the southern Swedish provinces of Halland, Skåne and Blekinge, the whole of Schleswig, and, as stated above, for a short period also a great part of England, and parts of Normandy. The oldest monuments of the language are runic inscriptions, altogether about 225 in number.[2] The oldest of them go as far back as to the beginning of the 9th century, the Snoldelev-stone, for instance, on Sealand, and the Flemløse-stone on Fünen. From about the year 900 date the very long inscriptions of Tryggevaelde (Zealand) and Glavendrup (Fünen); from the 10th century we have the stones of Jaellinge (Jutland), in memory of two of the oldest historical kings of Denmark (Gorm and Harald); while from about 1000 we have a stone at Dannevirke (Schleswig), raised by the conqueror of England, Sven Tjuguskaegg. Relics of about the same age are the words that were introduced by the Danes into English, the oldest of which date from the end of the 9th century, the time of the first Danish settlement in England; most of these are to be found in the early English work *Ormulum*.[3] No Danish literature arose before the 13th century. The oldest manuscript that has come down to us dates from the end of that century, written in runes and containing the law of Skåne. From about the year 1300 we possess a manuscript written in Latin characters and containing the so-called Valdemar's and Erik's laws of Zealand, the Flensborg manuscript of the law of Jutland, and a manuscript of the municipal laws of Flensborg. These three manuscripts represent three different dialects—that, namely, of Skåne, Halland and Blekinge, that of Zealand and the other islands, and that of Jutland and Schleswig. There existed no uniform literary language in the Old Danish period, although some of the most important works of the 15th century, such as the clerk Michael's *Poems* (since 1496) and the *Rhymed Chronicle* (the first book printed in Danish, in 1495), on account of their excellent diction, contributed materially to the final preponderance of their dialect, that of Zealand, towards the Reformation.

Dialects.

Form of the language.

As to the form of the language, it hardly differs at all during the period between A.D. 800 and 1200 from Old Swedish. It is only in the oldest literature that we can trace any marked differences; these are not very important, and are generally attributable to the fact that Danish underwent a little earlier the same changes that afterwards took place in Swedish (*e.g. h* in *hw* and *hj* in Danish was mute as early as the end of the 14th century. The laws referred to above only agree in differing from the Swedish laws in the following points: the nominative already takes the form of the accusative (as *half*, calf, but Old Sw. nom. *halver*, acc. *half*); the second person plural ends in *-æ* (as *køpæ*, but Old Sw. *køpin*, you buy); in the subjunctive no differences are expressed between persons and numbers. Among themselves, on the contrary, they show considerable differences; the law of Skåne most nearly corresponds with the Swedish laws, those of Zealand keep the middle place, while the law of Jutland exhibits the most distinctive individuality. The Skåne law, *e.g.*, retains the vowels *a*, *i*, *u* in terminations, which otherwise in Danish have become uniformly *æ*; the same law inserts *b* and *d* between certain consonants (like Old Sw.), has preserved the dative, and in the present tense takes the vowel of the infinitive; the law of Jutland, again, does not insert *b* and *d*, and has dropped the dative, while the present tense (undergoing an *Umlaut*) has by no means always accepted the vowel of the infinitive; in all three characteristics the laws of Zealand fluctuate. After 1350 we meet an essentially altered language, in which we must first note the change of *k*, *p*, *t* after a vowel into *g*, *b*, *d* (as *tag*, roof, *lābe*, to run, *æde*, to eat); *th* passes into *t* (as *ting*, thing), *gh* into *w* (as *law* for *lagh*, gild) or into *i* (as *vei* for *wægh*, way); *ld*, *nd* are pronounced like *ll*, *nn*; *s* is the general genitive ending in singular and plural, &c. The vocabulary, which in earlier times only borrowed a few, and those mostly ecclesiastical, words, is now—chiefly owing to the predominant influence of the Hanse towns—inundated by German words, such as those beginning with *be-*, *bi-*, *ge-*, *for-* and *und-*, and ending in *-hēd*, and a great number of others, as *blive*, to become, *skē*, to happen, *frī*, free, *krīg*, war, *buxer*, pantaloons, *ganske*, quite, &c.

Grammatical treatment.

An Old Danish grammar is still wanting, and the preparatory studies which exist are, although excellent, but few in number, being chiefly essays by the Danes K. J. Lyngby and L. F. A. Wimmer. N. M. Petersen's treatise *Det Danske, Norske, og Svenske sprogs historie*, vol. i. (1829), one of the first works that paid any attention to Old Danish, which till then had been completely neglected, is now surpassed by V. Dahlerup's *Geschichte der dänischen Sprache* (1904). A dictionary on a large scale covering the whole of Old Danish literature, except the very oldest, by O. Kalkar, has been in course of publication since 1881; older and smaller is C. Molbech's *Dansk Glossarium* (1857–1866).

Modern Danish sources.

2. *Modern Danish.*—The first important monument of this is the translation of the Bible, by C. Pedersen, Peder Palladius and others, the so-called Christian III.'s Bible (1550), famous for the unique purity and excellence of its language, the dialect of Zealand, then incontestably promoted to be the language of the kingdom. The first secular work deserving of the same praise is Vedel's translation of Saxo (1575). The succeeding period until 1750 offers but few works in really good Danish; as perfectly classical, however, we have to mention the so-called Christian V.'s Law of Denmark (1683). For the rest, humanism has stamped a highly Latin-French character on the literature, striking even in the works of the principal writer of this period, Holberg. But about the year 1750 there begins a new movement, characterized by a reaction against the language of the preceding period and by purist tendencies, or, at least, efforts to enrich the language with new-formed words (not seldom after the German pattern), as *omkreds*, periphery, *selvstændighed*, independence, *valgsprog*, devise, *digter*, poet. The leading representatives of these tendencies were Eilschow and Sneedorf. From their time Danish may be said to have acquired its present essential features, though it cannot be denied that several later authors, as J. Ewald and Ohlenschläger, have exercised a considerable influence on the poetical style.

Form of the language.

As the most important differences between the grammatical forms of the 18th and 19th centuries on one hand and those of the 16th and 17th centuries on the other, may be noted the following: most neuter substantives take a plural ending; those ending in a vowel form their plural by adding *-r* (as *riger*, for older *rige*, plural of *rige*, kingdom), and many of those ending in a consonant by adding *-e* (as *huse* for *hus*, of *hus*, house); substantives ending in *-ere* drop their final *-e* (as *dommer* for *dommere*, judge); the declension with suffixed article becomes simplified in the same way as in Swedish; the plural of verbs takes the singular form (as *drak* for *drukke*, we drank); and the preterite subjunctive is supplanted by the infinitive (as *var* for *vaare*, were).

[1] See A. Noreen, "Aperçu" &c.; *Vårt språk*, i. 181 sqq.

[2] See L. F. A. Wimmer, *De Danske runemindesmærker* (4 vols., 1895–1905).

[3] See E. Brate, "Nordische Lehnwörter im Ormulum" (*Paul Braune's Beiträge*, x., 1884); E. Björkman, *Scandinavian Loanwords in Middle English* (2 vols., 1900, 1902) in "Studien zur englischen Philologie," vii. and xi.) Also ORM.

The first Modern Danish grammar is by E. Pontoppidan, 1668, but in Latin; the first in Danish is by the famous Peder Syv, 1685. The works of the self-taught J. Højsgaard (*e.g. Accentueret og raisonneret grammatica*, 1747) possess great merit, and are of especial importance as regards accent and syntax. The earlier part of the 19th century gave us Rask's grammar (1830). A thoroughly satisfactory Modern Danish grammar does not exist; the most detailed is that by K. Mikkelsen (1894). The vocabulary of the 16th and 17th centuries is collected in Kalkar's *Ordbog*, mentioned above; that of the 18th and 19th centuries in the voluminous dictionary of Videnskabernes Selskab (1793–1905), and in C. Molbech's *Dansk Ordbog* (2nd ed., 1859); that of our days in B. T. Dahl's and H. Hammer's *Dansk Ordbog for folket* (1903 seq.).

Grammatical treatment.

As already mentioned, Danish at the Reformation became the language of the literary and educated classes of Norway and remained so for three hundred years, although it cannot be denied that many Norwegian authors even during this period wrote a language with a distinct Norwegian colour, as for instance the prominent prose-stylist Peder Claussøn Friis (d. 1614), the popular poet Petter Dass (d. 1708), and, in a certain degree, also the two literary masters of the 18th century, Holberg and Wessel. But it is only since 1814, when Norway gained her independence, that we can clearly perceive the so-called Dano-Norwegian gradually developing as a distinct offshoot of the general Danish language. The first representatives of this new language are the writer of popular life M. Hansen (d. 1842), the poets H. Wergeland (d. 1845) and J. S. C. Welhaven (d. 1873), but above all the tale-writers P. C. Asbjørnsen (d. 1885) and J. Moe (d. 1882). More recently it has been further developed, especially by the great poets Ibsen (d. 1906) and Bjørnson and the novelist Lie; and it has been said, not without reason, to have attained its classical perfection in the works of the first-named author. This language differs from Danish particularly in its vocabulary, having adopted very many Norwegian provincial words (more than 7000), less in its inflections, but to a very great extent in its pronunciation. The most striking differences in this respect are the following: Norwegian *p*, *t*, *k* answer to Danish *b*, *d*, *g* in cases where they are of later date (see above)—as *løpe*, Danish *løbe*, to run, *liten*, D. *liden*, little, *bak*, D. *bag*, back); to Danish *k*, *g* before palatal vowels answer Norwegian *tj*, *j*; *r* (point-trill, not back-trill as in Danish) is assimilated in some way with following *t* (*d*), *l*, *n*, and *s* into so-called supradental sounds; both the primitive Scandinavian systems of accentuation are still kept separate from a musical point of view, in opposition to the monotonous Danish. There are several other characteristics, nearly all of which are points of correspondence with Swedish.[1] Dano-Norwegian is in our days grammatically and lexically treated, especially by H. Falk and A. Torp (*e.g. Etymologisk Ordbog*, 1903, 1906).

Dano-Norwegian.

Form of the language.

At the middle of the 19th century, however, far more advanced pretensions were urged to an independent Norwegian language. By the study of the Modern Norwegian dialects and their mother language, Old Norwegian, the eminent philologist J. Aasen (d. 1896) was led to undertake the bold project of constructing, by the study of these two sources, and on the basis of his native dialect (Søndmøre), a Norwegian-Norwegian ("Norsk-Norsk") language, the so-called "Landsmål." In 1853 he exhibited a specimen of it, and, thanks to such excellent writers as Aasen himself, the poets O. Vinje and K. Janson, the novelists A. Garborg and J. Tvedt, as well as a zealous propagandism of the society *Det Norske Samlag* (founded in 1868) there has since arisen a valuable though not very large literature in the "Landsmål." Since 1892 it is also legally authorized to be, alternatively, used in the church and by teachers of the public schools. But still it is nowhere colloquially used. Its grammatical structure and vocabulary are exhibited in Aasen's *Norsk grammatik* (1864) and *Norsk Ordbog* (1873), supplemented by H. Ross's *Norsk Ordbog* (1895; with supplement, 1902). The local names of Norway are treated in the large work *Norske Gaardnavne*, by O. Rygh (1897 seq.).

Norwegian-Norwegian.

Scandinavian Dialects.—As above remarked, the Scandinavian dialects are not grouped, so far as their relationship is concerned, as might be expected judging from the literary languages. Leaving out of account the Icelandic dialects and those of the Faeroes, each of which constitutes a separate group, the remainder may be thus classified:—

Dialects.

1. *West Norwegian Dialects*—spoken on the western coast of Norway between Langesund and Molde.
2. *North Scandinavian*—the remaining Norwegian and the Swedish dialects of Uppland, Västmanland, Dalarna, Norrland, Finland and Russia.
3. The dialects on the island of Gotland.
4. *Middle Swedish*—spoken in the rest of Sweden, except the southernmost parts (No. 5).
5. *South Scandinavian*—spoken in the greater part of Småland and Halland, the whole of Skåne, Blekinge and Denmark, and the Danish-speaking part of Schleswig. This group is distinctly divided into three smaller groups—the dialects of southern Sweden (with the island of Bornholm), of the Danish islands and of Jutland (and Schleswig).

The study of the Modern Scandinavian dialects[2] has been very unequally prosecuted. Hardly anything has been done towards the investigation of the Icelandic dialects, while those of the Faeroes have been studied chiefly by V. U. Hammershaimb, J. Jakobsen, and A. C. Evensen. The Norwegian dialects have been thoroughly examined, first by Aasen, whose works give a general account of them; then by J. Storm, who has displayed an unwearying activity, especially in the minute investigation of their phonetic constitution, to which Aasen had paid but scant attention; in our own days by H. Ross and A. B. Larsen.[3] For the study of Danish dialects less has been done. Molbech's *Dialect-Lexicon* of 1841 is very deficient. The Schleswig dialect has been admirably treated of by E. Hagerup (1854), K. J. Lyngby (1858) and others. H. F. Feilberg's great dictionary (1886 seq.) of the dialect of Jutland is in every respect an excellent work. A dialect map on a large scale, and containing the whole territory, is (since 1898) being edited by V. Bennike and M. Kristensen. Finally, several dialect monographs by P. K. Thorsen may be mentioned as being especially valuable. A phonetic alphabet for the purpose of dialectal investigations is worked out by O. Jespersen and published in the journal *Dania*, vol. i. (1890). There is, however, no country in which the dialects have been and are studied with greater zeal and more fruitful results than in Sweden during the last hundred and fifty years. Archbishop E. Benzelius the younger (d. 1743) made collections of dialect words, and on his work is based the dialectical dictionary of Ihre of 1766. An excellent work considering its age is S. Hof's *Dialectus Vestrogothica* (1772). The energy and zeal of C. Säve (d. 1876; essays on the dialects of Gotland and Dalarna) inspired these studies with extraordinary animation at the middle of the 19th century; in 1867 J. E. Rietz (d. 1868) published a voluminous dialect dictionary; the number of special essays, too, increased yearly. From 1872 so-called "landsmålsföreningar" (dialect societies) were founded among the students at the universities of Upsala, Lund and Helsingfors (thirteen at Upsala alone) for a systematic and thorough investigation of dialects. We find remarkable progress in scientific method—especially with regard to phonetics—in the constantly increasing literature; special mention may be made of the detailed descriptions of the dialects of Värmland, Gotland and Dalarna by A. Noreen (1877 seq.), A. F. Freudenthal's and H. Vendell's monographs of the Finnish and Esthonian-Swedish dialects, as well as O. F. Hultman's (1894) and B. Hesselman's (1902 seq.) excellent comparative treatment of certain dialect groups. Since 1879 the Swedish dialect societies have published a magazine on a comprehensive plan, *De Svenska Landsmålen*, edited by J. A. Lundell, who has invented for this purpose an excellent phonetic alphabet (partially based on C. J. Sundevall's work, *Om phonetiska bokstäfver*, 1855). (A. No.)

SCANDIUM [symbol Sc, atomic weight 44·1(O=16)], one of the rare earth metals. It was isolated in 1879 by L. F. Nilson and was shown by Cleve to be identical with the ekaboron predicted by D. Mendeléeff. The separation of scandium from wolframite (which contains 0·14-0·16 % of rare earths) is given by R. J. Meyer (*Zeit. anorg. Chem.* 1908, 60, p. 134), but it seems impossible to obtain a perfectly pure specimen of the oxide. The salts of scandium are all colourless, the chloride and bromide corresponding in composition to $Sc_2X_6 \cdot 12H_2O$; the fluoride is anhydrous. The sulphate combines with the alkaline sulphates to form double salts of the type $Sc_2(SO_4)_3 \cdot 3K_2SO_4$. A large number of salts, both of inorganic and organic acids, have been described by Sir W. Crookes (*Phil. Trans.* 1908, 209, A. p. 15); those of the fatty acids are in most cases more soluble in cold than in hot water.

SCANTLING, measurement or prescribed size, dimensions, particularly used of timber and stone and also of vessels. In regard to timber the scantling is the thickness and breadth, the sectional dimensions; in the case of stone the dimensions of thickness, breadth and length; in shipbuilding the collective dimensions of the various parts. The word is a variation of "scantillon," a carpenter's or mason's measuring tool, also used of the measurements taken by it, and of a piece of timber of small size cut as a sample. The O. Fr. *escantillon*, mod. *échantillon*, is usually taken to be related to Ital. *scandaglio*, sounding-line (Lat. *scandere*, to climb; cf. *scansio*, the metrical scansion). It was probably influenced by *cantel*, cantle, a small piece, a corner piece. The English form "scantling" was no

[1] See A. Western, "Kurze Darstellung des norwegischen Lautsystems" in *Phonetische Studien II.*; J. C. Poestion, *Lehrbuch der norwegischen Sprache* (2. Aufl., 1900).

[2] Cf. J. A. Lundell, "Skandinavische Mundarten" (*Grundriss der germanischen Philologie*; 2. Aufl. 1901).

[3] The substance of these researches was presented in a magazine, called *Norvegia* (1887), which employed an alphabet invented by Storm.

doubt partly due to a confusion with "scant," stinted, of short measure; this is for *scami*, cf. "skimpy," "scamp" (*q.v.*), and is related to O.N. *skammr*, short, brief.

SCAPHOPODA, the third of the five classes into which the Phylum Mollusca is divided.[1] The Scaphopoda are marine Molluscs with the body, especially the foot, adapted to a burrowing life in sand. The structure is bilaterally symmetrical, the body and shell elongated along the antero-posterior axis and nearly cylindrical. The right and left margins of the mantle are united ventrally, leaving an anterior and posterior aperture to the mantle cavity. The shell has therefore the form of a tube open at both ends. The head is somewhat rudimentary and without eyes, but bears two dorsal appendages produced into numerous long filaments. Buccal mass and radular apparatus are present, but ctenidia are entirely wanting. The foot is cylindrical. At first supposed to be tubicolous Annelids, *Dentalium* and its allies were afterwards placed among the Gastropoda, to which recent authorities consider them to be closely related. In 1857 Lacaze-Duthiers raised them to the rank of a division equal to Lamellibranchia. This view is now generally adopted. The shell is narrower at the posterior end and is slightly curved to the dorsal side. Both the vernacular name, "tooth shell," and the Latin name, *Dentalium*, refer to the resemblance of the shell to a long tooth.

The animal grows at the anterior end, and therefore the shell at the posterior end is older and thicker. The edge of the mantle at the anterior aperture is very thick and muscular; at the posterior aperture also there is a circular muscle, and here the edge is interrupted by a ventral sinus and is provided internally with a dorsal and ventral valve which can be applied to each other so as to close the aperture. The living animal buries itself in the sand with only the posterior extremity projecting into the water, so that the posterior aperture of the mantle cavity is both inhalant and exhalant.

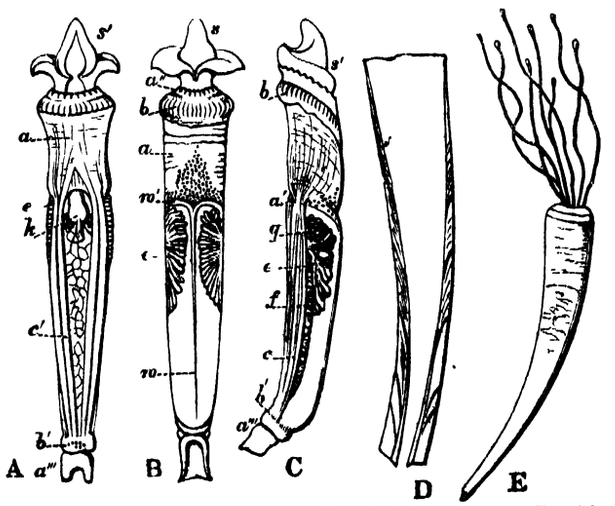
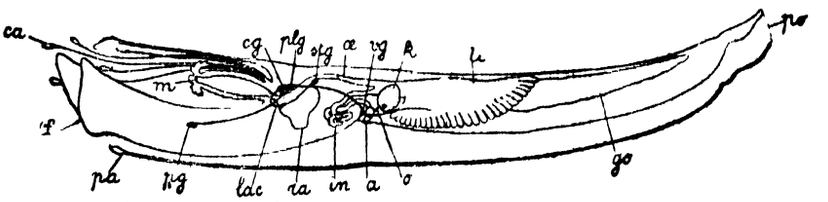


FIG. 1.—*Dentalium vulgare*, Da C. (after Lacaze Duthiers).

A, Ventral view of the animal removed from its shell.
B, Dorsal view of the same.
C, Lateral view of the same.
D, The shell in section.
E, Surface view of the shell with gill-tentacles exserted as in life.
a, Mantle.
a', Longitudinal muscle.
a'', Fringe surrounding the anterior opening of the mantle-chamber.
a''', The posterior appendix of the mantle.
b, Anterior circular muscle of the mantle.
b' Posterior do.
c, *c'*, Longitudinal muscle of mantle.
e, Liver.
f Gonad.
k Buccal mass (showing through the mantle).
q, Left nephridium.
s', Club-shaped extremity of the foot.
w, *w'*, Longitudinal blood-sinus of the mantle.

The head is situated on the dorsal side of the body anteriorly within the anterior aperture of the mantle, from which it cannot be protruded. It is a small somewhat cylindrical projection with the mouth at its anterior end. In the Dentaliidae the mouth is surrounded by eight small lobes, but these are absent in the Siphonopodiidae. At the base of the head dorsally are a pair of flat tentacular lobes from the edges of which the cephalic filaments or captacula arise. These captacula are of unequal length, highly contractile and extensile, easily thrown off and regenerated. They are ciliated, and their extremities are enlarged and have a small lateral depression in each. The captacula are tactile and prehensile and can be protruded from the anterior aperture of the mantle. The foot is elongated and cylindrical, and can be protruded from the anterior aperture to serve as a burrowing organ. In Dentaliidae it is pointed at the end and has an oblique projecting fold on either side behind the extremity. In Siphonopodiidae it ends in a disk with papillated margins, and in Pulsellum there is a filament in the centre of the disk, Two retractor muscles pass back from the base of the foot to the dorsal side of the shell.

Internal Anatomy.—The cavity within the head leads into a true buccal cavity situated within the body at the base of the foot. This buccal sac is provided with a dorsal mandible and a ventral radula. The latter is short and carries five teeth in each transverse row. The intestine is short and forms several loops all situated close behind the foot. The stomach is small; into it open a small pyloric caecum and the ducts of the liver, paired in Dentaliidae, one on the left only in *Siphonodentalium*. The anus opens just behind the base of the foot. The liver is placed entirely behind the intestine in the middle of the body, and behind it the rest of the body is occupied by the unpaired gonad. The vascular system is very rudimentary. Heart and blood-vessels are entirely absent; the blood is contained in sinuses which have no distinct walls or endothelial lining, and the principal of which are the perianal, the pedal, the visceral and the pallial. It is remarkable that in Scaphopoda only among Mollusca the blood-spaces are in communication with the external medium: a pair of apertures near the renal openings lead from the perianal sinus to the exterior and allow the blood to escape during violent contractions of the body. There are no special respiratory organs, their function is carried on by the internal surface of the mantle.



From Lankester's *Treatise on Zoology*.

FIG. 2.—Diagram of the Organization of *Dentalium*, Left-side View.

a, Anus.
ca, Captacula.
c.g, Cerebral ganglion.
f, Foot.
go, Gonad.
in, Intestine.
k, Left kidney.
la.c, Labial commissure.
li, Liver.
m, Mouth.
o, Orifice leading into the perianal sinus.
oe, Oesophagus.
pa, Mantle.
p.g, Pedal ganglion, with otocyst.
pl.g, Pleural ganglion
po, Posterior orifice of the mantle
ra, Radular sac.
st.g, Stomato-gastric ganglion.

The renal organs are a pair of short wide sacs with folded walls lying on either side of the anterior end of the liver. They open to the exterior on either side of the anus. The pericardium being absent, there are no reno-pericardial apertures.

The nervous system resembles that of Gastropoda and Lamellibranchia. A pair of cerebral ganglia lie on the dorsal side of the oesophagus: they innervate the proboscis or head and its tentacular lobes and captacula. Close to each cerebral ganglion is a pleural ganglion, and each is connected by a long nerve with the pedal ganglion of the same side, the two connectives of either side being united in the distal part of their course. The pedal ganglia are situated in the middle of the foot. The pleural ganglia are also united by a long visceral commissure as in Lamellibranchs, and this commissure bears two ganglia lying close beneath the epidermis in front of the anus. There is also a stomatogastric system arising from the cerebral ganglia.

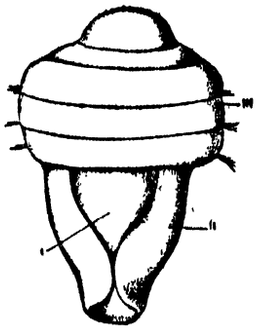
Eyes are absent; attached to the pedal ganglia are a pair of otocysts. They are innervated from the cerebral ganglia. The buccal cavity contains a sense-organ on the ventral side called the sub-radular organ. It consists of ciliated epithelium, beneath which are two ganglia connected with the labial commissure by nerves. The only other sense-organs are the captacula, which are tactile and olfactory. Each contains a terminal ganglion connected with sensory cells in the lateral pit.

The sexes are separate. The gonad, whose position has already been mentioned, is divided into transverse lobes; its duct is anterior and single, and diverges to the right to open into the right kidney as in primitive Gastropods and Lamellibranchs.

Development.—The ova are laid separately and develop in the sea-

[1] For a discussion of its relationship to the other classes of the Phylum see MOLLUSCA.

water. One large cell, or megamere, remains for some time unsegmented but is finally segmented and forms the endoderm cells which are invaginated. The gastrula thus formed has a large blastopore, which is at first posterior but afterwards gradually moves towards the anterior end of the ventral surface. The velum is peculiar, being reflected backwards over the body and bearing, besides an apical tuft, three or four rings of cilia. The shell-gland is formed on the dorsal surface, and the mantle arises as two lateral lobes which afterwards unite by their ventral edges to form the tubular mantle of the adult. The anus is not formed till a very late period of the development. The foot arises as a prominence on the ventral surface and grows forward, and at the end of five or six days the velum atrophies and the foot becomes the organ of locomotion; the animal then ceases to swim and sinks to the bottom.



After Kowalewsky, in Lankester's *Treatise on Zoology*.

FIG. 3.—Larva of *Dentalium*, aged one and a half days; ventral aspect.
I, Foot.
II, mantle.
III, Velum forming a sort of test.

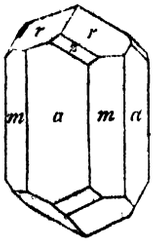
Habits and Distribution.—Scaphopoda feed on the lowest marine organisms such as Diatoms, Protozoa, &c. There are 150 living and about 275 known fossil species. The former occur in all seas from the shore to a depth of 2500 fathoms. Fossil remains are first found in the Silurian, but become most abundant from the Cretaceous onwards.

Classification.—Fam. 1. Dentaliidae. Foot conical with a laterally expanded and dorsally interrupted circular fold. Shell curved with greatest diameter at anterior aperture and diminishing gradually to posterior. *Dentalium*: posterior aperture of shell entire, without incision. *Antalis*: posterior aperture with short incision. *Fissidentalium*: posterior aperture with long fissure on ventral side; abyssal. *Fustiaria*. *Schizodentalium*: ventral border of posterior aperture with a series of small holes in a straight line. *Heterochisma*.

Fam. 2. Siphonopodiidae. Foot expanded distally into a symmetrical disk with a crenate edge or simple and vermiform without well-developed lateral processes; shell often contracted towards the anterior aperture. *Siphonodentalium*: foot ending in a median disk without a median appendage. *Cadulus*. *Dischides*. *Pulsellum*: terminal disk of foot with a median appendage. *Entalina*.

See F. J. H. Lacaze-Duthiers, "Histoire de l'organisation et du développement du Dentale," *Ann. Sci. Nat. Zool.* (4), vi., vii. (1856–1857); A. Kowalewsky, "Étude sur l'embryogénie du Dentale," *Ann. Musée d'Histoire Natur.* (Marseille, Zool. I. 1883); Boissevain, "Beiträge zur Anatomie und Histologie von Dentalium," *Jenarsche Zeitschr.* xxxviii. (1904); Paul Pelseneer, *Mollusca*; Lankester's *Treatise on Zoology*, pt. v. (1906). (J. T. C.)

SCAPOLITE (Gr. σκᾶπος, rod, λίθος, stone), a group of rock-forming minerals composed of aluminium, calcium and sodium silicate with chlorine. The variations in composition of the different members of the group may be expressed by the isomorphous mixture of the molecules $Ca_4Al_6Si_6O_{25}$ and $Na_4Al_3Si_9O_{24}Cl$, which are referred to as the meionite (Me) and marialite (Ma) molecules respectively, since they predominate in these two end-members of the series. Wernerite, or common scapolite (Me_3Ma_1 to Me_1Ma_2) and mizzonite (Me_1Ma_2 to Me_1Ma_3) are intermediate members. The tetragonal crystals are hemihedral with parallel faces (like scheelite), and usually have the form of square columns, sometimes of considerable size. There are distinct cleavages parallel to the prism-faces. Crystals are usually white or greyish-white and opaque, though meionite is found as colourless glassy crystals in the ejected limestone blocks of Monte Somma, Vesuvius. The hardness is 5-6, and the specific gravity varies with the chemical composition between 2·74 (meionite) and 2·56 (marialite). The scapolites are especially liable to alteration by weathering processes, with the development of mica, kaolin, &c., and this is the cause of the usual opacity of the crystals. Owing to this alteration, and to the variations in composition, numerous varieties have been distinguished by special names. Scapolite is commonly a mineral of metamorphic origin, occurring usually in crystalline limestones, but also with pyroxene in schists and gneisses. The long slender prisms abundant in the crystalline limestones and schists in the Pyrenees are known as "dipyre" or "couzeranite." Large crystals of common scapolite



(wernerite) are found in the apatite deposits in the neighbourhood of Bamle near Brevik in Norway, and have resulted from the alteration of the plagioclase felspar of a gabbro. (L. J. S.)

Scapolite Rocks.

According to their genesis the scapolite rocks fall naturally into four groups.

1. The scapolite limestones and contact rocks. As silicates rich in lime, it is to be expected that these minerals will be found where impure limestones have been crystallized by contact with an igneous magma. Even meionite (the variety richest in soda) occurs in this association, being principally obtained in small crystals lining cavities in ejected blocks of crystalline limestone at Vesuvius and the craters of the Eifel in Germany. Scapolite and wernerite are far more common at the contacts of limestone with intrusive masses. The minerals which accompany them are calcite, epidote, vesuvianite, garnet, wollastonite, diopside and amphibole. The scapolites are colourless, flesh-coloured, grey or greenish; occasionally they are nearly black from the presence of very small enclosures of graphitic material. They are not in very perfect crystals, though sometimes incomplete octagonal sections are visible; the tetragonal cleavage, strong double refraction and uniaxial interference figure distinguish them readily from other minerals. Commonly they weather to micaceous aggregates, but sometimes an isotropic substance of unknown nature is seen replacing them. In crystalline limestones and calc-silicate rocks they occur in small and usually inconspicuous grains mingled with the other components of the rock. Large, nearly idiomorphic crystals are sometimes found in argillaceous rocks (altered calcareous shales) which have suffered thermal metamorphism. In the Pyrenees there are extensive outcrops of lime stone which are penetrated by igneous rocks described as ophites (varieties of diabase) and lherzolites (peridotites). At the contacts scapolite occurs in a great number of places, both in the limestones and in the calcareous shales which accompany them. In some of these rocks large crystals of one of the scapolite minerals (an inch or two in length) occur, usually as octagonal prisms with imperfect terminations. In others the mineral is found in small irregular grains. It is sometimes clear, but often crowded with minute enclosures of augite, tourmaline, biotite and other minerals, such as constitute the surrounding matrix. From these districts also a black variety is well known, filled with minute graphitic enclosures, often exceedingly small and rendering the mineral nearly opaque. The names couzeranite and dipyre are often given to this kind of scapolite. Apparently the presence of chlorine in small quantities, which may often be detected in limestones, to some extent determines the formation of the mineral.

2. In many basic igneous rocks, such as gabbro and diabase, scapolite replaces felspar by a secondary or metasomatic process Some Norwegian scapolite-gabbros (or diorites) examined microscopically furnish examples of every stage of the process. The chemical changes involved are really small, one of the most important being the assumption of a small amount of chlorine in the new molecule. Often the scapolite is seen spreading through the felspar, portions being completely replaced, while others are still fresh and unaltered. The felspar does not weather, but remains fresh, and the transformation resembles metamorphism rather than weathering. It is not a superficial process, but apparently takes place at some depth under pressure, and probably through the operation of solutions or vapours containing chlorides. The basic soda-lime felspars (labradorite to anorthite) are those which undergo this type of alteration. Many instances of scapolitization have been described from the ophites (diabases) of the Pyrenees. In the unaltered state these are ophitic and consist of pyroxene enclosing lath-shaped plagioclase felspars; the pyroxene is often changed to uralite. When the felspar is replaced by scapolite the new mineral is fresh and clear, enclosing often small grains of hornblende. Extensive recrystallization often goes on, and the ultimate product is a spotted rock with white rounded patches of scapolite surrounded by granular aggregates of clear green hornblende: in fact the original structure disappears.

3. In Norway scapolite-hornblende rocks have long been known at Oedegården and other localities. They have been called spotted gabbros, but usually do not contain felspar, the white spots being entirely scapolite while the dark matrix enveloping them is an aggregate of green or brownish hornblende. In many features they bear a close resemblance to the scapolitized ophites of the Pyrenees. It has been suggested that the conversion of their original felspar (for there can be no doubt that they were once gabbros, consisting of plagioclase and pyroxene) into scapolite is due to the percolation of chloride solutions along lines of weakness, or planes of solubility, filling cavities etched in the substance of the mineral. Subsequently the chlorides were absorbed, and *pari passu* the felspar was transformed into scapolite. But it is found that in these gabbros there are veins of a chlorine-bearing apatite, which must have been deposited by gases or fluids ascending from below. This suggests that a pneumatolytic process has been at work, similar to that by which, around intrusions of granite, veins rich in tourmaline have been

laid down, and the surrounding rocks at the same time permeated by that mineral. In the composition of the active gases a striking difference is shown, for those which emanate from the granites are mainly fluorine and boron, while those which come from the gabbro are principally chlorine and phosphorus. In one case the felspar is replaced by quartz and white mica (in greisen) or quartz and tourmaline (in schorl rocks); in the other case scapolite is the principal new product. The analogy is a very close one, and this theory receives much support from the fact that in Canada (at various places in Ottawa and Ontario) there are numerous valuable apatite veins-deposits. They lie in basic rocks such as gabbro and pyroxenite, and these in the neighbourhood of the veins have been extensively scapolitized, like the spotted gabbros of Norway.

4. In many parts of the world metamorphic rocks of gneissose character occur containing scapolite as an essential constituent. Their origin is often obscure, but it is probable that they are of two kinds. One series is essentially igneous (orthogneisses); usually they contain pale green pyroxene, a variable amount of felspar, sphene, iron oxides. Quartz, rutile, green hornblende and biotite are often present, while garnet occurs sometimes; hypersthene is rare. They occur along with other types of pyroxene gneiss, hornblende gneiss, amphibolites, &c. In many of them there is no reason to doubt that the scapolite is a primary mineral. Other scapolite gneisses equally metamorphic in aspect and structure appear to be sedimentary rocks. Many of them contain calcite or are very rich in calc-silicates (wollastonite, diopside, &c.), which suggests that they were originally impure limestones. The frequent association of this type with graphitic-schists and andalusite-schists makes this correlation in every way probable. Biotite is a common mineral in these rocks, which often contain also much quartz and alkali felspar. (J. S. F.)

SCARAB (Lat. *scarabaeus*, connected with Gr. *κάραβος*), literally a beetle, and derivatively an Egyptian symbol in the form of a beetle. The Egyptian hieroglyph  pictures a dung beetle (*scarabaeus sacer*), which lays its egg in a ball of dung, and may be seen on sandy slopes in hot sunshine compacting the pellet by pushing it backward uphill with its hind legs and allowing it to roll down again, eventually reaching a place of deposit. Whatever the Egyptians may have understood by its actions, they compared its pellet to the globe of the sun. The beetle is common on both shores of the Mediterranean; the Egyptian name was *kheperer*, *khepēri*, and the sign spelt the verb *khōpi(r)* meaning "become" and perhaps "create," also the substantive "phenomenon" or "marvel." The insect was sacred to the sun-god in his form *khepēri* at Heliopolis, and has been found mummified. A colossal scarabaeus of granite in the British Museum probably came from the temple of Heliopolis. The scarabaeus was much used in Egyptian religions, appearing sometimes with outstretched wings or with a ram's head and horns as the vivifying soul. It is often seen in this guise on coffins of the New Kingdom and later, when it also became the custom to place in the bandages of the mummy a large stone scarab engraved with a chapter of the Book of the Dead. This chapter, the 64th, identified the object with the heart of the deceased and conjured it not to betray him in the judgment before Osiris. A winged scarab might also be laid on the breast; and later a number of scarabs were placed about the body. These are often of hard stone and of fine workmanship. Another and even more important class of Egyptian antiquities is in the form of scarabs, pierced longitudinally for a swivel or for threading, and having the bases flat and engraved with designs. These were intended principally for seals, but might also be used as beads or ornaments. They are thus found, engraved or plain, strung on necklaces, and amethyst scarabs with plain bases are common articles of Middle Kingdom jewelry. But the employment of scarabs as seals is proved by the impressions found on sealed documents of the Middle and New Kingdom; on several occasions the impressed clay seals alone have been found hardened and preserved by the fire which had destroyed the archives themselves. The seal type of scarabaei is extremely abundant, and the designs engraved beneath them show endless variety. Some have inscriptions carefully executed, but frequently corrupted by illiterate copying until they became meaningless. The inscriptions are sometimes "mottoes" having reference to places, deities, &c., or containing words of good omen or friendly wishes, *e.g.* "Memphis is mighty for ever," "Ammon protecteth," "Mūt give thee long life," "Bubastis grant a good New Year," "May thy name endure and a son be born thee." Such are of the New Kingdom or later. Names and titles of officials appear, most commonly in the Middle Kingdom.

Historically the most valuable class is of those which bear royal arms, ranging from Cheops of the IVth dynasty to the end of the XXVIth dynasty. Certain great kings are commemorated on scarabs of periods long subsequent to them. Thus Cheops (Khufu) may appear on an example of the latest Pharaonic age, and Tethmosis III. is found at all times after the XVIIIth dynasty. But as a rule the royal names are of contemporary workmanship, and the differences of style and pattern make it possible to group unknown kings with those who are known historically; the names of the Hyksos kings have been principally recovered from collections of scarab-seals. Scarab-shaped seals are traceable as far back as about the VIth dynasty. They became abundant under the XIIth and continued until almost the end of the native rule. As seals they took the place of the earlier cylinders. Considering the life-history of the scarabaeus and its meaning as a hieroglyph, it may well be that the scarab impressing the clay had a symbolic significance; however that may be, the oval form was well adapted for seal-stones and for the bezels of finger rings. In this situation the scarabs were often mounted with a rim of gold or silver round the edge. Rings of stone, glass or metal, with engraved bezels of the same material, and eventually Greek gem rings, gradually displaced them.

A series of exceptionally large scarabs was engraved in the reign of Amenophis III., *c.* 1450 B.C., all being inscribed with his name together with that of Queen Taia and her parentage. At present five varieties are known. The simplest commemorates his queen and the north and south limits of his empire; another dated in the first year, a great battue of wild cattle; the third, the arrival of the princess Gilukhipa of Mitanni in the tenth year; the fourth (many specimens), the number of lions slain by the king down to his tenth year; the last, the cutting of the lake of Zarukhe in the eleventh year.

Egyptian scarabs were carried by trade to most of the islands and shores of the eastern Mediterranean and to Mesopotamia. The Greeks, especially in their Egyptian colony of Naucratis (*q.v.*), imitated them in soft paste. The finest Etruscan gems of the 6th and 5th centuries B.C. are in the form of scarabs, perhaps suggested by the Egyptian. The forgers of antiquities have carried on a brisk trade in scarabs for more than a century.

See P. E. Newberry, *Scarabs* (London, 1906); also art. GEM, especially for later scarabaeoid gems. (F. Ll. G.)

SCARAMOUCH, properly a buffoon, used later colloquially for a ne'er-do-well. The name was that of a stock character in 17th-century Italian farce, *Scaramuccia* (*i.e.* literally "skirmish"), who, attired usually in a black Spanish dress, burlesquing a "don," was beaten by Harlequin for his boasting and cowardice. The part was played in London in 1673 by a well-known Italian actor, Tiberic Fiurelli, and became popular. There are many instances of the use of the word in the *New English Dictionary*.

SCARBOROUGH, a municipal and parliamentary borough and fashionable seaside resort in the North Riding of Yorkshire, England, 231 m. N. of London, on the North-Eastern railway. Pop. (1891) 33,776; (1901) 38,161. From the bold and picturesque coast a hammer-like peninsula (285 ft.) projects, separating North Bay from South Bay, and the modern extension of the town fringes both of these. The peninsula is crowned by a 12th-century castle, though this naturally strong position was probably occupied earlier. There is a moat (Castle Dyke) on the landward side, and a wall with towers also protects the castle in this direction. The keep, a lofty ruined tower, is of Norman date. The peninsula is much exposed to encroachment by the sea. In 1190 the plateau forming the castle yard was stated by William of Newburgh to be 60 acres in extent; it is now about 17. The list of the governors of the castle covers the period from 1136 to 1832. Near the landward side of the dike is the church of St Mary, finely situated, occupying the site of a Cistercian monastery of 1198. It is transitional Norman and Early English, with later additions. The choir was occupied by the Roundheads during the Commonwealth, and was wrecked by the castle guns. The tower fell later, and was in part rebuilt in the 17th century.

The development of Scarborough as a watering-place dates from the discovery in 1620 by Mrs Farren, a resident, of mineral

springs. These springs, of which there are two, occur near the shore of the South Bay, and a handsome Spa House in pleasant gardens contains them. The south spring is aperient, but contains some iron; while the north or chalybeate spring is more tonic in its properties. They are still in use, though of less importance than formerly in comparison with the other attractions of the town. The sea-bathing is very good, both bays having a sandy foreshore. Well-planted grounds fringe the steep slope down to the North Bay, in which there is a promenade pier; the South Cliff is similarly adorned. It is approached from the north by a lofty bridge over a ravine, to the west of which lies a pleasant park. The southern part of the town is the more fashionable portion. The principal buildings of entertainment are the aquarium (also used as a concert hall); the museum, a rotunda in Doric style, containing excellent antiquarian and natural history collections; two theatres, and the assembly rooms attaching to the Spa House. The promenades and drives are extensive, and there is an inclined tramway leading from summit to foot of the South Cliff. A great marine drive, 4200 ft. long, was opened in 1908. The neighbouring country is exceedingly picturesque, with high-lying moors intersected by narrow, well-wooded valleys. The hydrography of the district is remarkable, the Derwent, which flows S.W. to the Ouse and so to the Humber, having one of its sources near Scarborough within 2 m. of the sea. The climate is healthy and temperate; average temperature, 59·2° F. in July, and in January, 37·7.

The chief buildings of Scarborough apart from those already considered are the town hall, market hall and public hall, several modern churches and chapels, and charitable and benevolent institutions. The harbour, enclosed by piers and divided into two basins, lies on the south side of the castle peninsula. It is dry at low tide, but is accessible at spring tides to vessels of 13 ft. draught. It is largely used by fishing boats. The parliamentary borough, falling within the Whitby division of the county, returned two members until 1885, one since that date. The town is governed by a mayor, 6 aldermen and 18 councillors. Area, 2373 acres.

Although there is no mention of Scarborough (*Scardeburc, Escardebuc, Scardeburg, Scardeburk, Scartheburg, Schardeburg*) in the Domesday Survey the remains of Roman roads leading to the town indicate that it was in early times a place of importance. The castle was built during the 12th century by William le Gros, earl of Albemarle, who chose the site on the top of a steep cliff now called the "Scaur." Henry II. added greatly to its strength. From this time it was in the hands of a line of distinguished nobles appointed by the king. Scarborough is a borough by prescription. Its first charter of 1181 granted that the burgesses should possess all liberties in the same way as the citizens of York. They were also to render to the king yearly 4d. for every house whose gable was turned to the way, and 6d. for those whose sides were turned to the way. This charter was confirmed with various alterations and extensions by most of the succeeding monarchs. Henry III. in 1253 granted that a court of pleas should be held at Scarborough by the justices who went to hold common pleas at York; he also gave the corporation a gild merchant. Edward II. caused the town to be taken away from the burgesses "for certain causes," but it was restored to them by Edward III. in 1327. The charter of Edward III. in 1356 sets forth and confirms the privileges of the borough. Richard III. by his charter of 1485 appointed that the town should be governed by a mayor, sheriff and twelve aldermen, and also granted amongst other extensive privileges that this town with the manor of Whallesgrave should be a county of itself. However, on the death of Richard III. the charter took no effect, and the corporation returned to its ancient mode of government. In 1684 a mayor, 12 aldermen and 31 common councilmen were nominated as governors. Scarborough returned two members to parliament from 1295 to 1885. It is said that Henry II. held a market here which he granted to the burgesses, but of this there is no mention in subsequent charters. In 1253 Henry III. granted a yearly fair lasting from the Assumption of St Mary to the following Michaelmas. This fair was originally held on the sands. Jet was formerly an important manufacture.

See Thomas Hinderwell, *History of Scarborough* (Scarborough, 1832); J. B. Baker, *History of Scarborough* (London, 1882).

SCARF, a narrow wrap for the neck or shoulders; the term is a wide one, ranging from a light band of silk, muslin or other material worn by women as a decorative part of their costume to a warm knitted muffler of wool to protect the throat from cold. The O. Eng. *scearfe* meant a piece or fragment of anything, and is to be referred ultimately to the root *skar-*, to cut, seen in Dutch *scherf*, shred, Ger. *Scherbe*, potsherd, "scrap," a piece or fragment; "scrip," a piece of leather, hence a pouch or wallet. The particular meanings in English are to be referred to Fr. *escharpe*, pilgrim's wallet, also scarf. The ecclesiastical "scarf" was originally a loose wrap or muffler (band) to be worn round the neck out of doors. In the English Church, in post-Reformation times, the minister wore over the surplice the "scarf," which was a broad band of black silk with fringed ends arranged like the stole round the neck, but falling nearly to the feet. Its use has been almost entirely replaced by that of the stole (*q.v.*), with which it has sometimes been wrongly confused.

Ultimately from the same root, but directly adapted from the Scandinavian, cf. Swed. *skarf*, joint, is the use of the word "scarf," in carpentry and joinery, for a joint by which two timbers are fastened together longitudinally so as to form a continuous piece (see JOINERY).

SCARLATTI, ALESSANDRO (1659–1725), Italian musical composer, was born in Sicily, either at Trapani or Palermo, in 1659. He is generally said to have been a pupil of Carissimi in Rome, and there is reason to suppose that he had some connexion with northern Italy, since his early works show the influence of Stradella and Legrenzi. The production at Rome of his opera *Gli Equivoci nell' amore* (1679) gained him the protection of Queen Christina of Sweden, and he became her Maestro di Cappella. In February 1684 he became Maestro di Cappella to the viceroy of Naples, through the intrigues of his sister, an opera singer, who was the mistress of an influential noble in that city. Here he produced a long series of operas, remarkable chiefly for their fluency, as well as other music for state occasions. In 1702 he left Naples and did not return until the Spanish domination had been superseded by that of the Austrians. In the interval he enjoyed the patronage of Ferdinand III. of Tuscany, for whose private theatre near Florence he composed operas, and of Cardinal Ottoboni, who made him his Maestro di Cappella, and procured him a similar post at the church of S. Maria Maggiore in Rome (1703). After visiting Venice and Urbino in 1707, he took up his duties at Naples again in 1708, and remained there until 1717. By this time Naples seems to have become tired of his music; the Romans, however, appreciated it better, and it was at the Teatro Capranica in Rome that he produced some of his finest operas (*Telemaco*, 1718; *Marco Attilio Regolo*, 1719; *Griselda*, 1721), as well as some noble specimens of church music, including a mass for chorus and orchestra, composed in honour of St Cecilia for Cardinal Acquaviva in 1721. His last work on a large scale appears to have been the unfinished serenata for the marriage of the prince of Stigliano (1723); he died at Naples on the 24th of October 1725.

Scarlatti's music forms the most important link between the tentative "new music" of the 17th century and the classical school of the 18th, which culminated in Mozart. His early operas (*Gli Equivoci nel sembiante* (1679); *L' Honestà negli amori* (1680); *Pompeo* (1683), containing the well-known airs "O cessate di piagarmi" and "Toglietemi la vita ancor," and others down to about 1685) retain the older cadences in their recitatives, and a considerable variety of neatly constructed forms in their charming little arias, accompanied sometimes by the string quartet, treated with careful elaboration, sometimes by the harpsichord alone. By 1686 he had definitely established the "Italian overture" form (second edition of *Dal male il bene*), and had abandoned the ground bass and the binary air in two stanzas in favour of the ternary or *da capo* type of air. His best operas of this period are *La Rosaura* (1690, printed by the *Gesellschaft für Musikforschung*), and *Pirro e Demetrio* (1694), in which occur the songs "Rugiadose, odorose," "Ben ti sta, traditor." From about 1697 onwards (*La Caduta dei decemviri*), influenced partly perhaps by the style of Bononcini and probably more by the taste of the viceregal court, his opera songs become more conventional and commonplace in rhythm, while his scoring is hasty and crude, yet not without brilliancy (*Eraclea*, 1700), the oboes and trumpets being frequently used, and the violins often playing in unison. The operas composed for Ferdinand de Medici are lost; they would probably have given us a more favourable idea of his style, his correspondence with the prince showing that they were composed with a very sincere sense of inspiration. *Mitridate Eupatore*, composed for Venice in 1707,

contains music far in advance of anything that Scarlatti had written for Naples, both in technique and in intellectual power. The later Neapolitan operas (*L'Amor volubile e tiranno* (1709); *La Principessa fedele* (1712); *Tigrane*, 1715, &c.) are showy and effective rather than profoundly emotional; the instrumentation marks a great advance on previous work, since the main duty of accompanying the voice is thrown upon the string quartet, the harpsichord being reserved exclusively for the noisy instrumental *ritornelli*. His last group of operas, composed for Rome, exhibit a deeper poetic feeling, a broad and dignified style of melody, a strong dramatic sense, especially in accompanied recitatives, a device which he himself had been the first to use as early as 1686 (*Olimpia vendicata*) and a much more modern style of orchestration, the horns appearing for the first time, and being treated with striking effect.

Besides the operas, oratorios (*Agar et Ismaele esiliati*, 1684; *Christmas Oratorio*, *c.* 1705; *S. Filippo Neri*, 1714; and others) and serenatas, which all exhibit a similar style, Scarlatti composed upwards of five hundred chamber-cantatas for a solo voice. These represent the most intellectual type of chamber-music of their period, and it is to be regretted that they have remained almost entirely in MS., since a careful study of them is indispensable to any one who wishes to form an adequate idea of Scarlatti's development. His few remaining masses (the story of his having composed two hundred is hardly credible) and church music in general are comparatively unimportant, except the great St Cecilia Mass (1721), which is one of the first attempts at the style which reached its height in the great masses of Bach and Beethoven. His instrumental music, though not without interest, is curiously antiquated as compared with his vocal works.

Scarlatti's greatest claim to remembrance lies in the fact that he practically created the language of classical music. He extended the old forms, and filled them with melody unrivalled for purity and serenity, based on a far-reaching foundation of modern harmony and tonality, combined with a remarkable power of thematic development. That his great qualities have been little recognized is due partly to the wonderful mastery with which he avoided all appearance of difficulty, and partly to the fact that he carried out in his operas and cantatas the structural methods which the present age considers to be suitable to instruments alone, but which were indeed admirably suited to vocal music in an age when the singer was technically and intellectually far in advance of all other musicians.

His eldest son, DOMENICO SCARLATTI (1685–1757), also a composer, was born at Naples on the 26th of October 1685. Presumably he studied first under his father, but he was in all probability also a pupil of Gaetano Greco. In 1704 he remodelled Pollaroli's *Irene* for performance at Naples. Soon after this his father sent him to Venice, where he studied under Gasparini, and became intimate with Thomas Roseingrave. Domenico was already a harpsichord-player of eminence, and at a trial of skill with Handel at the palace of Cardinal Ottoboni in Rome he was adjudged his equal on that instrument, although inferior on the organ. In 1709 Domenico entered the service of Marie Casimire, queen of Poland, then living in Rome, and composed several operas for her private theatre. He was Maestro di Cappella at St Peter's from 1715 to 1719, and in the latter year came to London to direct his opera *Narciso* at the King's Theatre. In 1720 or 1721 he went to Lisbon, where he taught music to the princess Magdalena Theresia. He was at Naples again in 1725, but in 1729 went to Madrid as music master to the princess, who had married into the Spanish royal house. He remained in Spain for some twenty-five years, holding various honourable appointments, and devoting himself entirely to the harpsichord, for which he composed over four hundred pieces. He is supposed to have died in 1757, either at Naples or in Spain.

Like his father, Domenico Scarlatti was a composer of great fertility, intellectual rather than emotional, presenting us with an example of steady development of style up to the end of a long life. His operas and cantatas are of no importance, but his harpsichord pieces are the most original productions of their time. Little known until the beginning of the 19th century, their technical difficulties have caused them to be regarded as mere studies in virtuosity, and modern pianoforte technique owes much to their influence; but considered from a purely musical point of view they display an audacity of harmony and modulation, a freshness and variety of invention, a perfection of workmanship and a vigorous intellectuality in thematic development that places them almost on a level with the sonatas of Beethoven.

Modern Printed Editions.—Clementi's *Practical Harmony*; Czerny's edition; Farrenc, *Le Trésor des pianistes*. Of recent editions the most accurate and complete is by Alessandro Longo (Ricordi, Milan; 6 vols., published 1906). (E. J. D.)

SCARLET, a vivid, bright red colour, somewhat inclined to orange. The word appears in most European languages; cf. Ger. *Scharlach*, Swed. *skarlakan*, Ital. *scarlatto*, &c.; the English form is an adaptation of the O. Fr. *escarlate*, mod. *écarlate*. The origin of these is to be found in the Persian *saqlan*, meaning "broad-cloth." There are various forms, *saqalāt*, *siqalāt*, *suqlāt*; this cloth was chiefly used for dresses, flags, large tents and trappings, and was frequently scarlet in colour, and hence its name became applied to the colour.

SCARLET FEVER, or SCARLATINA, names applied indifferently to an acute infectious disease, characterized by high fever, accompanied with sore throat and a diffuse red rash upon the skin (see PARASITIC DISEASES). This fever appears to have been first accurately described by Sydenham in 1676, before which period it had evidently been confounded with smallpox and measles. Klein in 1885 isolated a streptococcus which he termed the streptococcus scarlatinae. The scarlatinal throat is the chief habitat of the organism, though it has been found both by Klein and other observers in the discharges from the ears of scarlet fever patients. Mervyn Gordon also isolated from cases the streptococcus conglomerulatus. It is possible that septic cases of scarlet fever are the result of a mixed infection. The serum of patients has been found to contain agglutins to streptococci from cases of erysipelas, septicaemia and puerperal fever, as well as to the streptococci scarlatinae. F. B. Mallory in 1904 published his discovery of "protozoonlike" bodies in the cells of the epidermis. Other observers have found them in the skin of fatal cases, but failed to find them in the living. The contagion of scarlet fever takes place from a previous case either by the skin during the early stages of the disease or by the nasal or aural discharges of a patient. It may be conveyed by any article of clothing or furniture or by any person that has been in contact with a scarlet fever patient. Infectivity may also take place through a contaminated milk supply, as in the Marylebone epidemic, 1885. Klein here found disorder in cows which he considers analogous to scarlatina and communicable to man.

The period of incubation in scarlet fever may be as short as one or two days, but in most instances it is probably less than a week. The invasion of this fever is generally sudden and sharp, consisting in rigors, vomiting and sore throat, together with a rapid rise of temperature and increase in the pulse. Occasionally, especially in young children, the attack is ushered in by convulsions. These premonitory symptoms usually continue for about twenty-four hours, when the characteristic eruption makes its appearance. It is first seen on the neck, chest, arms and hands, but quickly spreads all over the body, although it is not distinctly marked on the face. This rash consists of minute thickly-set red spots, which coalesce to form a general diffuse redness, in appearance not unlike that produced by the application of mustard to the skin. In some instances the redness is accompanied with small vesicles containing fluid. In ordinary cases the rash comes out completely in about two days, when it begins to fade, and by the end of a week from its first appearance it is usually gone. The severity of a case is in some degree measured by the copiousness and brilliancy of the rash, except in the malignant varieties, where there may be little or no eruption. The tongue, which at first was furred, becomes about the fourth or fifth day denuded of its epithelium and acquires the peculiar "strawberry" appearance characteristic of this fever. The interior of the throat is red and somewhat swollen, especially the uvula, soft palate and tonsils, and a considerable amount of secretion exudes from the inflamed surface. There is also tenderness and slight swelling of the glands under the jaw. In favourable cases the fever departs with the disappearance of the eruption and convalescence sets in with the commencement of the process of "desquamation" or peeling of the cuticle, which first shows itself about the neck, and proceeds slowly over the whole surface of the body. Where the skin is thin the desquamation is in the form of fine branny scales; but where it is thicker, as about the hands and feet, it comes off in large pieces, which sometimes assume the form of casts of the fingers or toes. The duration of this process is variable, but it is rarely complete before the end of six or eight weeks, and not unfrequently goes on for several weeks beyond that period. It is during this stage that complications are apt to appear.

Scarlet fever shows itself in certain well-marked varieties, of which the following are the chief:—

1. *Scarlatina Simplex* is the most common form; in this the symptoms, both local and general, are moderate, and the case usually runs a favourable course. In some rare instances it would seem that the evidences of the disease are so slight, as regards both fever and rash, that they escape observation and only become known by the

patient subsequently suffering from some of the complications associated with it. In such cases the name *latent scarlet fever* (*scarlatina latens*) is applied.

2. *Septic Scarlatina* or *Scarlatina Anginosa* is a more severe form of the fever, particularly as regards the throat symptoms. The rash may be well marked or not, but it is often slow in developing and in subsiding. There is intense inflammation of the throat, the tonsils, uvula and soft palate being swollen and ulcerated, or having upon them membranous patches not unlike those of diphtheria, while externally the gland tissues in the neck are enlarged and indurated and not unfrequently become the seat of abscesses. There is difficulty in opening the mouth; an acrid discharge exudes from the nostrils and excoriates the lips; and the countenance is pale and waxy-looking. This form of the disease is marked by great exhaustion and the gradual development of the symptoms of acute septicaemia, with sweating, albuminuria, delirium and septic rash.

3. *Toxic* or *ataxic scarlatina* (*scarlatina maligna*). In this form the gravity of the condition is due to intense poisoning, and the patient may even die therefrom before the typical symptoms of the disease have had time to manifest themselves.

The typically malignant forms are those in which the attack sets in with great violence and the patient sinks from the very first. In such instances the rash either does not come out at all or is of the slightest amount and of livid rather than scarlet appearance, while the throat symptoms are often not prominent. A further example of a malignant form is occasionally observed in cases where the rash, which had previously been well developed, suddenly recedes, and convulsions or other nervous phenomena and rapid death supervene.

The complications and effects of scarlet fever are among the most important features in this disease, although their occurrence is exceptional. The most common and serious of these is inflammation of the kidneys, which may arise during any period in the course of the fever, but is specially apt to appear in the convalescence, while desquamation is in progress. Its onset is sometimes announced by a return of feverish symptoms, accompanied with vomiting and pain in the loins; but in a large number of instances it occurs without these and comes on insidiously. One of the most prominent symptoms is slight swelling of the face, particularly of the eyelids, which is rarely absent in this complication. If the urine is examined it will probably be observed to be diminished in quantity and of dark smoky or red appearance, due to the presence of blood; while it will also be found to contain a large quantity of albumen. This, together with the microscopic examination which reveals the presence of tube casts containing blood, epithelium, &c., testifies to a condition of acute inflammation of the kidney (glomerular and tubal nephritis). Occasionally this condition does not wholly pass off, and consequently lays the foundation for Bright's disease. Muco-purulent rhinorrhoea and also rheumatism are others of the more common complications or results of scarlet fever, while suppuration of the ears is due to the extension of the inflammatory process from the throat along the Eustachian tube into the middle ear. This not unfrequently leads to permanent ear-discharge, with deafness from the disease affecting the inner ear and temporal bone, a condition implying a degree of risk from its proximity to the brain. Other maladies affecting the heart, lungs, pleura, &c., occasionally arise in connexion with scarlet fever, but they are of less common occurrence than those previously mentioned.

In the treatment of scarlet fever, one of the first requirements is the isolation of the case, with the view of preventing the spread of the disease. In convalescence, with the view of preventing the transmission of the desquamated cuticle, the inunction of the body with carbolized oil (1 in 40) and the frequent use of a bath containing soda, are to be recommended. With respect to the duration of the infective period, it may be stated generally that it is seldom that a patient who has suffered from scarlet fever can safely go about before the expiry of eight weeks, while on the other hand the period may be considerably prolonged beyond this, should any nasal or aural discharge continue. As to general management during the progress of the fever, in favourable cases little is required beyond careful nursing and feeding. The diet all through the fever and convalescence should be of light character, consisting mainly of milk food. Soups and solid animal food should as far as possible be avoided owing to the frequency of nephritis. During the febrile stage a useful drink may be made by a weak solution of chlorate of potash in water (1 drachm to the pint), and of this the patient may partake freely. The fauces should be irrigated every few hours with a mild antiseptic solution, and sucking ice often relieves local discomfort. Should the lymphatic glands be enlarged and tender, they should be fomented. If suppuration threatens they must be opened. In septic cases the nasofaucial passages must be cleansed with a more powerful antiseptic. Insomnia, restlessness and high temperature may be relieved by tepid sponging, and acute hyperpyrexia by cold baths. The treatment of kidney complications is similar to that of acute Bright's disease. A hot-air bath or wet pack are often useful. Otitis may be troublesome, and when otorrhoea is established the canal must be kept as aseptic as possible. The ears should be carefully syringed every four hours with an antiseptic solution and dried, and a little iodoform inserted into the meatus. Complications such as mastoid disease require special treatment. Recently a method of treatment introduced by Dr Robert Milne, and consisting of the inunction of the entire body with eucalyptus oil from the *first* day of the disease, together with swabbing the tonsils with a solution of 1 in 10 of carbolic oil, has been advocated as rendering the patient absolutely non-infectious as well as limiting the severity of the disease. The method is still on its trial, but it is possible it may revolutionize our mode of treatment.

Serumtherapy.—Marmorek's original antistreptococci serum has been on the whole disappointing in its results, but polyvalent serums have been much more successful. Dr Besredka prepared a serum from the blood of fatal cases, and in the serum prepared at the Pasteur Institute no less than twenty separate strains of streptococci are used. In using serums, early and large dosage is necessary. Palmirski and Zebrowski have also prepared a serum from the streptococcus conglomerulatus, which has been used with considerable success in the children's hospital at Warsaw.

SCARLETT, SIR JAMES YORKE (1799–1871), British general, was the second son of the 1st Baron Abinger. Educated at Eton and Trinity College, Cambridge. He entered the army as a cornet in 1818, and in 1830 became major in the 5th Dragoon Guards. From 1836 until 1841 he was Conservative member of Parliament for Guildford. In 1840 he obtained the command of his regiment, which he held for nearly fourteen years. In the Crimean War the 5th Dragoon Guards formed part of the Heavy Cavalry Brigade (of which Scarlett was appointed brigadier); it was sent to the Black Sea in 1854, and suffered very heavily from cholera in the camps of Varna. Scarlett underwent his baptism of fire before Sebastopol. On the 25th of October 1854 occurred the battle of Balaklava, at which the Heavy Brigade achieved a magnificent success against the Russian cavalry, and had the brigadier (who in the previous charge had been in the thickest of the mêlée) been allowed to advance as he wished, might have converted the disastrous charge of the Light Brigade into a substantial success (see BALAKLAVA and CRIMEAN WAR). For his services on this day Scarlett was promoted major-general, and in 1855 was made K.C.B. After a short absence in England he returned to the Crimea with the local rank of lieutenant-general to command the British cavalry. After the Peace of Paris Sir James Scarlett commanded the cavalry at Aldershot until 1860, and was adjutant-general of the army from 1860 to 1865. In the latter year he became commander of the Aldershot Camp, a post which he held until his retirement in 1870. He died in 1871. In 1869 he had been made G.C.B.

SCARRON, PAUL (1610–1660), French poet, dramatist, novelist and husband of Madame de Maintenon, was baptized on the 4th of July 1610. His father, of the same name, was a member of the *parlement* of Paris. Paul the younger became an *abbé* when he was nineteen, and in 1633 entered the service of Charles de Beaumanoir, bishop of Le Mans, with whom he travelled to Rome in 1635. Finding a patron in Marie de Hautefort, he became a well-known figure in literary and fashionable society. An improbable story is told on the authority of La Beaumelle (*Mémoires . . . de Mme de Maintenon*) that—when in residence at his canonry of Le Mans—he once tarred and feathered himself as a carnival freak and, being obliged to take refuge from popular wrath in a swamp, was crippled from rheumatism. What is certain is that Scarron, after having been in perfect health for nearly thirty years, passed twenty more in a state of miserable deformity and pain. His head and body were twisted, and his legs became useless. He bore up against his sufferings with invincible courage, though his circumstances were further complicated by a series of lawsuits with his stepmother over his father's property, and by the poverty and misconduct of his sisters, whom he supported. Scarron returned to Paris in 1640, and in 1643 appeared a *Recueil de quelques vers burlesques*, and in the next year *Typhon ou la gigantomachie*. At Le Mans he had conceived the idea of the *Roman comique*, the first part of which was printed in 1651. In 1645 was performed the comedy of *Jodelet, ou le maître valet*, the name of which was derived from the actor who took the principal part. *Jodelet* was the first of many French plays in which the humour depends on the valet who takes the part of master, an idea that Scarron borrowed from the Spanish. After a short visit to Le Mans in 1646, he returned to Paris, and worked hard for the bookseller Quinet, calling his works his "*marquisat de Quinet.*" He had

also a pension from Fouquet, and one from the queen, which was withdrawn because he was suspected of Frondeur sentiments. When Mazarin received the dedication of *Typhon* coldly, Scarron changed it to a burlesque on the minister. In 1651 he definitely took the side of the Fronde in a *Mazarinade*, a violent pamphlet. He now had no resources but his "*marquisat.*"

In his early years he had been something of a libertine. In 1649 a penniless lady of good family, Céleste Palaiseau, kept his house in the Rue d'Enfer, and tried to reform the gay company which assembled there. But in 1652, sixteen years after he had become almost entirely paralysed, he married a girl of much beauty and no fortune, Françoise d'Aubigné, afterwards famous as Madame de Maintenon (*q.v.*). Scarron had long been able to endure life only by the aid of constant doses of opium, and he died on the 6th of October 1660.

Scarron's work is very abundant and very unequal. The piece most famous in his own day, his *Virgile travesti* (1648–1653), is now thought a somewhat ignoble waste of singular powers for burlesque. But the *Roman comique* (1651–1657) is a work the merit of which is denied by no competent judge. Unfinished, and a little desultory, this history of a troop of strolling actors is almost the first French novel, in point of date, which shows real power of painting manners and character, and is singularly vivid. It is in the style of the Spanish picaresque romance, and furnished Théophile Gautier with the idea and with some of the details of his *Capitaine Fracasse*. Scarron also wrote some shorter novels: *La Précaution inutile*, which inspired Sedaine's *Gageure imprévue*; *Les Hypocrites*, to which *Tartuffe* owes something, and others. Of his plays *Jodelet* (1645) and *Don Japhet d'Arménie* (1653) are the best.

The most complete edition of his works is by La Martinière, 1737 (10 vols., Amsterdam). The *Roman comique* and the *Énéide travestie* were edited by Victor Fournel in 1857 and 1858. Among the contemporary notices of Scarron, that contained in the *Historiettes* of Tallemant des Réaux is the most accurate. The most important modern works on the subject are *Scarron et le genre burlesque* (1888) by Paul Morillot; a biography by J. J. Jusserand in English, prefixed to his edition of *The Comical Romance and other tales by Paul Scarron, done into English by Tom Brown of Shifnal, John Savage and others* (2 vols., 1892); and *Paul Scarron et Françoise d'Aubigné d'après des documents nouveaux* (1894) by A. de Boislisle.

SCAUP, the wild-fowler's ordinary abridgment of SCAUP-DUCK, meaning a duck so called "because she feeds upon *Scaup, i.e.* broken shell-fish," as may be seen in F. Willughby's *Ornithology* (p. 365); but it would be more proper to say that the name comes from the "mussel-scaups," or "mussel-scalps," the beds of rock or sand on which mussels are aggregated. It is the *Anas marila* of Linnaeus and *Fuligula marila* of modern systematic writers, a very abundant bird around the coasts of most parts of the northern hemisphere, repairing inland in spring for the purpose of reproduction, though so far as is positively known hardly but in northern districts, as Iceland, Lapland, Siberia and the fur-countries of America. The scaup-duck has considerable likeness to the pochard (*q.v.*), both in habits and appearance; but it much more generally affects salt-water, and the head of the male is black, glossed with green; hence the name of "Black-head," by which it is commonly known in North America, where, however, a second species or race, smaller than the ordinary one, is also found, the *Fuligula affinis*. The female scaup-duck can be readily distinguished from the dunbird or female pochard by her broad white face. (A. N.)

SCAURUS, MARCUS AEMILIUS (*c.* 163–88 B.C.), Roman statesman, was a member of a great patrician family which had sunk into obscurity. His father had been a coal-dealer, and he himself had thought of becoming a money-changer, but finally decided in favour of a political career. Having served in the army in Spain and Sardinia, he became curule aedile, praetor and (after an unsuccessful attempt in 117) consul in 115. During his consulship he celebrated a triumph for his victory over certain Alpine tribes. In 112 he was one of the commissioners sent to Africa to arrange the dispute between Jugurtha and Adherbal. When a special committee was appointed to examine the charges of venality in their dealings with Jugurtha brought against the Roman representatives, Scaurus, who was equally guilty with the rest, was especially active in promoting the establishment of the committee, and even managed to get himself put at the head of it. He thus saved himself, but his intercession on behalf of the other offenders was of no avail. In 109 Scaurus was censor, and constructed the Via Aemilia and restored the Mulvian bridge.[1] In 104 he superseded Saturninus (*q.v.*) in the management of the corn supply at Ostia.

During all his life Scaurus was a firm adherent of the moderate aristocratical party, which frequently involved him in quarrels with the representatives of the people and the extremists on his own side. Though not a great orator, his speeches were weighty and impressive. His wife was Caecilia Metella, who after his death married the dictator Sulla. His daughter Aemilia was the wife of Manius Acilius Glabrio, and subsequently of Pompey, the triumvir.

See Sallust, *Jugurtha*; Orelli's *Onomasticon Tullianum*; Asconius, *In Scaurum*; Aurelius Victor, *De viris illustribus*, 72; A. H. J. Greenidge, *Hist. of Rome*, i. 296; and M. G. Bloch, *Mélanges d'histoire ancienne*, i. (1909).

MARCUS AEMILIUS SCAURUS, his son, served during the third Mithradatic War (74–61 B.C.) as quaestor to Pompey, by whom he was sent to Judaea to settle the quarrel between Hyrcanus and Aristobulus. Scaurus decided in favour of the latter, who was able to offer more money. On his arrival in Syria, Pompey reversed the decision, but, ignoring the charge of bribery brought against Scaurus, left him in command of the district. An incidental campaign against Aretas, king of the Nabataeans, was ended by the payment of 300 talents by Aretas to secure his possessions. This agreement is represented on coins of Scaurus—Aretas kneeling by the side of a camel, and holding out an olive branch in an attitude of supplication. As curule aedile in 58, Scaurus celebrated the public games on a scale of magnificence never seen before. Animals, hitherto unknown to the Romans, were exhibited in the circus, and an artificial lake (*euripus*) was made for the reception of crocodiles and hippopotamuses. One of the greatest curiosities was a huge skeleton brought from Joppa, said to be that of the monster to which Andromeda had been exposed. A wooden theatre was erected for the occasion, capable of holding 80,000 spectators. In 56 Scaurus was praetor, and in the following year governor of Sardinia. On his return to Rome (54) he was accused of extortion in his province. Cicero and five others (amongst them the famous Q. Hortensius) undertook his defence, and, although there was no doubt of his guilt, he was acquitted. During the same year, however (according to some, two years later, under Pompey's new law), Scaurus was condemned on a charge of illegal practices when a candidate for the consulship. He went into exile, and nothing further is heard of him.

See Josephus, *Antiq.* xiv. 3-5, *Bell. Jud.* i. 7; Appian, *Syr.* 51, *Bell. civ.* ii. 24; Pliny, *Nat. Hist.* xxxvi. 24; Cicero, *Pro Sestio*, 54, fragments of *Pro Scauro*, numerous references in the *Letters*; Asconius, *Argumentum in Scaurum*. See also, for both the above, AEMILIUS (Nos. 140, 141) in Pauly-Wissowa's *Realencyclopädie der classischen Altertumswissenschaft*, i. pt. 1. (1894), and Smith's *Dictionary of Greek and Roman Biography*, *s.v.* SCAURUS.

SCAURUS, QUINTUS TERENTIUS, Latin grammarian, flourished during the reign of Hadrian (Aulus Gellius xi. 15). He was the author of an *ars grammatica* and commentaries on Plautus, Virgil's *Aeneid* and probably Horace. Under his name two fragments are extant—the longer from his work on orthography (*De orthographia*), the shorter (chiefly on the use of prepositions) from another grammatical work.

SCAVENGER, now one who cleans the streets, removes refuse, generally a workman employed by the local public health authority (see PUBLIC HEALTH). The name is properly "scavager" or "scaveger" (the *n* being intrusive as in "passenger" and "messenger"), an official who was concerned with the receipt of custom duties and the inspection (*scavage*) of imported goods. The "scavagers" are found with such officials of the City of London as aleconners, beadles, &c., in the *Liber Albus* (*Munimenta Gildhallae Londoniensis*, ed. Riley). These officials seem to have been charged also with the cleaning of the streets, and the name superseded the older *rakyer* for those who performed this duty. Skeat takes "scavage" to be a Low French corruption of "showage," spelled variously as *schewage*, *scevage*, &c., and, therefore, to be derived from "show," to exhibit for inspection.

[1] The view that he was consul again in 108 is disproved by Bloch (see bibliog.).

SCAVENGER'S DAUGHTER (corruption of Skevington's or Skeffington's Daughter), an instrument of torture in use during the 16th century in England. It was invented by Sir W. Skevington, lieutenant of the Tower in the reign of Henry VIII. It consisted of a wide iron hoop which by means of screws was tightened round the victim's body until the blood was forced from the nose and ears, and sometimes even from the hands and feet.

SCENE (Fr. *scène*, Lat. *scaena*, Gr. σκηνή, a tent or booth, a stage or scene), a word of which the various applications, figurative or otherwise, are derived from its original meaning of the stage or platform in the Greek or Roman theatre together with the structure that formed the background. Thus "scene" was formerly used, as "stage" is to-day, of the actor's profession or of dramatic art; and of the actual performance or representation on the stage, still surviving in such phrases as "the scene opens" or "closes." It is also applied, actually and figuratively, to the place where the action of a play or any series of events take place, and so of any episode or situation in a novel or other narrative or description of events; from this the transition to an excited or violent exhibition of feeling between two or more persons is easy.

Of the specific applications of the word to the drama the main examples are (1) to a division of the play, marked by the fall of the curtain, the "scene" being a subdivision of an "act," where the play is thus divided, or where there are no acts, of the divisions themselves; (2) to the material which forms the view of the place where the action is supposed to occur, that is, the painted cloths, slides and other apparatus, known as the "scenery," a word which has thus been transferred to a view generally, the appearance of the feature of a natural landscape. Allied words are "scena," used only in music, of a composition consisting mainly of recitative with accompaniment, forming part of an opera or as an individual composition; and "scenario," a full outline of a play or opera, giving details of the acts, scenes, actors, situations, stage-business, &c.

SCENT, an odour or smell, particularly a fragrant liquid distilled from flowers, &c., used as a perfume (see PERFUMERY). The word should be properly spelled "sent," and is derived from the Mid. Eng. verb *senten*, to scent, to perceive by the sense of smell, Fr. *sentir*, Lat. *sentire*, perceive by the senses. The intrusive *c* appears in the 17th century, and is paralleled by the same in "scythe" for *sythe*. For the physical causes of the sensation caused by a scent see SMELL, and for the anatomy of the organs concerned see OLFACTORY SYSTEM.

SCEPTICISM (σκέπτομαι, I consider, reflect, hesitate, doubt), a term signifying etymologically a state of doubt or indecision in the face of mutually conflicting statements. It is implied, moreover, that this doubt is not merely a stage in the road to true knowledge, but rather the last result of investigation, the conclusion that truth or real knowledge is unattainable by man. Therefore, in general terms, scepticism may be summarily defined as a thorough-going impeachment of man's power to know—a denial of the possibility of objective knowledge.

Trust, not distrust, is the primitive attitude of the mind.

Historical appearances.

1. What is put before us, whether by the senses or by the statements of others, is instinctively accepted as a veracious report, till experience has proved the possibility of deception. In the history of philosophy affirmation precedes negation; dogmatism goes before scepticism. And this must be so, because the dogmatic systems are, as it were, the food of scepticism. Accordingly, we find that sceptical thought did not make its appearance till a succession of mutually inconsistent theories as to the nature of the real had suggested the possibility that they might all alike be false.

The Sophists.

The Sophistic epoch of Greek philosophy was, in great part, such a negative reaction against the self-confident assertion of the nature-philosophies of the preceding age. Though scepticism as a definite school may be said to date only from the time of Pyrrho (*q.v.*) of Elis, the main currents of Sophistic thought were sceptical in the wider sense of that term. The Sophists (*q.v.*) were the first in Greece to dissolve knowledge into individual and momentary opinion (Protagoras), or dialectically to deny the possibility of knowledge (Gorgias). In these two examples we see how the weapons forged by the dogmatic philosophers to assist in the establishment of their own theses are sceptically turned against philosophy in general. As every attempt to rationalize nature implies a certain process of criticism and interpretation to which the data of sense are subjected, and in which they are, as it were, transcended, the antithesis of reason and sense is formulated early in the history of speculation. The opposition, being taken as absolute, implies the impeachment of the veracity of the senses in the interest of the rational truth proclaimed by the philosophers in question. Among the pre-Socratic nature-philosophers of Greece, Heraclitus and the Eleatics are the chief representatives of this polemic. The diametrical opposition of the grounds on which the veracity of the senses is impugned by the two philosophies (see HERACLITUS, PARMENIDES, ELEATIC SCHOOL) was in itself suggestive of sceptical reflection. Moreover, the arguments by which Heraclitus supported his theory of the universal flux are employed by Protagoras to undermine the possibility of objective truth, by dissolving all knowledge into the momentary sensation or persuasion of the individual. The idea of an objective flux, or law of change constituting the reality of things, is abandoned, and subjective points of sense alone remain—which is tantamount to eliminating the real from human knowledge.

Still more unequivocal was the sceptical nihilism expressed by Gorgias (*q.v.*):—(1) nothing exists; (2) if anything existed, it would be unknowable; (3) if anything existed and were knowable, the knowledge of it could not be communicated. His arguments were drawn from the dialectic which the Eleatics had directed against the existence of the phenomenal world. But they are no longer used as indirect proofs of a universe of pure and unitary Being. The prominence given by most of the Sophists to rhetoric, their cultivation of a subjective readiness as the essential equipment for life, their substitution of persuasion for conviction, all mark the sceptical undertone of their teaching. This attitude of indifference to real knowledge passed in the younger and less reputable generation into a corroding moral scepticism which recognized no good but pleasure and no right but might.

Socrates.

The scientific impulse communicated by Socrates was sufficient to drive scepticism into the background during the great age of Greek philosophy (*i.e.* the hundred years preceding Aristotle's death, 323 B.C.). The captious logic of the Megarian school (*q.v.*) was indeed in some cases closely related to sceptical results. The school has been considered with some truth to form a connecting link with the later scepticism, just as the contemporary Cynicism and Cyrenaicism may be held to be imperfect preludes to Stoicism and Epicureanism. The extreme nominalism of some of the Cynics also, who denied the possibility of any but identical judgments, must be similarly regarded as a solvent of knowledge. But with these insignificant exceptions it holds true that, after the sceptical wave marked by the Sophists, scepticism does not reappear till after the exhaustion of the Socratic impulse in Aristotle.

Pyrrho.

Scepticism, as a distinct school, begins with Pyrrho of Elis, who maintained that knowledge of things is impossible and that we must assume an attitude of reserve (ἐποχή). The Pyrrhonists were consistent enough to extend their doubt even to their own principle of doubt. They thus attempted to make their scepticism universal, and to escape the reproach of basing it upon a fresh dogmatism. Mental imperturbability (ἀταραξία) was the result to be attained by cultivating such a frame of mind. The happiness or satisfaction of the individual was the end which dominated this scepticism as well as the contemporary systems of Stoicism and Epicureanism, and all three philosophies place it in tranquillity or self-centred indifference. It is men's opinions or unwarranted judgments about things, say the sceptics, which betray them into desire, and painful effort and disappointment. From all this a man is delivered who abstains from judging one state to be preferable to another. But, as complete inactivity would have been synonymous with death, it appears to have been admitted that the sceptic, while retaining his consciousness of the complete uncertainty enveloping every step, might follow custom in the ordinary affairs of life.

The scepticism of the New Academy (more strictly of the Middle Academy, under Arcesilaus and Carneades) differed very little from that of the Pyrrhonists. The differences

asserted by later writers are not borne out on investigation. But the attitude maintained by the Academics was chiefly that of a negative criticism of the views of others, in particular of the somewhat crude and imperious dogmatism of the Stoics. They also, in the absence of certainty, allowed a large scope to probability as a motive to action, and defended their doctrine on this point with greater care and skill. The whole position was stated with more urbanity and culture, and was supported, by Carneades in particular, by argumentation at once more copious and more acute. It seems also true that the Academics were less overborne than the Pyrrhonists by the practical issue of their doubts (imperturbability); their interest was more purely intellectual, and they had something of the old delight in mental exercitation for its own sake (see ARCESILAUS, CARNEADES, AENESIDEMUS, AGRIPPA and SEXTUS EMPIRICUS).

The Academy.

Both Zeller and Hegel remark upon the difference between the calm of ancient scepticism and the perturbed state of mind evinced by many modern sceptics. Universal doubt was the instrument which the sceptics of antiquity recommended for the attainment of complete peace of mind. By the moderns, on the other hand, doubt is portrayed, for the most part, as a state of unrest and painful yearning. Even Hume, in various passages of his *Treatise*, speaks of himself as recovering cheerfulness and mental tone only by forgetfulness of his own arguments. His state of universal doubt he describes as a "malady" or as "philosophical melancholy and delirium." The difference might easily be interpreted either as a sign of sentimental weakness on the part of the moderns or as a proof of the limitation of the ancient sceptics which rendered them more easily satisfied in the absence of truth. It seems to prove, at all events, that the ancient sceptics were more thoroughly convinced than their modern successors of the reasonableness of their own attitude.

Ancient and modern scepticism.

It may be doubted whether the thoroughgoing philosophical scepticism of antiquity has any exact parallel in modern times, with the single exception possibly of Hume's *Treatise on Human Nature*. It is true we find many thinkers who deny the competency of reason when it ventures in any way beyond the sphere of experience, and such men are not unfrequently called sceptics. This is the sense in which Kant often uses the term, and the usage is adopted by others—for example, in the following definition from Ueberweg's *History of Philosophy*: "The principle of scepticism is universal doubt, or at least doubt with regard to the validity of all judgments respecting that which lies beyond the range of experience." The last characteristic, however, is not enough to constitute scepticism, in the ancient sense. Scepticism, to be complete, must hold that even within experience we do not rationally conclude but are irrationally induced to believe. "In all the incidents of life," as Hume puts it, "we ought still to preserve our scepticism. If we believe that fire warms, or water refreshes, 'tis only because it costs us too much pains to think otherwise" (*Treatise*, bk. i. iv. 7). This tone, which fairly represents the attitude of ancient sceptics, is rare among the moderns, at least among those who are professed philosophers. It is more easily matched in the unsystematic utterances of a man of the world like Montaigne.

2. One form of scepticism, however, may be claimed as an exclusively modern growth, namely, philosophical scepticism in the interests of theological faith. These sceptics are primarily Apologists. Their scepticism is simply a means to the attainment of a further end. They find that the dogmas of their church have often been attacked in the name of reason, and it may be that some of the objections urged have proved hard to rebut. Accordingly, in an access of pious rage, as it were, they turn upon reason to rend her. They endeavour to show that she is in contradiction with herself, even on matters non-theological. Thus the "imbecility" of reason becomes their warrant for the reception by another organ—*i.e.* faith—of that to which reason had raised objections. The Greeks had no temptation to divide man in two in this fashion. Their scepticism was an end in itself. But this line of argument was latent in Christian thought from the time when St Paul spoke of the "foolishness" of preaching. So Tertullian: "Crucifixus est Dei filius; non pudet, quia pudendum est. Et mortuus est Dei filius; prorsus credibile est, quia ineptum est. Et sepultus resurrexit; certum est, quia impossibile est." But, as Christianity became firmly established, Christian writers [1] became more tolerant of speculation, and laboured to reduce the doctrines of the church to a rational system. This was the long task essayed by Scholasticism; and, though the great Schoolmen of the 13th century refrained from attempting to rationalize such doctrines as the Trinity and the Incarnation, they were far from considering them as essentially opposed to reason. It was not till towards the close of the middle ages that a sense of conflict between reason and revelation became widely prevalent and took shape in the essentially sceptical theory of the twofold nature of truth. Philosophical truth, as deduced from the teaching of Aristotle, it was said, directly contradicts the teaching of the church, which determines truth in theology; but the contradiction leaves the authority of the latter unimpaired in its own sphere. It is difficult to believe that this doctrine was ever put forward sincerely; in the most of those who professed it, it was certainly no more than a veil by which they sought to cover their heterodoxy and evade its consequences. Rightly divining as much, the church condemned the doctrine as early as 1276. Nevertheless, it was openly professed during the period of the break up of Scholastic Aristotelianism (see POMPONAZZI).

Scepticism in the interest of faith.

Theory of the two-fold nature of truth.

The typical and by far the greatest example of the Christian sceptic is Pascal (1623–1662). The form of the *Pensées* forbids the attempt to evolve from their detached utterances a completely coherent system. For, though he declares at times "Le pyrrhonisme est le vrai," "Se moquer de la philosophie c'est vraiment philosopher," or, again, "Humiliez-vous, raison impuissante, taisez-vous, nature imbécile," other passages might be quoted in which he assumes the validity of reason within its own sphere. But what he everywhere emphatically denies is the possibility of reaching by the unassisted reason a satisfactory theory of things. Man is a hopeless enigma to himself, till he sees himself in the light of revelation as a fallen creature. The fall alone explains at once the nobleness and the meanness of humanity; Jesus Christ is the only solution in which the baffled reason can rest. These are the two points on which Pascal's thought turns. Far from being able to sit in judgment upon the mysteries of the faith, reason is unable to solve its own contradictions without aid from a higher source. In a somewhat similar fashion, Lamennais (in the first stage of his speculations, represented by the *Essai sur l'indifférence en matière religieuse*, 1817–1821) endeavoured to destroy all rational certitude in order to establish the principle of authority; and the same profound distrust of the power of the natural reason to arrive at truth is exemplified (though the allegation has been denied by the author) in Cardinal Newman. In a different direction and on a larger scale, Hamilton's philosophy of the conditioned may be quoted as an example of the same religious scepticism (see HAMILTON, SIR WILLIAM). The theological application and development of Hamilton's arguments in Mansel's Bampton Lectures *On the Limits of Religious Thought* marked a still more determined attack, in the interests of theology, upon the competency of reason.

Pascal.

Passing from this particular vein of sceptical or semi-sceptical thought, we find, as we should expect, that the downfall of Scholasticism, and the conflict of philosophical theories and religious confessions which ensued, gave a decided impetus to sceptical reflection. One of the earliest instances of this spirit is afforded by the book of Agrippa of Nettesheim (1487–1535), *De incertitudine et vanitate scientiarum*.

Sceptics in 16th and 17th centuries.

[1] This turn of thought is not confined, however, to Christian thinkers; it appears also in the Arabian philosophy of the East. Ghazālī (*q.v.*) in his *Tahāfot al-Filāsifa* ("The Collapse of the Philosophers") is the advocate of complete philosophical scepticism in the interests of orthodox Mahommedanism—an orthodoxy which passed, however, in his own case into a species of mysticism. He did his work of destruction so thoroughly that Arabian philosophy died out after his time in the land of its birth.

Sceptical reflection rather than systematic scepticism is what meets us in Michel de Montaigne (1533–1592), though the elaborate presentation of sceptical and relativistic arguments in his "Apologie de Raimond-Sebond" (*Essais*, ii. 12), and the emblem he recommends —a balance with the legend, "Que scay-je?"—might allowably be adduced as evidence of a more thoroughgoing Pyrrhonism. In his "tesmoynages de nostre imbécillité" he follows in the main the lines of the ancients, and he sums up with a lucid statement of the two great arguments in which the sceptical thought of every age resumes itself—the impossibility of verifying our faculties, and the relativity of all impressions. In the concluding lines of this essay, Montaigne seems to turn to "nostre foy chrestienne" as man's only succour from his native state of helplessness and uncertainty. But undoubtedly his own habitual frame of mind is better represented in his celebrated saying—"How soft and healthful a pillow are ignorance and incuriousness . . . for a well-ordered head." More inclined than Montaigne to give a religious turn to his reflections was his friend Pierre Charron (1541–1603), who in his book *De la sagesse* systematized in somewhat scholastic fashion the train of thought which we find in the *Essais*. François Sanchez (1562–1632), professor of medicine and philosophy in Toulouse, combated the Aristotelianism of the schools with much bitterness, and was the author of a book with the title *Quod nihil scitur*. Of more or less isolated thinkers may be mentioned François de la Mothe le Vayer (1588–1672), whose *Cinq Dialogues* appeared after his death under the pseudonym of Orosius Tubero; Samuel Sorbière (1615–1670), who translated the *Hypotyposes Pyrrhoneae* of Sextus Empiricus; Simon Foucher (1644–1696), canon of Dijon, who wrote a *History of the Academics*, and combated Descartes and Malebranche from a sceptical standpoint. The work of Hieronymus Hirnhaim of Prague (1637–1679), *De typho generis humani sive scientiarum humanarum inani ac ventoso tumore*, was written in the interests of revelation. This is still more the case with the bitter polemic of Daniel Huet (1630–1721), *Censura philosophiae Cartesianae*, and his later work, *Traité philosophique de la faiblesse de l'esprit humain*. The scepticism of Joseph Glanvill (*q.v.*), which is set forth in his two works *The Vanity of Dogmatizing* (1661) and *Scepsis scientifica* (1665), has more interest for Englishmen. More celebrated than any of the above was Pierre Bayle (1647–1706), whose scepticism lay more in his keen negative criticism of all systems and doctrines which came before him as literary historian than in any theoretic views of his own as to the possibility of knowledge. Bayle also paraded the opposition between reason and revelation; but the argument in his hands is a double-edged weapon, and when he extols the merits of submissive faith his sincerity is at least questionable.

3. Hume is the most illustrious and indeed the typical sceptic of modern times. His scepticism is sometimes placed, as we have seen it is by Kant, in his distrust of our ability and right to pass beyond the empirical sphere. But it is essential to the sceptical position that reason be dethroned within experience as well as beyond it, and this is undoubtedly the result at which Hume finally arrives. The *Treatise* is a *reductio ad absurdum* of the principles of Lockianism, inasmuch as these principles, when consistently applied, leave the structure of experience entirely "loosened" (to use Hume's own expression), or cemented together only by the irrational force of custom. Hume's scepticism thus really arises from his thoroughgoing empiricism. Starting with "particular perceptions" or isolated ideas let in by the senses, he never advances beyond these "distinct existences." Each of them exists on its own account; it is what it is, but it contains no reference to anything beyond itself. The very notion of objectivity and truth therefore disappears. Hume's analysis of the conceptions of a permanent world and a permanent self reduces us to the sensationalistic relativism of Protagoras. He expressly puts this forward in various passages as the conclusion to which reason conducts us. The fact that the conclusion is in "direct and total opposition" to the apparent testimony of the senses is a fresh justification of philosophical scepticism. For, indeed, scepticism with regard to the senses is considered in the *Inquiry* to be sufficiently justified by the fact that they lead us to suppose "an external universe which depends not on our perception," whereas "this universal and primary opinion of all men is soon destroyed by the slightest philosophy." Scepticism with regard to reason, on the other hand, depends on an insight into the irrational character of the relation which we chiefly employ, viz. that of cause and effect. It is not a real relation in objects, but rather a mental habit of belief engendered by frequent repetition or custom. This point of view is applied in the *Treatise* universally. All real connexion or relation, therefore, and with it all possibility of an objective system, disappears; it is, in fact, excluded by Hume *ab initio*, for "the mind never perceives any real connexion among distinct existences." Belief, however, just because it rests, as has been said, on custom and the influence of the imagination, survives such demonstrations. "Nature," as Hume delights to reiterate, "is always too strong for principle." "Nature, by an absolute and uncontrollable necessity, has determined us to judge as well as to breathe and feel." The true philosopher, therefore, is not the Pyrrhonist, trying to maintain an impossible equilibrium or suspense of judgment, but the Academic, yielding gracefully to the impressions or maxims which he finds, as matter of fact, to have most sway over himself.[1]

Hume.

The system of Kant, or rather that part of his system expounded in the *Critique of Pure Reason*, though expressly distinguished by its author from scepticism, has been included by many writers in their survey of sceptical theories. The difference between Kant, with his system of pure reason, and any of the thinkers we have passed in review is obvious; and his limitation of reason to the sphere of experience suggests in itself the title of agnostic or positivist rather than that of sceptic. Yet, if we go a little deeper, there is substantial justification for the view which treats agnosticism of the Kantian type as essentially sceptical in its foundations and in its results. For criticism not only limits our knowledge to a certain sphere, but denies that our knowledge within that sphere is real; we never know things as they actually are, but only as they appear to us. But this doctrine of relativity really involves a condemnation of our knowledge (and of all knowledge), because it fails to realize an impossible and self-contradictory ideal. The man who impeaches the knowing faculties because of the fact of relation which they involve is pursuing the phantom of an apprehension which, as Lotze expresses it, does not apprehend things, but is itself things; he is desiring not to know but to *be* the things themselves. If this dream or prejudice be exploded, then the scepticism originating in it—and a large proportion of recent sceptical thought does so originate—loses its *raison d'être*.[2] The prejudice, however, which meets us in Kant is, in a somewhat different form, the same prejudice which is found in the tropes of antiquity—what Lotze calls the "inadmissible relation of the world of ideas to a foreign world of objects." For, as he rightly points out, whether we suppose idealism or realism to be true, in neither case do the things themselves pass into our knowledge. No standpoint is possible from which we could compare the world of knowledge with such an independent world of things, in order to judge of the conformity of the one to the other. But the abstract doubt "whether after all things may not be quite other in themselves than that which by the laws of our thought they necessarily appear" is a scepticism which, though admittedly irrefutable, is as certainly groundless. No arguments can be brought against it, simply because the scepticism rests on nothing more than the empty possibility of doubting. This holds true, even if we admit the "independent" existence of such a world of things. But the independence of things may with much greater reason be regarded as itself a fiction or prejudice. The real "objective" to which our thoughts must show conformity is not a world of things in themselves, but the system of things as it exists for a perfect intelligence. Scepticism is deprived of its persistent argument if it is seen that, while our individual experiences are to be judged by their coherence with the context of experience in general, experience as a whole does not admit of being judged by reference to anything beyond itself.

Sceptical side of Kantianism.

Prejudices on which scepticism rests.

To the attack upon the possibility of demonstration, inasmuch as every proof requires itself a fresh proof, it may quite fairly be retorted that the contradiction really lies in the demand

[1] Much the same conclusion is reached in what is perhaps the ablest English exposition of pure philosophic scepticism since Hume —A. J. Balfour's *Defence of Philosophic Doubt* (1879).

[2] It may be as well to add that the sceptical side of Kantianism is mainly confined to the *Critique of Pure Reason*, but this side of Kantian thought has been most widely influential. The remarks made above would not apply to the coherent system of idealism which may be evolved from Kant's writings, and which many would consider alone to deserve the name of Kantianism or Criticism.

for proof of the self-evident, on which all proof must ultimately depend. It is of course always possible that in any particular case we may be deceived; we may be assuming as self-evidently true what is in reality not so. But such incidental lapses are found to correct themselves by the consequences in which they involve us, and they have no power to shake our trust in the general validity of reason. It may, however, be granted that the possibility of lapse throws us open to the objections, ingenuous or disingenuous, of the sceptic; and we must remain exposed to them so long as we deal with our first principles as so many isolated axioms or intuitions. But the process of self-correction referred to points to another proof—the only ultimately satisfactory proof of which first principles admit. Their evidence lies in their mutual interdependence and in the coherence of the system which they jointly constitute.

Function of scepticism.

Of a scepticism which professes to doubt the validity of every reasoning process and every operation of all our faculties it is, of course, as impossible as it would be absurd to offer any refutation. This absolute scepticism, indeed, can hardly be regarded as more than empty words; the position which they would indicate is not one which has ever existed. In any case, such scepticism is at all times sufficiently refuted by the imperishable and justifiable trust of reason in itself. The real function of scepticism in the history of philosophy is relative to the dogmatism which it criticizes. And, as a matter of fact, it has been seen that many so-called sceptics were rather critics of the effete systems which they found cumbering the ground than actual doubters of the possibility of knowledge in general. And even when a thinker puts forward his doubt as absolute it does not follow that his successors are bound to regard it in the same light. The progress of thought may show it to be, in truth, relative, as when the nerve of Hume's scepticism is shown to be his thoroughgoing empiricism, or when the scepticism of the *Critique of Pure Reason* is traced to the unwarrantable assumption of things-in-themselves. When the assumptions on which it rests are proved to be baseless, the particular scepticism is also overcome. In like manner, the apparent antinomies on which such a scepticism builds will be found to resolve themselves for a system based on a deeper insight into the nature of things. The serious thinker will always repeat the words of Kant that, in itself, scepticism is "not a permanent resting-place for human reason." Its justification is relative, and its function transitional.

AUTHORITIES.—Ancient scepticism is fully treated in the relative parts of Zeller's *Philosophie der Griechen*. See also works quoted in the biographical articles; Brochard, *Les Sceptiques grecs* (1887); Ed. Caird, *Evolution of Theology in the Greek Philosophers* (1904); Norman MacColl, *Greek Sceptics from Pyrrho to Sextus* (1869); Haas, *De philosophorum scepticorum successionibus* (1875). Among other works may be mentioned Stäudlin, *Geschichte und Geist d. Scepticismus, vorzüglich in Rücksicht auf Moral u. Religion* (1794) Tafel, *Geschichte d. Scepticismus* (1834); E. Saisset, *Le Scepticisme: Ænésidème, Pascal, Kant* (1875). For a modern view see A. J. Balfour, *Defence of Philosophic Doubt* (1879). All histories of philosophy deal with scepticism, and general accounts will be found in J. M. Robertson's *Short History of Free Thought* and A. W. Benn's *History of Modern Rationalism*. See also AGNOSTICISM, RATIONALISM.

(A. S. P.-P.; X.)

SCEPTRE. A rod or staff has always been regarded as a token of authority. Among the early Greeks the sceptre (σκῆπτρον) was a long staff used by aged men (*Il.* xviii. 416, Herod. i. 196), and came to be used by judges, military leaders, priests and others. It is represented on painted vases as a long staff tipped with a metal ornament, and is borne by some of the gods. Among the Etruscans sceptres of great magnificence were used by kings and upper orders of the priesthood, and many representations of such sceptres occur on the walls of the painted tombs of Etruria. The British Museum, the Vatican and the Louvre possess Etruscan sceptres of gold, most elaborately and minutely ornamented. The Roman sceptre was probably derived from the Etruscan. Under the Republic an ivory sceptre (*sceptrum eburneum*) was a mark of consular rank. It was also used by victorious generals who received the title of *imperator*, and it may be said to survive in the marshal's baton. Under the empire the *sceptrum Augusti* was specially used by the emperors, and was often of ivory tipped with a golden eagle. It is frequently shown on medallions of the later empire, which have on the obverse a half-length figure of the emperor, holding in one hand the *sceptrum Augusti*, and in the other the orb surmounted by a small figure of Victory.

With the advent of Christianity the sceptre was often tipped with a cross instead of the eagle, but during the middle ages the finials on the top of the sceptre varied considerably. In England from a very early period two sceptres have been concurrently used, and from the time of Richard I. they have been distinguished as being tipped with a cross and a dove respectively. In France the royal sceptre was tipped with a fleur de lys, and the other, known as the *main de justice*, had an open hand of benediction on the top. Sceptres with small shrines on the top are sometimes represented on royal seals, as on the great seal of Edward III., where the king, enthroned, bears such a sceptre, but it was an unusual form; and it is of interest to note that one of the sceptres of Scotland, preserved at Edinburgh, has such a shrine at the top, with little images of Our Lady, St Andrew and St James in it. This sceptre was, it is believed, made in France about 1536, for James V. Great seals usually represent the sovereign enthroned, holding a sceptre (often the second in dignity) in the right hand, and the orb and cross in the left. Harold is so depicted on the Bayeux tapestry.

The earliest coronation form of the 9th century mentions a sceptre (*sceptrum*), and a staff (*baculum*). In the so-called coronation form of Ethelred II. a sceptre (*sceptrum*), and a rod (*virga*) are named, and this is also the case with a coronation order of the 12th century. In a contemporary account of Richard I.'s coronation the royal sceptre of gold with a gold cross, and the gold rod (*virga*) with a gold dove on the top, are mentioned for the first time. About 1450 Sporley, a monk of Westminster, compiled a list of the relics there. These included the articles used at the coronation of St Edward the Confessor, and left by him for the coronations of his successors. A golden sceptre, a wooden rod gilt and an iron rod are named. These survived till the Commonwealth, and are minutely described in an inventory of the whole of the regalia drawn up in 1649, when everything was destroyed.

For the coronation of Charles II. new sceptres were made, and though slightly altered, are still in use. They are a sceptre with a cross called St Edward's sceptre, a sceptre with a dove, and a long sceptre or staff with a cross of gold on the top called St Edward's staff. To these, two sceptres for the queen, one with a cross, and the other with a dove, have been subsequently added.

See Cyril Davenport, *The English Regalia*; Leopold Wickham-Legg, *English Coronation Records*; *The Ancestor*, Nos. 1 and 2 (1902); Menin, *The Form, &c., of Coronations* (English translation, 1727).

SCÈVE, MAURICE (*c.* 1500–1564), French poet, was born at Lyons, where his father practised law. Besides following his father's profession he was a painter, architect, musician and poet. He was the centre of the Lyonnese coterie that elaborated the theory of spiritual love, derived partly from Plato and partly from Petrarch, which was enunciated in Antoine Heroet's *Parfaicte Amye*.

Scève's chief works are *Délie, objet de plus haulte vertu* (1544); two eclogues, *Arion* (1536) and *La Saulsaye* (1547); and *Le Microcosme* (1562), an encyclopaedic poem beginning with the fall of man. *Délie* consists of 450 *dizaines* and about 50 other poems in praise of his mistress. These poems, now little read, were even in Scève's own day so obscure that his enthusiastic admirer Étienne Dolet confesses he could not understand them. Scève was a musician as well as a poet, and cared very much for the musical value of the words he used. In this and in his erudition he forms a link between the school of Marot and the Pléiade. *Délie* (an anagram for *l'idée*) set the fashion of a series of poems addressed to a mistress real or imaginary, followed by Ronsard in *Cassandre* and by Du Bellay in *Olive*. The Lyonnese school of which Scève was the leader included his friend Claude de Taillemont and many women writers of verse, Jeanne Gaillarde—placed by Marot on an equality with Christine de Pisan—Pernette du Guillet, Clémence de Bourges and the poet's sisters, Claudine and Sibylle Scève. Scève died in 1564. See also LABÉ, LOUISE).

See E. Bourciez, *La Littérature polie et les mœurs de cour sous Henri II* (Paris, 1886); Pernetti, *Recherches pour servir à l'histoire de Lyon* (2 vols., Lyons, 1757); and F. Brunetière, "Un Précurseur de la Pléïade, Maurice Scève," in his *Études critiques*, vol. vi. (1899).

SCHACK, ADOLF FRIEDRICH, GRAF VON (1815–1894), German poet and historian of literature, was born at Brüsewitz near Schwerin on the 2nd of August 1815. Having studied jurisprudence (1834–1838) at the universities of Bonn, Heidelberg and Berlin, he entered the Mecklenburg State service and was subsequently attached to the "Kammergericht" in Berlin. Tiring of official work, he resigned his appointment, and after travelling in Italy, Egypt and Spain, was attached to the court

of the grand duke of Oldenburg, whom he accompanied on a journey to the East. On his return he entered the Oldenburg government service, and in 1849 was sent as envoy to Berlin. In 1852 he retired from his diplomatic post, resided for a while on his estates in Mecklenburg and then travelled in Spain, where he studied Moorish history. In 1855, he settled at Munich, where he was made member of the academy of sciences, and here collected a splendid gallery of pictures, containing masterpieces of Genelli, Feuerbach, Schwind, Böcklin, Lenbach, &c., and which, though bequeathed by him to the Emperor William II., still remains at Munich and is one of the noted galleries in that city. He died at Rome on the 14th of April 1894.

Schack was a most productive author; he wrote lyric poems (*Gedichte*, 1867, 6th ed. 1888); novels in verse, *Durch alle Welten* (1870, 3rd ed. 1875) and *Ebenbürtig* (1876); the dramatic poem *Helidor* (1878); the tragedies *Die Pisaner* (1872) and *Walpurga* and *Der Johanniter* (1887); and the political comedies, *Der Kaiserbote* and *Cancan* (1873). As an historian of literature and art, he published *Geschichte der dramatischen Literatur und Kunst in Spanien* (3 vols. 1845–1846, 2nd ed. 1854), *Poesie und Kunst der Araber in Spanien und Sicilien* (1865, 2nd ed. 1877), which are valuable contributions to literary history. He also produced some excellent translations, *e.g. Spanisches Theater* (1845); *Heldensagen des Firdusi* (1851) and *Stimmen vom Ganges* (1857, 2nd ed. 1877). He also compiled the catalogue and history of his own picture gallery, *Meine Gemäldesammlung* (7th ed., 1894). His collected works, *Gesammelte Werke*, were published in six volumes (1883, 3rd ed. in 10 vols. 1897–1899). *Nachgelassene Dichtungen* were edited by G. Winkler (1896). See his autobiography, *Ein halbes Jahrhundert, Erinnerungen und Aufzeichnungen* (3 vols. 1887, 3rd ed. 1894). Cf. further the accounts of Schack by F. W. Rogge (1883), E. Zabel (1885), E. Brenning (1885), W. J. Mannsen (from the Dutch, 1889), and also L. Berg, *Zwischen zwei Jahrhunderten* (1896).

SCHADOW, a distinguished name in the annals of German art.

I. Johann Gottfried Schadow (1764–1850), sculptor, was born and died in Berlin, where his father was a poor tailor. His first teacher was an inferior sculptor, Tassaert, patronized by Frederick the Great; the master offered his daughter in marriage, but the pupil preferred to elope with a girl to Vienna, and the father-in-law not only condoned the offence but furnished money wherewith to visit Italy. Three years' study in Rome formed his style, and in 1788 he returned to Berlin to succeed Tassaert as sculptor to the court and secretary to the Academy. Over half a century he produced upwards of two hundred works, varied in style as in subjects.

Among his ambitious efforts are Frederick the Great in Stettin, Blücher in Rostock and Luther in Wittenberg. His portrait statues include Frederick the Great playing the flute, and the crown-princess Louise and her sister. His busts, which reach a total of more than one hundred, comprise seventeen colossal heads in the Walhalla, Ratisbon; from the life were modelled Goethe, Wieland and Fichte. Of church monuments and memorial works thirty are enumerated; yet Schadow hardly ranks among Christian sculptors. He is claimed by classicists and idealists: the quadriga on the Brandenburger Thor and the allegorical frieze on the façade of the Royal Mint, both in Berlin, are judged among the happiest studies from the antique. Schadow, as director of the Berlin Academy, had great influence. He wrote on the proportions of the human figure, on national physiognomy, &c.; and many volumes by himself and others describe and illustrate his method and his work.

II. His eldest son, Rudolph Schadow (1786–1822), sculptor, was born in Rome, and had his father at Berlin for his first master. In 1810 he went to Rome and received kindly help from Canova and Thorvaldsen. His talents were versatile; his first independent work was a figure of Paris, and it had for its companion a spinning girl.

Embracing the Roman Catholic faith, he produced statues of John the Baptist and of the Virgin and Child. In England he became known by bas-reliefs executed for the duke of Devonshire and for the marquis of Lansdowne. His last composition, commissioned by the king of Prussia, was a colossal group, Achilles with the Body of Penthesilea; the model, universally admired for its antique character and the largeness of its style, had not been carried out in marble when in 1822 the artist died in Rome.

III. Friedrich Wilhelm Schadow (1789–1862), painter, was the second son of Johann Gottfried Schadow. In 1806–1807 he served as a soldier; in 1810 he went with his elder brother Rudolph to Rome. He became one of the leaders among the German pre-Raphaelites. Following the example of Overbeck and others, he joined the Roman Catholic Church, and held that an artist must believe and live out the truths he essays to paint. The sequel showed that Schadow was qualified to shine less as a painter than as a teacher and director.

The Prussian consul, General Bartholdi, befriended his young compatriots by giving them a commission to decorate with frescoes a room in his house on the Pincian Hill. The artists engaged were Schadow, Cornelius, Overbeck and Veit; the subject selected was the story of Joseph and his brethren, and two scenes, the Bloody Coat and Joseph in Prison, fell to the lot of Schadow. Schadow was in 1819 appointed professor in the Berlin Academy, and his ability and thorough training gained devoted disciples. To this period belong his pictures for churches. In 1826 the professor was made director of the Düsseldorf Academy. The high and sacred art matured in Rome Schadow transplanted to Düsseldorf; he reorganized the Academy, which in a few years grew famous as a centre of Christian art to which pupils flocked from all sides. In 1837 the director selected, at request, those of his scholars best qualified to decorate the chapel of St Apollinaris on the Rhine with frescoes, which when finished were accepted as the fullest and purest manifestation of the Düsseldorf school on its spiritual side. To 1842 belong the "Wise and Foolish Virgins," in the Städel Institute, Frankfort; this large and important picture is carefully considered and wrought, but lacks power. Schadow's fame indeed rests less on his own creations than on the school he formed. In Dusseldorf a reaction set in against the spiritual and sacerdotal style he had established; and in 1859 the party of naturalism, after a severe struggle, drove the director from his chair. Schadow died at Düsseldorf in 1862, and a monument in the platz which bears his name was raised at the jubilee held to commemorate his directorate. (J. B. A.)

SCHAFARIK (Czech, *Šafařík*), **PAVEL JOSEF** (1795–1861), Slavonic philologist, was born of Slovak parents at Kobeljarova, a village of northern Hungary, where his father was a Protestant clergyman. His first production was a volume of poems in Czech entitled *The Muse of Tatra with a Slavonic Lyre* (Levocza, 1814). In 1815 he began a course of study at the university of Jena, and while there translated into Czech the *Clouds* of Aristophanes and the *Maria Stuart* of Schiller. In 1817 he removed to Prague and joined the literary circle of which Dobrovsky, Jungmann and Hanka were members. From 1819 to 1833 he was head master of the high school at Neusatz in the south of Hungary. There he studied Servian literature and antiquities, acquired many rare books and manuscripts, and published a collection of Slovak folk-songs in collaboration with Kollar and others (1823–1827). In 1826 his *Geschichte der slawischen Sprache und Literatur nach allen Mundarten* appeared at Budapest (2nd ed., 1869). This book was the first attempt to give anything like a systematic account of the Slavonic languages as a whole. In 1833 he returned to Prague, where he spent the remainder of his life. There he published his *Serbische Lesekörner oder historisch-kritische Beleuchtung der Serbischen Mundart*, and in 1837 his great work *Slovanské Starožitnosti* ("Slavonic Antiquities"). The "Antiquities" have been translated into Polish, Russian and German; a second edition (1863) was edited by J. Jireček. In 1840 he published in conjunction with Palacký *Die ältesten Denkmäler der böhmischen Sprache.* In 1837 poverty compelled him to accept the uncongenial office of censor of Czech publications, which he abandoned in 1847 on becoming custodian of the Prague public library. In 1842 he published his *Slovanský Národopis*, in which he sought to give a complete account of Slavonic ethnology. He was also for some time conductor of the "Journal" of the Bohemian Museum, and edited the first volume of the *Vybor*, or selections from old Czech writers, which appeared under the auspices of the Prague literary society in 1845. To this he prefixed a grammar of the Old Czech language, *Počátková staročeské mluvnice.* In 1848 he was made professor of Slavonic philology in the university of Prague, but resigned in 1849. He was then made keeper of the university library. In 1857 he published *Glagolitische Fragmente* in collaboration with Höfler; but in the same year, as a result of overwork, ill health and family anxieties, he became insane. He was nevertheless continued in his appointment until his death in 1861.

Schafarik's collected works, *Sebrané Spisy*, were published at Prague, 1862–1865; his *Geschichte der südslawischen Literatur* was edited by Jireček in 3 vols. (1864–1865).

SCHAFF, PHILIP (1819–1893), American theologian and church historian, was born in Chur, Switzerland, on the 1st of January 1819. He was educated at the gymnasium of Stuttgart, and at the universities of Tübingen, Halle and Berlin, where he was successively influenced by Baur and Schmid, by Tholuck and Julius Müller, by Strauss and, above all, Neander. In 1842 he was *Privatdozent* in the university of Berlin, and in 1843 he was called to become professor of church history and Biblical literature in the German Reformed Theological Seminary of Mercersburg, Pennsylvania, then the only seminary of that church in America. On his journey he stayed six months in England and met Pusey and other Tractarians. His inaugural address on *The Principle of Protestantism*, delivered in German at Reading, Pennsylvania, in 1844, and published in German with an English version by J. W. Nevin (*q.v.*), by its Neander-like view that Romanism and Protestantism were only stages in the divinely appointed development of the Christian Church, aroused fierce opposition in the Reformed Church and Schaff was characterized as "Puseyistic" and "semi-papistical"; in 1845 he was tried for heresy and found not guilty by the Synod. Opposition to him soon died out within his own denomination: it was more particularly directed against his polemic champion, Nevin, and it had its source more in the Dutch (than in the German) Reformed Church, and even there was confined more to the New Brunswick school (*i.e.* the churchmen of the Dutch Reformed Theological Seminary in New Brunswick, New Jersey) and its English and Scottish members, —as late as 1856 J. J. Janeway of New Brunswick published his *Antidote to the Poison of Popery in the Writings and Conduct of Professors Nevin and Schaff*. Schaff's broad views strongly influenced the German Reformed Church, through his teaching at Mercersburg, through his championship of English in German Reformed churches and schools in America, through his hymnal (1859), through his labours as chairman of the committee which prepared a new liturgy, and by his edition (1863) of the Heidelberg Catechism. His *History of the Apostolic Church* (in German, 1851; in English, 1853) and his *History of the Christian Church* (7 vols., 1858–1890), opened a new period in American study of ecclesiastical history. After 1864 his home was in New York City, where he was until 1869 secretary of the New York Sabbath Committee (which fought the "continental Sunday"), and was corresponding secretary of the American Evangelical Alliance, of which he was in 1866 a founder. In 1865 he founded the first German Sunday School in Stuttgart. In 1862–1867 he lectured on church history at Andover, and after 1869 taught at the Union Theological Seminary—as instructor in church history in 1869–1870, and professor of theological cyclopaedia and Christian symbolism in 1870–1873, of Hebrew and cognate languages in 1873-1874, of sacred literature in 1874–1887, and of church history in 1887–1893. The English Bible Revision Committee in 1870 requested him to form a co-operating American Committee, of which he became president in 1871. He died in New York City on the 20th of October 1893. Working with the Evangelical Alliance and the Chicago (1893) World's Parliament of Religions, and in Germany, through the monthly *Kirchenfreund*, he strove earnestly to promote Christian unity and union; and it was his hope that the pope would abandon the doctrine of infallibility and undertake the reunion of Christianity. He recognized that he was a "mediator between German and Anglo-American theology and Christianity"; his theology was broad rather than definite, though he sharply dissented from Nevin's mystical doctrine of the union in the eucharist of the believer with Christ's glorified body as well as His glorified soul. He edited (1864–1880) the American translation and revision of Lange's *Bibelwerk*, the great Schaff-Herzog *Encyclopaedia of Religious Knowledge* (1884, 3rd ed. 1891); the first seven volumes of the Nicene and Post-Nicene Church Fathers in English (1886–1894); and the *International Illustrated Commentary on the New Testament* (4 vols., 1879–1883) and the *International Revision Commentary* (5 vols. 1881–1884), as far as the Epistle to Romans. His *Bibliotheca symbolica ecclesiae universalis: the Creeds of Christendom* (3 vols. 1877, 6th ed. 1893) was a pioneer work in English in the field of symbolics. His *History of the Christian Church*, already mentioned, resembled Neander's work, though less biographical, and was pictorial rather than philosophical. He wrote, besides, biographies, catechisms and hymnals for children, manuals of religious verse, lectures and essays on Dante, &c.

His son, DAVID SCHLEY SCHAFF (1852–), was professor of church history in Lane Theological Seminary in 1897–1903, and after 1903 in Western Theological Seminary at Allegheny, Pa. He wrote a *Commentary on the Book of Acts* (1882) and a *Life of Philip Schaff* (New York, 1897).

SCHAFFHAUSEN (Fr. *Schaffhouse*), the most northerly of the Swiss cantons, and the only one wholly (excepting the small hamlet of Burg, a suburb of Stein) north of the Rhine. It is divided into three detached portions by the grand-duchy of Baden, which surrounds it on all sides save that of the Rhine, which separates it from the cantons of Thurgau and of Zürich: by far the largest part is the region near the chief town, Schaffhausen, while to the south is the small isolated district of Rüdlingen and Buchberg (purchased in 1520), and to the east the more extensive tract around the old town of Stein on the Rhine (ceded by Zurich in 1798). Within the territory of Schaffhausen are two "enclaves," belonging politically to Baden—the village of Büsingen (just east of the chief town) and the farm of Verenahof, near Büttenhardt. The total area of the canton is 113·5 sq. m., of which 108·4 sq. m. are classed as "productive" (forests covering 46 sq. m., and vineyards 4 sq. m.). The main portion of the canton consists of the gently inclined plateau of the Randen (its highest point, *c.* 3000 ft., is at its north edge) that slopes towards the Rhine, and is intersected by several short glens, separated by rounded ridges. The most important of these glens is that of the Klettgau, to the west of the chief town. There are only intermittent torrents in the canton, apart from the broad stream of the Rhine, which, about 1½ m. below the town, forms the celebrated Falls of the Rhine (first mentioned about 1122), which are rather rapids (only 60 ft. in height) than a cascade proper, though the mass of water is very great.

The direct railway line from Constance to Basel, along the right and (generally) non-Swiss bank of the Rhine, passes through the canton for some 10 m., while there is a branch line (entirely within the canton) from Schaffhausen to Schleitheim (10½ m.), and two lines join the chief town with the Swiss territory to the south, Zürich being thus 29 m. or 35½ m. distant. In 1900 the population was 41,454, of whom 40,290 were German-speaking, while 34,046 were Protestants, 7403 Romanists and 22 Jews. The inhabitants are devoted chiefly to agriculture (particularly fodder stuffs and fruits) and to wine-growing (Hallauer is the best-known red wine). There are tile factories in the Reiath region (N.E. of the capital). The canton is divided into six administrative districts, which comprise thirty-six communes. The cantonal constitution dates in its main features from 1876. The legislature or *Grossrat* is composed of members elected for four years in the proportion of one to every 500 (or fraction over 250) of the population, but only communes with more than 250 inhabitants form separate electoral circles, the smaller being united for electoral purposes with their greater neighbours. The executive or *Regierungsrat* of five members is also elected for four years by a popular vote, as are the two members of the Federal *Ständerat* and of the Federal *Nationalrat*. One thousand citizens have the right of "initiative" as to legislative projects and important financial matters as well as to the revision of the cantonal constitution. Since 1895 the "obligatory referendum" for all legislative projects has prevailed, as well as a curious institution (formerly existing in several cantons) by which the legislature can consult the people on certain questions involving principles and not merely on fully drafted legislative projects. The taxes are very small, while the property of the canton is the most considerable in Switzerland, so that from a financial point of view Schaffhausen is the most favoured in the country, and till recently it had no public debt at all. The numerous forests are well managed and bring in much money.

The canton arose from acquisitions made at various dates from 1461 to 1798 by the town, which at the time of the Reformation obtained possession of the outlying estates of the ecclesiastical foundations then suppressed. The most interesting spot in the canton is the little town of Stein, with its Benedictine monastery (1005–1526), now a sort of medieval museum, and the castle of Hohenklingen towering above it. (W. A. B. C.)

SCHAFFHAUSEN, the capital of the Swiss canton of that name, situated entirely (for its suburb, Feuerthalen, is in the canton of Zürich) on rising ground above the right bank of the Rhine. Its streets are narrow (save in the modern quarters), while it is dominated by the fortress of Unnoth (wrongly called Munoth). It is by rail 31 m. W. of Constance and 59 m. W. of Basel. It is a city of contrasts, medieval architecture of the true Swabian type and modern manufactures mingling curiously together. Three of the sixteen town gates survive, and many old houses, though few have preserved traces of the frescoes which formerly adorned their external walls. The chief ancient building in the town is the *Munster* (now Protestant) of All Saints, formerly a Benedictine monastery. It was consecrated in 1052, and is a good specimen of the "sternest and plainest Romanesque, finished with a single side tower near the east end, that is architecturally connected both with Italian campaniles and the so-called Anglo-Saxon towers of England" (E. A. Freeman). Close to it is deposited the famous 15th-century bell that suggested Schiller's *Song of the Bell* and the opening of Longfellow's *Golden Legend*. The castle of Unnoth, above the town, dates in its present form from the second half of the 16th century. It has enormously thick casemates and a tower, the platform of which (now used as a restaurant) is reached by a spiral ascent. The museum contains antiquarian and natural history collections, as well as the town library, which possesses the MSS. and books of the Swiss historian J. von Müller (*q.v.*). A monument to his memory is on the promenade of the Fäsenstaub, west of the town. Opposite is a building constructed in 1864 by a citizen (G. C. im Thurn) who had made his fortune in London. It is named after him the Imthurneum, and houses a theatre, a picture gallery, concert rooms and the school of music. There are a number of factories in the town, while at Neuhausen, its suburb, are aluminium works, railway rolling stock works and a manufactory of playing cards and railway tickets. Industrial development has been furthered by the hydraulic works for the utilization of the forces in the Rhine; founded 1863–1866 by H. Moser (1805–1874), a wealthy citizen, these are now the property of the town and since 1900 are worked by electricity. In 1900 the town had 15,275 inhabitants (14,684 German-speaking), while there were 11,144 Protestants, 4085 Roman Catholics and 21 Jews.

The spot is first mentioned in 1045, "Villa Scafhusun," while in 1050 we hear of the "ford" there across the Rhine. Hence it is probable that the name is really derived from *scapha*, a skiff, as here goods coming from Constance were disembarked in consequence of the falls of the Rhine a little below. Some writers, however, prefer the derivation from *Schaf* (a sheep), as a ram (now a sheep) formed the ancient arms of the town, derived from those of its founders, the counts of Nellenburg. About 1050 those counts founded here the Benedictine monastery of All Saints, which henceforth became the centre of the town. Perhaps as early as 1190, certainly in 1208, it was an imperial free city, while the first seal dates from 1253. The powers of the abbot were gradually limited and in 1277 the emperor Rudolf gave the town a charter of liberties. It ran considerable risk of becoming a part of the private estates of the Habsburgs, as the emperor Louis of Bavaria pledged it in 1330 to that family, which held it till Duke Frederick with Empty Pockets was placed under the ban of the empire in 1415, its freedom being finally purchased in 1418, while from 1411 the trade gilds ruled the town. But it was much harassed by the neighbouring Austrian nobles, so that in 1454 it made an alliance with six of the Swiss confederates (Uri and Unterwalden coming in in 1479), by whom it was received as an "ally," being finally admitted a full member in 1501. The Reformation was adopted in 1524, finally in 1529. The town suffered much in the Thirty Years' War from the passage of Swedish and Bavarian troops. It was not till the early 19th century that the arrested industrial development of the town took a fresh start.

AUTHORITIES.—F. L. Baumann, *Das Kloster Allerheiligen in Schaffhausen* (vol. iii. of the "Quellen z. Schweizer Geschichte") (Basel, 1881); *Beiträge z. vaterländisch. Geschichte* (5 parts, 1863–1884); E. Im-Thurn, *Der Kanton Schaffhausen* (St Gall and Bern, 1840); A. Pfaff, *Das Staatsrecht d. alten Eidgenossenschaft* (Schaffhausen, 1870) (pp. 89-97 contain a history of Schaffhausen). In 1901 there appeared at Schaffhausen two elaborate historical "Festschriften," one for the canton and one for the town, while in 1906–1907 there were published at Schaffhausen two parts (from 987 to 1530) of an official *Urkundenregister für den Kanton Schaffhausen*. (W. A. B. C.)

SCHÄFFLE, ALBERT EBERHARD FRIEDRICH (1831–1903), German statesman and political economist, was born at Nürtingen in Württemberg on the 24th of February 1831, and in 1848 became a student at the university of Tübingen. From 1850 to 1860 he was attached to the editorial staff of the *Schwäbische Merkur* in Stuttgart, and in the latter year accepted a call to the chair of political economy at Tübingen. From 1862 to 1864 Schäffle was a member of the Württemberg diet, and in 1868 he received a mandate to the German *Zollparlament*. This year he was appointed professor of political science at the university of Vienna, and in 1871 he entered the cabinet of Karl Siegmund Graf von Hohenwart as minister of commerce for Austria. But the government fell in the same year, and Schäffle withdrew to Stuttgart, where he took up his residence, devoting himself entirely to literary work. He died at Stuttgart on the 25th of December 1903. Among his numerous writings must be mentioned *Das Gesellschaftliche System der menschlichen Wirthschaft* (new ed., 1873); *Die Nationalökonomische Theorie der ausschliessenden Absatzverhältnisse* (1867); *Bau und Leben des socialen Körpers* (2nd ed. 1896); *Ein Votum gegen den neuesten Zolltarif* (Tübingen, 1901); *Die agrarische Gefahr* (Berlin, 1902); *Gesammelte Aufsätze* (1885–1887). From 1892 to 1901 Schäffle was the sole editor of the *Zeitschrift für die gesamte Staatswissenschaft*.

See Biermann, *Schäffle und der Agrarismus* (Bonn, 1902) and his autobiography, *Aus meinem Leben* (Berlin, 1905).

SCHALCKEN, GODFRIED (1643–1706), Dutch genre and portrait painter, was born at Dort in 1643, and studied under Hoogstraten, and afterwards under Gerhard Douw, whose works his earlier genre-pictures very closely resemble. He visited England and painted several portraits, of which the half-length of William III., now in the Museum, Amsterdam, is a good example. In this work he shows an effect of candle-light, which he also introduced—frequently with fine effect—in many of this subject-pictures. These may be studied in the collections at Buckingham Palace, the Louvre, Vienna and Dresden. His Scriptural subjects are of very indifferent merit. He died at The Hague in 1706.

SCHALL, JOHANN ADAM VON (1591–1666), Jesuit missionary in China, born of noble parents in Cologne. At the age of twenty he joined the Society of Jesus, and in 1628 went out to China. Apart from successful missionary work, he became the trusted counsellor of the emperor, was created a mandarin, and held an important post in connexion with the mathematical school. His position enabled him to procure from the emperor permission for the Jesuits to build churches and to preach throughout the country. Proselytes to the number of 100,000 are said to have been obtained within fourteen years. The emperor, however, died in 1661, and Schall's circumstances at once changed. He was imprisoned and condemned to death. The sentence was not carried out, but he died after his release owing to the privations he had endured. A collection of his MS. remains was deposited in the Vatican Library.

SCHANDAU, a town of Germany, in the kingdom of Saxony, situated on the right bank of the Elbe, at the mouth of the little valley of the Kirnitsch. It is 4 m. from the Bohemian frontier, 20 m. S.E. of Dresden on the railway to Bodenbach, and has a branch to Niederneukirch, which is carried from the railway station lying on the right bank across the Elbe by an iron bridge. Pop. (1905) 3373. Schandau has an Evangelical parish church, a hydropathic establishment and a school of river navigation. The position of Schandau in the heart of the romantic "Saxon Switzerland" has made it a place of importance, and thousands of tourists make it their headquarters in summer. For their accommodation numerous hotels and villas have been

erected. The chief manufactures of the town are artificial flowers and furniture.

See Schäfer, *Führer durch Schandau und seine Umgebung* (Dresden, 1907).

SCHANDORPH [or SKAMDRUP], **SOPHUS CHRISTIAN FREDERICK** (1836–1901), Danish poet and novelist, was born at Ringsted in Zealand on the 8th of May 1836. In 1855 he entered the university of Copenhagen. In 1862 he published his first volume of poetry, written in the romantic style and giving little indication of the ultimate direction that his talent was to take. Other books followed, but his gifts first found full expression in a volume of rustic tales entitled *Fra Provinsen* (1876), in which he described provincial character and life with much frankness of detail and a great deal of wit. In 1878 his novel, *Uden Midtpunkt* ("Without a Centre"), recast later in dramatic form, attracted great attention by its exposure of contemporary failings. Among the more famous of his later novels are: *Thomas Fris' Historie* (2 vols., 1881), *Det gamle Apothek* ("The Old Apothecary") (1855) and *Helga* (1900); but his most characteristic work is to be found in his various volumes of short sketches. He published his own *Recollections* (Oplevelser) in 1889. He died after a long illness at Frederiksberg on New Year's Day 1901.

See an article by V. Möller in C. F. Bricka's *Dansk Biografisk Leaikon* (vol. xv., 1901).

SCHARF, SIR GEORGE (1820–1895), British art critic, was born in London on the 16th of December 1820, the son of George Scharf, a Bavarian miniature painter who settled in England in 1816 and died in 1860. He studied in the schools of the Royal Academy. In 1840 he accompanied Sir Charles Fellows to Asia Minor, and in 1843 acted as draughtsman to a government expedition to the same country. After his return he devoted himself with great industry and success to the illustration of books relating to art and antiquity, of which the best known are Macaulay's *Lays of Ancient Rome* (1847); Milman's *Horace*, (1849); Kugler's *Handbook of Italian Painting* (1851); and Dr Smith's classical dictionaries. He also engaged largely in lecturing and teaching, and took part in the formation of the Greek, Roman and Pompeian courts at the Crystal Palace. He acted as art secretary to the great Manchester Art Treasures Exhibition of 1857, and in that year was appointed secretary and director to the newly founded National Portrait Gallery. The remainder of his life was given to the care of that institution. Scharf acquired an unrivalled knowledge of all matters relating to historic portraiture, and was the author of many learned essays on the subject. In 1885, in recognition of his services to the Portrait Gallery, he was made C.B., and on his resignation, early in 1895, K.C.B. and a trustee of the Gallery. He died on the 19th of April of the same year.

SCHARNHORST, GERHARD JOHANN DAVID VON (1755–1813), Prussian general, was born at Bordenau near Hanover, of a farmer stock, on the 12th of November 1755. He succeeded in educating himself and in securing admission to the military academy of Wilhelmstein, and in 1778 received a commission in the Hanoverian service. He employed the intervals of regimental duty in further self-education and literary work. In 1783 he was transferred to the artillery and appointed to the new artillery school in Hanover. He had already founded a military journal which under various names endured till 1805, and in 1788 he designed, and in part published, a *Handbuch für Offiziers in den anwendbaren Theilen der Kriegswissenschaften*. He also published in 1792 his *Militärische Taschenbuch für den Gebrauch im Felde*. The income he derived from his writings was his chief means of support, for he was still a lieutenant, and though the farm of Bordenau produced a small sum annually he had a wife (Clara Schmalz, sister of Theodor Schmalz, first director of Berlin University) and family to maintain. His first campaign was that of 1793 in the Netherlands, in which he served under the duke of York with distinction. In 1794 he took part in the defence of Menin and commemorated the escape of the garrison in his *Vertheidigung der Stadt Menin* (Hanover, 1803), which, next to his paper *Die Ursachen des Glücks der Franzosen im Revolutionskrieg*, is his best-known work. Shortly after this he was promoted major and employed on the staff of the Hanoverian contingent.

In 1795, after the peace of Basel, he returned to Hanover. He was by now so well known to the armies of the various allied states that from several of them he received invitations to transfer his services. This in the end led to his engaging himself to the king of Prussia, who gave him a patent of nobility, the rank of lieutenant-colonel and a pay more than twice as large as that he had received in Hanover (1801). He was employed, almost as a matter of course, in important instructional work at the War Academy of Berlin, he had Clausewitz (*q.v.*) as one of his pupils, and he was the founder of the Berlin Military Society. In the mobilizations and precautionary measures that marked the years 1804 and 1805, and in the war of 1806 that was the natural consequence, Scharnhorst was chief of the general staff (lieutenant-quartermaster) of the duke of Brunswick, received a slight wound at Auerstädt and distinguished himself by his stern resolution during the retreat of the Prussian army. He attached himself to Blücher in the last stages of the disastrous campaign, was taken prisoner with him at the capitulation of Ratkau, and, being shortly exchanged, bore a prominent and almost decisive part in the leading of L'Estocq's Prussian corps which served with the Russians. For his services at Eylau, he received the order *pour le mérite*.

It was now evident that Scharnhorst was more than a brilliant staff officer. Educated in the traditions of the Seven Years' War, he had by degrees, as his experience widened, divested his mind of antiquated forms of war, and it had been borne in upon him that a "national" army and a policy of fighting decisive battles alone responded to the political and strategical situation created by the French Revolution. The steps by which he converted the professional long-service army of Prussia, wrecked at Jena, into the national army as we know it to-day, based on universal service, were slow and laboured. He was promoted major-general a few days after the peace of Tilsit, and placed as the head of a reform commission, to which were appointed the best of the younger officers such as Gneisenau, Grolman and Boyen. Stein himself became a member of the commission and secured Scharnhorst free access to the king by causing him to be appointed aide-de-camp-general. But Napoleon's suspicions were quickly aroused, and the king had repeatedly to suspend or to cancel the reforms recommended. In 1809 the war between France and Austria roused premature hopes in the patriots' party, which the conqueror did not fail to note. By direct application to Napoleon, Scharnhorst evaded the decree of the 26th of September 1810, whereby all foreigners were to leave the Prussian service forthwith, but when in 1811–1812 Prussia was forced into an alliance with France against Russia and despatched an auxiliary army to serve under Napoleon's orders, Scharnhorst left Berlin on unlimited leave of absence. In retirement he wrote and published a work on firearms, *Über die Wirkung des Feuergewehrs* (1813). But the retreat from Moscow at last sounded the call to arms for the new national army of Prussia. Scharnhorst was recalled to the king's headquarters, and after refusing a higher post was made chief of staff to Blücher, in whose vigour, energy and influence with the young soldiers he had complete confidence. The first battle Lützen or Gross-Görschen was a defeat, but a very different defeat from those which Napoleon had hitherto been accustomed to inflict. In it Scharnhorst received a wound in the foot, not in itself grave, but soon made mortal by the fatigues of the retreat to Dresden, and he succumbed to it on the 28th of June at Prague, whither he had been sent to negotiate with Schwarzenberg and Radetzky for the armed intervention of Austria. Shortly before his death he had been promoted to the rank of lieutenant-general. Frederick William III. erected a statue in memory of him, by Rauch, in Berlin.

See C. von Clausewitz, *Über das Leben und den Charakter des General v. Scharnhorst*; H. v. Boyen, *Beiträge zur Kenntnis des General v. Scharnhorst*; lives by Schweder (Berlin, 1865), Klippel (Leipzig, 1869); M. Lehmann (Leipzig, 1886–1888, an important

work in two volumes); also Max Jähns, *Gesch. der Kriegswissenschaften*, iii. 2154; Weise, *Scharnhorst und die Durchführung der allgemeinen Wehrpflicht* (1892); A. von Holleben, *Der Frühjahrsfeldzug, 1813* (1905); and F. N. Maude, *The Leipzig Campaign* (1908).

SCHAUMBURG-LIPPE, a principality forming part of the German Empire, consisting of the western half of the old countship of Schaumburg, and surrounded by Westphalia, Hanover and the Prussian part of Schaumburg. Area, 131 sq. m. Its northern extremity is occupied by a lake named the Steinhuder Meer. The southern part is hilly (Wesergebirge), but the remainder consists of a fertile plain. Besides husbandry, the inhabitants practise yarn-spinning and linen-weaving, and the coal-mines of the Bückeberg, on the south-eastern border, are very productive. The great bulk of the population (in 1905, 44,992), are Lutherans. The capital is Bückeburg, and Stadthagen is the only other town. Under the constitution of 1868 there is a legislative diet of 15 members, 10 elected by the towns and rural districts and 1 each by the nobility, clergy and educated classes, the remaining 2 nominated by the prince. Schaumburg-Lippe sends one member to the Bundesrat (federal council) and one deputy to the reichstag. The annual revenue and expenditure amount each to about £41,000. The public debt is about £23,000.

SCHEDULE, originally a written strip or leaf of paper or parchment, a label or ticket, especially when attached to another document, as explaining or adding to its contents, hence any additional detailed statement such as cannot conveniently be embodied in the main statement. The word occurs first (14th century) as *cedule*, or *sedule*, representing the Fr. *cedule* (mod. *cédule*, cf. Ital. *cedola*, Ger. *Zettel*, &c.), which is derived from Late Lat. *scedula* or *schedula*, dim. of *sceda*, a written strip of parchment (late Gr. σχέδη), probably from *scindere*, to cleave, cf. *scindala*, a shingle. The original pronunciation in English was *sedule*, the modern pronunciation is *shedule*; American usage has gone back to the original Latin or Greek, and adopts *skedule*.

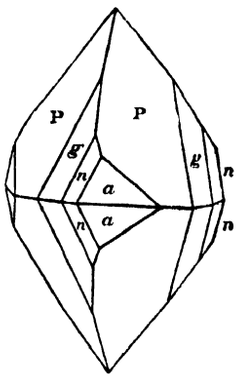
SCHEELE, KARL WILHELM (1742–1786), Swedish chemist, was born at Stralsund, the capital of Pomerania, which then belonged to Sweden, on the 19th of December 1742. He was apprenticed at the age of fourteen to an apothecary in Gothenburg, with whom he stayed for eight years. His spare time and great part of his nights were devoted to the experimental examination of the different bodies which he dealt with, and the study of the standard works on chemistry. He thus acquired a large store of knowledge and great practical skill and manipulative dexterity. In 1765 he removed to Malmö, and in 1768 to Stockholm. While there he wrote an account of his experiments with cream of tartar, from which he had isolated tartaric acid, and sent it to T. O. Bergman, the leading chemist in Sweden. Bergman somehow neglected it, and this caused for a time a reluctance on Scheele's part to become acquainted with that savant, but the paper, through the instrumentality of Anders Johann Retzius (1742–1821), was ultimately communicated to the Academy of Sciences at Stockholm. He left Stockholm in 1770 and took up his residence at Upsala, where through the agency of Johann Gottlieb Gahn (1745–1818), assessor of mines at Fahlun, he made the personal acquaintance of Bergman. A friendship, of mutual advantage, soon sprang up between the two men, and it has been said that Scheele was Bergman's greatest discovery. In 1775, the year in which he was elected into the Stockholm Academy of Sciences, he left Stockholm for Köping, a small place on Lake Malar, where he became provisor and subsequently proprietor of a pharmacy. The business, however, was not what he had been led to expect, and it took him several years to put it on a sound footing. Yet in spite of his business cares he found time for an extraordinary amount of original research, and every year he published two or three papers, most of which contained some discovery or observation of importance. His unremitting work, it is said, especially at night, exposing him to cold and draughts, induced a rheumatic attack which brought about his death. He had intended, as soon as his circumstances permitted him, to marry the widow of his predecessor, but his illness increased so rapidly that it was only on his death-bed, on the 19th of May 1786, that he carried out his design. Two days later he died, leaving his wife what property he had acquired.

Scheele's power as an experimental investigator has seldom if ever been surpassed, and his accuracy is most remarkable when his primitive apparatus, his want of assistance, his place of residence, and the undeveloped state of chemical and physical science in his time, are all taken into account. Research was at once his occupation and his relaxation, and his natural endowments were cultivated by unceasing practice and unwearied attention. Study of his original papers shows that his discoveries were not made at haphazard, but were the outcome of experiments carefully planned to verify inferences already drawn, and successfully designed to settle the point at issue in the simplest and most direct manner. He left nothing in doubt if experiment would decide it, and he evidently did not consider that he had fully investigated any compound until he could both unmake and remake it. His record as a discoverer of new substances is probably unequalled. The analysis of manganese dioxide in 1774 led him to the discovery of chlorine and baryta, to the description of various salts of manganese itself, including the manganates and permanganates, and to the explanation of its action in colouring and decolourizing glass. In 1775 he investigated arsenic acid and its reactions, discovering arseniuretted hydrogen and "Scheele's green" (copper arsenite), a process for preparing which on a large scale he published in 1778. Papers published in 1776 were concerned with quartz, alum and clay and with the analysis of *calculus vesicae* from which for the first time he obtained uric acid. In 1778 he proposed a new method of making calomel and powder of algaroth, and he got molybdic acid from mineral *molybdaena nitens* which he carefully distinguished from ordinary molybdena (plumbago or black lead of commerce). In the following year he showed that plumbago consists essentially of carbon, and he published a record of estimations of the proportions of oxygen in the atmosphere, which he had carried on daily during the whole of 1778—three years before Cavendish. In 1780 he proved that the acidity of sour milk is due to what was afterwards called lactic acid; and by boiling milk sugar with nitric acid he obtained mucic acid. His next discovery, in 1781, was the composition of the mineral tungsten, since called scheelite (calcium tungstate), from which he obtained tungstic acid. In 1782 he published some experiments on the formation of ether, and in 1783 examined the properties of glycerine, which he had discovered seven years before. About the same time he showed by a wonderful series of experiments that the colouring matter of Prussian blue could not be produced without the presence of a substance of the nature of an acid, to which the name of prussic acid was ultimately given; and he described the composition, properties and compounds of this body, and even ascertained its smell and taste, quite unaware of its poisonous character. In the last years of his life he returned to the vegetable acids, and investigated citric, malic, oxalic and gallic acids. His only book, on *Air and Fire*, was published in 1777, but was written some years before. The manuscript was in the hands of the printers in 1775, and most of the experimental work for it was done before 1773. Although it starts from the erroneous basis of the phlogistic theory, it contains much matter of permanent value. One of the chief observations recorded in it is that the atmosphere is composed of two gases—one which supports combustion and the other which prevents it. The former, "fire-air," or oxygen, he prepared from "acid of nitre," from saltpetre, from black oxide of manganese, from oxide of mercury and other substances, and there is little doubt but that he obtained it independently a considerable time before Priestley. Incidentally in 1777 Scheele prepared sulphuretted hydrogen, and noted the chemical action of light on silver compounds and other substances.

A list of Scheele's papers is given in Poggendorff's *Biographisch-literarisches Handwörterbuch* (Leipzig, 1863). They were collected and published in French as *Mémoires de chymie* (Paris, 1785–1788); in English as *Chemical Essays*, by Thomas Beddoes (London, 1786); in Latin as *Opuscula*, translated by Schäfer, edited by Hebenstreit (Leipzig, 1788–1789); and in German as *Sämmtliche Werke*, edited

by Hermbstadt (Berlin, 1793). The treatise on *Air and Fire* appeared in German, Leipzig and Upsala in 1777, and again in 1782; in English, by J. R. Forster (London, 1780); and in French, by Dietrich (Paris, 1781).

SCHEELITE, a mineral consisting of calcium tungstate, $CaWO_4$. It was early known as "tungsten" (meaning in Swedish, "heavy stone"), and is the mineral in which K. W. Scheele discovered tungstic acid, hence the name scheelite. Well-developed crystals are not infrequent; they usually have the form of acute tetragonal bipyramids (P in fig.); sometimes other pyramid-faces are present, and these (*g* and *n*) being developed on only one side of P indicate the parallel-faced hemihedrism of the crystals. Compact and granular masses also occur. The colour is usually yellowish white or brownish, the crystals sometimes transparent to translucent; the lustre vitreous to adamantine. The hardness is 4½, the specific gravity 6·0. Molybdenum is usually present, replacing an equivalent amount of tungsten; and in a green variety known as "cupro-scheelite" part of the calcium is replaced by copper.



Scheelite usually occurs with topaz, fluor, apatite, wolframite, &c., in tin-bearing veins; and is sometimes found in association with gold. Fine crystals have been obtained from Caldbeck Fells in Cumberland, Zinnwald and Elbogen in Bohemia, Guttannen in Switzerland, the Riesengebirge in Silesia, Dragoon Mountains in Arizona and elsewhere. At Trumbull in Connecticut and Kimpu-san in Japan large crystals of scheelite completely altered to wolframite have been found: those from Japan have been called "reinite."

SCHEEMAKERS, PETER (1691–1770), Flemish sculptor, was born in Antwerp, and learnt his art from his father and from Delvaux. After visiting Denmark and walking thence to Rome for purposes of study, he returned on foot to the port of embarcation for England, but stayed in London but a short while. From 1728 to 1735 he again sojourned in Rome and then settled in England, where he remained from 1735 to 1770, returning in the latter year to his native city where he died a few months afterwards. He worked for a time with Francis Bird, the pupil of Grinling Gibbons. Fifteen of his works—monuments, figures and busts—are in Westminster Abbey, two executed in collaboration with his master Delvaux: the "Hugh Chamberlen" (d. 1728, and therefore perhaps produced during his first visit to London) and "Catherine, duchess of Buckinghamshire." He is best, though not most creditably, known to fame by his monument to Shakespeare (1740), but as this work was designed by Kent the blame for the errors of taste therein displayed must not be laid to Scheemakers' account. In addition to these may be mentioned the monuments to Admiral Sir Charles Wager, Vice-Admiral Watson, Lieut.-General Percy Kirk, George Lord Viscount Howe, General Monck, and Sir Henry Belasye. His busts of John Dryden (1720) and Dr Richard Mead (1754), also in the Abbey, are among the best of his smaller works. The most important of his monuments elsewhere, as mentioned by Walpole, are those to the 1st and 2nd dukes of Ancaster at Edenham, Lincolnshire; Lord Chancellor Hardwicke at Wimpole, Cambridgeshire; the duke of Kent, his wives and daughters, at Fletton, Bedfordshire; the earl of Shelburne, at Wycombe, Bucks; and the figure on the sarcophagus to Montague Sherrard Drake, at Amersham. Although less esteemed as an artist than Rysbrack and Roubiliac, Scheemakers was a very popular and widely-employed sculptor in his day, whose influence was considerable; he was the master of Nollekens, and left a son, Thomas Scheemakers, who produced a considerable amount of work, and exhibited in the Royal Academy from 1782–1804.

See Walpole's *Anecdotes of Painting*, vol. 3 (ed. 1876), and *Dictionary of National Biography*.

SCHEFER, LEOPOLD (1784–1862), German poet and novelist, was born at Muskau in Lower Lusatia on the 30th of July 1784, and educated at the gymnasium of Bautzen. In 1813, he was appointed manager of the estates of Prince Pückler-Muskau (*q.v.*). The prince, recognizing the literary abilities of the young man, encouraged his early poetical efforts and gave him the means to travel. After visiting England, Italy, Greece and Turkey, Schefer returned in 1820 to Muskau, where he lived in easy circumstances and with abundant leisure for his literary pursuits, until his death on the 16th of February 1862. Schefer wrote a large number of short stories which appeared in several series, *Novellen* (5 vols., 1825–1829); *Neue Novellen* (4 vols., 1831–1835); *Lavabecher* (2 vols., 1833); *Kleine Romane* (6 vols., 1836–1837). The historical novel *Die Gräfin Ulfeld* (2 vols., 1834), and the piquant satire, *Die Sibylle von Mantua* (1852), were published separately. But Schefer is less known for his novels, which are lacking in plastic power and creative imagination, than for a volume of charming poems, *Laienbrevier* (1834–1835). These, owing to their warmth of feeling and fascinating descriptions of the beauties of nature, at once established his fame as a poet. This vein, in close imitation of his friend the poet Richard Georg Spiller von Hauenschild, known under the pseudonym Max Waldau (1822–1855), he followed in later years with the poems *Vigilien* (1843), *Der Weltpriester* (1846), and *Hausreden* (1869). His *Hafis in Hellas* (Hamburg, 1853) and *Koran der Liebe* (Hamburg, 1855) contain with their glowing descriptions of the East, original poetry of a high order.

A selection of Schefer's works, *Ausgewählte Werke*, in 12 vols., was published in 1845 (2nd ed., 1857). See J. Schmidt, *Geschichte der deutschen Literatur im 19. Jahrhundert*, vol. ii.; E. Brenning *Leopold Schefer* (1884); and L. Geiger in *Dichter und Frauen* (1896).

SCHEFFEL, JOSEPH VIKTOR VON (1826–1886), German poet and novelist, was born at Karlsruhe on the 16th of February 1826. His father, a retired major in the Baden army, was a civil engineer and member of the commission for regulating the course of the Rhine; his mother, *née* Josephine Krederer, the daughter of a prosperous tradesman at Oberndorf on the Neckar, was a woman of great intellectual powers and of a romantic disposition. Young Scheffel was educated at the lyceum at Karlsruhe and afterwards (1843–1847) at the universities of Munich, Heidelberg and Berlin. After passing the state examination for admission to the judicial service, he graduated *doctor juris* and for four years (1848–1852) held an official position at Säckingen. Here he wrote his poem *Der Trompeter von Säckingen* (1853), a romantic and humorous tale which immediately gained extraordinary popularity. It has reached more than 250 editions. Scheffel next undertook a journey to Italy. Returning home in 1853 he found his parents more than ever anxious that he should continue his legal career. But in 1854, defective eyesight incapacitated him; he quitted the government service and took up his residence at Heidelberg, with the intention of preparing himself for a post on the teaching staff of the university. His studies were, however, interrupted by eye-disease, and in search of health he proceeded to Switzerland and took up his abode on the Lake of Constance, and elaborated the plan of his famous historical romance *Ekkehard* (1857); (Eng. trans. by S. Delffs, Leipzig, 1872). The first ideas for this work he got from the *Monumenta Germaniae*. It gained popularity hardly inferior to that of the *Trompeter von Säckingen*. In 1901 it had reached the 179th edition. Scheffel next returned to Heidelberg, and published *Gaudeamus, Lieder aus dem Engeren und Weiteren* (1868), a collection of joyous and humorous songs, the matter for which is taken partly from German legends, partly from historical subjects. In these songs the author shows himself the light-hearted student, a friend of wine and song; and their success is unexampled in German literature and encouraged numerous imitators. For two years (1857–1859) Scheffel was custodian of the library of Prince Egon von Fürstenberg at Donaueschingen, but giving up his appointment in 1859, visited Joseph Freiherr von Lassberg, at Meersburg on the Lake of Constance, stayed for a while with the grand duke Charles Alexander of Saxe-Weimar at the Wartburg in Thuringia, then, settling at Karlsruhe, he married in 1864 Caroline von Malzen, and, in 1872, retired to his Villa Seehalde near Radolfzell.

on the lower lake of Constance. On the occasion of his jubilee (1876), which was celebrated all over Germany, he was granted a patent of hereditary nobility by the grand duke of Baden. He died at Karlsruhe on the 9th of April 1886.

His works, other than those already mentioned, are *Frau Aventiure. Lieder aus Heinrich von Ofterdingens Zeit* (1863); *Juniperus, Geschichte eines Kreuzfahrers* (1866); *Bergpsalmen* (1870); *Waldeinsamkeit* (1880); *Der Heini von Steier* (1883); and *Hugideo, eine alte Geschichte* (1884). Volumes of *Reisebilder* (1887); *Episteln* (1892); and *Briefe* (1898) were published posthumously. Scheffel's *Gesammelte Werke* have been published in six volumes (1907). Cf. also A. Ruhemann, *Joseph Victor von Scheffel* (1887); G. Zernin, *Erinnerungen an Joseph Victor von Scheffel* (1887); J. Prölss, *Scheffels Leben und Dichten* (1887); L. von Kobell, *Scheffel und seine Frau* (1901); E. Boerschel, *J. V. von Scheffel und Emma Heim* (1906).

SCHEFFER, ARY (1795–1858), French painter of Dutch extraction, was born at Dort on the 10th of February 1795. After the early death of his father, a poor painter, Ary was taken to Paris and placed in the studio of Guérin by his mother, a woman of great energy and character. The moment at which Scheffer left Guérin coincided with the commencement of the Romantic movement. He had little sympathy with the directions given to it by either of its most conspicuous representatives, Sigalon, Delacroix or Gericault, and made various tentative efforts—"Gaston de Foix" (1824), "Suliot Women" (1827)—before he found his own path. Immediately after the exhibition of the last-named work he turned to Byron and Goethe, selecting from *Faust* a long series of subjects which had an extraordinary vogue. Of these, we may mention "Margaret at her Wheel"; "Faust Doubting"; "Margaret at the Sabbat"; "Margaret Leaving Church": the "Garden Walk"; and lastly, perhaps the most popular of all, "Margaret at the Well." The two "Mignons" appeared in 1836; and "Francesca da Rimini," which is on the whole Scheffer's best work, belongs to the same period. He now turned to religious subjects: "Christus Consolator" (1836) was followed by "Christus Remunerator," "The Shepherds Led by the Star" (1837), "The Magi Laying Down their Crowns," "Christ in the Garden of Olives," "Christ bearing his Cross," "Christ Interred" (1845), "St Augustine and Monica" (1846), after which he ceased to exhibit, but, shut up in his studio, continued to produce much which was first seen by the outer world after his death, which took place at Argenteuil on the 15th of June 1858. At the posthumous exhibition of his works there figured the "Sorrows of the Earth," and the "Angel Announcing the Resurrection," which he had left unfinished. Amongst his numerous portraits those of La Fayette, Béranger, Lamartine and Marie Alkélic were the most noteworthy. His reputation, much shaken by this posthumous exhibition, was further undermined by the sale of the Paturle Gallery, which contained many of his most celebrated achievements; the charm and facility of their composition could not save them from the condemnation provoked by their poor and earthy colour and vapid sentiment. Scheffer, who married the widow of General Baudrand, was only made commander of the Legion of Honour in 1848—that is, after he had wholly withdrawn from the Salon. His brother Henri, born at the Hague on the 27th of September 1798, was also a fertile painter.

See Vitet's notice (1861) prefixed to Bingham's publication of works of A. Scheffer; Etex, *Ary Scheffer*; Mrs Grote, *Life of A. Scheffer* (1860).

SCHELANDRE, JEAN DE (*c.* 1585–1635), Seigneur de Saumazènes, French poet, was born about 1585 near Verdun of a Calvinist family. He studied at the university of Paris and then joined Turenne's army in Holland, where he gained rapid advancement. He was the author of a tragedy, *Tyr et Sidon, ou les funestes amours de Belcar et Méliane*, published in 1608 under the anagram-name Daniel d'Anchères, and reprinted with numerous changes in 1628 under the author's own name. In defiance of all rules the action proceeds alternately at Tyre, where Belcar, prince of Sidon, is a prisoner, and at Sidon where Léonte, prince of Tyre, is a prisoner and pursues his gallant adventures. The play, which was divided into two days and ten acts, had a complicated plot and contained 5000 lines. It required an immense stage on which the two towns should be represented, with a field between, where the contests should take place. It is noteworthy as an attempt to introduce the liberty of the Spanish and English drama into France, thus anticipating the romantic revolt of the 19th century. It has been suggested that Schelandre was directly acquainted with Shakespearian drama, but of this there is no direct proof, although he appears to have spent some time in England and to have seen James I. *Tyr et Sidon* is reprinted in the 8th volume of the *Ancien Théâtre français*. Schelandre was also the author of a *Stuartide* (1611), and of *Les Sept Excellents Travaux de la pénitence de Saint Pierre* (1636). He pursued his military career to the end of his life, dying at Saumazènes in 1635 from wounds received in the German campaign of Louis d'Épernon, Cardinal de la Valette.

See Ch. Asselineau, *Jean de Schelandre* (Paris, 1854).

SCHELDT (Fr. *Escaut*, Flem. *Schelde*), a river rising near Catelet in France, entering Belgium near Bleharies in Hainaut, and flowing past Tournai, Oudenarde, Ghent and Termonde till it reaches Antwerp. Some distance below Antwerp, in front of the island Beveland, where the river divides into two channels, respectively north and south of the island, both banks belong to Holland. Of the two channels named, the southern, which reaches the sea at Flushing, is the more important and is used for ocean commerce. The Scheldt has a length of 250 m., of which, by a skilful arrangement of locks, not less than 207 m. are navigable. The principal tributaries are the Lys and the Dender. By the treaty of Munster in 1648 the Dutch obtained the right to close the Scheldt to navigation, and they clung tenaciously to it for over two centuries. In 1839 on the final dissolution of the kingdom of the Netherlands, Holland gave definite form to this right by fixing the toll, and by obtaining the assent of the powers to the arrangement which fettered the trade of Antwerp. In 1863 after long negotiations Belgium bought up this right—each of the powers interested in the trade contributing its quota—and the navigation of the Scheldt was then declared free.

SCHELER, JEAN AUGUSTE ULRIC (1819–1890), Belgian philologist, was born at Ebnat, Switzerland, in 1819. His father, a German, was chaplain to King Leopold I. of Belgium, and Jean Scheler, after studying at Bonn and Munich, became King's librarian and professor at the Brussels Free University. His investigations in Romance philology earned him a wide reputation. He died at Ixelles, Belgium, in 1890.

The most important of his numerous philological works are: *Mémoire sur la conjugaison française considérée sous le rapport étymologique* (Brussels, 1847), *Dictionnaire d'étymologie française d'après les résultats de la science moderne* (Brussels, 1862), *Étude sur la transformation française des mots latins* (Ghent, 1869). He also edited the fourth edition of Diez's *Etymologisches Wörterbuch der romanischen Sprachen* (Bonn, 1878), and completed Grandgagnage's *Dictionnaire étymologique de la langue wallonne* (Louvain, 1880). He also published several critical editions of middle ages texts, including one of *Les Poésies de Froissart* (Brussels, 1870–1872), and a monograph *Sur le séjour de l'apôtre saint Pierre à Rome* (Brussels, 1845), which was translated into German and English.

SCHELLING, FRIEDRICH WILHELM JOSEPH VON (1775–1854), German philosopher, was born on the 27th of January 1775 at Leonberg, a small town of Württemberg. He was educated at the cloister school of Bebenhausen, near Tübingen, where his father, an able Orientalist, was chaplain and professor, and at the theological seminary at Tübingen, which he was specially allowed to enter when he was three years under the prescribed age. Among his (elder) contemporaries were Hegel and Hölderlin. In 1792 he graduated in the philosophical faculty. In 1793 he contributed to Paulus's *Memorabilien* a paper "Über Mythus, historische Sagen, und Philosopheme der ältesten Welt"; and in 1795 his thesis for his theological degree was *De Marcione Paullinarum epistolarum emendatore*. Meanwhile a much more important influence had begun to operate on him, arising out of his study of Kant and Fichte. The *Review of Aenesidemus* and the tractate *On the Notion of Wissenschaftslehre* found in his mind most fruitful soil. With characteristic zeal and impetuosity Schelling had no sooner grasped the leading ideas of Fichte's amended form of the critical philosophy than he put together his impressions of it in his *Über die Möglichkeit*

einer Form der Philosophie überhaupt (1794). There was nothing original in the treatment, but it showed such power of appreciating the new ideas of the Fichtean method that it was hailed with cordial recognition by Fichte himself, and gave the author immediately a place in popular estimation as in the foremost rank of existing philosophical writers. The more elaborate work, *Vom Ich als Princip der Philosophie, oder über das Unbedingte im menschlichen Wissen* (1795), which, still remaining within the limits of the Fichtean idealism, however, exhibits unmistakable traces of a tendency to give the Fichtean method a more objective application, and to amalgamate with it Spinoza's more realistic view of things.

After two years as tutor to two youths of noble family, Schelling was called as extraordinary professor of philosophy to Jena in midsummer 1798. He had already contributed articles and reviews to the *Journal* of Fichte and Niethammer, and had thrown himself with all his native impetuosity into the study of physical and medical science. From 1796 date the *Briefe über Dogmatismus und Kriticismus*, an admirably written critique of the ultimate issues of the Kantian system; from 1797 the essay entitled *Neue Deduction des Naturrechts*, which to some extent anticipated Fichte's treatment in the *Grundlage des Naturrechts*, published in 1796, but not before Schelling's essay had been received by the editors of the *Journal*.[1] His studies of physical science bore rapid fruit in the *Ideen zu einer Philosophie der Natur* (1797), and the treatise *Von der Weltseele* (1798).

The philosophical renown of Jena reached its culminating point during the years (1798–1803) of Schelling's residence there. His intellectual sympathies united him closely with some of the most active literary tendencies of the time. With Goethe, who viewed with interest and appreciation the poetical fashion of treating fact characteristic of the *Naturphilosophie*, he continued on excellent terms, while on the other hand he was repelled by Schiller's less expansive disposition, and failed altogether to understand the lofty ethical idealism that animated his work. He quickly became the acknowledged leader of the Romantic school whose impetuous litterateurs had begun to tire of the cold abstractions of Fichte. In Schelling, essentially a self-conscious genius, eager and rash, yet with undeniable power, they hailed a personality of the true Romantio type. With August Wilhelm Schlegel and his gifted wife Caroline, herself the embodiment of the Romantic spirit, Schelling's relations were of the most intimate kind, and a marriage between Schelling and Caroline's young daughter, Auguste Böhmer, was vaguely contemplated by both. Auguste's death in 1800 (due partly to Schelling's rash confidence in his medical knowledge) drew Schelling and Caroline together, and Schlegel having removed to Berlin, a divorce was, apparently with his consent, arranged. On the 2nd of June 1803 Schelling and Caroline were married, and with the marriage Schelling's life at Jena came to an end. It was full time, for Schelling's undoubtedly overweening self-confidence had involved him in a series of disputes and quarrels at Jena, the details of which are important only as illustrations of the evil qualities in Schelling's nature which deface much of his philosophic work.

From September 1803 until April 1806 Schelling was professor at the new university of Würzburg. This period was marked by considerable changes in his views and by the final breach on the one hand with Fichte and on the other hand with Hegel. In Würzburg Schelling had had many enemies. He embroiled himself with his colleagues and also with the government. In Munich, to which he removed in 1806, he found a quiet residence. A position as state official, at first as associate of the academy of sciences and secretary of the academy of arts, afterwards as secretary of the philosophical section of the academy of sciences, gave him ease and leisure. Without resigning his official position he lectured for a short time at Stuttgart, and during seven years at Erlangen (1820–1827). In 1809 Caroline died, and three years later Schelling married one of her closest friends, Pauline Gotter, in whom he found a faithful companion.

During the long stay at Munich (1806–1841) Schelling's literary activity seemed gradually to come to a standstill. The "Aphorisms on Naturphilosophie" contained in the *Jahrbücher der Medicin als Wissenschaft* (1806 1808) are for the most part extracts from the Würzburg lectures; and the *Denkmal der Schrift von den göttlichen Dingen des Herrn Jacobi* was drawn forth by the special incident of Jacobi's work. The only writing of significance is the "Philosophische Untersuchungen über das Wesen der menschlichen Freiheit," which appeared in the *Philosophische Schriften*, vol. i. (1809), and which carries out, with increasing tendency to mysticism, the thoughts of the previous work, *Philosophie und Religion*. In 1815 appeared the tract *Über die Gottheiten zu Samothrake*, ostensibly a portion of a great work, *Die Weltalter*, frequently announced as ready for publication, of which no great part was ever written. Probably it was the overpowering strength and influence of the Hegelian system that constrained Schelling to so long a silence, for it was only in 1834, after the death of Hegel, that, in a preface to a translation by H. Beckers of a work by Cousin, he gave public utterance to the antagonism in which he stood to the Hegelian and to his own earlier conceptions of philosophy. The antagonism certainly was not then a new fact; the Erlangen lectures on the history of philosophy (*Sämmt. Werke*, x. 124-125) of 1822 express the same in a pointed fashion, and Schelling had already begun the treatment of mythology and religion which in his view constituted the true positive complement to the negative of logical or speculative philosophy. Public attention was powerfully attracted by these vague hints of a new system which promised something more positive, as regards religion in particular, than the apparent results of Hegel's teaching. For the appearance of the critical writings of Strauss, Feuerbach and Bauer, and the evident disunion in the Hegelian school itself had alienated the sympathies of many from the then dominant philosophy. In Berlin particularly, the headquarters of the Hegelians, the desire found expression to obtain officially from Schelling a treatment of the new system which he was understood to have in reserve. The realization of the desire did not come about till 1841, when the appointment of Schelling as Prussian privy councillor and member of the Berlin Academy, gave him the right, a right he was requested to exercise, to deliver lectures in the university. The opening lecture of his course was listened to by a large and appreciative audience. The enmity of his old foe, H. E. G. Paulus, sharpened by Schelling's apparent success, led to the surreptitious publication of a verbatim report of the lectures on the philosophy of revelation, and, as Schelling did not succeed in obtaining legal condemnation and suppression of this piracy, he in 1845 ceased the delivery of any public courses. No authentic information as to the nature of the new positive philosophy was obtained till after his death (at Bad Rogaz, on the 20th of August 1854), when his sons began the issue of his collected writings with the four volumes of Berlin lectures: vol. i. *Introduction to the Philosophy of Mythology* (1856); ii. *Philosophy of Mythology* (1857); iii. and iv. *Philosophy of Revelation* (1858).

Philosophy.—Whatever judgment one may form of the total worth of Schelling as a philosopher, his place in the history of that important movement called generally German philosophy is unmistakable and assured. It happened to him, as he himself claimed, to turn a page in the history of thought, and one cannot ignore the actual advance upon his predecessor achieved by him or the brilliant fertility of the genius by which that achievement was accomplished. On the other hand he nowhere succeeds in attaining to a complete scientific system. His philosophical writings are the successive manifestations of a restless highly endowed spirit, striving unsuccessfully after a solution of its own problems. Such unity as they possess is a unity of tendency and endeavour; in some respects the final form they assumed is the least satisfactory. Hence it has come about that Schelling remains for the philosophic student but a moment of historical value in the development of thought, and that his works have for the most part ceased now to have more than historic interest.

It is not unfair to connect the apparent failings of Schelling's

[1] The reviews of current philosophical literature were afterwards collected, and edited under the title "Abhandlungen zur Erläuterung des Idealismus der Wissenschaftslehre" in Schelling's *Philos. Schriften*, vol. i. (1809).

philosophizing with the very nature of the thinker and with the historical accidents of his career. In his early writings, for example, more particularly those making up *Naturphilosophie*, one finds in painful abundance the evidences of hastily acquired knowledge, impatience of the hard labour of minute thought, over-confidence in the force of individual genius, and desire instantaneously to present even in crudest fashion the newest idea that has dawned upon the thinker. Schelling was prematurely thrust into the position of a foremost productive thinker; and when the lengthened period of quiet meditation was at last forced upon him there unfortunately lay before him a system which achieved what had dimly been involved in his ardent and impetuous desires. It is not possible to acquit Schelling of a certain disingenuousness in regard to the Hegelian philosophy; and if we claim for him perfect disinterestedness of view we must accuse him of deficient insight.

At all stages of his thought he called to his aid the forms of some other system. Thus Fichte, Spinoza, Jakob Boehme and the Mystics, and finally, the great Greek thinkers with their Neoplatonic, Gnostic, and Scholastic commentators, give respectively colouring to particular works. But Schelling did not merely borrow, he had genuine philosophic spirit and no small measure of philosophic insight, and under all the differences of exposition which seem to constitute so many differing systems, there is one and the same philosophic effort and spirit. But what Schelling did want was power to work out his ideas methodically. Hence he could only find expression for himself in forms of this or that earlier philosophy, and hence too the frequent formlessness of his own thought, the tendency to relapse into mere impatient despair of ever finding an adequate vehicle for transmitting thought. It is fair in dealing with Schelling's development to take into account the indications of his own opinion regarding its more significant momenta. In his own view the turning points seem to have been—(1) the transition from Fichte's method to the more objective conception of nature—the advance, in other words, to *Naturphilosophie*; (2) the definite formulation of that which implicitly, as Schelling claims, was involved in the idea of *Naturphilosophie*, viz. the thought of the identical, indifferent, absolute substratum of both nature and spirit, the advance to *Identitätsphilosophie*; (3) the opposition of negative and positive philosophy, an opposition which is the theme of the Berlin lectures, though its germs may be traced back to 1804. Only what falls under the first and second of the divisions so indicated can be said to have discharged a function in developing philosophy; only so much constitutes Schelling's philosophy proper.

1. *Naturphilosophie.*—The Fichtean method had striven to exhibit the whole structure of reality as the necessary implication of self-consciousness. The fundamental features of knowledge, whether as activity or as sum of apprehended fact, and of conduct had been deduced as elements necessary in the attainment of self-consciousness. Fichtean idealism therefore at once stood out negatively, as abolishing the dogmatic conception of the two real worlds, subject and object, by whose interaction cognition and practice arise, and as amending the critical idea which retained with dangerous caution too many fragments of dogmatism; positively, as insisting on the unity of philosophical interpretation and as supplying a key to the form or method by which a completed philosophic system might be constructed. But the Fichtean teaching appeared on the one hand to identify too closely the ultimate ground of the universe of rational conception with the finite, individual spirit, and on the other hand to endanger the *reality* of the world of nature by regarding it too much after the fashion of subjective idealism, as mere moment, though necessitated, in the existence of the finite thinking mind. It was almost a natural consequence that Fichte never succeeded in amalgamating with his own system the aesthetic view of nature to which the *Kritik of Judgment* had pointed as an essential component in any complete philosophy.

From Fichte's position Schelling started. From Fichte he derived the ideal of a completed whole of philosophic conception and also the formal method to which for the most part he continued true. The earliest writings tended gradually towards the first important advance. Nature must not be conceived as merely abstract limit to the infinite striving of spirit, as a mere series of necessary thoughts for mind. It must be that and more than that. It must have reality for itself, a reality which stands in no conflict with its ideal character, a reality the inner structure of which is ideal, a reality the root and spring of which is spirit. Nature as the sum of that which is objective, intelligence as the complex of all the activities making up self-consciousness, appear thus as equally real, as alike exhibiting ideal structure, as parallel with one another. The philosophy of nature and transcendental philosophy are the two complementary portions of philosophy as a whole.

Animated with this new conception Schelling made his hurried rush to *Naturphilosophie*, and with the aid of Kant and of fragmentary knowledge of contemporary scientific movements, threw off in quick succession the *Ideen*, the *Weltseele*, and the *Erster Entwurf*. *Naturphilosophie* has had scant mercy at the hands of modern science. Schelling had neither the strength of thinking nor the acquired knowledge necessary to hold the balance between the abstract treatment of cosmological notions and the concrete researches of special science. His efforts after a construction of natural reality are bad in themselves, and gave rise to wearisome and useless physical speculation. Yet it would be unjust to ignore the many brilliant and sometimes valuable thoughts that are scattered throughout the writings on *Naturphilosophie*—thoughts to which Schelling himself is but too frequently untrue. Regarded merely as a criticism of the notions with which scientific interpretation proceeds, these writings have still importance and might have achieved more had they been untainted by the tendency to hasty, ill-considered, a priori anticipations of nature.

Nature, as having reality for itself, forms one completed whole. Its manifoldness is not then to be taken as excluding its fundamental unity; the divisions which our ordinary perception and thought introduce into it have not absolute validity, but are to be interpreted as the outcome of the single formative energy or complex of forces which is the inner aspect, the soul of nature. This we are in a position to apprehend and constructively to exhibit to ourselves in the successive forms which its development assumes, for it is the same spirit, though unconscious, of which we become aware in self-consciousness. It is the realization of spirit. Nor is the variety of its forms imposed upon it from without; there is neither external teleology in nature, nor mechanism in the narrower sense. Nature is a whole and forms itself; within its range we are to look for no other than natural explanations. The function of *Naturphilosophie* is to exhibit the ideal as springing from the real, not to deduce the real from the ideal. The incessant change which experience brings before us, taken in conjunction with the thought of unity in productive force of nature, leads to the all-important conception of the duality, the polar opposition through which nature expresses itself in its varied products. The dynamical series of stages in nature, the forms in which the ideal structure of nature is realized, are matter, as the equilibrium of the fundamental expansive and contractive forces; light, with its subordinate processes—magnetism, electricity, and chemical action; organism, with its component phases of reproduction, irritability and sensibility.[1]

Just as nature exhibits to us the series of dynamical stages of processes by which spirit struggles towards consciousness of itself, so the world of intelligence and practice, the world of mind, exhibits the series of stages through which self-consciousness with its inevitable oppositions and reconciliations develops in its ideal form. The theoretical side of inner nature in its successive grades from sensation to the highest form of spirit, the abstracting reason which emphasizes the difference of subjective and objective, leaves an unsolved problem which receives satisfaction only in the practical, the individualizing activity. The practical, again, taken in conjunction with the theoretical, forces on the question of the reconciliation between the free conscious organization of thought and the apparently necessitated and unconscious mechanism of the objective world. In the notion of a teleological connexion and in that which for spirit is its subjective expression, viz. art and genius, the subjective and objective find their point of union.

2. Nature and spirit, *Naturphilosophie* and *Transcendentalphilosophie*, thus stand as two relatively complete, but complementary parts of the whole. It was impossible for Schelling, the animating principle of whose thought was ever the reconciliation of differences, not to take and to take speedily the step towards the conception of the uniting basis of which nature and spirit are manifestations, forms, or consequences. For this common basis, however, he did not succeed at first in finding any other than the merely negative expression of indifference. The identity, the absolute, which underlay all difference, all the relative, is to be characterized simply as *neutrum*, as absolute undifferentiated self-equivalence. It lay in the very nature of this thought that Spinoza should now offer himself to Schelling as the thinker whose form of presentation came nearest to his new problem. The *Darstellung meines Systems*, and the more expanded and more careful treatment contained in the lectures on *System der gesammten Philosophie und der Naturphilosophie insbesondere* given in Würzburg, 1804 (published in the *Sämmtliche Werke*, vol. vi. pp. 131-570), are thoroughly Spinozistic in form, and to a large extent in substance. They are not without value, indeed, as extended commentary on Spinoza. With all his efforts, Schelling does not succeed in bringing his conceptions of nature and spirit into any vital connexion with the primal identity, the absolute indifference of reason. No true solution could be achieved by resort to the mere absence of distinguishing, differencing feature. The absolute was left with no other function than that of removing all the differences on which thought turns. The criticisms of Fichte, and more particularly of Hegel (in the "Vorrede" to the *Phänomenologie des Geistes*), point to the fatal defect in the conception of the absolute as mere featureless identity.

3. Along two distinct lines Schelling is to be found in all his later writings striving to amend the conception, to which he remained true, of absolute reason as the ultimate ground of reality. It was necessary, in the first place, to give to this absolute a *character*, to make of it something more than empty sameness; it was necessary, in the second place, to clear up in some way the relation in which the actuality or apparent actuality of nature and spirit

[1] The briefest and best account in Schelling himself of *Naturphilosophie* is that contained in the *Einleitung zu dem Erster Entwurf* (*S.W.* iii.). A full and lucid statement of *Naturphilosophie* is that given by K. Fischer in his *Gesch. d. n. Phil.*, vi. 433-692.

stood to the ultimate real. Schelling had already (in the *System der ges. Phil.*) begun to endeavour after an amalgamation of the Spinozistic conception of substance with the Platonic view of an ideal realm, and to find therein the means of enriching the bareness of absolute reason. In *Bruno*, and in *Philos. u. Religion*, the same thought finds expression. In the realm of ideas the absolute finds itself, has its own nature over against itself as objective over against subjective, and thus is in the way of overcoming its abstractness, of becoming concrete. This conception of a difference, of an internal structure in the absolute, finds other and not less obscure expressions in the mystical contributions of the *Menschliche Freiheit* and in the scholastic speculations of the Berlin lectures on mythology. At the same time it connects itself with the second problem, how to attain in conjunction with the abstractly rational character of the absolute an explanation of actuality. Things—nature and spirit—have an actual being. They exist not merely as logical consequence or development of the absolute, but have a stubbornness of being in them, an antagonistic feature which in all times philosophers have been driven to recognize, and which they have described in varied fashion. The actuality of things is a defection from the absolute, and their existence compels a reconsideration of our conception of God. There must be recognized in God as a completed actuality, a dim, obscure ground or basis, which can only be described as not yet being, but as containing in itself the impulse to externalization, to existence. It is through this ground of Being in God Himself that we must find explanation of that independence which things assert over against God. And it is easy to see how from this position Schelling was led on to the further statements that not in the rational conception of God is an explanation of existence to be found, nay, that all rational conception extends but to the form, and touches not the real—that God is to be conceived as act, as will, as something over and above the rational conception of the divine. Hence the stress laid on will as the realizing factor, in opposition to thought, a view through which Schelling connects himself with Schopenhauer and Von Hartmann, and on the ground of which he has been recognized by the latter as the reconciler of idealism and realism. Finally, then, there emerges the opposition of negative, *i.e.* merely rational philosophy, and positive, of which the content is the real evolution of the divine as it has taken place in fact and in history, and as it is recorded in the varied mythologies and religions of mankind. Not much satisfaction can be felt with the exposition of either as it appears in the volumes of Berlin lectures.

Schelling's works were collected and published by his sons, in 14 vols. (1856–1861). The individual works appeared as follows:—*Über die Möglichkeit einer Form der Philosophie überhaupt* (Tübingen, 1794); *Ideen zu einer Philosophie der Natur* (Leipzig, 1797, ed. 1803); *Von der Weltseele* (Hamburg, 1798, 3rd ed. 1809); *Erster Entwurf eines Systems der Naturphilosophie* (Jena, 1799); *Einleitung zu seinem Entwurf der Naturphilosophie* (ib., 1799); *System des transcendentalen Idealismus* (Tubingen, 1800); *Bruno, oder über das göttliche und natürliche Prinzip der Dinge* (Berlin, 1802, ed. 1843); *Vorlesungen über die Methode des akademischen Studiums* (Tübingen, 1803, ed. Braun, 1907); *Über das Verhältniss der bildenden Künste zu der Natur* (Munich, 1807); *Über die Gottheiten von Samothrake* (Stuttgart, 1815). His Munich lectures were published by A. Drews (Leipzig, 1902). For the life good materials are to be found in the 3 vols., *Aus Schelling's Leben in Briefen* (3 vols., 1869–1870), in which a biographic sketch of the philosopher's early life is given by his son, and in J. Waitz, *Karoline* (2 vols., 1871). An interesting little work is Klaiber, *Hölderlin, Hegel, u. Schelling in ihren schwäbischen Jugendjahren* (1877). The biography in Kuno Fischer's *Gesch. der neueren Philosophie*, vol. vii. (3rd ed., 1902) is complete and admirable. See further *Schelling als Persönlichkeit. Briefe, Reden, Aufsätze*, ed. Otto Braun (1908), who also wrote *Schellings geistige Wandlungen in den Jahren 1800–1810* (1906); Rosenkranz, *Schelling* (1843); L. Noack, *Schelling und die Philosophie der Romantik* (2 vols., 1859); G. A. C. Frantz, *Schelling's Positive Philosophie* (3 vols., 1879–1880); Watson, *Schelling's Transcendental Idealism* (1882); Groos, *Die reine Vernunftwissenschaft. Systematische Darstellung von Schellings . . . Philosophie* (1889); E. von Hartmann, *Schelling's philos. System* (1897); Delbos, *De posteriore Schellingii philosophia quatenus Hegelianae doctrinae adversatur* (1902); Koeber, *Die Grundprinzipien der Schellingschen Naturphilosophie* (1882); G. Mehlis, *Schellings Geschichtsphilosophie in den Jahren 1799–1804* (1907); H. Sueskind, *Der Einfluss Schellings auf die Entwicklung von Schleiermachers System* (1909). (R. AD.; J. M. M.)

SCHELLING, KAROLINE (1763–1809), one of the most intellectual German women of her age, was born at Göttingen on the 2nd of September 1763, the daughter of the orientalist Michaelis. She married, in 1784, a district medical officer, one Böhmer, in Clausthal in the Harz, and after his death, in 1788, returned to Göttingen. Here she entered into close relations to the poet Gottfried August Bürger and the critic of the Romantic school, August Wilhelm Schlegel. In 1791 she took up her residence in Mainz, joined the famous society of the Clubbists (*Klubbisten*), and suffered a short period of imprisonment on account of her political opinions. In 1796 she married Schlegel, was divorced in 1803, and then became the wife of the philosopher Friedrich Wilhelm Joseph von Schelling. She died at Maulbronn on the 7th of September 1809. Karoline Schelling played a considerable rôle in the intellectual movement of her time, and is especially remarkable for the assistance she afforded Schlegel in his translation of Shakespeare's works. She published nothing, however, in her own name.

See G. Waitz, *Caroline: Briefe an ihre Geschwister*, &c. (2 vols., 1871), and, by the same author, *Caroline und ihre Freunde* (1882); further, J. Janssen, *Eine Kulturdame und ihre Freunde, Zeit- und Lebensbilder* (1885), and Mrs. A. Sidgwick, *Caroline Schlegel and her Friends* (London, 1899).

SCHEME (Lat. *schema*, Gr. σχῆμα, figure, form, from the root σχ, seen in ἔχειν, to have, hold, to be of such shape, form, &c.), in the most general and common sense, a plan or design, especially of action with some definite purpose, often and more particularly in the derivatives "to scheme," "schemer," "scheming," with a hostile or unfavourable notion of a plot or surreptitious plan, or of a selfish project or enterprise. The original meaning, derived from the Med. Lat. translation *figura*, of σχῆμα, is that of a diagram or figure to illustrate a mathematical proposition and the like, a map or plan, &c., thus used of an analysis, a tabular statement; an epitome or synopsis, a table or system of classification. In Kantian philosophy, "Schema" is used of "the product of the exercise of the transcendental imagination in giving generality to sense and particularity to thought," and "schematism of the theory, in the Kantian analysis of knowledge, of the use of the transcendental imagination as mediating between sense and understanding" (Baldwin, *Dictionary of Philosophy and Psychology*, 1902, vol. ii.).

SCHENECTADY, a city and the county-seat of Schenectady county, New York, U.S.A., about 16 m. N.W. of Albany, on the Mohawk river and the Erie Canal. Pop. (1890) 19,902; (1900) 31,682, of whom 7169 were foreign-born; (1910, census) 72,826. Schenectady is served by the New York Central & Hudson river, and the Delaware & Hudson railways, and by interurban electric lines connecting with Albany, Troy, Saratoga, Amsterdam, Johnstown and Gloversville. The city has a fine situation about 230 ft. above the sea. It is a place of much historic interest, and has many examples of quaint Dutch colonial and early American architecture. There is an Indian monument on the site of the "old fort." Schenectady is the seat of Union College (undenominational), which grew out of the Schenectady Academy (1784), was chartered in 1795, and comprises the academic and engineering departments of Union University, the medical (1838), law (1851) and pharmacy (1881) departments of which are at Albany, where also is the Dudley Observatory (1852), which is under the control of the university. Schenectady is a manufacturing centre of growing importance; here are the main works of the General Electric Company, manufacturers of electrical implements, apparatus, motors and supplies, and of the American Locomotive Company. Together they give employment to about 80% of the wage-earners of the city. Among other manufactures are hosiery and knit goods, overalls and suspenders, hardware, lumber, oils and varnishes, gasoline fire engines, mica insulators, agricultural implements, and wagons and carriages. The capital invested in manufacturing industries in 1905 was $22,050,746, and the value of the factory product was $33,084,431, an increase of 87·9% since 1900.

According to tradition Schenectady stands on the site of the chief village of the Mohawk Indians, and its name, of which there are many different spellings in early records, is probably of Indian origin; on an early map (1665) it appears as Scanacthade. Arendt Van Corlaer, or Curler (d. 1667),[1] while manager of the estates of his cousin, the patroon, Killian Van Rensselaer, visited the site in 1642, and in 1662, being dissatisfied with conditions on the Manor, he led a band of settlers here. Their allegiance was directly to the Dutch West India Company, and they enjoyed

[1] Van Corlaer had emigrated to America about 1630; while manager of Rensselaerwyck he had earned the confidence of the Indians, among whom "Corlaer" became a generic term for the English governors, and especially the governors of New York.

a greater degree of freedom, especially commercial freedom, than had been possible on the Manor. The land was purchased from the Mohawks. To each of the fifteen original proprietors, except Van Corlaer, who received a double portion, was assigned a village lot 200 ft. sq., a tract of bottom-land for farming purposes, a strip of woodland, and common pasture rights. Many of the early settlers were well-to-do and brought their slaves with them, and for many years the settlement was reputed the richest in the colony. It received a serious set-back in 1690, when on the 9th of February a force of French and Indians surprised and burned the village, massacred sixty of the inhabitants and carried thirty into captivity. The village was rebuilt in the following year, and a military post was established. About 1700 there was a considerable influx of English settlers. In 1748 the French and Indians again descended on the region and killed many of the inhabitants of the outlying settlement at Beukendaal, 3 m. N.W. of Schenectady. Schenectady became a chartered borough in 1765 and a city in 1798. The first newspaper, the *Gazette*, was established in 1799. For some years after the completion of the Erie Canal, Schenectady, which had formerly been an important depot of the Mohawk river boat trade to the westward, suffered a decline. The first two railways in the state made Schenectady their terminus, the Mohawk & Hudson opening to Albany in September 1831 and the Saratoga & Schenectady in July 1832, the original station of the Mohawk & Hudson is still standing. It was not, however, until its new manufacturing era began, about 1880, that Schenectady's modern growth and prosperity began.

See Jonathan Pearson, *A History of Schenectady Patent in the Dutch and English Times* (Albany, 1883); G. S. Roberts, *Old Schenectady* (Schenectady, 1904); and G. R. Howell and J. H. Munsell, *History of the County of Schenectady* (Albany, 1887).

SCHENKEL, DANIEL (1813–1885), Swiss Protestant theologian, was born at Dägerlen in the canton of Zürich on the 21st of December 1813. After studying at Basel and Göttingen he was successively pastor at Schaffhausen (1841), professor of theology at Basel (1849); and at Heidelberg professor of theology (1851), director of the seminary and university preacher. At first inclined to conservatism, he afterwards became an exponent of the mediating theology (*Vermittelungs-theologie*), and ultimately a liberal theologian and advanced critic. Associating himself with the "German Protestant Union" (*Deutsche Protestanten-verein*), he defended the community's claim to autonomy, the cause of universal suffrage in the church and the rights of the laity. From 1852 to 1859 he edited the *Allgemeine Kirchenzeitung*, and from 1861 to 1872 the *Allgemeine Kirchliche Zeitschrift*, which he had founded in 1859. In 1867, with a view to popularizing the researches and results of the Liberal school, he undertook the editorship of a *Bibel-Lexicon* (5 vols., 1869–1875), a work which was so much in advance of its time that it is still useful. In his *Das Wesen des Protestantismus aus den Quellen des Reformationszeitalter beleuchtet* (3 vols. 1846–1851, 2nd ed. 1862), he declares that Protestantism is a principle which is always living and active, and not something which was realized once and for all in the past. He contends that the task of his age was to struggle against the Catholic principle which had infected Protestant theology and the church. In his *Christliche Dogmatik* (2 vols., 1858–1859) he argues that the record of revelation is human and was historically conditioned: it can never be absolutely perfect; and that inspiration, though originating directly with God, is continued through human instrumentality. His *Charakterbild Jesu* (1864, 4th ed. 1873; Engl. trans. from 3rd ed., 1869), which appeared almost simultaneously with D. Strauss's *Leben Jesu*, met with fierce opposition. The work is considered too subjective and fanciful, the great fault of the author being that he lacks the impartiality of objective historical insight. Yet, as Pfleiderer says, the work "is full of a passionate enthusiasm for the character of Jesus." The author rejects all the miracles except those of healing, and these he explains psychologically. His main purpose was to modernize and reinterpret Christianity; he says in the preface to the third edition of the book: "I have written it solely in the service of evangelical truth, to win to the truth those especially who have been most unhappily alienated from the church and its interests, in a great measure through the fault of a reactionary party, blinded by hierarchical aims." Schenkel died on the 18th of May 1885.

Other works:—*Friedrich Schleiermacher. Ein Lebens- und Charakterbild* (1868); *Christentum und Kirche* (2 vols., 1867–1872); *Die Grundlehren des Christentums aus dem Bewusstsein des Glaubens dargestellt* (1877); and *Das Christusbild der Apostel und der nachapostolischen Zeit* (1879). See Herzog-Hauck, *Realencyklopädie*, Otto Pfleiderer, *Development of Theology* (1890); and F. Lichtenbergor, *History of German Theology* (1889). (M. A. C.)

SCHERER, EDMOND HENRI ADOLPHE (1815–1889), French theologian, critic and politician, was born in Paris on the 8th of April 1815. After a course of legal studies he spent several years in theological study at Strassburg, where he graduated doctor in theology in 1843, and was ordained. In 1843 he was appointed to a professorship in the École Evangélique at Geneva, but the development of his opinions in favour of the Liberal movement in Protestant theology led to his resigning the post six years later. He founded the *Anti-Jésuite*, afterwards the *Réformation au XIXe siècle*, in which he advocated the separation of the Church from the State; but he gradually abandoned Protestant doctrine. In thought he became a pronounced Hegelian. Eventually he settled in Paris, where he at once attracted attention by brilliant literary criticisms, at first chiefly on great foreign writers, contributed to the *Revue des deux mondes*. He was elected municipal councillor at Versailles in 1870, deputy to the National Assembly for the department of Seine-et-Oise in 1871 and senator in 1875. He supported the Republican party. Towards the end of his life he devoted himself mainly to literary and general criticism, and was for many years one of the ablest contributors to *Le Temps*. He was a frequent visitor to England, and took a lively interest in English politics and literature. He died at Versailles on the 16th of March 1889.

His chief works are: *Dogmatique de l'Église réformée* (1843), *De l'état actuel de l'Église réformée en France* (1844), *Esquisse d'une théorie de l'Église chrétienne* (1845), *La Critique et la foi* (1850), *Alexandre Vinet* (1853), *Lettres à mon curé* (1853), *Études critiques sur la littérature contemporaine* (1863–1889), *Études critiques de littérature* (1870), *Diderot* (1880), *La Démocratie et la France* (1883), *Études sur la littérature au XVIIIe siècle* (1891).

A memoir of him, by V. C. O. Gréard, appeared in 1890. See also an article by Professor E. Dowden in the *Fortnightly Review* (April 1889).

SCHERER, WILHELM (1841–1886), German philologist and historian of literature, was born at Schönborn in Lower Austria on the 26th of April 1841. He was educated at the academic gymnasium at Vienna and afterwards at the university, where he was the favourite pupil of the distinguished Germanist, Karl Viktor Müllenhoff (1818–1884). Having taken the degree of *doctor philosophiae*, he became *Privatdozent* for German language and literature in 1864. In 1868 he was appointed ordinary professor, and in 1872 received a call in a like capacity to Strassburg, and in 1877 to Berlin, where in 1884 he was made member of the Academy of Sciences. He died at Berlin on the 6th of August 1886.

Scherer's literary activity falls into three categories: in Vienna he was the philologist, at Strassburg the professor of literature and in Berlin the author. His earliest work was a biography of the great philologist Jakob Grimm (1865, 2nd ed. 1885); he next, in conjunction with his former teacher Müllenhoff, published *Denkmaler deutscher Poesie und Prosa aus dem 8. bis 12. Jahrhundert* (1864, 3rd ed. 1892). His first great work was, however, *Zur Geschichte der deutschen Sprache* (Berlin, 1868; 3rd ed., 1890), being a history of the German language with especial reference to phonetic laws. He contributed the section on Alsatian literature to O. Lorenz's *Geschichte des Elsasses* (1871, 3rd ed. 1886). Other important works are *Geistliche Poeten der deutschen Kaiserzeit* (Strassburg, 1874–1875); *Geschichte der deutschen Dichtung im 11. und 12. Jahrhundert* (1875); and *Vorträge und Aufsätze zur Geschichte des geistigen Lebens in Deutschland und Österreich* (1874). Scherer's best-known work is his history of German literature, *Geschichte der deutschen Literatur* (Berlin, 1883; 10th ed., 1905; English translation by Mrs F. C. Conybeare, 1883; new ed., 1906). This work is distinguished by the clearness with which details are co-ordinated with a general and comprehensive survey of German literature from the beginning to the death of Goethe. Besides many other philological treatises, Scherer wrote largely on Goethe (*Aus Goethes Frühzeit*,

1879; *Aufsätze über Goethe*, 1886), and took an active part in the foundation of the Goethe archives at Weimar. A small treatise on *Poetik*, a biography of Karl Müllenhoff, and two volumes of *Kleine Schriften* were published after his death.

See V. Basch, *Wilhelm Scherer et la philologie allemande* (Paris, 1889), and the article by Eduard Schröder in *Allgemeine deutsche Biographie*.

SCHERR, JOHANNES (1817–1886), German man of letters and novelist, was born at Hohenrechberg in the kingdom of Württemberg on the 3rd of October 1817. After studying philosophy and history at the university of Tübingen (1837–1840), he became master in a school conducted by his brother Thomas in Winterthur. In 1843 he removed to Stuttgart, and, entering the political arena with a pamphlet *Württemberg im Jahr 1843*, was elected in 1848 a member of the Württemberg House of Deputies; became leader of the democratic party in south Germany and, in consequence of his agitation for parliamentary reform in 1849, was obliged to take refuge in Switzerland to avoid arrest. Condemned *in contumaciam* to fifteen years' hard labour, he established himself in Zurich as *Privatdozent* in 1850, but removed in 1852 to Winterthur. In 1860 he was appointed professor of history and Helvetian literature at the Polytechnicum in Zurich, in which city he died on the 21st of November 1886.

Scherr was a voluminous writer in the field of historical investigation into the civilization, literature, and manners and customs of his country. His works have largely a political bias, but are characterized by clearness of exposition and careful research. Noteworthy among his books are the following: *Geschichte der deutschen Kultur und Sitte* (1852–1853, new ed. 1897); *Schiller und seine Zeit* (1859, new ed. 1876); *Geschichte der deutschen Frauenwelt* (1860, 4th ed. 1879); *Allgemeine Geschichte der Literatur* (1851, 9th ed. 1895–1896); *Geschichte der englischen Literatur* (1854, 2nd ed. 1883); *Blücher, seine Zeit und sein Leben* (1862, 4th ed. 1887). Scherr also wrote the humorous *Sommertagebuch des weiland Dr Gastrosophiae, Jeremia Sauerampfer* (1873); as a novelist he published the historical novels, *Schiller* (1856), and *Michel, Geschichte eines Deutschen unserer Zeit* (1858) which have passed through several editions.

With the exception of some of his stories (*Novellenbuch*, 10 vols. 1873–1877) Scherr's works have not appeared in a collected edition.

SCHERZO (Italian for "a joke"), in music, the name given to a quick movement evolved from the minuet and used in the position thereof in the sonata forms. The term is occasionally applied otherwise, as a mere character name. Haydn first used it for a middle movement quicker than a minuet, in the comparatively early set of six quartets known sometimes (for that reason) as *Gli Scherzi*, and sometimes as the *Russian quartets* (Op. 33). He never used the term again, though his later minuets, especially those in the Salomon symphonies, and the last completed quartets (Op. 77), are in a very rapid *tempo* and on a larger scale than any of the earlier scherzos of Beethoven. Haydn wished to see the minuet made more worthy of its position in large sonata works; but he did not live to appreciate (though he might possibly have heard) the great scherzos of his pupil Beethoven, which brought the element of the sublime into what may be generically termed the dance movement of the sonata style.

With rare exceptions Beethoven not only retained the dance character in lively middle movements, but accentuated it to the utmost in terms of what we have elsewhere called "dramatic" as distinguished from "decorative" music. He took those features of minuet form and style which most contrast the minuet with the larger and more highly organized movements, and he devised a form that emphasized them as they have never been emphasized before or since. The distinctive external feature in the minuet and trio is the combination of melodic binary forms with an exact *da capo* of the minuet after the trio; no other movement in the sonata admitting of so purely decorative a symmetry. The form of Beethoven's typical scherzo purposely exaggerates this feature. Mozart had frequently enriched minuets by giving them two or even three trios, with the minuet *da capo* after each. Beethoven does not do this; for, the general structure and texture of his scherzos being more continuous and highly organized, the variety of themes thereby produced would tend to give the form an elaborate *rondo* character which would not have differentiated it sufficiently from finales. But after Beethoven's mature scherzo has run through the stages of scherzo, trio and scherzo *da capo*, it goes through the same trio and *da capo* again; and perhaps even tries to do so a third time, as if it could not find a way out, and is then playfully and abruptly stopped.

This form lends itself to high-spirited humour, and differentiates the scherzo from the more highly organized movements by dramatically emphasizing its formal and dancelike character. The earliest example is the seventh of the pianoforte *Bagatelles* (Op. 33) where its "round-and-round" effect is realized with a mastery which alone suffices to dispose of Thayer's belief that these bagatelles belong, in their finished form, to Beethoven's boyhood.[1] As a rule Beethoven did not find the pianoforte a favourable instrument for his characteristic scherzo style; and his only other typical examples for pianoforte are the second movements of the sonatas Op. 27, No. 1, and Op. 106 (in neither of which is the trio repeated) and the fifth of the Six Bagatelles Op. 126.

The scherzo of the Eroica symphony is too long for Beethoven to allow it to go twice round; and that of the 9th symphony is so enormous that the main body of the scherzo is like a complete first movement of a sonata, from which it differs only in its comparative uniformity of texture and its incessant onrush, which not even the startling measured pauses and the changes from 4-bar to 3-bar rhythm can really interrupt. Beethoven directs as many repetitions of its sub-sections as possible, and his coda consists of a most impressive attempt to begin the trio again, dramatically cut short. In the 4th, 6th and 7th symphonies, the great pianoforte trio in B flat (Op. 97) and the string quartets in E flat (Op. 74), F minor (Op. 95) and C sharp minor (Op. 131), the round-and-round form is developed to the utmost, though in performance the necessary repetitions are too often omitted where Beethoven has only indicated them by a direction instead of writing them in full. The scherzo of the C minor symphony was originally meant to go twice round; and a certain pair of superfluous bars, which caused controversy for thirty years after Beethoven's death, were due simply to traces of the difference between the *prima volta* and *seconda volta* being left in the score.

Beethoven also used other types of quick middle movement in the place of the scherzo. In one case, that of the second allegretto of the E flat trio (Op 70, No. 2), the round-and-round form is developed to the utmost in an exceedingly luscious and placid movement, very remote from the fiery humours of his typical scherzo style.

Modern custom uses the name of scherzo as a mere technical term for quick middle movements, and in this sense we may speak of the second movement of Beethoven's F major string quartet (Op. 59, No. 1) as a unique example; it being a very highly developed application of binary form with the utmost humour and unexpectedness of detail and style. It is possible that this gigantic movement, occurring in a work which was an especial favourite of Mendelssohn's, may have been the inspiring source of the Mendelssohnian scherzo which is one of the most distinctive new types of sonata movement since Beethoven, and is independent of the notion of an alternating trio, whether in the single or the round-and-round form. The scherzos in Mendelssohn's *Midsummer Night's Dream* music, in the *Scotch Symphony* and in the string quartets in E minor and E flat major (Op. 44, Nos. 2 and 3) are splendid examples. Even Berlioz shows their influence at the height of his power, in the "Queen Mab" scherzo of his *Roméo et Juliette*. The round-and-round form has remained peculiar to Beethoven; perhaps because with the modern scherzo it would be too long, and because it is easier nowadays to manage a scherzo with two trios.

Of Brahms's scherzos there are many distinct types. His largest, such as that of the trio Op. 8, are greatly influenced by Beethoven; but there are several great quick movements in the usual form which are not called scherzos, and are as far from being jokes as is the third movement of Beethoven's F minor quartet. The third movement of Brahms's fourth symphony is perhaps the most gigantic scherzo since Beethoven's time. It lasts hardly seven minutes, but is a fully developed blend of rondo and first-movement forms, with a coda containing one of the greatest climaxes in symphonic art.

Chopin produced a new type of scherzo; independent of the sonata, but still in the quick triple time (one beat in a bar) which is Beethoven's typical scherzo rhythm. Chopin's form is traceable

[1] The autograph date, 1783, tallies neither with the handwriting nor with the style, but it may well refer to the raw material. Beethoven sometimes kept back his ideas for thirty years before executing them.

to the classical of scherzo and trio, and the style is dramatically capricious and romantic, but far too impressive to suggest humour. The same may be said of many classical scherzos, though Beethoven uses the title only where the humorous character of the movement lies on the surface. Even then Beethoven's only mature instances of the title (except in the form of *scherzando* as a mark of expression) are those of the Eroica symphony, the B flat trio Op. 97 and the B flat sonata Op. 106. It is, however, correct to call any energetic movement a scherzo when it occupies the position thereof in a sonata scheme. (D. F. T.)

SCHETKY, JOHN CHRISTIAN (1778–1874), Scottish marine painter, descended from an old Transylvanian family, was born in Edinburgh on the 11th of August 1778. He studied art under Alexander Nasmyth, and after having travelled on the continent he settled in Oxford, and taught for six years as a drawing-master. In 1808 he obtained a post in the military college, Great Marlow, and three years later he was appointed professor of drawing in the naval college, Portsmouth, where he had ample opportunities for the study of his favourite marine subjects. From 1836 to 1855 he held a similar professorship in the military college, Addiscombe. To the Royal Academy exhibitions he contributed at intervals from 1805 to 1872, and he was represented at the Westminster Hall competition of 1847 by a large oil-painting of the Battle of La Hogue. He was marine painter to George IV., William IV. and Queen Victoria. Among his published works are the illustrations to Lord John Manners's *Cruise in Scotch Waters*, and a volume of photographs from his pictures and drawings issued in 1867 under the title of *Veterans of the Sea*. One of his best works, the "Loss of the Royal George," painted in 1840, is in the National Gallery, London, and the United Service Club possesses another important marine subject from his brush. He died in London on the 28th of January 1874. A memoir by his daughter was published in 1877.

His younger brother, JOHN ALEXANDER SCHETKY (1785–1824), studied medicine in Edinburgh university and drawing in the Trustees' Academy. As a military surgeon he served with distinction under Lord Beresford in Portugal. He contributed excellent works to the exhibitions of the Royal Academy and of the Water-Colour Society, and executed some of the illustrations in Sir W. Scott's *Provincial Antiquities*. He died at Cape Coast Castle on the 5th of September 1824, when preparing to follow Mungo Park's route of exploration.

SCHEUCHZER, JOHANN JAKOB (1672–1733), Swiss *savant*, was born at Zürich on the 2nd of August 1672. The son of the senior town physician (or *Archiater*) of Zürich, he received his education in that place, and in 1692 went to the university of Altdorf near Nuremberg, being intended for the medical profession. Early in 1694 he took his degree of doctor in medicine at the university of Utrecht, and then returned to Altdorf to complete his mathematical studies. He went back to Zürich in 1696, and was made junior town physician (or *Poliater*), with the promise of the professorship of mathematics; this he obtained in 1710, being promoted to the chair of physics, with the office of senior town physician, in January 1733, a few months before his death on the 23rd of June.

His published works (apart from numerous articles) were estimated at thirty-four in number. His historical writings are mostly still in MS. The more important of his published writings relate either to his scientific observations (all branches) or to his journeys, in the course of which he collected materials for these scientific works. In the former category are his *Beschreibung der Naturgeschichte des Schweitzerlandes* (3 vols., Zürich, 1706–1708, the 3rd volume containing an account in German of his journey of 1705; a new edition of this book and, with important omissions, of his 1723 work, was issued, in 2 vols., in 1746, by J. G. Sulzer, under the title of *Naturgeschichte des Schweitzerlandes sammt seinen Reisen über die schweitzerischen Gebürge*), and his *Helvetiae historia naturalis oder Naturhistorie des Schweitzerlandes* (published in 3 vols., at Zürich, 1716–1718, and reissued in the same form in 1752, under the German title just given). The first of the three parts of the last-named work deals with the Swiss mountains (summing up all that was then known about them, and serving as a link between Simler's work of 1574 and Gruner's of 1760), the second with the Swiss rivers, lakes and mineral baths, and the third with Swiss meteorology and geology. Scheuchzer's works, as issued in 1746 and in 1752, formed (with Tschudi's *Chronicum Helveticum*) one of the chief sources for Schiller's play of *Wilhelm Tell* (1804). In 1704 Scheuchzer was elected a F.R.S.; he published many scientific notes and papers in the *Philosophical Transactions* for 1706–1707, 1709 and 1727–1728. In the second category are his *Itinera alpina tria* (made in 1702–1704), which was published in London in 1708, and dedicated to the Royal Society, while the plates illustrating it were executed at the expense of various fellows of the society, including the president, Sir Isaac Newton (whose *imprimatur* appears on the title-page), Hans Sloane, Dean Aldrich, Humfrey Wanley, &c. The text is written in Latin, as is that of the definitive work describing his travels (with which is incorporated the 1708 volume) that appeared in 1723 at Leiden, in four quarto volumes, under the title of *Itinera per Helvetiae alpinas regiones facta annis 1702–1711*. These journeys led Scheuchzer to almost every part of Switzerland, particularly its central and eastern districts. A propos of his visit (1705) to the Rhone glacier, he inserts a full account of the other Swiss glaciers, as far as they were then known, while in 1706, after mentioning certain wonders to be seen in the museum at Lucerne, he adds reports by men of good faith who had seen dragons in Switzerland. He doubts their existence, but illustrates the reports by fanciful representations of dragons, which have led some modern writers to depreciate his merits as a traveller and naturalist, for the belief in dragons was then widely spread. In 1712 he published a map of Switzerland in four sheets (scale 1/290,000), of which the east portion (based on his personal observations) is far the most accurate, though the map as a whole was the best map of Switzerland till the end of the 18th century. At the end of his 1723 book he gives a full list (covering 27 4to pages) of his writings from 1694 to 1721.

See F. X. Hoeherl, *J. J. Scheuchzer, der Begründer d. phys. Geographie d. Hochgebirges* (Munich, 1901), a useful little pamphlet, conveniently summarizing Scheuchzer's scientific views.

(W. A. B. C.)

SCHEVENINGEN, a fishing port and watering-place of Holland, on the North Sea, in the province of South Holland, about 2 m. N. of the Hague, with which it is connected by tramways. It is situated in the dunes at the extremity of the woods which separate it from the Hague. The development of Scheveningen as a fashionable seaside resort dates from modern times, but the fishing village is of ancient origin and once stood farther seaward. To prevent coast erosion a stone wall was built along the sea front in 1896–1900, and below this lies the fine sandy beach stretching for miles on either side. The first bathing establishment here dates from 1818, and was also the first in Holland. Overlooking the sea from the top of the dunes on either side are villas, hotels and the pavilion (1826) belonging to the family of Prince von Wied. The costumes of the fishing community are picturesque, the men having silver buttons and wide trousers, the women wide skirts and brass helmets. There is a large harbour for the fishing fleet at the mouth of the Hague-Scheveningen canal. Among the historical memories associated with Scheveningen are the defeat of the combined French and English fleets by Admiral de Ruyter in 1673, and the flight and subsequent return of William I., king of the Netherlands, in 1813, at the beginning and end of the French occupation. This is commemorated by an obelisk (1865). The town has a rapidly growing population of about 23,000.

SCHIAPARELLI, GIOVANNI VIRGINIO (1835–1910), Italian astronomer and senator of the kingdom of Italy, was born on the 14th of March 1835 at Savigliano in Piedmont. He entered Turin university in 1850, and graduated in 1854. Two years later he went to Berlin to study astronomy under Encke, and in 1859 was appointed assistant observer at Pulkova, a post which he resigned in 1860 for a similar one at Brera, Milan. On the death of Francesco Carlini (b. 1783) in 1862, Schiaparelli succeeded to the directorship, a position which he held until 1900. He died at Milan on the 4th of July 1910.

Schiaparelli was primarily an observer—his first discovery was of the asteroid Hesperia in 1861—but he had also considerable mathematical gifts, as is shown in his treatment of orbital motions, published in 1864, and in other papers. His great contribution to astronomy dates from 1866, when he showed that meteors or shooting stars traverse space in cometary orbits, and, in particular, that the orbits of the Perseids and Comet III., 1862, and of the Leonids and Comet I., 1866, were practically the same. These discoveries, subsequently amplified in his *Le Stelle cadenti* (1873) and in his *Norme per le osservazioni delle stelle cadenti dei bolidi* (1896) gained for him the Lalande prize of the Academy of Sciences, Paris, in 1868, and the gold medal and foreign associateship of the Royal Astronomical Society in 1872. He next worked on the double stars, but his results have only been partially published. This labour was followed in

1877 by observations of the surface of Mars, whereon he detected, among other peculiar characters, certain streaky markings or *canali*, the nature and origin of which is still controversial (see MARS). Mercury and Venus were also studied, and he concluded that these planets rotated on their axes in the same time as they revolved about the sun; but these views are questioned. He also discussed many other problems, such as stellar distribution, the extent of the universe, &c., whilst at Brera. On his retirement he turned to the astronomy of the Hebrews and Babylonians; his earlier results are given in his *L' Astronomia nell' antico Testamento* (1903), a work which has been translated into English and German, whilst later ones are to be found in various journals, the last being in *Scientia* (1908).

SCHIAVONE, the Italian name of the basket-hilted sword of the 17th century, resembling what is erroneously called the "claymore" of modern Highland regiments. The "schiavone" was the sword of the Slavonic guards (*Schiavoni*) of the doges of Venice, whence the name (see SWORD).

SCHIAVONETTI, LUIGI (1765–1810), Italian engraver, was born at Bassano in Venetia on the 1st of April 1765. After having studied art for several years he was employed by Testolini, an engraver of very indifferent abilities, to execute imitations of Bartolozzi's works, which he passed off as his own. In 1790 Testolini was invited by Bartolozzi to join him in England, and, it having been discovered that Schiavonetti, who accompanied him, had executed the plates in question, he was employed by Bartolozzi and became an eminent engraver in both the line and the dot manner. Among his early works are four plates of subjects from the French Revolution, after Benazech. He also produced a "Mater Dolorosa" after Vandyck, and Michelangelo's cartoon of the "Surprise of the Soldiers on the Banks of the Arno." From 1805 to 1808 he was engaged in etching Blake's designs to Blair's *Grave*, which, with a portrait of the artist engraved by Schiavonetti after T. Phillips, R.A., were published in 1808. The etching of Stothard's "Canterbury Pilgrims" was one of his latest works, and on his death on the 7th of June 1810 the plate was taken up by his brother Niccolo, and finally completed by James Heath.

SCHICHAU, FERDINAND (1814–1896), German engineer and shipbuilder, was born at Elbing, where his father was a smith and ironworker, on the 30th of January 1814. He studied engineering at Berlin and then in England, and returning to Elbing in 1837 started works of his own, which from small beginnings eventually developed into an establishment employing some 8000 men. He began by making steam engines, hydraulic presses and industrial machinery, and, by concerning himself with canal work and river or coast improvement, came to the designing and construction of dredgers, in which he was the pioneer (1841), and finally to the building of ships.

His "Borussia," in 1855, was the first screw-vessel constructed in Germany. Schichau began to specialize in building torpedo-boats and destroyers (at first for the Russian government) at an early date. From 1873 he had the co-operation of Carl H. Ziese, who married his daughter. Ziese introduced compound engines into the first vessels built by Schichau for the German navy, the gun-boats "Habicht" and "Möwe," launched in 1879, and also designed in 1881 the first triple-expansion machinery constructed on the continent, supplying these engines to the torpedo-boats built by Schichau for the German navy in 1884, the first of some 160 that by the year 1909 were provided for Germany out of the Elbing yards. Torpedo-boats were also built for China, Austria and Italy. Meanwhile Elbing had become insufficient for the increased output demanded. In 1889 Schichau established a floating dock and repairing shops at Pillau, and soon afterwards, by arrangement with the government, started a large shipbuilding yard at Danzig, for the purpose of constructing the largest ships of war and for the mercantile marine. He died on the 23rd of January 1896; but Ziese carried on the work, and not only made the Danzig yard the chief cradle of the new German fleet, rivalling the finest English establishments, but also largely developed the equipment at Elbing. The Schichau works have made the name of their originator to rank with that of Krupp.

SCHIEDAM, a town and river port of Holland, in the province of South Holland, on the Schie, near its confluence with the Maas, and a junction station 3 m. by rail and steam tramway W. of Rotterdam. Pop. (1905) 29,227. The public buildings of interest are the Groote or Janskerk, the old Roman Catholic church, the synagogue, the town-hall, the exchange, the concert-hall and a ruined castle. Schiedam is famous as the seat of a great gin manufacture, which, carried on in more than three hundred distilleries, gives employment besides to malt-factories, cooperages and cork-cutting establishments, and supplies grain refuse enough to feed about 30,000 pigs, as well as sufficient yeast to form an important article of export. Other industries include shipbuilding, glass-blowing and the manufacture of stearine candles.

SCHIEFNER, FRANZ ANTON (1817–1879), Russian linguist, was born at Reval, in Russia, on the 18th of July 1817. His father was a merchant who had emigrated from Bohemia. He was educated first at the Reval grammar school, matriculated at St Petersburg as a law student in 1836, and subsequently devoted himself at Berlin, from 1840 to 1842, exclusively to Eastern languages. On his return to St Petersburg in 1843 he was employed in teaching the classics in the First Grammar School, and soon afterwards received a post in the Imperial Academy, where in 1852 the cultivation of the Tibetan language and literature was assigned to him as his special function. Simultaneously he held from 1860 to 1873 the professorship of classical languages in the Roman Catholic theological seminary. From 1854 till his death he was an extraordinary member of the Imperial Academy. He visited England three times for purposes of research—in 1863, 1867 and 1878. He died on the 16th of November 1879.

Schiefner made his mark in literary research in three directions. First, he contributed to the *Memoirs* and *Bulletin* of the St Petersburg Academy, and brought out independently a number of valuable articles and larger publications on the language and literature of Tibet. He possessed also a remarkable acquaintance with Mongolian, and when death overtook him had just finished a revision of the New Testament in that language with which the British and Foreign Bible Society had entrusted him. Further, he was one of the greatest authorities on the philology and ethnology of the Finnic tribes. He edited and translated the great Finnic epic *Kalevala*; he arranged, completed and brought out in twelve volumes the literary remains of Alexander Castrén, bearing on the languages of the Samoyedic tribes, the Koibal, Karagass, Tungusian, Buryat, Ostiak and Kottic tongues, and prepared several valuable papers on Finnic mythology for the Imperial Academy. In the third place, he made himself the exponent of investigations into the languages of the Caucasus, which his lucid analyses placed within reach of European philologists. Thus he gave a full analysis of the Tush language, and in quick succession, from Baron P. Uslar's investigations, comprehensive papers on the Awar, Ude, Abkhasian, Tchetchenz, Kasi-Kumük, Hürkanian and Kürinian languages. He had also mastered Ossetic, and brought out a number of translations from that language, several of them accompanied by the original text.

SCHILL, FERDINAND BAPTISTA VON (1776–1809), Prussian soldier, was born in Saxony. Entering the Prussian cavalry at the age of twelve, he was still a subaltern of dragoons when he was wounded at the battle of Auerstädt. From that field he escaped to Kolberg, where he played a very prominent part in the celebrated siege of 1807, as the commander of a volunteer force of all arms. After the peace of Tilsit he was promoted major and given the command of a hussar regiment formed from his Kolberg men. In 1809 the political situation in Europe appeared to Schill to favour an attempt to liberate his country from the French domination. Leading out his regiment from Berlin under pretext of manœuvres, he raised the standard of revolt, and, joined by many officers and a company of light infantry, marched for the Elbe. At the village of Dodendorf (5th of May 1809) he had a brush with the Magdeburg garrison, but was soon driven northwards, where he hoped to find British support. The king of Prussia's proclamations prevented the patriots from receiving any appreciable assistance, and with little more than his original force Schill was surrounded by 5000 Danish and Dutch troops in the neighbourhood of Wismar. He escaped by hard fighting (action of Damgarten, 24th of May) to Stralsund, and attempted to put the crumbling fortifications in order. The Danes and Dutch soon hemmed him in, and by sheer numbers overwhelmed the defenders (May 31). Schill himself was killed. Some parties escaped to Prussia, where the officers were tried by court-martial, cashiered and imprisoned. A few escaped to Swinemünde, but the rest were either killed or taken. Handed over to the French, the soldiers were sent to the galleys, and the eleven officers shot at Wesel on the 16th

of September. The body of Schill was buried at Stralsund, his head sent to Leiden, where it remained until 1837. Monuments were erected at Brunswick, Stralsund and Wesel, and the 1st Silesian *Leib*-Hussars have borne Schill's name since 1889.

See Haken, *Ferdinand von Schill* (Leipzig, 1824); Bärsch, *Ferdinand von Schill's Zug und Tod* (Leipzig, 1860), and *F. von Schill, ein Charakterbild* (Potsdam, 1860); Petrich, *Pommer'sche Lebensbilder*, vol. ii. (Stettin, 1884); Francke, *Aus Stralsunds Franzosenszeit* (1890).

SCHILLER, JOHANN CHRISTOPH FRIEDRICH VON (1759–1805), German poet, dramatist and philosopher, was born at Marbach on the Neckar, on the 10th of November 1759. His grandfather had been a baker in the village of Bittenfeld, near Waiblingen; his father, Johann Kaspar (1723–1796), was an army-surgeon, who had settled in Marbach and married the daughter of an innkeeper, Elisabeth Dorothea Kodweis (1732–1802). In 1757 Schiller's father again took service in the army and ultimately rose to the rank of captain. The vicissitudes of his profession entailed a constant change of residence; but at Lorch and at Ludwigsburg, where the family was settled for longer periods, the child was able to receive a regular education. In 1773 the duke Karl Eugen of Württemberg claimed young Schiller as a pupil of his military school at the "Solitude" near Ludwigsburg, where, instead of his chosen subject of study, theology, he was obliged to devote himself to law. On the removal of the school in 1775 to Stuttgart, he was, however, allowed to exchange this subject for the more congenial study of medicine. The strict military discipline of the school lay heavily on Schiller, and intensified the spirit of rebellion, which, nurtured on Rousseau and the writers of the *Sturm und Drang*, burst out in the young poet's first tragedy; but such a school-life had for a poet of Schiller's temperament advantages which he might not have known had he followed his own inclinations; and it afforded him glimpses of court life invaluable for his later work as a dramatist. In 1776 some specimens of Schiller's lyric poetry had appeared in a magazine, and in 1777–1778 he completed his drama, *Die Räuber*, which was read surreptitiously to an admiring circle of schoolmates. In 1780 he left the academy qualified to practise as a surgeon, and was at once appointed by the duke to an ill-paid post as doctor to a regiment garrisoned in Stuttgart. His discontent found vent in the passionate, unbalanced lyrics of this period. Meanwhile *Die Räuber*, which Schiller had been obliged to publish at his own expense, appeared in 1781 and made an impression on his contemporaries hardly less deep than Goethe's *Götz von Berlichingen*, eight years before. The strength of this remarkable tragedy lay, not in its inflated tone or exaggerated characterization—the restricted horizon of Schiller's school-life had given him little opportunity of knowing men and women—but in the sure dramatic instinct with which it is constructed and the directness with which it gives voice to the most pregnant ideas of the time. In this respect, Schiller's *Räuber* is one of the most vital German dramas of the 18th century. In January 1782 it was performed in the Court and National Theatre of Mannheim, Schiller himself having stolen secretly away from Stuttgart in order to be present. The success encouraged him to begin a new tragedy, *Die Verschwörung des Fiesco zu Genua*, and he edited a lyric *Anthologie auf das Jahr 1782*, to which he was himself the chief contributor. A second surreptitious visit to Mannheim came, however, to the ears of the duke, who was also irritated by a complaint from Switzerland about an uncomplimentary reference to Graubünden in *Die Räuber*. He had Schiller put under a fortnight's arrest, and forbade him to write any more "comedies" or to hold intercourse with any one outside of Württemberg. Schiller, embittered enough by the uncongenial conditions of his Stuttgart life, resolved on flight, and took advantage of some court festivities in September 1782 to put his plan into execution. He hoped in the first instance for material support from the theatre in Mannheim, and its intendant, W. H. von Dalberg; but nothing but rebuffs and disappointments were in store for him. He did not even feel secure against extradition in Mannheim, and after several weeks spent mainly in the village of Oggersheim, where his third drama, *Luise Millerin*, or, as it was subsequently renamed, *Kabale und Liebe*, was in great part written, he found a refuge at Bauerbach in Thuringia, in the house of Frau von Wolzogen, the mother of one of his former schoolmates. Here *Luise Millerin* was finished and *Don Carlos* begun. In July 1783 Schiller received a definite appointment for a year as "theatre poet" in Mannheim, and here both *Fiesco* and *Kabale und Liebe* were performed in 1784. Neither play is as spontaneous or inspired as *Die Räuber* had been; but both mark a steady advance in characterization and in the technical art of the playwright. *Kabale und Liebe*, especially, is an admirable example of that "tragedy of common life" which Lessing had introduced into Germany from England and which bulked so largely in the German literature of the later 18th century. In this drama Schiller's powers as a realistic portrayer of people and conditions familiar to him are seen to best advantage. Although Schiller failed to win an established position in Mannheim, he added to his literary reputation by his address on *Die Schaubühne als eine moralische Anstalt betrachtet* (1784), and by the publication of the beginning of *Don Carlos* (in blank verse) in his journal, *Die rheinische Thalia* (1785). He had also the opportunity of reading the first act of the new tragedy before the duke of Weimar at Darmstadt in December 1784, and, as a sign of favour, the duke conferred upon him the title of "Rat."

In April 1785 Schiller, whose position in Mannheim had, long before this, become hopeless, accepted the invitation of four unknown friends—C. G. Körner, L. F. Huber, and their *fiancées* Minna and Dora Stock—with whom he had corresponded, to pay a visit to Leipzig. He spent a happy summer mainly at Gohlis, near Leipzig, his jubilant mood being reflected in the *Ode an die Freude*; and in September of the same year he followed his new friend Körner to Dresden. As Körner's guest in Dresden and at Loschwitz on the Elbe, Schiller completed *Don Carlos*, wrote the dramatic tale, *Der Verbrecher aus Infamie* (later entitled *Der Verbrecher aus verlorener Ehre*, 1786) and the unfinished novel, *Der Geisterseher* (1789). The *Rheinische Thalia* was continued as the *Thalia* (1786–1791; in 1792, again renamed *Die neue Thalia*), and in this journal he published most of his writings at this time. Körner's interest in philosophy also induced Schiller to turn his attention to such studies, the first results of which he published in the *Philosophische Briefe* (1786). *Don Carlos*, meanwhile, appeared in book form in 1787, and added to Schiller's reputation as a poet. In adopting verse instead of prose as a medium of expression, Schiller showed that he was prepared to challenge comparison with the great dramatic poets of other times and other lands; but in seeking a model for this higher type of tragedy he unfortunately turned rather to the classic theatre of France than to the English drama which Lessing, a little earlier, had pronounced more congenial to the German temperament. The unwieldiness of the plot and its inconsistencies show, too, that Schiller had not yet mastered the new form of drama; but *Don Carlos* at least provided him with an opportunity of expressing ideas of political and intellectual freedom with which, as the disciple of Rousseau, he was in warm sympathy.

A new chapter in Schiller's life opened with his visit to Weimar in July 1787. Goethe was then in Italy, and the duke of Weimar was absent from Weimar; but the poet was kindly received by Herder and Wieland, by the duchess Amalie and other court notabilities. The chief attraction for Schiller was, however, Frau von Kalb with whom he had been passionately in love in Mannheim; but not very long afterwards he made the acquaintance at Rudolstadt of the family von Lengefeld, the younger daughter of which subsequently became his wife. Meanwhile the preparation for *Don Carlos* had interested Schiller in history, and in 1788 he published the first volume of his chief historical work, *Geschichte des Abfalls der vereinigten Niederlande von der spanischen Regierung*, a book which at once gave him a respected position among the historians of the 18th century. It obtained for him, on the recommendation of Goethe, a professorship in the university of Jena, and in November 1789 he delivered his inaugural lecture, *Was heisst und zu welchem Ende studiert man Universalgeschichte?* In February of the following year he married Charlotte von Lengefeld. Schiller's other historical writings comprise a *Sammlung historischer Memoires*, which he began to publish in 1790, and the *Geschichte des dreissigjährigen Krieges* (1791–1793). The latter work is more perfunctory in execution and written for a wider public than his first history, but the narrative is dramatic and vivid, the portraiture is sympathetic, and the historical events are interpreted by the light of the rationalistic optimism of the later 18th century.

Before, however, the *History of the Thirty Years' War* was finished, Schiller had turned from history to philosophy. A year after his marriage he had been stricken down by severe illness, from the effects of which he was never completely to recover; financial cares followed, which were relieved unexpectedly by the generosity of the

hereditary prince of Holstein-Augustenburg and his minister, Graf Schimmelmann, who conferred upon him a pension of 1000 talers a year for three years. Schiller resolved to devote the leisure of these years to the study of philosophy. In the summer of 1790 he had lectured in Jena on the aesthetics of tragedy, and in the following year he studied carefully Kant's treatise on aesthetics, *Kritik der Urteilskraft*, which had just appeared and appealed powerfully to Schiller's mind. The influence of these studies is to be seen in the essays *Über den Grund unseres Vergnügens an tragischen Gegenständen* and *Über tragische Kunst* (1792), as well as in his correspondence with his friend Körner. Here Schiller arrives at his definition of beauty, as *Freiheit in der Erscheinung*, which, although it failed to remove Kant's difficulty that beauty was essentially a subjective conception, marked the beginning of a new stage in the history of German aesthetic theory. *Über Anmut und Würde*, published in 1793, was a further contribution to the elucidation and widening of Kant's theories; and in the eloquent *Briefe über die ästhetische Erziehung des Menschen* (1795), Schiller proceeded to apply his new standpoint to the problems of social and individual life. These remarkable letters were published in *Die Horen*, a new journal, founded in 1794, which was the immediate occasion for that intimate friendship with Goethe which dominated the remainder of Schiller's life. The two poets had first met in 1788, but at that time Goethe, fresh from Italy, felt little inclination towards the author of the turbulent dramas *Die Räuber*, *Kabale und Liebe* and *Don Carlos*. By degrees, however, Schiller's historical publications, and, in a higher degree, the magnificent poems, *Die Götter Griechenlands* (1788) and *Die Künstler* (1789), awakened Goethe's respect, and in 1794, when the younger poet invited Goethe to become a collaborator in the *Horen*, the latter responded with alacrity. In a very few weeks the two men had become friends. In the meantime a holiday in Schiller's Wurttemberg home had brought renewed health and vigour. An immediate outcome of the new friendship was Schiller's admirable essays, published in the *Horen* (1795–1796) and collected in 1800 under the title *Über naive und sentimentalische Dichtung*. Here Schiller applied his aesthetic theories to that branch of art which was most peculiarly his own, the art of poetry; it is an attempt to classify literature in accordance with an a priori philosophic theory of "ancient" and "modern," "classic" and "romantic," "naive" and "sentimental"; and it sprang from the need Schiller himself felt of justifying his own "sentimental" and "modern" genius with the "naive" and "classic" tranquillity of Goethe's. While Schiller's standpoint was too essentially that of his time to lay claim to finality, it is, on the whole, the most concise statement we possess of the literary theory which lay behind the classical literature of Germany.

For Schiller himself this was the bridge that led back from philosophy to poetry. Under Goethe's stimulus he won fresh laurels in that domain of philosophical lyric which he had opened with *Die Künstler*; and in *Das Ideal und das Leben*, *Die Macht des Gesanges*, *Würde der Frauen*, and *Der Spaziergang*, he produced masterpieces of reflective poetry which have not their equal in German literature. These poems appeared in the *Musenalmanach*, a new publication which Schiller began in 1796, the *Horen*, which had never met with the success it merited, coming to an end in 1797. In the *Musenalmanach* were also published the "Xenien" (1797), a collection of distichs by Goethe and Schiller, in which the two friends avenged themselves on the cavilling critics who were not in sympathy with them. The *Almanach* of the following year, 1798, was even more noteworthy, for it contained a number of Schiller's most popular ballads, "Der Ring des Polykrates," "Der Handschuh," "Ritter Toggenburg," "Der Taucher," "Die Kraniche des Ibykus" and "Der Gang nach dem Eisenhammer"; "Der Kampf mit dem Drachen" following in 1799, and "Das Lied von der Glocke" in 1800. As a ballad poet, Schiller's popularity has been hardly less great than as a dramatist; the bold and simple outline, the terse dramatic characterization appealed directly to the popular mind, which did not let itself be disturbed by the often artificial and rhetorical tone into which the poet falls. But the supreme importance of the last period of Schiller's life lay in the series of master-dramas which he gave to the world between 1799 and 1804. Just as *Don Carlos* had led him to the study of Dutch history, so now his occupation with the history of the Thirty Years' War supplied him with the theme of his trilogy of *Wallenstein* (1798–1799). The plan of *Wallenstein* was of long standing, and it was only towards the end, when Schiller realized the impossibility of saying all he had to say within five acts, that he decided to divide it into three parts, a descriptive prologue, *Wallensteins Lager*, and the two dramas *Die Piccolomini* and *Wallensteins Tod*. Without entirely breaking with the pseudo-classic method he had adopted in *Don Carlos*—the two lovers, Max Piccolomini and Thekla, are an obvious concession to the tradition of the French theatre—*Wallenstein* shows how much Schiller's art had benefited by his study of Greek tragedy; the fatalism of his hero is a masterly application of an antique motive to a modern theme. His whole conception of life and character had deepened since *Don Carlos*, and under the influence of Kant's philosophy the drama became the embodiment of ethical problems that are essentially modern. The success of *Wallenstein*, with which Schiller passed at once into the front rank of European dramatists, was so encouraging that the poet resolved to devote himself with redoubled ardour to dramatic poetry. Towards the end of 1799 he took up his residence permanently in Weimar, not only to be near his friend, but also that he might have the advantage of visiting regularly the theatre of which Goethe was director.

Wallenstein was followed in 1800 by *Maria Stuart*, a tragedy, which, in spite of its great popularity in and outside of Germany, was felt by the critics to follow too closely the methods of the lachrymose "tragedy of common life" to maintain a high position among Schiller's works. It is a serious flaw in the play that the fate of the heroine is virtually decided before the curtain rises, and the poet is obliged to create by theatrical devices the semblance of a tragic conflict which, in reality, does not exist. A finer production in every way is Schiller's "romantic tragedy," *Die Jungfrau von Orleans* (1801). The resplendent medieval colouring of the subject, the essentially heroic character of Joan of Arc, gave Schiller an admirable opportunity for the display of his rich imagination and rhetorical gifts; and by an ingenious alteration of the historical tradition, he was able to make the drama a vehicle for his own imperturbable moral optimism. In unity of style and in the high level of its dramatic diction, *Die Jungfrau von Orleans* is unsurpassed among Schiller's works. Between this drama and its successor, *Die Braut von Messina*, Schiller translated and adapted to his classic ideals Shakespeare's *Macbeth* (1801) and Gozzi's *Turandot* (1802). With *Die Braut von Messina* (1803) he experimented with a tragedy on purely Greek lines, this drama being as close an approximation to ancient tragedy as its medieval and Christian *milieu* permitted of. If the experiment cannot be regarded as successful, the fault lies in the difficulty of reconciling the artificial conventions of the Greek theatre, the chorus and the oracle—here represented by dreams and superstitions—with the point of view of the poet's own time. As far as the diction itself is concerned, the lyric outbursts of the chorus gave Schiller's genius an opportunity of which he was not slow to avail himself. In the poet's last completed drama, *Wilhelm Tell* (1804), he once more, as in *Wallenstein*, chose a historical subject involving wide issues. *Wilhelm Tell* is the drama of the Swiss people; its subject is less the personal fate of its hero than the struggle of a nation to free itself from tyranny. This is the reason for the epic breadth of the work, its picturesque and panoramic character. It also justifies the idealization of the hero, on the one hand, and, on the other, the introduction of episodes which have but little relation to his personal fate, or even put his character in a directly unfavourable light. *Wilhelm Tell* was an attempt to win for the German drama a new field, to widen the domain of dramatic poetry. Besides writing *Tell*, Schiller had found time in 1803 and 1804 to translate two French comedies by Picard, and to prepare a German version of Racine's *Phèdre*; and in the last months of his life he began a new tragedy, *Demetrius*, which gave every promise of being another step forward in his poetic achievement. But *Demetrius* remains a fragment of hardly two acts.

Schiller died at Weimar on the 9th of May 1805. His last years were darkened by constant ill-health; and indeed it is marvellous that he was able to achieve so much. A visit to Leipzig in 1801, and to Berlin—where there was some prospect of his being invited to settle—in 1804, were the chief outward events of his later years. He was ennobled in 1802, and in 1804 the duke of Weimar, unwilling to lose him, doubled his meagre salary of 400 talers. Schiller's art, with its broad, clear lines, its unambiguous moral issues, and its enthusiastic optimism, has appealed with

peculiar force to the German people, especially in periods of political despondency. But since the re-establishment of the German empire in 1871 there has been, at least in intellectual circles, a certain waning of his popularity, the Germans of to-day realizing that Goethe more fully represents the aspirations of the nation. In point of fact, Schiller's genius lacks that universality which characterizes Goethe's; as a dramatist, a philosopher, an historian, and a lyric poet, he was the exponent of ideas which belong rather to the Europe of the period before the French Revolution than to our time; we look to his high principles of moral conduct, his noble idealism and optimism, rather as the ideal of an age that has passed away than as the expression of the more material ambitions of the modern world.

The first edition of Schiller's *Sämtliche Werke* appeared in 1812–1815 in 12 vols. and was edited by Schiller's most intimate friend, C. G. Körner. Of the countless subsequent editions mention need only be made here of the *historisch-kritische Ausgabe* by K. Goedeke and others (15 vols., 1867–1876); the edition published by Hempel and edited by R. Boxberger and W. von Maltzahn (16 vols., 1868–1874); that in Kürschner's *Deutsche Nationalliteratur*, vols. 118–129 (1882–1890), edited by R. Boxberger and A. Birlinger; and the latest Cotta edition (*Säkularausgabe*), edited by E. von der Hellen and others (17 vols., 1904–1905). A critical edition of Schiller's *Briefe* was published by F. Jonas (7 vols.) in 1892–1896; the chief collections of his correspondence are: *Briefwechsel zwischen Schiller und Goethe* (1828–1829, edited by F. Muncker, 4 vols., 1893); *Briefwechsel zwischen Schiller und W. von Humboldt* (1830, edited by F. Muncker, 1893); *Schillers Briefwechsel mit Körner* (1847, edited by L. Geiger, 1893); *Schiller und Lotte* (1856, 4th ed. 1893); *Briefwechsel zwischen Schiller und Cotta*, ed. by W. Vollmer (1876).

The chief biographies of Schiller are the following: T. Carlyle, *Life of Friedrich Schiller* (1824, German translation with an introduction by Goethe, 1830); Caroline von Wolzogen, *Schillers Leben* (1830, 5th ed. 1876, cheap reprint, 1884); K. Hoffmeister, *Schillers Leben* (1838–1842); G. Schwab, *Schillers Leben* (1840, 2nd ed. 1844); E. Palleske, *Schillers Leben und Werken* (1858–1859, 14th ed. 1894, Eng. trans. 1885); H. Viehoff, *Schillers Leben* (1875, new ed. 1888); H. Düntzer, *Schillers Leben* (1881); J. Sime, *Schiller* (1882); R. Weltrich, *F. Schiller* (vol. i., 1890); O. Brahm, *Schiller* (vols. i.-ii., 1888–1892); J. Minor, *Schiller, sein Leben und seine Werke* (vols. i.-ii., 1890); J. Wychgram, *Schiller* (1895, 3rd ed. 1898, popular ed. 1905); O. Harnack, *Schiller* (1898, 2nd ed. 1905); L. Bellermann, *Schiller* (1901); C. Thomas, *Life and Works of Schiller* (1901); K. Berger, *Schiller* (vol. i., 1905); E. Kühnemann, *Schiller* (1905). See also E. Boas, *Schillers Jugendjahre* (1856); E. Müller, *Schillers Mutter* (1894); by the same, *Schillers Jugenddichtung und Jugendleben* (1896); A. Streicher, *Schillers Flucht von Stuttgart* (1836, reprint, 1905); E. Müller, *Regesten zu Schillers Leben und Werken* (1900); A. Kontz, *Les Drames de la jeunesse de Schiller* (1899); E. Kühnemann, *Kants und Schillers Begründung der Ästhetik* (1895); V. Basch, *La Poétique de Schiller* (1902); K. Tomaschek, *Schiller in seinem Verhältnisse zur Wissenschaft* (1862); F. Überweg, *Schiller als Historiker und Philosoph* (1884); O. Harnack, *Die klassische Ästhetik der Deutschen* (1892); W. Fielitz, *Studien zu Schillers Dramen* (1876); L. Bellermann, *Schillers Dramen: Beiträge zu ihrem Verstandnis* (2 vols., 1888–1891; 2nd ed. 1898); K. Werder, *Vorlesungen uber Schillers Wallenstein* (1889); A. Köster, *Schiller als Dramaturg* (1891); L. Belling, *Schillers Metrik* (1883); K. Fischer, *Schiller-Schriften* (1891–1892); J. W. Braun, *Schiller im Urteile seiner Zeitgenossen* (3 vols., 1882); J. G. Robertson, *Schiller after a Century* (1905).

(J. G. R.)

SCHILTBERGER, JOHANN or **HANS** (1381–1440 ?), German traveller and writer, was born of a noble family in 1381 (May 9th ?), probably at Hollern near Lohof, half way between Munich and Freising, on what was then a property of his family. In 1394 he joined the suite of Lienhart Richartinger, and went off to fight under Sigismund, king of Hungary (afterwards emperor), against the Turks on the Hungarian frontier. At the battle of Nicopolis (Sept. 28th, 1396) he was wounded and taken prisoner: when he had recovered the use of his feet, Sultan Bayezid I. (*Ilderim*) took him into his service as a runner (1396–1402). During this time he seems to have accompanied Ottoman troops to certain parts of Asia Minor and to Egypt. On Bayezid's overthrow at Angora (July 20th, 1402), Schiltberger passed into the service of Bayezid's conqueror Timur: he now appears to have followed *Themurlin* to Samarkand, and perhaps also to Armenia and Georgia. After Timur's death (February 17th, 1405) his German runner first became a slave of Shah Rukh, the ablest of Timur's sons; then of Miran Shah, a brother of Shah Rukh; then of Abu Bekr, a son of Miran Shah, whose camp roamed up and down Armenia. He next accompanied Chekre, a Tatar prince living in Abu Bekr's horde, on an excursion to Siberia, of which name Schiltberger gives us the first clear mention in west European literature. He also probably followed his new master in his attack on the Old Bulgaria of the middle Volga, answering to the modern Kazan and its neighbourhood. Wanderings in the steppe lands of south-east Russia; visits to Sarai, the old capital of the Kipchak Khanate on the lower Volga and to Azov or Tana, still a trading centre for Venetian and Genoese merchants; a fresh change of servitude on Chekre's ruin; travels in the Crimea, Circassia, Abkhasia and Mingrelia; and finally escape (from the neighbourhood of Batum) followed. Arriving at Constantinople, he there lay hid for a time; he then returned to his Bavarian home (1427) by way of Kilia, Akkerman, Lemberg, Cracow, Breslau and Meissen. After his return he became a chamberlain of Duke Albert III., probably receiving this appointment in the first instance before the duke's accession in 1438.

Schiltberger's *Reisebuch* contains not only a record of his own experiences and a sketch of various chapters of contemporary Eastern history, but also an account of countries and their manners and customs, especially of those countries which he had himself visited. First come the lands "this side" of Danube, where he had travelled; next follow those between the Danube and the sea, which had now fallen under the Turk; after this, the Ottoman dominions in Asia; last come the more distant regions of Schiltberger's world, from Trebizond to Russia and from Egypt to India. In this regional geography the descriptions of Brusa; of various west Caucasian and Armenian regions; of the regions around the Caspian, and the habits of their peoples (especially the *Red Tatars*); of Siberia; of the Crimea with its great Genoese colony at Kaffa (where he once spent five months); and of Egypt and Arabia, are particularly worth notice. His allusions to the Catholic missions still persisting in Armenia and in other regions beyond the Euxine, and to (non-Roman ?) Christian communities even in the Great Tatary of the steppes are also remarkable. Schiltberger is perhaps the first writer of Western Christendom to give the true burial place of Mahomet at Medina: his sketches of Islam and of Eastern Christendom, with all their shortcomings, are of remarkable merit for their time: and he may fairly be reckoned among the authors who contributed to fix Prester John, at the close of the middle ages, in Abyssinia. His work, however, contains many inaccuracies; thus in reckoning the years of his service both with Bayezid and with Timur he unaccountably multiplies by two. His account of Timur and his campaigns is misty, often incorrect, and sometimes fabulous: nor can von Hammer's parallel between Marco Polo and Schiltberger be sustained without large reservations.

Four MSS. of the *Reisebuch* exist: (1) at Donaueschingen in the Fürstenberg Library, No. 481; (2) at Heidelberg, University Library, 216; (3) at Nuremberg, City Library, 34; (4) at St Gall, Monast. Library, 628 (all of 15th century, the last fragmentary). The work was first edited at Augsburg, about 1460; four other editions appeared in the 15th century, and six in the 16th; in the 19th the best were K. F. Neumann's (Munich, 1859), P. Bruun's (Odessa, 1866, with Russian commentary, in the *Records of the Imperial University of New Russia*, vol. i.), and V. Langmantel's (Tübingen, 1885); "Hans Schiltbergers Reisebuch," in the 172nd volume of the *Bibliothek des literarischen Vereins in Stuttgart*. See also the English (Hakluyt Society) version, *The Bondage and Travels of Johann Schiltberger . . .*, trans. by Buchan Telfer with notes by P. Bruun (London, 1879); von Hammer, "Berechtigung d. orientalischen Namen Schiltbergers," in *Denkschriften d. Königl. Akad. d. Wissenschaften* (vol. ix., Munich, 1823–1824); R. Röhricht, *Bibliotheca geographica Palaestinae* (Berlin, 1890, pp. 103-104); C. R. Beazley, *Dawn of Modern Geography*, iii. 356-378, 550, 555.

(C. R. B.)

SCHIMMEL, HENDRIK JAN (1825–), Dutch poet and novelist, was born on the 30th of June 1825, at 'S Graveland, in the province of North Holland, where his father was a notary and the burgomaster. From 1836 to 1842 Schimmel served in his father's office, and upon his death he was taken into the office of the agent of the Dutch Treasury in Amsterdam, exchanging in 1849 for a post with the Dutch Trading Company there. In 1863 he became a director of the Amsterdam Credit Association. His first volume of poems appeared in 1852; but it was as a writer of historical dramas in blank verse and one of the regenerators of the Dutch stage that his literary position was made. His finest production was *Struensee* (1868), which was preceded by *Napoleon Bonaparte* (1851) and *Juffrouw Serklaas* ("Mrs Serklaas," 1857). Among his other dramatic works may be mentioned *Joan Woutersz* (a drama, 1847), *Twee*

Tudors ("Two Tudors," 1847), *Gondelbald* (1848), *Schuld en Boete* ("Guilt and Retribution," a drama, 1852), *Het Kind van Staat* ("The State Child," a dramatic fragment, 1859); *Zege na Strijd* ("Struggle and Triumph," a drama, 1878). Schimmel's renderings of Casimir de la Vigne's *Louis XI.*, Geibel's *Sophonisbe*, and Ponsard's *Lucrèce* are also still acted in the Netherlands. His novels are distinguished by their vigorous style and able characterization. The earlier, better-known ones betray the writer's English proclivities. The plots of *Mary Hollis* (1860, 3 vols., English translation, London 1872, under the title of "Mary Hollis, a Romance of the Days of Charles II. and William, Prince of Orange," 3 vols.) and of *Mylady Carlisle* (1864, 4 vols.) are laid in England, whereas those of his *Sinjeur Semeyns* (1875, 3 vols.), a powerful picture of the terrible year 1672, and of *De Kapitein van de Lijfgarde* (1888, 3 vols., English adaptation, 1896, under the title of "The Lifeguardsman," 1 vol.), a continuation of "Master Semeyns," are almost entirely centred in Holland. He had many points of style and manner in common with Madame Bosboom-Toussaint, though both remained highly original in their treatment. Both finally reverted to essentially national subjects. To the earlier romances of Schimmel belong: *Bonaparte en zyn Tyd* ("Bonaparte and his Time," 1853), *De Eerste Dag eens Nieuwen Levens* ("The First Day of a New Life," 2 vols., 1855), *Sproken en Vertellingen* ("Legends and Tales," 1855), *Een Haagsche Joffer* ("A Hague Damsel," 1857), *De Vooravond der Revolutie* ("The Eve of the Revolution," 1866). Schimmel was an early collaborator of Potgieter on the *Gids* staff. His dramatic works appeared in a collected edition in 1885–1886 at Amsterdam (3 vols.), followed by a complete and popular issue of his novels (Schiedam, 1892).

SCHINKEL, KARL FRIEDRICH (1781–1841), German architect and painter, and professor in the academy of fine arts at Berlin from 1820, was born at Neuruppin, in Brandenburg, on the 13th of March 1781. He was a pupil of Friedrich Gilly, the continuation of whose work he undertook when his master died in 1800. In 1803 Schinkel went to Italy, returning to Berlin in 1805. The Napoleonic wars interfered seriously with his work as architect, so that he took up landscape painting, displaying a talent for the romantic delineation of natural scenery. In 1810 he drew a plan for the mausoleum of Queen Louise and in 1819 a brilliant sketch for the Berlin cathedral in Gothic style. From 1808 to 1814 he painted a number of dioramas for Gropins. From 1815 he devoted much time to scene painting, examples of his work being still in use in the royal theatres of Germany. Schinkel's principal buildings are in Berlin and its neighbourhood. His merits are, however, best shown in his unexecuted plans for the transformation of the Acropolis into a royal palace, for the erection of the Orianda Palace in the Crimea and for a monument to Frederick the Great. These and other designs may be studied in his *Sammlung architektonischer Entwürfe* (1820–1837, 3rd ed. 1857–1858) and his *Werke der höheren Baukunst* (1845–1846, new ed. 1874).

See the biographies by Kugler, Böttticher, Quast, H. Grimm, Waagen, Woetmann, Pecht, Dohme, and vol. xxviii. of the *Künstler-monographie*, by Ziller (Leipzig, 1897).

SCHIRMER, FRIEDRICH WILHELM (1802–1866), German landscape artist, was born in Berlin. As a youth he painted flowers in the royal porcelain factory; afterwards he became a pupil of F. W. Schadow in the Berlin Academy, but his art owed most to Italy. He went to Italy in 1827; his sojourn extended over three years; he became a disciple of his countryman Joseph Koch, who built historic landscape on the Poussins, and is said to have caught inspiration from Turner. In 1831 Schirmer established himself in Berlin in a studio with scholars from 1839 to 1865 he was professor of landscape in the academy.

Schirmer's place in the history of art is distinctive: his sketches in Italy were more than transcripts of the spots; he studied nature with the purpose of composing historic and poetic landscapes. On the completion of the Berlin Museum of Antiquities came his opportunity: upon the walls he painted classic sites and temples, and elucidated the collections by the landscape scenery with which they were historically associated. His supreme aim was to make his art the poetic interpretation of nature and he deemed technique secondary to conception. His pictures appeal to the mind by the ideas they embody, by beauty of form, harmony of line, significance of light and colour. In this constructional landscape German critics discover "motive," "inner meaning," "the subjective," "the ideal." And Schirmer thus formed a school.

SCHIRMER, JOHANN WILHELM (1807–1863), German landscape painter, was born at Jülich in Rhenish Prussia. This artist, a namesake of F. W. Schirmer, had a similar aim and career. He first was a student, and subsequently became a professor in the academy of Düsseldorf. In 1854 he was made director of the art school at Carlsruhe, where he died. He travelled and sketched in Italy, and aimed at historic landscape after the manner of the Poussins. His Biblical landscapes with figures are held in good esteem.

SCHISM, a division, especially used of a formal separation from a church or religious body, a sect, or church formed by such separation. The Greek σχίσμα, a cleft, split, from σχίζειν, to cleave, is used in the New Testament of an actual rent in a garment (Matt. ix. 16) and also several times of divisions or differences of opinion as to the teaching and message of Christ (John vii. 43) or of dissension in the church (1 Cor. xi. 18). In the early Christian Church, as defined by the Fathers, and later, the offence of "schism" is distinguished from that of "heresy"; it refers not to differences of belief or doctrine, but to the promotion, or the state, of divisions of organisation, and to the formation of bodies separate from the true church, or to dissensions and separations due to disputes over matters of discipline or authority (see HERESY). The dispute which led to the separation of the Latin and Greek Churches is known as the "Great Schism," and the division over the election to the Papacy of Urban VI. and Clement VII. as the "Great Schism of the West" (1378–1417) (see PAPACY and CHURCH HISTORY).

SCHISTS (Gr. σχίζειν, to split), in petrology, metamorphic rocks which have a fissile character. In all of them there is at least one mineral which crystallizes in platy forms (*e.g.* mica, talc, chlorite, haematite), or in long blades or fibres (anthophyllite, tremolite, actinolite, tourmaline), and, when these have a well marked parallel arrangement in definite bands or folia, the rock will break far more easily along the bands than across them. The platy minerals have also a perfect cleavage parallel to their flat surfaces, while the fibrous species often have two or more cleavages following their long axes; hence a schistose rock may split not only by separation of the mineral plates from one another but also by cleavage of the parallel minerals through their substance.

Schists in the common acceptance of that term are really highly crystalline rocks; fissile slates, shales or sandstones, in which the original sedimentary structures are little modified by recrystallization, are not included in this group by English petrologists, though the French *schistes* and the German *Schiefer* are used to designate also rocks of these types. The difference between schists and gneisses is mainly that the latter have less highly developed foliation; they also, as a rule, are more coarse grained, and contain far more quartz and felspar, two minerals which rarely assume platy or acicular forms, and hence do not lead to the production of a fissile character in the rocks in which they are important constituents. Schists, as a rule, are found in regions composed mainly of metamorphic rocks, such as the Central Alps, Himalayas, and other mountain ranges, Saxony, Scandinavia, the Highlands of Scotland and north-west of Ireland. They are typical products of "regional" metamorphism, and are in nearly all cases older than the fossiliferous sedimentary rocks. Transitions between schists and normal igneous or sedimentary rocks are often found. The Silurian mica-schists of Bergen in Norway are fossiliferous; in the Alps it is believed that even Mesozoic rocks pass laterally into mica-schists and calc-schists. These changes are regarded as having been produced by the operation of heat, pressure and folding. It is often taught that gneisses are the further stages of the crystallization of schists and belong to a deeper zone where the pressures and the temperatures were greater. Igneous rocks also may be converted readily into schists (*e.g.* serpentine into talc-schist, dolerite into hornblende-schist) by the same agencies.

There are two great groups of schists, viz. those derived from sedimentary and those derived from igneous rocks, or, as they have been called, the "paraschists" and the "orthoschists." The first group is the more important and includes some of the commonest metamorphic rocks. In the paraschists, though fossils are exceedingly rare, sedimentary structures such as bedding and the alternation of laminae of fine and coarse deposit may frequently be preserved. The foliation is often parallel to the bedding, but may cross it obliquely or at right angles; or the bedding may be folded and contorted while the foliation maintains a nearly uniform orientation. When the foliation is undulose or sinuous the rocks are said to be crumpled, and have wavy splitting surfaces instead of nearly plane ones. The development of foliation in shaly rocks is undoubtedly closely akin to the production of cleavage in slates.

The sedimentary schists or paraschists have three great subdivisions, the mica-schists and chlorite-schists (which correspond in a general way to shales or clay rocks) the calc-schists (impure limestones) and the quartz-schists (metamorphosed sandstones). In the mica-schists of this group biotite or muscovite may be the principal mineral and often both are present in varying proportions; the mica has developed from the argillaceous matter of the original rock; in addition there is always quartz and sometimes felspar (albite or oligoclase). A large number of minerals may occur as accessories, *e.g.* garnet, tourmaline, staurolite, andalusite, actinolite, chloritoid or ottrelite, epidote, haematite, and if any of these is abundant its presence may be indicated by the name given the rock, *e.g.* staurolite-mica-schist. The phyllites (*q.v.*) form a middle term between this group and the slates; they consist usually of quartz, white mica and chlorite, and have much of the foliation and schistosity of the mica-schists. Those rocks which contain andalusite and staurolite are sometimes found in such associations as show that they are due to contact action by intrusive igneous masses. The chlorite-schists are often of igneous derivation, such as ash-beds or fine lavas which have been metamorphosed. Many of them contain large octahedra of magnetite. Others are probably sedimentary rocks, especially those which contain much muscovite. Calc-schists are usually argillaceous limestones in which a large development of biotite or phlogopite has occasioned foliation. Often they contain quartz and felspar, sometimes pyroxene, amphibole, garnet or epidote. Pure limestones do not frequently take on schistose facies. The quartz-schists consist of quartz and white mica, and are intimately related to quartzites. Many of them have been originally micaceous or felspathic sandstones. We may mention also graphitic-schists containing dark scaly graphite (often altered forms of carbonaceous shales), and haematite-schists which may represent beds of ironstone.

The orthoschists are white mica-schists produced by the shearing of acid rocks, such as felsite and porphyry. Some of the "porphyroids" which have grains of quartz and felspar in a finely schistose micaceous matrix are intermediate between porphyries and mica-schists of this group. Still more numerous are orthoschists of hornblendic character (hornblende-schists) consisting of green hornblende with often felspar, quartz and sphene (also rutile, garnet, epidote or zoisite, biotite and iron oxides). These are modified forms of basic rocks such as basalt, dolerite and diabase. Every transition can be found between perfectly normal ophitic dolerites and typical hornblende-schists, and occasionally the same dike or sill will provide specimens of all the connecting stages. A few hornblende-schists are metamorphosed gabbros; others have developed from dikes or sills of lamprophyre. Under extreme crushing these basic rocks may be converted into dark biotite-schists, or greenish chlorite-schists. Tremolite-schist and anthophyllite-schist are in nearly all cases the representatives of the ultra-basic igneous rocks such as peridotite in regions of high metamorphism. Talc-schists are of the same category. They are soft and lustrous, with a peculiarly smooth feel, and though often confounded with mica-schists may be distinguished by their richness in magnesia; many of them contain tremolite or actinolite; others have residual grains of olivine or augite; and here also every gradation can be found between the unmodified igneous types and the perfectly metamorphic schists. Occasionally serpentines become sheared without yielding talcose minerals; they are then known as serpentine-schist and antigorite-schist, the latter being tough leek-green rocks, more or less transparent.

SCHLAGINTWEIT, the name of five German scientific explorers or students of foreign countries. They were brothers, and were named HERMANN (1826–1882, who became known as Hermann von Schlagintweit Sakünlünski), ADOLF (1829–1857), EDUARD (1831–1866), ROBERT (1833–1885), and EMIL (1835–1904). Hermann was born at Munich on the 13th of May 1826. His first scientific labours were studies in the Alps, carried on between 1846 and 1848 in association with his brother Adolf (born at Munich on the 9th of January 1829). The publication of the *Untersuchungen über die physikalische Geographie der Alpen* in 1850 (Leipzig) founded the scientific reputation of the two brothers, and their reputation was increased by subsequent investigations in the same field, in which Robert (born at Munich on the 27th of October 1837) also took part. Soon after the publication of the *Neue Untersuchungen über die phys. Geog. u. Geol. der Alpen* (Leipzig, 1854), the three brothers received, on the recommendation of Alexander von Humboldt, a commission from the East India Company to travel for scientific purposes in their territory, and more particularly to make observations on terrestrial magnetism. During 1854–1857 they travelled, sometimes in company, sometimes separately, in the Deccan and in the region of the Himalayas, prosecuting their investigations beyond the frontiers of the company's territory into the region of the Karakorum and Kuen-lun mountains. Hermann and Robert were the first Europeans who crossed the Kuen-lun, and in honour of that achievement the former had the title or surname of Sakünlünski bestowed upon him (in 1864). Robert returned to Europe early in 1857; Hermann, after a visit to Nepal, joined him on his homeward journey; but Adolf, who remained to prosecute his explorations in Central Asia, was put to death by the amir of Kashgar on the 26th of August. Hermann and Robert published in four volumes the *Results of a Scientific Mission to India and High Asia* (Leipzig, 1860–1866). They had, moreover, made extensive ethnographical and natural history collections. Hermann spent the last years of his life chiefly in literary and scientific activity, partly at Munich, partly at the castle of Jägernburg near Forchheim. He died at Munich on the 19th of January 1882. Robert was appointed professor of geography at Giessen in 1863. He paid several visits to America, which furnished him with material for such works as *Die Pacific-Eisenbahn* (1870), *Die Mormonen* (1874), *Die Prärien* (1876), &c., all published at Cologne. He died at Giessen on the 6th of June 1885. Eduard, born on the 23rd of March 1831, killed in battle at Kissingen in 1866, made himself known by an account of the Spanish expedition to Morocco in 1859–1860. Emil, born on the 7th of July 1835, wrote several learned works relating to India and Tibet. He died on the 29th of October 1904.

SCHLAN (Czech, *Slané*), a town of Bohemia, 37 m. N.W. of Prague by rail. Pop. (1900) 9491, mostly Czech. The most notable churches are St Gotthard (14th century, remodelled in 1782) St Mary, attached to the Piarist college (1655–1658), the chapel of St Lawrence (13th century) and the church of the Holy Trinity belonging to the Franciscan friary (1655). There are extensive coal-fields and important iron, metal and machine industries, together with the manufacture of chemicals and corn-milling.

Schlan—probably the name of a castle—occurs in documents of the 10th century. The town was probably founded in the 13th century by Ottakar II. In the Hussite wars it took the utraquist side, was occupied in 1420 by King Sigismund, but retaken the next year by the troops of Prague. These were expelled, in 1425, after a desperate resistance by the Taborites and Orphans. The town now remained faithful to the Taborite cause till its collapse in 1434. The place was re-fortified between 1460 and 1472. After the battle of the White Hill (1620), Schlan was granted to Jaroslaus Bořita of Martinic, lord of Smečno, whose descendants still own the lordship.

SCHLANGENBAD, a watering-place of Germany, in the Prussian province of Hesse-Nassau, pleasantly situated in a deep and well-wooded valley of the Taunus range, 6 m. N.W. of Wiesbaden, 4½ m. S. of Langenschwalbach, and 5 m. E. of Eltville on the Rhine, with which it is connected by a steam tramway. Its eight thermal springs are mostly used for bathing, and are efficacious in nervous complaints and feminine disorders. There is a handsome kursaal connected with the principal bathing establishment. Permanent population (1905) 400, while the number of visitors numbers about 2500 annually.

See Baumann, *Schlangenbad, mit besonderer Berücksichtigung seiner Kur- und Bade-Anstalten* (new ed., Wiesbaden, 1894); and Bertrand, *Schlangenbad und seine Warmquellen* (Heidelberg, 1878).

SCHLEGEL, AUGUST WILHELM VON (1767–1845), German poet, translator and critic, was born on the 8th of September, 1767, at Hanover, where his father, Johann Adolf Schlegel (1721–1793), was a Lutheran pastor. He was educated at the Hanover gymnasium and at the university of Göttingen. Having spent some years as a tutor in the house of a banker at

Amsterdam, he went to Jena, where, in 1796, he married Karoline, the widow of the physician Böhmer (see SCHELLING, KAROLINE) and in 1798 was appointed extraordinary professor. Here he began his translation of Shakespeare, which was ultimately completed, under the superintendence of Ludwig Tieck, by Tieck's daughter Dorothea and Graf W. H. Baudissin. This rendering is one of the best poetical translations in German, or indeed in any language. At Jena Schlegel contributed to Schiller's periodicals the *Horen* and the *Musenalmanach*; and with his brother Friedrich he conducted the *Athenaeum*, the organ of the Romantic school. He also published a volume of poems, and carried on a rather bitter controversy with Kotzebue. At this time the two brothers were remarkable for the vigour and freshness of their ideas, and commanded respect as the leaders of the new Romantic criticism. A volume of their joint essays appeared in 1801 under the title *Charakteristiken und Kritiken*. In 1802 Schlegel went to Berlin, where he delivered lectures on art and literature; and in the following year he published *Ion*, a tragedy in Euripidean style, which gave rise to a suggestive discussion on the principles of dramatic poetry. This was followed by *Spanisches Theater* (2 vols., 1803–1809), in which he presented admirable translations of five of Calderon's plays; and in another volume, *Blumenstrausse italienischer, spanischer und portuguesischer Poesie* (1804), he gave translations of Spanish, Portuguese and Italian lyrics. In 1807 he attracted much attention in France by an essay in the French language, *Comparaison entre la Phèdre de Racine et celle d'Euripide*, in which he attacked French classicism from the standpoint of the Romantic school. His lectures on dramatic art and literature (*Über dramatische Kunst und Literatur*, 1809–1811), which have been translated into most European languages, were delivered at Vienna in 1808. Meanwhile, after a divorce from his wife Karoline, in 1804, he travelled in France, Germany, Italy and other countries with Madame de Staël, who owed to him many of the ideas which she embodied in her work, *De l'Allemagne*. In 1813 he acted as secretary of the crown prince of Sweden, through whose influence the right of his family to noble rank was revived. Schlegel was made a professor of literature at the university of Bonn in 1818, and during the remainder of his life occupied himself chiefly with oriental studies, although he continued to lecture on art and literature, and in 1828 he issued two volumes of critical writings (*Kritische Schriften*). In 1823–1830 he published the journal *Indische Bibliothek* (3 vols.) and edited (1823) the *Bhagavad-Gîta* with a Latin translation, and (1829) the *Rāmāyana*. These works mark the beginning of Sanskrit scholarship in Germany. After the death of Madame de Staël Schlegel married (1818) a daughter of Professor Paulus of Heidelberg; but this union was dissolved in 1821. He died at Bonn on the 12th of May 1845. As an original poet Schlegel is unimportant, but as a poetical translator he has rarely been excelled, and in criticism he put into practice the Romantic principle that a critic's first duty is not to judge from the standpoint of superiority, but to understand and to "characterize" a work of art.

In 1846–1847 Schlegel's *Sämtliche Werke* were issued in twelve volumes by E. Böcking. There are also editions by the same editor of his *Œuvres écrites en français* (3 vols., 1846), and of his *Opuscula Latine scripta* (1848). Schlegel's Shakespeare translations have been often reprinted; the edition of 1871–1872 was revised with Schlegel's MSS. by M. Bernays. See M. Bernays, *Zur Entstehungsgeschichte des Schlegelschen Shakespeare* (1872); R. Genée, *Schlegel und Shakespeare* (1903). Schlegel's Berlin lectures of 1801–1804 were reprinted from MS. notes by J. Minor (1884). A selection of the writings of both A. W. and Friedrich Schlegel, edited by O. F. Walzel, will be found in Kürschner's *Deutsche Nationalliteratur*, 143 (1892). See especially R. Haym, *Romantische Schule*, and the article in the *Allg. deutsche Biographie* by F. Muncker.

SCHLEGEL, JOHANN ELIAS (1719–1749), German critic and dramatic poet, was born at Meissen on the 28th of January 1719. He was educated at Schulpforta and at the university of Leipzig, where he studied law. In 1743 he became private secretary to his relative, von Spener, the Saxon ambassador at the Danish court. Afterwards he was made professor extraordinary at the academy of Sorõe, where he died on the 13th of August 1749. Schlegel was a contributor to the *Bremer Beiträge* and for some time, while he was living in Denmark, edited a weekly periodical, *Der Fremde*. With his dramas as well as with his critical writings he did much to prepare the way for Lessing, by whom his genius was warmly appreciated. He wrote two lively and well-constructed comedies, *Der Triumph der guten Frauen* and *Die stumme Schönheit*, the former in prose, the latter in alexandrines. *Hermann* and *Canut* (in alexandrines) are generally considered his best tragedies.

His works were edited (in 5 vols., 1761–1770) by his brother, J. H. Schlegel (1724–1780), who had a considerable reputation as a writer on Danish history. Another brother, J. Adolf Schlegel (1721–1793), an eminent preacher, and author of some volumes of verse, was the father of August Wilhelm and Friedrich von Schlegel. J. E. Schlegel's *Ästhetische und dramaturgische Schriften* have been edited by J. von Antoniewicz (1887), and a selection of his plays by F. Muncker in *Bremer Beiträge*, vol. ii. (Kürschner's *Deutsche Nationalliteratur*, vol. xliv., 1899). See, besides the biography by his brother in the edition of his works, E. Wolff, *Johann Elias Schlegel* (1889); and J. Rentsch, *Johann Elias Schlegel als Trauerspieldichter* (1890).

SCHLEGEL, KARL WILHELM FRIEDRICH VON (1772–1829), German poet, critic and scholar, was the younger brother of August Wilhelm von Schlegel. He was born at Hanover on the 10th of March 1772. He studied law at Göttingen and Leipzig, but ultimately devoted himself entirely to literary studies. He published in 1797 the important book *Die Griechen und Römer*, which was followed by the suggestive *Geschichte der Poesie der Griechen und Römer* (1798). At Jena, where he lectured as a *Privatdozent* at the university, he contributed to the *Athenaeum* the aphorisms and essays in which the principles of the Romantic school are most definitely stated. Here also he wrote *Lucinde* (1799), an unfinished romance, which is interesting as an attempt to transfer to practical ethics the Romantic demand for complete individual freedom, and *Alarcos*, a tragedy (1802) in which, without much success, he combined romantic and classical elements. In 1802 he went to Paris, where he edited the review *Europa* (1803), lectured on philosophy and carried on Oriental studies, some results of which he embodied in an epoch-making book, *Über die Sprache und Weisheit der Indier* (1808). In the same year in which this work appeared, he and his wife Dorothea (1763–1839), a daughter of Moses Mendelssohn, joined the Roman Catholic Church, and from this time he became more and more opposed to the principles of political and religious freedom. He went to Vienna and in 1809 was appointed imperial court secretary at the headquarters of the archduke Charles. At a later period he was councillor of legation in the Austrian embassy at the Frankfort diet, but in 1818 he returned to Vienna. Meanwhile he had published his collected *Gedichte* (1809) and two series of lectures, *Über die neuere Geschichte* (1811) and *Geschichte der alten und neuen Literatur* (1815). After his return to Vienna from Frankfort he edited *Concordia* (1820–1823), and began the issue of his *Sämtliche Werke*. He also delivered lectures, which were republished in his *Philosophie des Lebens* (1828) and in his *Philosophie der Geschichte* (1829). He died on the 11th of January 1829 at Dresden. A permanent place in the history of German literature belongs to Friedrich Schlegel and his brother August Wilhelm as the critical leaders of the Romantic school, which derived from them most of its governing ideas as to the characteristics of the middle ages, and as to the methods of literary expression. Of the two brothers, Friedrich was unquestionably the more original genius. He was the real founder of the Romantic school; to him more than to any other member of the school we owe the revolutionizing and germinating ideas which influenced so profoundly the development of German literature at the beginning of the 19th century.

Friedrich Schlegel's wife, Dorothea, was the author of an unfinished romance, *Florentin* (1801), a *Sammlung romantischer Dichtungen des Mittelalters* (2 vols., 1804), a version of *Lother und Maller* (1805), and a translation of Madame de Staël's *Corinne* (1807–1808)—all of which were issued under her husband's name. By her first marriage she had a son, Philipp Veit, who became an eminent painter.

Friedrich Schlegel's *Sämtliche Werke* appeared in 10 vols. (1822–1825); a second edition (1846) in 15 vols. His *Prosaische Jugendschriften* (1794–1802) have been edited by J. Minor (1882, 2nd ed. 1906); there are also reprints of *Lucinde*, and F. Schleiermacher's *Vertraute Briefe über Lucinde, 1800* (1907). See R. Haym, *Die romantische Schule* (1870); I. Rouge, *F. Schlegel et la genèse du romantisme allemand* (1904); by the same, *Erläuterungen zu F. Schlegels Lucinde* (1905); M. Joachimi, *Die Weltanschauung der Romantik* (1905); W. Glawe, *Die Religion F. Schlegels* (1906); E. Kircher, *Philosophie der Romantik* (1906). On Dorothea Schlegel see J. M. Raich, *Dorothea von Schlegel und deren Söhne* (1881); F. Diebel, *Dorothea Schlegel als Schriftsteller im Zusammenhang mit der romantischen Schule* (1905).

SCHLEICHER, AUGUST (1821–1868), German philologist, was born at Meiningen on the 19th of February 1821, the son of a medical practitioner. He attended (1835–1840) the gymnasium at Coburg. In the autumn of 1840 he entered the university of Leipzig as a student of theology, but exchanged Leipzig in the spring of 1841 for Tübingen. Here he remained two years, and under the influence of the famous orientalist Ewald, relinquished the study of theology for that of languages. Proceeding to the university of Bonn in 1843, he took his doctor's degree in 1846 and established himself as *Privatdozent* for comparative philology. In 1850 he was appointed extraordinary professor of classical philology at the university of Prague, and in 1853 was advanced as ordinary professor to the chair of German and comparative philology and Sanskrit. While at Prague he commenced the study of Slavonic languages, and with the assistance of the Vienna academy of sciences undertook in 1852 a journey of scientific research into Prussian Lithuania, the fruits of which were the first scientific examination and description of the character of the Lithuanian language. In 1857 he became professor of philology at Jena, where he lived and worked until his death on the 6th of December 1868. Next to Franz Bopp (*q.v.*), the founder of the science of language, no German savant left a more enduring stamp of his personality upon this science than did Schleicher.

His first scientific work, *Zur vergleichenden Sprachgeschichte* (1848), was followed by *Die Sprachen Europas* (1850); but the book by which he is best known is *Kompendium der vergleichenden Grammatik der indogermanischen Sprachen* (2 pts., 1861, 1864; 4th ed., 1876), and a supplementary volume, *Indogermanische Chrestomathie* (1869). Among his minor writings are "Zur Morphologie der Sprache" (in the *Mémoires de l'académie de St. Pétersbourg*, 1859); *Die Darwinsche Theorie und die Sprachwissenschaft* (1863, new ed. 1873), *Über die Bedeutung der Sprache für die Naturgeschichte des Menschen* (1865); while in the department of Slavonic and Lithuanian languages the following may be mentioned: *Formenlehre der kirchenslavischen Sprache* (1852); *Handbuch der litauischen Sprache* (with grammar, reader and glossary, 1856–1857). Besides Lithuanian legends he published an edition of *Christian Donaleitis' Litauische Dichtungen* (1865).

See S. Lefmann, *August Schleicher* (1870) and *Zeitschrift für vergleichende Sprachforschung*, vol. xviii.

SCHLEIDEN, MATTHIAS JAKOB (1804–1881), German botanist, was born at Hamburg on the 5th of April 1804. He studied law at Heidelberg and practised as an advocate in Hamburg till 1831, but not succeeding he studied botany and medicine at Göttingen and Berlin, and in 1839 graduated at Jena, where he was appointed extraordinary professor of botany, becoming honorary professor in 1846 and ordinary professor in 1850. In 1863 he was called to Dorpat, but resigned the following year and returned to Germany, where he lived as a private teacher. He died at Frankfort-on-Main on the 23rd of June 1881. His title to remembrance is twofold. Uniting the labours of two centuries of workers in vegetable histology, he proved that a nucleated cell is the only original constituent of the plant embryo, and that the development of all vegetable tissues must be referred to such cells, thus preparing the way for the epoch-making cell theory of Theodor Schwann (*q.v.*); and his *Principles of Scientific Botany* (1842–1843), which went through several editions, did much to shake the tyranny of the purely systematic Linnean school, whose accumulations he was accustomed irreverently to describe as "hay." Despite a certain inability to criticize and verify his own hypotheses, he gave, both by his speculative activity and by the introduction of improved technical methods, so vivid an impulse to the younger botanists of his time as to have earned from Anton de Bary the title of reformer of scientific botany. His botanical labours practically ceased after 1850, when he entered on various philosophical and historical studies.

SCHLEIERMACHER, FRIEDRICH DANIEL ERNST (1768–1834), theologian and philosopher, was the son of a Prussian army chaplain of the Reformed confession, and was born on the 21st of November 1768 at Breslau. He was educated in a Moravian school at Niesky in upper Lusatia, and at Barby near Halle. Moravian theology, however, soon ceased to satisfy him, and his doubts rapidly took definite shape. Reluctantly his father gave him permission to leave Barby for the university of Halle, which had already (1787) abandoned pietism and adopted the rationalist spirit of Wolf and Semler (see RATIONALISM). As a student he pursued an independent course of reading and neglected to his permanent loss the study of the Old Testament and the Oriental languages. But he frequented the lectures of Semler and of J. A. Eberhard, acquiring from the former the principles of an independent criticism of the New Testament and from the latter his love of Plato and Aristotle. At the same time he studied with great earnestness the writings of Kant and Jacobi. He acquired thus early his characteristic habit of forming his opinions by the process of patiently examining and weighing the positions of all thinkers and parties. But with the receptivity of a great eclectic he combined the reconstructive power of a profoundly original thinker. While yet a student he began to apply ideas gathered from the Greek philosophers in a reconstruction of Kant's system. At the completion of his three years' course at Halle he was for two years private tutor in the family of Count Dohna-Schlobitten, developing in a cultivated and aristocratic household his deep love of family and social life. In 1796 he became chaplain to the Charité Hospital in Berlin. Having no scope for the development of his powers as a preacher, he sought mental and spiritual satisfaction in the cultivated society of Berlin, and in profound philosophical studies. This was the period in which he was constructing the framework of his philosophical and religious system. It was the period, too, when he made himself widely acquainted with art, literature, science and general culture. He was at that time profoundly affected by German Romanticism, as represented by his friend Friedrich Schlegel. Of this his *Confidential Letters* on Schlegel's *Lucinde* (*Vertrauten Briefe über Schlegel's "Lucinde,"* 1801; ed. 1835; by Jonas Fränkel, 1907; R. Frank, 1907), as well as his perilous relation to Eleonore Grunow, the wife of a Berlin clergyman, are proof and illustration. Though his ultimate principles were unchanged he gained much from the struggle. It showed him much of the inner truth of human feeling and emotion, and enriched his imagination and life with ideals ancient and modern, which gave elevation, depth and colour to all his thought. Meantime he studied Spinoza and Plato, and was profoundly influenced by both, though he was never a Spinozist; he made Kant more and more his master, though he departed on fundamental points from him, and finally remodelled his philosophy; with some of Jacobi's positions he was in sympathy, and from Fichte and Schelling he accepted ideas, which in their place in his system, however, received another value and import. The literary fruit of this period of intense fermentation and of rapid development was his "epoch-making" book, *Reden über die Religion* (1799; ed. Göttingen, 1906), and his "new year's gift" to the new century, the *Monologen* (1800; ed. 1902). In the first book he vindicated for religion an eternal place amongst the divine mysteries of human nature, distinguished it from all current caricatures of it and allied phenomena, and described the perennial forms of its manifestation and life in men and society, giving thereby the programme of his subsequent theological system. In the *Monologen* he threw out his ethical manifesto, in which he proclaimed his ideas as to the freedom and independence of the spirit, and as to the relation of the mind to the world of sense and imperfect social organizations, and sketched his ideal of the future of the individual and society.

From 1802 to 1804, Schleiermacher was pastor in the little Pomeranian town of Stolpe. These years were full of literary

work, as well as rich in personal and moral progress. He relieved Friedrich Schlegel entirely of his nominal responsibility for the translation of Plato, which they had together undertaken (vols. 1–5, 1804–1810; 3rd ed., 1855–1861; vol. 6, *Repub.* 1828; 2nd ed., 1855–1862). At the same time another work, *Grundlinien einer Kritik der bisherigen Sittenlehre* (1803; 2nd ed. 1834), the first of his strictly critical and philosophical productions, occupied him. This work is a severe criticism of all previous moral systems, especially those of Kant and Fichte, Plato's and Spinoza's finding most favour; its leading principles are that the tests of the soundness of a moral system are the completeness of its view of the laws and ends of human life as a whole and the harmonious arrangement of its subject-matter under one fundamental principle; and, though it is almost exclusively critical and negative, the book announces clearly the division and scope of moral science which Schleiermacher subsequently adopted, attaching prime importance to a "Güterlehre," or doctrine of the ends to be obtained by moral action. But the obscurity of the style of the book as well as its almost purely negative results proved fatal to its immediate success. In 1804 Schleiermacher removed as university preacher and professor of theology to Halle, where he remained until 1807, and where he quickly obtained a reputation as professor and preacher, and exercised a powerful influence in spite of the contradictory charges of his being atheist, Spinozist and pietist. In this period he wrote his dialogue the *Weihnachtsfeier* (1806; 4th ed. 1850), a charming production, which holds a place midway between his *Reden* and his great dogmatic work, *Der christliche Glaube*, and presents in the persons of its speakers phases of his growing appreciation of Christianity as well as the conflicting elements of the theology of the period. After the battle of Jena he returned to Berlin (1807), was soon appointed pastor of the Trinity Church there, and the next year married the widow of his friend Willich. At the foundation of the Berlin university (1810), in which he took a prominent part, he was called to a theological chair, and soon became secretary to the Academy of Sciences. He was thus placed in a position suited to his powers and in domestic and social surroundings adapted to meet the wants of his rich nature. At the same time he approved himself in the pulpit and elsewhere as a large-hearted and fearless patriot in that time of national calamity and humiliation, acquiring a name and place in his country's annals with Arndt, Fichte, Stein and Scharnhorst. He took a prominent part too in the reorganization of the Prussian church, and became the most powerful advocate of the union of the Lutheran and Reformed divisions of German Protestantism. The twenty-four years of his professional career in Berlin were opened with his short but important outline of theological study (*Kurze Darstellung des theologischen Studiums*, 1811; 2nd ed. 1830), in which he sought to do for theology what he had done for religion in his *Reden*. While he preached every Sunday, he also gradually took up in his lectures in the university almost every branch of theology and philosophy—New Testament exegesis, introduction to and interpretation of the New Testament, ethics (both philosophic and Christian), dogmatic and practical theology, church history, history of philosophy, psychology, dialectics (logic and metaphysics), politics, pedagogy and aesthetics. His own materials for these lectures and his students' notes and reports of them are the only form in which the larger proportion of his works exist—a circumstance which has greatly increased the difficulty of getting a clear and harmonious view of fundamental portions of his philosophical and ethical system, while it has effectually deterred all but the most courageous and patient students from reading these posthumous collections. As a preacher he produced a powerful effect, yet not at all by the force of his oratory but by his intellectual strength, his devotional spirit and the philosophical breadth and unity of his thought. In politics he was an earnest friend of liberty and progress, and in the period of reaction which followed the overthrow of Napoleon he was charged by the Prussian government with "demagogic agitation" in conjunction with the great patriot Arndt. At the same time he prepared for the press his chief theological work *Der christliche Glaube nach den Grundsätzen der evangelischen Kirche* (1821–1822; 2nd ed., greatly altered, 1830–1831; 6th ed., 1884). The fundamental principle of this classical work is, that religious feeling, the sense of absolute dependence on God as communicated by Jesus Christ through the church, and not the creeds or the letter of Scripture or the rationalistic understanding, is the source and law of dogmatic theology. The work is therefore simply a description of the facts of religious feeling, or of the inner life of the soul in its relations to God, and these inward facts are looked at in the various stages of their development and presented in their systematic connexion. The aim of the work was to reform Protestant theology by means of the fundamental ideas of the *Reden*, to put an end to the unreason and superficiality of both supernaturalism and rationalism, and to deliver religion and theology from a relation of dependence on perpetually changing systems of philosophy. Though the work added to the reputation of its author, it naturally aroused the increased opposition of the theological schools it was intended to overthrow, and at the same time Schleiermacher's defence of the right of the church to frame its own liturgy in opposition to the arbitrary dictation of the monarch or his ministers brought upon him fresh troubles. He felt himself in Berlin more and more isolated, although his church and his lecture-room continued to be largely attended. But he prosecuted his translation of Plato and prepared a new and greatly altered edition of his *Christliche Glaube*, anticipating the latter in two letters to his friend Lücke (in the *Studien und Kritiken*, 1829), in which he defended with a masterly hand his theological position generally and his book in particular against opponents on the right and the left. The same year he lost his only son—a blow which, he said, "drove the nails into his own coffin." But he continued to defend his theological position against Hengstenberg's party on the one hand and the rationalists von Cölln and D. Schulz on the other, protesting against both subscription to the ancient creeds and the imposition of a new rationalistic formulary. In the midst of such labours, and enjoying still full bodily and mental vigour, he was carried off after a few days' illness by inflammation of the lungs, on the 12th of February 1834.

Philosophical System.—A great antithesis lies at the basis of all thought and life—that of the real and the ideal, of organism, or sense, and intellect. But the antithesis is not absolute, for in life and being both elements are united—though without its presence life and thought would be impossible. In the actual world the antithesis appears as reason and nature, in each of which, however, there is a combination of its two elements—the ideal and the real—the reason having a preponderance of the first and nature a preponderance of the second. At the basis of nature lies universal reason as its organizing principle, and when reason becomes a conscious power in man it finds itself in conflict as well as in harmony with external nature. The whole effort and end of human thought and action is the gradual reduction of the realm and the power of this antithesis in the individual, the race and the world. Though the antithesis is real and deep, the human mind cannot admit its absolute nature; we are compelled to suppose a transcendental reality or entity in which the real and the ideal, being and thought, subject and object, are one. Consciousness itself involves the union of the antithetic elements, and prior to moral action nature is found organized and reason manifested or symbolized therein. We are ourselves proofs of the unity of the real and the ideal, of thought and being, for we are both, our self-consciousness supplying the expression of the fact. As we have in ourselves an instance of the identity of thought and being, we must suppose a universal identity of the ideal and real behind the antithesis which constitutes the world. This supposition is the basis of all knowledge, for thought becomes knowledge only when it corresponds to being. The supposition may be called a belief, but it is so only in the sense in which belief appears in the religious department, where it is the ultimate ground of all action. The supposition is the basis of all ethics, for without the conviction of the correspondence of thought and reality action would be fruitless and in the end impossible. It is above all the substance of religious feeling, which is the immediate consciousness of the unity of the world, of the absolute oneness behind the infinite multiplicity of contrasts; indeed, it is the religious conviction of the unity which is the best guarantee of the truth of the suppositions of philosophy. It is "the religious consciousness of the unity of the intellectual and physical world in God" which is to overcome the scepticism of the critical philosophy. But, though

this unity must be laid down as the basis of knowledge, it is absolute and transcendental. In contrast with the "world," as the totality of being in its differentiation, this absolute unity, or God, in whom the real as manifold, and the spirit as one, find their unifying base, by its very nature is unphenomenal, indefinable and inconceivable. The idea is outside the boundary of thought, though its necessary postulate, and it is no less inaccessible to religious feeling, though it is its life and soul. Neither member of the antithesis of the real and the ideal must be conceived as producing the other; they are both equally existent and equally constituent elements of the world; but in God they are one, and therefore the world must not be identified with Him. The world and God are distinct, but correlative, and neither can be conceived without the other. The world without God would be "chaos," and God without the world an empty "phantasm." But though God is transcendent and unknowable He is immanent in the world. In self-consciousness God is present as the basis of the unity of our nature in every transition from an act of knowledge to an act of will, and vice versa. As far as man is the unity of the real and the ideal, God is in him. He is also in all things, inasmuch as in everything the totality of the world and its transcendental basis is presupposed by virtue of their being and correlation. The unity of our personal life amidst the multiplicity of its functions is the symbol of God's immanence in the world, though we may not conceive of the Absolute as a person. The idea of the world as the totality of being is, like the correlative idea of God, only of regulative value; it is transcendent, as we never do more than make approaches to a knowledge of the sum of being. The one idea is the transcendental *terminus a quo* and the other the transcendental *terminus ad quem* of all knowledge. But though the world cannot be exhaustively known it can be known very extensively, and though the positive idea of God must always remain unattainable we are able to reject those ideas which involve a contradiction of the postulate of the Absolute. Thus the pantheistic and the theistic conceptions of God as the supreme power, as the first cause, as a person, are alike unallowable, since they all bring God within the sphere of antithesis and preclude His absolute unity. On the other hand, the world can be known as the realm of antithesis, and it is the correlative of God. Though He may not be conceived as the absolute cause of the world, the idea of absolute causality as symbolized in it may be taken as the best approximate expression of the contents of the religious consciousness. The unbroken connexion of cause and effect throughout the world becomes thus a manifestation of God. God is to be sought only in ourselves and in the world. He is completely immanent in the universe. It is impossible that His causality should have any other sphere than the world, which is the totality of being. "No God without a world, and no world without God." The divine omnipotence is quantitatively represented by the sum of the forces of nature, and qualitatively distinguished from them only as the unity of infinite causality from the multiplicity of its finite phenomena. Throughout the world—not excepting the realm of mind—absolute necessity prevails. As a whole the world is as good and perfect as a world could possibly be, and everything in it, as occupying its necessary place in the whole, is also good, evil being only the necessary limitation of individual being.

Schleiermacher's psychology takes as its basis the phenomenal dualism of the ego and the non-ego, and regards the life of man as the interaction of these elements with their interpenetration as its infinite destination. The dualism is therefore not absolute, and, though present in man's own constitution as composed of body and soul, is relative only even there. The ego is itself both body and soul—the conjunction of both constitutes it; our "organization" or sense nature has its intellectual element, and our "intellect" its organic element. There is no such thing as "pure mind" or "pure body." The one general function of the ego, thought, becomes in relation to the non-ego either receptive or spontaneous action, and in both forms of action its organic, or sense, and its intellectual energies co-operate; and in relation to man, nature and the universe the ego gradually finds its true individuality by becoming a part of them, "every extension of consciousness being higher life." The specific functions of the ego, as determined by the relative predominance of sense or intellect, are either functions of the senses (or organism) or functions of the intellect. The former fall into the two classes of feelings (subjective) and perceptions (objective); the latter, according as the receptive or the spontaneous element predominates, into cognition and volition. In cognition being is the object and in volition it is the purpose of thought: in the first case we receive (in our fashion) the object of thought into ourselves; in the latter we plant it out into the world. Both cognition and volition are functions of thought as well as forms of moral action. It is in those two functions that the real life of the ego is manifested, but behind them is *self-consciousness* permanently present, which is always both subjective and objective—consciousness of ourselves and of the non-ego. This self-consciousness is the third special form or function of thought—which is also called feeling and immediate knowledge. In it we cognise our own inner life as affected by the non-ego. As the non-ego helps or hinders, enlarges or limits, our inner life, we feel pleasure or pain. Aesthetic, moral and religious feelings are respectively produced by the reception into consciousness of large ideas—nature, mankind and the world; those feelings are the sense of being one with these vast objects. Religious feeling therefore is the highest form of thought and of life; in it we are conscious of our unity with the world and God; it is thus the sense of absolute dependence. Schleiermacher's doctrine of knowledge accepts the fundamental principle of Kant that knowledge is bounded by experience, but it seeks to remove Kant's scepticism as to knowledge of the *Ding an sich*, or *Sein*, as Schleiermacher's term is. The idea of knowledge or scientific thought as distinguished from the passive form of thought—of aesthetics and religion—is thought which is produced by all thinkers in the same form and which corresponds to being. All knowledge takes the form of the concept (*Begriff*) or the judgment (*Urtheil*), the former conceiving the variety of being as a definite unity and plurality, and the latter simply connecting the concept with certain individual objects. In the concept therefore the intellectual and in the judgment the organic or sense element predominates. The universal uniformity of the production of judgments presupposes the uniformity of our relations to the outward world, and the uniformity of concepts rests similarly on the likeness of our inward nature. This uniformity is not based on the sameness of either the intellectual or the organic functions alone, but on the correspondence of the forms of thought and sensation with the forms of being. The essential nature of the concept is that it combines the general and the special, and the same combination recurs in being; in being the system of substantial or permanent forms answers to the system of concepts and the relation of cause and effect to the system of judgments, the higher concept answering to "force" and the lower to the phenomena of force, and the judgment to the contingent interaction of things. The sum of being consists of the two systems of substantial forms and interactional relations, and it reappears in the form of concept and judgment, the concept representing being and the judgment being in action. Knowledge has under both forms the same object, the relative difference of the two being that when the conceptual form predominates we have speculative science and when the form of judgment prevails we have empirical or historical science. Throughout the domain of knowledge the two forms are found in constant mutual relations, another proof of the fundamental unity of thought and being or of the objectivity of knowledge. It is obvious that Plato, Spinoza and Kant had contributed characteristic elements of their thought to this system, and directly or indirectly it was largely indebted to Schelling for fundamental conceptions.

Ethics.—Next to religion and theology it was to the moral world, of which, indeed, the phenomena of religion and theology were in his systems only constituent elements, that he specially devoted himself. In his earlier essays he endeavoured to point out the defects of ancient and modern ethical thinkers, particularly of Kant and Fichte, Plato and Spinoza only finding favour in his eyes. He failed to discover in previous moral systems any necessary basis in thought, any completeness as regards the phenomena of moral action, any systematic arrangement of its parts and any clear and distinct treatment of specific moral acts and relations. His own moral system is an attempt to supply these deficiencies. It connects the moral world by a deductive process with the fundamental idea of knowledge and being; it offers a view of the entire world of human action which at all events aims at being exhaustive; it presents an arrangement of the matter of the science which tabulates its constituents after the model of the physical sciences; and it supplies a sharply defined treatment of specific moral phenomena in their relation to the fundamental idea of human life as a whole. Schleiermacher defines ethics as the theory of the nature of the reason, or as the scientific treatment of the effects produced by human reason in the world of nature and man. As a theoretical or speculative science it is purely descriptive and not practical, being correlated on the one hand to physical science and on the other to history. Its method is the same as that of physical science, being distinguished from the latter only by its matter. The ontological basis of ethics is the unity of the real and the ideal, and the psychological and actual basis of the ethical process is the tendency of reason and nature to unite in the form of the complete organization of the latter by the former. The end of the ethical process is that nature (*i.e.* all that is not mind, the human body as well as external nature) may become the perfect symbol and organ of mind. Conscience, as the subjective expression of the presupposed identity of reason and nature in their bases, guarantees the practicability of our moral vocation. Nature is preordained or constituted to become the symbol and organ of mind, just as mind is endowed with the impulse to realize this end. But the moral law must not be conceived under the form of an "imperative" or a "*Sollen*"; it differs from a law of nature only as being descriptive of the fact that it ranks the mind as conscious will, or *zweckdenkend*, above nature. Strictly speaking, the antitheses of good and bad and of free and necessary have no place in an ethical system, but simply in history, which is obliged to compare the actual with the ideal, but as far as the terms "good" and "bad" are used in morals they express the rule or the contrary of reason, or the harmony or the contrary of the particular and the general. The idea of "free" as opposed to necessary expresses simply the fact that the mind can propose to itself ends, though a man cannot alter his own nature. In contrast to Kant and Fichte and modern moral philosophers

Schleiermacher reintroduced and assigned pre-eminent importance to the doctrine of the *summum bonum*, or highest good. It represents in his system the ideal and aim of the entire life of man, supplying the ethical view of the conduct of individuals in relation to society and the universe, and therewith constituting a philosophy of history at the same time. Starting with the idea of the highest good and of its constituent elements (*Güter*), or the chief forms of the union of mind and nature, Schleiermacher's system divides itself into the doctrine of moral ends, the doctrine of virtue and the doctrine of duties; in other words, as a development of the idea of the subjection of nature to reason it becomes a description of the actual forms of the triumphs of reason, of the moral power manifested therein and of the specific methods employed. Every moral good or product has a fourfold character: it is individual and universal; it is an organ and symbol of the reason, that is, it is the product of the individual with relation to the community, and represents or manifests as well as classifies and rules nature. The first two characteristics provide for the functions and rights of the individual as well as those of the community or race. Though a moral action may have these four characteristics at various degrees of strength, it ceases to be moral if one of them is quite absent. All moral products may be classified according to the predominance of one or the other of these characteristics. Universal organizing action produces the forms of intercourse, and universal symbolizing action produces the various forms of science; individual organizing action yields the forms of property and individual symbolizing action the various representations of feeling, all these constituting the relations, the productive spheres, or the social conditions of moral action. Moral functions cannot be performed by the individual in isolation but only in his relation to the family, the state, the school, the church, and society -all forms of human life which ethical science finds to its hand and leaves to the science of natural history to account for. The moral process is accomplished by the various sections of humanity in their individual spheres, and the doctrine of virtue deals with the reason as the moral power in each individual by which the totality of moral products is obtained. Schleiermacher classifies the virtues under the two forms of *Gesinnung* and *Fertigheit*, the first consisting of the pure ideal element in action and the second the form it assumes in relation to circumstances, each of the two classes falling respectively into the two divisions of wisdom and love and of intelligence and application. In his system the doctrine of duty is the description of the method of the attainment of ethical ends, the conception of duty as an imperative, or obligation, being excluded, as we have seen. No action fulfils the conditions of duty except as it combines the three following antitheses: reference to the moral idea in its whole extent and likewise to a definite moral sphere; connexion with existing conditions and at the same time absolute personal production; the fulfilment of the entire moral vocation every moment though it can only be done in a definite sphere. Duties are divided with reference to the principle that every man make his own the entire moral problem and act at the same time in an existing moral society. This condition gives four general classes of duty: duties of general association or duties with reference to the community (*Rechtspflicht*), and duties of vocation (*Berufspflicht*)—both with a universal reference, duties of the conscience (in which the individual is sole judge), and duties of love or of personal association. It was only the first of the three sections of the science of ethics—the doctrine of moral ends—that Schleiermacher handled with approximate completeness; the other two sections were treated very summarily. In his *Christian Ethics* he dealt with the subject from the basis of the Christian consciousness instead of from that of reason generally; the ethical phenomena dealt with are the same in both systems, and they throw light on each other, while the Christian system treats more at length and less aphoristically the principal ethical realities—church, state, family, art, science and society. Rothe, amongst other moral philosophers, bases his system substantially, with important departures, on Schleiermacher's. In Beneke's moral system his fundamental idea was worked out in its psychological relations.

Religious System.—From Leibnitz, Lessing, Fichte, Jacobi and the Romantic school he had imbibed a profound and mystical view of the inner depths of the human personality. The ego, the person, is an individualization of universal reason; and the primary act of self-consciousness is the first conjunction of universal and individual life, the immediate union or marriage of the universe with incarnated reason. Thus every person becomes a specific and original representation of the universe and a compendium of humanity, a microcosmos in which the world is immediately reflected. While therefore we cannot, as we have seen, attain the idea of the supreme unity of thought and being by either cognition or volition, we can find it in our own personality, in immediate self-consciousness or (which is the same in Schleiermacher's terminology) feeling. Feeling in this higher sense (as distinguished from "organic" sensibility, *Empfindung*), which is the minimum of distinct antithetic consciousness, the cessation of the antithesis of subject and object, constitutes likewise the unity of our being, in which the opposite functions of cognition and volition have their fundamental and permanent background of personality and their transitional link. Having its seat in this central point of our being, or indeed consisting in the essential fact of self-consciousness, religion lies at the basis of all thought and action. At various periods of his life Schleiermacher used different terms to represent the character and relation of religious feeling. In his earlier days he called it a feeling or intuition of the universe, consciousness of the unity of reason and nature, of the infinite and the eternal within the finite and the temporal. In later life he described it as the feeling of absolute dependence, or, as meaning the same thing, the consciousness of being in relation to God. In our consciousness of the world the feelings of relative dependence and relative independence are found; we are acted upon, but we also react. In our religious consciousness the latter element is excluded, and everything within and without us is referred to its absolute cause, that is, God. But, when we call this absolute cause God, the name stands solely as indicating the unknown *source* of our receptive and active existence; on the one hand it means that the world upon which we can react is not the source of the feeling, on the other, that the Absolute is not an object of thought or knowledge. This feeling of absolute dependence can arise only in combination with other forms of consciousness. We derive the idea of a totality by means of its parts, and the transcendental basis of being comes to us through the agency of individual phenomena. As in every affection of our being by individual phenomena we are brought into contact with the whole universe, we are brought into contact with God at the same time as its transcendental cause. This religious feeling is not knowledge in the strict sense, as it is purely subjective or immediate; but it lies at the basis of all knowledge. As immediate knowledge, however, it is no more than the consciousness of the unity of the world, a unity which can never be reached by human inquiry. Religious truths, such as the determination of all things by God, are simply the implications of the feeling of absolute dependence. While that feeling is the characteristic of religion generally, this assumes various forms as the religions of the world. The so-called natural as distinguished from positive religion, or the religion of reason, is a mere abstraction. All religions are positive, or their characteristics and value are mainly determined by the manner in which the world is conceived and imagined. But these varying conceptions with their religious meaning become religiously productive only in the souls of religious heroes, who are the authors of new religions, mediators of the religious life, founders of religious communities. For religion is essentially social. It everywhere forms churches, which are the necessary instruments and organs of its highest life. The specific feature of Christianity is its mediatorial element, its profound feeling of the striving of the finite individual to reach the unity of the infinite whole, and its conception of the way in which Deity deals with this effort by mediatorial agencies, which are both divine and human. It is the religion of mediatorial salvation, and, as Schleiermacher emphatically taught in his riper works, of salvation through the mediation of Christ; that is, its possessors are conscious of having been delivered by Jesus of Nazareth from a condition in which their religious consciousness was overridden by the sense-consciousness of the world and put into one in which it dominates, and everything is subordinated to it. The consciousness of being saved in this sense is now transmitted and mediated by the Christian church, but in the case of Jesus, its originator, it was an entirely new and original factor in the process of religious development, and in so far, like every new and higher stage of being, a supernatural revelation. It was at the same time a natural attainment, in as far as man's nature and the universe were so constituted as to involve its production. The appearance of the Saviour in human history is therefore as a divine revelation neither absolutely supernatural nor absolutely beyond reason, and the controversy of the 18th century between the rationalists and supernaturalists rests on false grounds, leads to wrong issues, and each party is right and wrong (see RATIONALISM). As regards Christian theology, it is not its business to formulate and establish a system of objective truth, but simply to present in a clear and connected form a given body of Christian faith as the contents of the Christian consciousness. Dogmatic theology is a connected and accurate account of the doctrine held at a particular time in a given section of the Christian church. But such doctrines as constitute no integral part of the Christian consciousness—*e.g.* the doctrine of the Trinity—must be excluded from the theological system of the evangelical theologian. As regards the relation of theology and philosophy, it is not one of dependence or of opposition on either side, but of complete independence, equal authority, distinct functions and perfect harmony. Feeling is not a mental function subordinate to cognition or volition, but of equal rank and authority; yet feeling, cognition and volition alike conduct to faith in the unknown Absolute, though by different paths and processes.

The marked feature of Schleiermacher's thought in every department is the effort to combine and reconcile in the unity of a system the antithetic conceptions of other thinkers. He is realistic and idealistic, individualistic and universalistic, monistic and dualistic, sensationalist and intellectualist, naturalist and supernaturalist, rationalist and mystic, gnostic and agnostic. He is the prince of the *Vermittler* in philosophy, ethics, religion and theology. But he does not seek to reconcile the antitheses of thought and being by weakening and hiding the points of difference; on the contrary, he brings them out in their sharpest outlines. His method is to

distinctly define the opposing elements and then to seek their harmonious combination by the aid of a deeper conception. Apart from the positive and permanent value of the higher unities which he succeeds in establishing, the light and suggestiveness of his discussions and treatment of the great points at issue in all the principal fields of human thought, unsatisfactory as many of his positions may be considered, make him one of the most helpful and instructive of modern thinkers. And, since the focus of his almost universal thought and inquiry and of his rich culture and varied life was religion and theology, he must be regarded as the classical representative of modern effort to reconcile science and philosophy with religion and theology, and the modern world with the Christian church.

Schleiermacher's collected works were published in three sections: (1) Theological (11 vols.); (2) Sermons (10 vols., ed. 1873–1874, 5 vols.); (3) Philosophical and Miscellaneous (9 vols., Berlin, 1835–1864). His *Pädagogische Schriften* were separately published by Platz (3rd ed., 1902). Of lives of him the best are his own correspondence. *Aus Schleiermachers Leben in Briefen*, published by W. Dilthey (Berlin, 1858–1863, in 4 vols., Eng. trans. by Rowan); *Leben Schleiermachers* by Dilthey (vol. i., 1870, the period from 1768–1804); *Friedrich Schleiermacher, ein Lebens- u. Charakterbild*, by D. Schenkel (Elberfeld, 1868); a selection of the letters by M. Rade (Jena, 1906). See also E. von Willick, *Aus Schleiermachers Hause, Jugenderinnerungen seines Stiefsohnes* (1909). The accounts and critiques of his philosophy, ethics and theology are numerous; some of the most valuable are: J. Schaller, *Vorlesungen über Schleiermacher* (Halle, 1844); G. Weisenborn, *Darstellung und Kritik der Schleiermacher'schen Glaubenslehre* (1849); F. Vorländer, *Schleiermachers Sittenlehre* (Marburg, 1851); W. Bender, *Schleiermachers Theologie mit ihren philosophischen Grundlagen* (1876–1878); O. Ritschl, *Schleiermachers Stellung zum Christentum in seinen Reden über die Religion* (1888); and *Schleiermachers Theorie von der Frömmigkeit* (1897); O. Kirn, *Schleiermacher und die Romantik* (1895); H. Bleek, *Die Grundlagen der Christologie Schleiermachers* (1898); M. Fischer, *Schleiermacher* (1899); Lulmann, *Das Bild des Christentums bei den grossen deutschen Idealisten* (1901), and *Schleiermacher der Kirchenvater der 19. Jahrhunderts* (1907); Stephan, *Die Lehre Schleiermacher von der Erlösung* (1901); Theile, *Schleiermachers Theologie und ihre Bedeutung für die Gegenwart* (1903); G. Thimme, *Die religionsphilosophischen Prämissen der Schleiermacher'schen Glaubenslehre* (1901); H. Sueskind, *Der Einfluss Schellings auf die Entwicklung von Schleiermachers System* (1909); F. Kattenbusch, *Von Schleiermacher zu Ritschl* (1903); E. Cramaussel, *La Philosophie religieuse de Schleiermacher* (1909). See also the histories of philosophy and theology by Zeller, Ueberweg, Chalybäus, Dorner, Gass, Lichtenberger (Eng. trans., 1889), Pfleiderer (Eng. trans., 1890), and the articles in Herzog-Hauck's *Realencyk.* (O. Kirn), and *Allgem. deutsche Biog.* (W. Dilthey). (J. F. S.; X.)

SCHLEIZ, a town of Germany, second capital of the principality of Reuss, Younger Line, situated in a fertile district on the river Wiesenthal, 20 m. by rail N.W. of Plauen. Pop. (1905) 5577. It has a palace, with a chapel and a library, three churches, one of them containing the burial vaults of the princes, several educational establishments, and various small industries such as the manufacture of hosiery, toys, sweetmeats and lamps. It has a market for cattle and pigs.

Schleiz was originally a Slav settlement, but received civic privileges in 1359. There was a settlement of the Teutonic Order here, and for some years previous to 1848 the town was the capital of the small principality of Reuss-Schleiz. In the vicinity a battle was fought, on the 9th of October 1806, between the French and the Prussians.

See Alberti, *Aus vergangenen Tagen des Reussenlandes und der Stadt Schleiz* (Schleiz, 1896).

SCHLESWIG (Dan. *Slesvig*), a town of Germany, capital of the Prussian province of Schleswig-Holstein. It is situated at the west end of the long narrow arm of the sea called the Schlei, 30 m. to the N.W. of Kiel on the railway from Hamburg to Vamdrup, on the Danish frontier. Pop. (1905) 19,032. The town consists mainly of a single street, 3½ m. long, forming a semicircle round the Schlei, and is divided into the old town (Altstadt), Holm, Lollfuss, and Friedrichsberg. The church of St Peter, erected about 1100 and renewed in the Gothic style in the 15th century, has a lofty steeple (365 ft.) and contains a very fine carved oak reredos by Hans Brüggemann, which is regarded as the most valuable work of art in Schleswig-Holstein. Between Friedrichsberg and Lollfuss on an island between the Schlei and Burg See is the old château of Gottorp, now used as barracks. The former commercial importance of the town has disappeared, and the Schlei now affords access to small vessels only. Fishing, tanning, flour-milling and brewing are the chief industries.

Schleswig (ancient forms *Sliesthorp, Sliaswic, i.e.* the town or bay of the Slia or Schlei) is a town of very remote origin, and seems to have been a trading place of considerable importance as early as the 9th century. It served as a medium of commercial intercourse between the North Sea and the Baltic, and was known to the Arabian geographers. The first Christian church in this district was built here by Ansgarius (d. 865), and it became the seat of a bishop about a century later. The town, which obtained civic rights in 1200, also became the seat of the dukes of Schleswig, but its commerce gradually dwindled owing to the rivalry of Lübeck, the numerous wars in which the district was involved, and the silting up of the Schlei. At the partition of 1544 the old château of Gottorp, originally built in 1160 for the bishop, became the residence of the Gottorp line of the Schleswig-Holstein family, which remained here till expelled by the Danish king Frederick IV. in 1713. From 1731 to 1846 it was the seat of the Danish governor of the duchies. In the wars of 1848 and 1864 Schleswig was an important strategical point on account of its proximity to the Dannewerk (*q.v.*) and was occupied by the different contending parties in turn. It has been the capital of Schleswig-Holstein since its incorporation by Prussia in 1864.

See Sach, *Geschichte der Stadt Schleswig* (Schleswig, 1875); and Jensen, *Schleswig und Umgebung* (Schleswig, 1905).

SCHLESWIG-HOLSTEIN, a province in the north-west of Prussia, formed out of the once Danish duchies of Schleswig, Holstein and Lauenburg, and bounded W. by the North Sea, N. by Denmark (Jutland), E. by the Baltic Sea, Lübeck and Mecklenburg, and S. by the lower course of the Elbe (separating it from Hanover). It thus consists of the southern half of the Cimbric peninsula, and forms the connecting link between Germany and Denmark. (For map, see DENMARK.) In addition to the mainland, which decreases in breadth from south to north, the province includes several islands, the most important being Alsen and Fehmarn in the Baltic, and Röm, Sylt and Föhr of the North Frisian chain in the North Sea. The total area of the province is 7338 sq. m., 450 of which belong to the small duchy of Lauenburg in the S.E. corner, while the rest are divided almost equally between Holstein to the south of the Eider and Schleswig to the north of it. From north to south the province is about 140 m. long, while its breadth varies from 90 m. in Holstein to 35 m. at the narrower parts of Schleswig.

Schleswig-Holstein belongs to the great North-German plain, of the characteristic features of which it affords a faithful reproduction in miniature, down to the continuation of the Baltic ridge or plateau by a range of low wooded hills skirting its eastern coast and culminating in the Bungsberg (538 ft.), a little to the north of Eutin. This hilly district contains the most productive land in the province, the soil consisting of diluvial drift or boulder clay. The central part of the province forms practically a continuation of the great Lüneburg Heath, and its thin sandy soil is of little use for cultivation. Along the west coast extends the "Marshland," a belt of rich alluvial soil formed by the deposits of the North Sea, and varying in breadth from 5 to 15 m. It is seldom more than a few feet above the sea-level, while at places it is below it, and it has consequently to be defended by an extensive system of dykes or embankments resembling those of Holland.

The more ancient geological formations are scarcely met with in Schleswig-Holstein. The contrast between the two coast-lines of the province is marked. The Baltic coast has generally steep well-defined banks and is irregular, being pierced by numerous long and narrow inlets (*Föhrden*) which often afford excellent harbours. The islands of Alsen and Fehmarn are separated from the coast by narrow channels. The North Sea coast is low and flat, and its smooth outline is interrupted only by the estuary of the Eider and the peninsula of Eiderstedt. Dunes or sand-hills, though rare on the protected mainland, occur on Sylt and other islands, while the small flat islands called *Halligen* are being washed away where not defended by dykes. The numerous islands on the west coast probably formed part of the peninsula at no remote period, and the sea between them and the mainland is shallow and full of sandbanks.

The climate of Schleswig-Holstein is mainly determined by the proximity of the sea, and the mean annual temperature, varying from 45° F. in the north to 49° F. in the south, is rather higher than is usual in the same latitude. Rain and fog are frequent, but the climate is on the whole healthy. The Elbe forms the southern boundary of Holstein for 65 m., but the only river of importance

within the province is the Eider, which rises in Holstein, and after a course of 120 m. falls into the North Sea, forming an estuary 3 to 12 m. in breadth. It is navigable from its mouth as far as Rendsburg, which is on the Kaiser Wilhelm (Kiel-Elbe) canal, which intersects Holstein. There are numerous lakes in north-east Holstein, the largest of which are the Plöner See (12 sq. m.) and the Selenter See (9 sq. m.).

Of the total area of the province 57 % is occupied by tilled land, 22 % by meadows and pastures, and barely 7 % by forests. The ordinary cereals are all cultivated with success and there is generally a considerable surplus for export. Rape is grown in the marsh lands and flax on the east coast, while large quantities of apples and other fruit are raised near Altona for the Hamburg and English markets. The marsh lands afford admirable pasture, and a greater proportion of cattle (65 per 100 inhabitants) is reared in Schleswig-Holstein, mainly by small owners, than in any other Prussian province. Great numbers of cattle are exported to England. The Holstein horses are also in request, but sheep-farming is comparatively neglected. Bee-keeping is a productive industry. The hills skirting the bays of the Baltic coast are generally pleasantly wooded, but the forests are nowhere of great extent except in Lauenburg. The fishing in the Baltic is productive; Eckernförde is the chief fishing station in Prussia. The oysters from the beds on the west coast of Schleswig are widely known under the misnomer of "Holstein natives." The mineral resources are almost confined to a few layers of rock-salt near Segeberg. The more important industrial establishments, such as iron foundries, machine works, tobacco and cloth factories, are mainly confined to the large towns, such as Altona, Kiel and Flensburg. The shipbuilding of Kiel and other seaports, however, is important; and lace is made by the peasants of north Schleswig. The commerce and shipping of Schleswig-Holstein, stimulated by its position between two seas, as well as by its excellent harbours and waterways, are much more prominent than its manufactures. Kiel is one of the chief seaports of Prussia, while oversea trade is also carried on by Altona and Flensburg. The main exports are grain, cattle, horses, fish and oysters, in return for which come timber, coal, salt, wine and colonial produce.

The population of the province in 1905 was 1,504,248, comprising 1,454,526 Protestants, 41,227 Roman Catholics and 3270 Jews. The urban and rural communities are in the proportion of 4 to 6. The great bulk of the Holsteiners and a large proportion of the Schleswigers are of genuine German stock, but of the 148,000 inhabitants in the north part of Schleswig 139,000 are Danish-speaking. Among the Germans the prevalent tongue is Low German, but the North Frisians on the west coast of Schleswig and the North Sea islands (about 19,000 in all) still speak a Frisian dialect, which, however, is dying out. The peninsula of Angeln, between the Gulf of Flensburg and the Schlei, is supposed to have been the original seat of the English, and observers profess to see a striking resemblance between this district and the counties of Kent and Surrey. The peasants of Dithmarschen in the south-west also retain many of their ancient peculiarities. The boundary between the Danish and German languages is approximately a line running from Flensburg south-west to Joldelund and thence north-west to Tondern and the North Sea coast; not more than 15 % of the entire population of the province speak Danish as their mother-tongue, but the proportion is far larger for Schleswig alone, where there is also a considerable bilingual population. The chief educational institution in Schleswig-Holstein is the university of Kiel.

Schleswig is the official capital of the province, but Altona and Kiel are the largest towns, the latter being the chief naval station of Germany. Kiel and Friedrichsort are fortified, but the old lines of Düppel have been dismantled. The province sends 10 members to the Reichstag and 19 to the Prussian Abgeordnetenhaus (house of deputies). The provincial estates meet in Rendsburg.

For the history of the duchies of Schleswig and Holstein see SCHLESWIG-HOLSTEIN QUESTION below.

SCHLESWIG-HOLSTEIN QUESTION, the name given to the whole complex of diplomatic and other issues arising in the 19th century out of the relations of the two "Elbe duchies," Schleswig and Holstein, to the Danish crown on the one hand and the German Confederation on the other, which came to a crisis with the extinction of the male line of the reigning house of Denmark by the death of King Frederick VII. on the 15th of November 1863. The central question was whether the two duchies did or did not constitute an integral part of the dominions of the Danish crown, with which they had been more or less intimately associated for centuries. This involved the purely legal question, raised by the death of the last common male heir to both Denmark and the duchies, as to the proper succession in the latter, and the constitutional questions arising out of the relations of the duchies to the Danish crown, to each other, and of Holstein to the German Confederation. There was also the national question: the ancient racial antagonism between German and Dane, intensified by the tendency, characteristic of the 19th century, to the consolidation of nationalities. Lastly, there was the international question: the rival ambitions of the German powers involved, and beyond them the interests of other European states, notably that of Great Britain in preventing the rise of a German sea-power in the north.

To take the racial question first, from time immemorial the country north of the Elbe had been the battle-ground of Danes and Germans. Danish scholars point to the prevalence of Danish place-names [1] far southward into the German-speaking districts as evidence that at least the whole of Schleswig was at one time Danish; German scholars claim it, on the other hand, as essentially German. That the duchy of Schleswig, or South Jutland (Sönderjylland), had been from time immemorial a Danish fief was, indeed, not in dispute, nor was the fact that Holstein had been from the first a fief of the Germano-Roman Empire. The controversy in the 19th century raged round the ancient "indissoluble" union of the two duchies, and the inferences to be drawn from it; the "Eider Danes" [2] claimed Schleswig as an integral part of the Danish monarchy, which, on the principle of the union, involved the retention of Holstein also; the Germans claimed Holstein as a part of Germany and, therefore, on the same historic principle, Schleswig also. The history of the relations of Schleswig and Holstein thus became of importance in the practical political question.

Early history of the duchies.

Though the designation of Schleswig-Holstein, implying the fusion of the duchies of Schleswig and Holstein in a single Prussian province, only dates from 1866, the history of the duchies has since the 14th century been so closely interwoven that it is impossible to treat them separately. Something must, however, be said about their origins and their separate history up to the time of their first union under the Holstein counts.

Mark of Schleswig.

When it first appears in history South Jutland was inhabited by mingled Cimbri, Angles, Jutes and Frisians, upon whom the Danes exercised an unceasing pressure from the north. To the south of Schleswig what is now Holstein was inhabited mainly by Saxons, pressed upon from the east by the Wends and other Slavonic races. These Saxons were the last of their nation to submit to Charlemagne (804), who put their country under Frankish counts, the limits of the Empire being pushed in 810 as far as the Schlei in Schleswig. Then began the secular struggle between the Danish kings and the German emperors, and in 934 the German king Henry I. established the Mark of Schleswig (*Limes Danarum*) between the Eider and the Schlei as an outpost of Germany against the Danes. South of this raged the contest between Germans and Slavs. The latter, conquered and Christianized, rose in revolt in 983, after the death of the emperor Otto II., and for a while reverted to paganism and independence. The Saxon dukes, however, continued to rule central Holstein, and when Lothair of Süpplingenburg became duke of Saxony (1106), on the extinction of the Billung line, he invested Adolf I. of Schauenburg with the countship of Holstein. Adolf I.'s son, Adolf II. (1128–1164), succeeded in reconquering the Slavonic Wagri and founded the city and see of Lübeck to hold them in check. Adolf III. (d. 1225), his successor, received Dithmarschen in fee from the emperor Frederick I., but in 1203 the fortunes of war compelled him to surrender Holstein to Valdemar II. of Denmark, the cession being confirmed by the emperor Frederick II. in 1214 and the pope in 1217. Valdemar appointed Albert of Orlamünde his lieutenant in Holstein, and the Schleswig-Holstein question might have been thus early settled but for Valdemar's ill fortune in being taken prisoner in 1223. During his captivity Albert of Orlamünde was beaten at Mölln by Count Adolf III., to whom Valdemar restored his countship as the price of his own release. A papal dispensation from oaths taken under duress excused a new war; but Valdemar himself was beaten at Bornhövede on the 22nd of July 1227, and Holstein was permanently secured to the house of Schauenburg. After the death of Adolf IV.

Countship of Holstein.

[1] *I.e.* place-names according to popular usage, not the official names given in German maps (*e.g.* Hadersley for Hadersleben). See *La Question du Slesvig*, p. 61 seq., "Noms de lieux."

[2] *I.e.* the party at Copenhagen which aimed at making the Eider, the southern boundary of Schleswig, the frontier of the Danish kingdom proper.

in 1261, Holstein was split up into several countships by his sons and grandsons: the lines of Kiel, Plön, Schauenburg-Pinneberg and Rendsburg.

In 1232 King Valdemar II., who had retained the former German Mark north of the Eider, erected South Jutland (Schleswig) into a duchy for his second son, Abel. On the death of the latter's descendant, Duke Eric, in 1319, Christopher II. of Denmark attempted to seize the duchy, the heir of which, Valdemar V., was a minor; but Valdemar's guardian and uncle, Gerhard III. of Holstein-Rendsburg (1304–1340), surnamed "the Great" and a notable warrior, drove back the Danes and, Christopher having been expelled, succeeded in procuring the election of Valdemar to the Danish throne. His reward was the duchy of Schleswig and the famous charter, known as the *Constitutio Valdemariana*, which laid down the principle that the duchy of South Jutland was never to be incorporated in the kingdom of Denmark or ruled by the same sovereign (7 June 1326). Thus Schleswig and Holstein were for the first time united. The union was, indeed, as yet precarious. In 1330 Christopher II. was restored to his throne and Valdemar V. to his duchy, Gerhard having to be content with the reversion in the case of the duke dying without issue. Gerhard, however, was assassinated in 1340 by a Dane, and it was not till 1375, when the male lines both in the kingdom and the duchy became extinct by the deaths of King Valdemar IV. and Duke Valdemar V., that the counts of Holstein seized on their inheritance, assuming at the same time the style of "lords of Jutland." In 1386 Queen Margaret allowed their claim in return for the usual homage and promise of feudal service, and directed that one of their number should be elected duke of Schleswig. The choice fell on Gerhard VI., grandson of Gerhard III. of Rendsburg, who after the extinction of the line of Kiel (1390) obtained in 1403 the whole of the countship of Holstein, except the small Schauenburg territories. With this begins the history of the union of Schleswig and Holstein.

Duchy of Schleswig or South Jutland.

The Constitutio Valdemariana, 1326.

Union of Schleswig and Holstein.

Gerhard VI. died in 1404, and soon afterwards war broke out between his sons and Eric of Pomerania, Margaret's successor on the throne of Denmark, who claimed South Jutland as an integral part of the Danish monarchy, a claim formally recognized by the emperor Sigismund in 1424.[1] It was not till 1440 that the struggle ended with the investiture of Count Adolf VIII., Gerhard's son, with the hereditary duchy of Schleswig by Christopher III. of Denmark. On the death of Christopher eight years later, Adolf's influence secured the election of his nephew Count Christian of Oldenburg to the vacant throne.

On the death of Adolf in 1459 without issue, King Christian I., though he had been forced to swear to the *Constitutio Valdemariana*, succeeded in asserting his claim to Schleswig in right of his mother, Adolf's sister. Instead of incorporating South Jutland with the Danish kingdom, however, he preferred to take advantage of the feeling of the estates in Schleswig and Holstein in favour of union to secure both countries. On Schleswig the Schauenburg counts had no claim; their election in Holstein would have separated the countries, and it was easy therefore for Christian to secure his election both as duke of Schleswig and count of Holstein (5 March 1460). The price he paid was a charter of privileges, issued first at Ribe and afterwards at Kiel, in which he promised to preserve the countries for ever as "one and indivisible," and conceded to the estates the right to refuse to elect as count and duke any Danish prince who should not undertake, on becoming king, to confirm their privileges. By these privileges the union between South Jutland and Holstein, established under the Schauenburg line, was officially recognized. For external affairs the two countries were to be regarded as one, the bishop of Lübeck and five "good men" elected by the estates of each country forming an advisory and executive council under the duke-count. For internal affairs duchy and county were to retain their separate estates and peculiar customs and laws. Above all, Holstein remained a German, Schleswig a Danish fief. The claims of the Schauenburg counts were surrendered for a money payment; it was not till 1640, however, that the extinction of their line brought Schauenburg itself to the Danish crown. Finally, in 1472 the emperor Frederick III. confirmed Christian I.'s overlordship over Dithmarschen, and erected Dithmarschen, Holstein and Stormarn into the duchy of Holstein.

King-dukes of the Oldenburg line.

Charter of Ribe, 1460. The "indissoluble union."

Duchy of Holstein, 1472.

On the death of King Frederick I. (1523–1533), under whom the Reformation had been introduced into the duchies,[2] occurred the first of several partitions of the inheritance of the house of Oldenburg; the elder son, Christian III., succeeding as king of Denmark, the younger, Adolphus (Adolf) I., founding the line of the dukes of Gottorp. In 1581 a further partition was made, by a compact signed at Flensburg, between King Frederick II. and his uncle Duke Adolphus I., under which the rights of overlordship in the various towns and territories of Schleswig were divided between them; the estates, however, remained undivided, and the king and duke ruled the country alternately. To make confusion worse confounded, Frederick II. in 1582 ceded certain lands in Hardersleben to his brother John, who founded the line of Schleswig-Sonderburg, and John's grandsons again partitioned this appanage, Ernest Günther (1609–1689), founding the line of Schleswig-Sonderburg-Augustenburg, and Augustus Philip (1612–1675) that of Schleswig-Beck-Glücksburg (known since 1825 as Holstein-Sonderburg-Glücksburg).

Subdivision of the duchies.

Meanwhile the Gottorp dukes were making themselves a great position in Europe. Frederick III., duke from 1616 to 1659, established the principle of primogeniture for his line, and the full sovereignty of his Schleswig dominions was secured to him by his son-in-law Charles X. of Sweden by the convention of Copenhagen (12 May 1658)[3] and to his son Christian Albert (d. 1694) by the treaty of Oliva, though it was not till after years of warfare that Denmark admitted the claim by the convention of Altona (30 June 1689). Christian Albert's son Frederick IV. (d. 1702) was again attacked by Denmark, but had a powerful champion in Charles XII. of Sweden, who secured his rights by the treaty of Travendal in 1700. Frederick was killed at the battle of Klissow in 1702, and his brother Christian Augustus acted as regent for his son Charles Frederick until 1718. In 1713 the regent broke the stipulated neutrality of the duchy in favour of Sweden, and Frederick IV. of Denmark seized the excuse to expel the duke by force of arms. Holstein was restored to him by the peace of Frederiksborg in 1720, but in the following year Frederick IV. was recognized as sovereign of Schleswig by the estates and by the princes of the Augustenburg and Glücksburg lines.

The dukes of Gottorp.

The situation was ultimately simplified by the marriage of Duke Charles Frederick with the tsarevna Anna Pavlovna, and the recognition in 1742 of their son Charles Peter Ulrich as cesarevitch by the empress Elizabeth of Russia. For Peter as duke of Gottorp, Adolphus Frederick, bishop of Lübeck, son of Christian Augustus, acted as regent until 1745; in 1751 he became king of Sweden.[4] But the rulers of Russia had no interest in maintaining their part of Holstein and their confused and disputed common rights in Jutland, and in 1767 the empress Catherine II. resigned them, by the treaty of Copenhagen, in the name of her son Paul, who confirmed this action on coming of age in 1773. Oldenburg and Delmenhorst, surrendered by the Danish king in compensation, were handed over to Frederick Augustus, bishop of Lübeck, the second son of Christian Augustus, who thus founded the younger line of the house of Gottorp. Schleswig and Holstein were thus once more united under the Danish king.

Russia resigns her rights in the duchies, 1767, 1773.

On the abolition of the Holy Roman Empire in 1806, Holstein was practically, though not formally, incorporated in Denmark. Under the administration of the Danish prime minister Count Bernstorff, himself from Schleswig, many reforms were carried out in the duchies, *e.g.* abolition of torture and of serfdom; at the same time Danish laws and coinage were introduced, and Danish was made the official language for communication with Copenhagen. Since, however, the Danish court itself at the time was largely German in language and feeling, this produced no serious expressions of resentment.

The Congress of Vienna, instead of settling the questions involved in the relations of the duchies of Denmark once for all,[5] sought to stereotype the old divisions in the interests of Germany. The settlement of 1806 was reversed, and while Schleswig remained as before, Holstein and Lauenburg were included in the new German Confederation. The opening up of the Schleswig-Holstein question thus became sooner or later inevitable. The Germans of Holstein, influenced by the new national enthusiasm evoked by the War of Liberation, resented more than ever the attempts of the government of Copenhagen to treat them as part of the Danish monarchy and, encouraged by the sympathy of the Germans in Schleswig, early tried to reassert in the interests of Germanism the old principle of the unity of the duchies. The political atmosphere, however, had changed at Copenhagen also; and their demands were met by the Danes with a nationalist temper as intractable as their own. Affairs were ripe for a crisis, which the threatened failure of the common male heirs to the kingdom and the duchies precipitated.

Congress of Vienna, 1815.

[1] *Question du Slesvig*, p. 78.

[2] The Church (Lutheran) was organized under a *Probst* (provost) and consistory, the king himself assuming the jurisdiction of *summus episcopus*.

[3] The king by a convention of the same date secured the full sovereignty for his own particular appanage in Schleswig. The attempt of the dukes of Gottorp to partition the actual government of the duchy broke on the opposition of the estates.

[4] Adolphus Frederick had renounced his rights in Schleswig by an agreement with the Danish king signed on the 25th of April 1750.

[5] The best solution, which afterwards had the support of Napoleon III., would have been to partition Schleswig on the lines of nationality, assigning the Danish part to Denmark, the German to Holstein. This idea, which subsequently had supporters both among Danes and Germans, proved impracticable later owing to the intractable temper of the majority on both sides. See *La Question de Slesvig*, p. 135 seq., "Historique de l'idée d'un partage du Slesvig."

When Christian VIII. succeeded his father Frederick VI. in 1839 the elder male line of the house of Oldenburg was obviously on the point of extinction, the king's only son and heir having no children. Ever since 1834, when joint consultative estates had been re-established for the duchies, the question of the succession had been debated in this assembly. To German opinion the solution seemed clear enough. The crown of Denmark could be inherited by female heirs; in the duchies the Salic law had never been repealed and, in the event of a failure of male heirs to Christian VIII., the succession would pass to the dukes of Augustenburg.[1] Danish opinion, on the other hand, clamoured for a royal pronouncement proclaiming the principle of the indivisibility of the monarchy and its transmission intact to a single heir, in accordance with the royal law. To this Christian VIII. yielded so far as to issue in 1846 letters patent declaring that the royal law in the matter of the succession was in full force so far as Schleswig was concerned, in accordance with the letters patent of August 22, 1721, the oath of fidelity of September 3, 1721, the guarantees given by France and Great Britain in the same year and the treaties of 1767 and 1773 with Russia. As to Holstein, he stated that certain circumstances prevented him from giving, in regard to some parts of the duchy, so clear a decision as in the case of Schleswig. The principle of the independence of Schleswig and of its union with Holstein were expressly reaffirmed. An appeal against this by the estates of Holstein to the German diet received no attention. The revolutionary year 1848 brought matters to a head. On the 28th of January, Christian VIII. issued a rescript proclaiming a new constitution which, while preserving the autonomy of the different parts of the country, incorporated them for common purposes in a single organization. The estates of the duchies replied by demanding the incorporation of Schleswig-Holstein, as a single constitutional state, in the German Confederation. Frederick VII., who had succeeded his father at the end of January, declared (March 4) that he had no right to deal in this way with Schleswig, and, yielding to the importunity of the Eider-Danish party, withdrew the rescript of January (April 4) and announced to the people of Schleswig (March 27) the promulgation of a liberal constitution under which the duchy, while preserving its local autonomy, would become an integral part of Denmark.

Question of the succession.

Meanwhile, however, the duchies had broken out into open insurrection; a provisional government had been established at Kiel; and the duke of Augustenburg had hurried to Berlin to secure the assistance of Prussia in asserting his rights. This was at the very crisis of the revolution in Berlin, and the Prussian government saw in the proposed intervention in Denmark in a popular cause an excellent opportunity for restoring its damaged prestige. Prussian troops were accordingly marched into Holstein; and, the diet having on the 12th of April recognized the provisional government of Schleswig and commissioned Prussia to enforce its decrees, General Wrangel was ordered to occupy Schleswig also.

Prussian intervention, 1848.

The principles which Prussia was commissioned to enforce as the mandatory of Germany were: (1) that they were independent states, (2) that their union was indissoluble, (3) that they were hereditary only in the male line. But the Germans had reckoned without the European powers, which were united in opposing any dismemberment of Denmark, even Austria refusing to assist in enforcing the German view. Swedish troops landed to assist the Danes; Nicholas I. of Russia, speaking with authority as representing the elder Gottorp line, pointed out to King Frederick William IV. the risks of a collision; Great Britain, though the Danes rejected her mediation, threatened to send her fleet to assist in preserving the *status quo*. Frederick William now ordered Wrangel to withdraw his troops from the duchies; but the general refused to obey, on the plea that he was under the command not of the king of Prussia but of the regent of Germany, and proposed that, at least, any treaty concluded should be presented for ratification to the Frankfort government. This the Danes refused; and negotiations were broken off. Prussia was now confronted on the one side by the German nation urging her clamorously to action, on the other side by the European powers with one voice threatening the worst consequences should she persist. After painful hesitation, Frederick William chose what seemed the lesser of two evils and, on the 26th of August 1848, Prussia signed at Malmoe a convention which yielded practically all the Danish demands. The Holstein estates appealed to the German parliament, which hotly took up their cause; but it was soon clear that the central government had no means of enforcing its views, and in the end the convention was ratified at Frankfort.

Attitude of the powers.

Convention of Malmoe.

The convention was only in the nature of a truce establishing a temporary *modus vivendi*, and the main issues, left unsettled, continued to be hotly debated. At a conference held in London in October, Denmark suggested an arrangement on the basis of a separation of Schleswig from Holstein, which was about to become a member of the new German empire, Schleswig to have a separate constitution under the Danish crown. This was supported by Great Britain and Russia and accepted by Prussia and the German government (27th January 1849). The negotiations broke down, however, on the refusal of Denmark to yield the principle of the indissoluble union with the Danish crown; on the 23rd of February the truce was at an end, and on the 3rd of April the war was renewed. At this point the tsar intervened in favour of peace; and Prussia, conscious of her restored strength and weary of the intractable temper of the Frankfort government, determined to take matters into her own hands. On the 10th of July 1849 another truce was signed; Schleswig, until the peace, was to be administered separately, under a mixed commission, Holstein was to be governed by a vicegerent of the German empire—an arrangement equally offensive to German and Danish sentiment. A settlement seemed as far off as ever; the Danes still clamoured for the principle of succession in the female line and union with Denmark, the Germans for that of succession in the male line and union with Holstein. In utter weariness Prussia proposed, in April 1850, a definitive peace on the basis of the *status quo ante bellum* and the postponement of all questions as to mutual rights. To Palmerston the basis seemed meaningless, the proposed settlement to settle nothing. The emperor Nicholas, openly disgusted with Frederick William's weak-kneed truckling to the Revolution, again intervened. To him the duke of Augustenburg was a rebel; Russia had guaranteed Schleswig to the Danish crown by the treaties of 1767 and 1773; as for Holstein, if the king of Denmark was unable to deal with the rebels there, he himself would intervene as he had done in Hungary. The threat was reinforced by the menace of the European situation. Austria and Prussia were on the verge of war, and the sole hope of preventing Russia from throwing her sword into the scale of Austria lay in settling the Schleswig-Holstein question in the sense desired by her. The only alternative, an alliance with "the devil's nephew," Louis Napoleon, who already dreamed of acquiring the Rhine frontier for France at the price of his aid in establishing German sea-power by the cession of the duchies, was abhorrent to Frederick William. On the 2nd of July 1850 was signed at Berlin a treaty of peace between Prussia and Denmark. Both parties reserved all their antecedent rights; but for Denmark it was enough, since it empowered the king-duke to restore his authority in Holstein with or without the consent of the German Confederation.

Treaty of Berlin, 1850.

Danish troops now marched in to coerce the refractory duchies; but while the fighting went on negotiations among the powers continued, and on the 2nd of August 1850 Great Britain, France, Russia and Norway-Sweden signed a protocol, to which Austria subsequently adhered, approving the principle of restoring the integrity of the Danish monarchy. The Copenhagen government, which in May 1851 made an abortive attempt to come

[1] This was the argument of Karl Samwer, the German jurist, in his *Die Staatserbfolge der Herzogthümer Schleswig und Holstein*, published in 1844 at the instigation of the duke of Augustenburg.

to an understanding with the inhabitants of the duchies by convening an assembly of notables at Flensburg, issued on the 6th of December 1851 a project for the future organization of the monarchy on the basis of the equality of its constituent states, with a common ministry; and on the 28th of January 1852 a royal letter announced the institution of a unitary state which, while maintaining the fundamental constitution of Denmark, would increase the parliamentary powers of the estates of the two duchies. This proclamation was approved by Prussia and Austria, and by the German federal diet in so far as it affected Holstein and Lauenburg. The question of the succession was next approached. Only the question of the Augustenburg succession made an agreement between the powers impossible, and on the 31st of March 1852 the duke of Augustenburg resigned his claim in return for a money payment. Further adjustments followed. After the renunciation by the emperor of Russia and others of their eventual rights, Charlotte, landgravine of Hesse, sister of Christian VIII., and her son Prince Frederick transferred their rights to the latter's sister Louise, who in her turn transferred them to her husband Prince Christian of Glücksburg. This arrangement received international sanction by the protocol signed in London on the 8th of May 1852 by the five great powers and Norway and Sweden.[1] On the 31st of July 1853 King Frederick VII. gave his assent to a law settling the crown on Prince Christian, "prince of Denmark," and his heirs male. The protocol of London, while consecrating the principle of the integrity of Denmark, stipulated that the rights of the German Confederation in Holstein and Lauenburg should remain unaffected. It was, in fact, a compromise, and left the fundamental issues unsettled. The German federal diet had been unrepresented in London, and the terms of the protocol were regarded in Germany as a humiliation. As for the Danes, they were far from being satisfied with the settlement, which they approved only in so far as it gave them a basis for a more vigorous prosecution of their unionist schemes. On the 15th of February and the 11th of June 1854 the king of Denmark, after consulting the estates, promulgated special constitutions for Schleswig and Holstein respectively, under which the provincial assemblies received certain very limited powers. On the 26th of July 1854 he published a common constitution for the whole monarchy; this, which was little more than a veiled absolutism, was superseded on the 2nd of October 1855 by a parliamentary constitution of a modified type. The legality of this constitution was disputed by the two German great powers, on the ground that the estates of the duchies had not been consulted as promised in the royal letter of the 6th of December 1851; the diet of the Confederation refused to admit its validity so far as Holstein and Lauenburg were concerned (11th February 1858).

The Succession Protocol of London, 1852.

Danish Unitary Constitution of 1855.

The question was now once more the subject of lively international debate; but the European situation was no longer so favourable as it had been to the Danish view. The Crimean War had crippled the power of Russia, and Nicholas I. was dead. France was prepared to sell the interests of Denmark in the duchies to Prussia in return for "compensations" to herself elsewhere. Great Britain alone sided with the Danes; but the action of British ministers, who realized the danger to British supremacy at sea of the growth of German sea-power in the Baltic, was hampered by the natural sympathy of Queen Victoria and the prince consort with the German point of view.[2] The result was that the German diet, on the motion of Bismarck, having threatened federal intervention (July 29), King Frederick VII. issued a proclamation abolishing the general constitution so far as it affected Holstein and Lauenburg, while retaining it for Denmark and Schleswig (November 6).

[1] Hertslet, *Map of Europe*, ii. 1151.

[2] See Queen Victoria to Lord Malmesbury, 1st of May 1858, in *Letters* (pop. ed., 1908), iii. 280. Compare the letters to Palmerston of 21st of June 1849, ii. 222, and 22nd of June 1850, ii. 279, with Palmerston to Russell, 23rd of June 1850, and Queen Victoria to Russell, ii. 250.

Though even this concession violated the principle of the "indissoluble union" of the duchies, the German diet, fully occupied at home, determined to refrain from further action till the Danish parliament should make another effort to pass a law or budget affecting the whole kingdom without consulting the estates of the duchies. This contingency arose in July 1860, and in the spring of the following year the estates were once more at open odds with the Danish government. The German diet now prepared for armed intervention; but it was in no condition to carry out its threats, and Denmark decided, on the advice of Great Britain, to ignore it and open negotiations directly with Prussia and Austria as independent powers. These demanded the restoration of the union between the duchies, a question beyond the competence of the Confederation. Denmark replied with a refusal to recognize the right of any foreign power to interfere in her relations with Schleswig; to which Austria, anxious to conciliate the smaller German princes, responded with a vigorous protest against Danish infringements of the compact of 1852. Lord John Russell now intervened, on behalf of Great Britain, with a proposal for a settlement of the whole question on the basis of the independence of the duchies under the Danish crown, with a decennial budget for common expenses to be agreed on by the four assemblies, and a supreme council of state consisting in relative proportion of Danes and Germans.[3] This was accepted by Russia and by the German great powers, and Denmark found herself isolated in Europe. The international situation, however, favoured a bold attitude, and she met the representations of the powers with a flat defiance. The retention of Schleswig as an integral part of the monarchy was to her a matter of life and death; the German Confederation had made the terms of the protocol of 1852, defining the intimate relations between the duchies, the excuse for unwarrantable interference in the internal affairs of Denmark; and on the 30th of March 1863 a royal proclamation was published at Copenhagen repudiating the compacts of 1852, and, by defining the separate position of Holstein in the Danish monarchy, negativing once for all the claims of Germany upon Schleswig.[4]

Denmark repudiates the compacts of 1852.

The reply of the German diet to this move was to forward a note to Copenhagen (July 9) demanding, on pain of federal execution, the withdrawal of the proclamation and the grant of a fresh constitution, based on the compacts of 1852 or on the British note of the 24th of September 1862. Instead, King Frederick VII. issued on the 28th of September 1863 a new constitution for "our Kingdom of Denmark-Slesvig." The diet now resolved on federal execution; but action was delayed, partly through British efforts at mediation, partly because Bismarck judged the time for a satisfactory solution of the whole question had not yet come. Encouraged by this hesitating attitude, the Danish parliament passed the new constitution on the 13th of November. Two days later Frederick VII. died.

Danish Constitution of 1862.

The "Protocol-King," Christian IX., who now ascended the throne, was in a position of extraordinary difficulty. The first sovereign act he was called upon to perform was to sign the new constitution. To sign was to violate the terms of the very protocol which was his title to reign; to refuse to sign was to place himself in antagonism to the united sentiment of his Danish subjects. He chose what seemed the remoter evil, and on the 18th of November signed the constitution. The news was received in Germany with violent manifestations of excitement and anger. Frederick, duke of Augustenburg, son of the prince who in 1852 had renounced the succession to the duchies, now claimed his rights on the ground that he had had no share in the renunciation. In Holstein an agitation in his favour had begun from the first, and this was extended to Schleswig on the terms of the new Danish constitution becoming known. His claim was enthusiastically

Accession of Christian IX., 1863.

[3] Note of Sept. 24, 1862. For the diplomatic correspondence on the duchies see *Parl. Papers*, lxxiv. (1863).

[4] For this and later correspondence see *Parl. Papers*, lxiv. (1864), p. 40 seq.

supported by the German princes and people, and in spite of the negative attitude of Austria and Prussia the federal diet decided to occupy Holstein "pending the settlement of the succession." On the 24th of December Saxon and Hanoverian troops marched into the duchy in the name of the German Confederation, and supported by their presence and by the loyalty of the Holsteiners the duke of Augustenburg assumed the government under the style of Duke Frederick VIII. With this "folly"—as Bismarck roundly termed it—Austria and Prussia, in the teeth of violent public opinion, would have nothing to do, for neither wished to risk a European war. It was clear to Bismarck that the two powers, as parties to the protocol of 1852, must uphold the succession as fixed by it, and that any action they might take in consequence of the violation of that compact by Denmark must be so "correct" as to deprive Europe of all excuse for interference. The publication of the new constitution by Christian IX. was in itself sufficient to justify a declaration of war by the two powers as parties to the signature of the protocol. As to the ultimate outcome of their effective intervention, that could be left to the future to decide. Austria had no clear views. King William wavered between his Prussian feeling and a sentimental sympathy with the duke of Augustenburg. Bismarck alone knew exactly what he wanted, and how to attain it. "From the beginning," he said later (*Reflections*, ii. 10), "I kept annexation steadily before my eyes."

Decree of federal execution.

Attitude of Austria and Prussia.

The protests of Great Britain and Russia against the action of the German diet, together with the proposal of Count Beust, on behalf of Saxony, that Bavaria should bring forward in that assembly a formal motion for the recognition of Duke Frederick's claims, helped Bismarck to persuade Austria that immediate action must be taken. On the 28th of December a motion was introduced in the diet by Austria and Prussia, calling on the Confederation to occupy Schleswig as a pledge for *the observance by Denmark of the compacts of 1852*. This implied the recognition of the rights of Christian IX., and was indignantly rejected; whereupon the diet was informed that the Austrian and Prussian governments would act in the matter as independent European powers. The agreement between them was signed on the 16th of January 1864. An article drafted by Austria, intended to safeguard the settlement of 1852, was replaced at Bismarck's instance by another which stated that the two powers would decide only in concert on the relations of the duchies, and that they would in no case determine the question of the succession save by mutual consent.

At this stage, had the Danes yielded to the necessities of the situation and withdrawn from Schleswig under protest, the European powers would probably have intervened, a congress would have restored Schleswig to the Danish crown, and Austria and Prussia, as European powers, would have had no choice but to prevent any attempt upon it by the duke of Holstein. To prevent this possibility Bismarck made the Copenhagen government believe that Great Britain had threatened Prussia with intervention should hostilities be opened, "though, as a matter of fact, England did nothing of the kind." The cynical stratagem succeeded; Denmark remained defiant; and on the 1st of February 1864 the Austrian and Prussian forces crossed the Eider.

Austria and Prussia occupy the duchies.

An invasion of Denmark itself had not been part of the original programme of the allies; but on the 18th of February some Prussian hussars, in the excitement of a cavalry skirmish, crossed the frontier and occupied the village of Kolding. Bismarck determined to use this circumstance to revise the whole situation. He urged upon Austria the necessity for a strong policy, so as to settle once for all not only the question of the duchies but the wider question of the German Confederation; and Austria reluctantly consented to press the war. On the 5th of March a fresh agreement was signed between the powers, under which the compacts of 1852 were declared to be no longer valid, and the position of the duchies within the Danish monarchy as a whole was to be made the subject of a friendly understanding. Meanwhile, however, Lord John Russell on behalf of Great Britain, supported by Russia, France and Sweden, had intervened with a proposal that the whole question should once more be submitted to a European conference.[1] The German powers agreed on condition that the compacts of 1852 should not be taken as a basis, and that the duchies should be bound to Denmark by a personal tie only. But the proceedings of the conference, which opened at London on the 25th of April, only revealed the inextricable tangle of the issues involved. Beust, on behalf of the Confederation, demanded the recognition of the Augustenburg claimant; Austria leaned to a settlement on the lines of that of 1852; Prussia, it was increasingly clear, aimed at the acquisition of the duchies. The first step towards the realization of this latter ambition was to secure the recognition of the absolute independence of the duchies, and this Austria could only oppose at the risk of forfeiting her whole influence in Germany. The two powers, then, agreed to demand the complete political independence of the duchies bound together by common institutions. The next move was uncertain. As to the question of annexation Prussia would leave that open, but made it clear that any settlement must involve the complete military subordination of Schleswig-Holstein to herself. This alarmed Austria, which had no wish to see a further extension of Prussia's already overgrown power, and she began to champion the claims of the duke of Augustenburg. This contingency, however, Bismarck had foreseen and himself offered to support the claims of the duke at the conference if he would undertake to subordinate himself in all naval and military matters to Prussia, surrender Kiel for the purposes of a Prussian war-harbour, give Prussia the control of the projected North Sea Canal, and enter the Prussian Customs Union. On this basis, with Austria's support, the whole matter might have been arranged without—as Beust pointed out (*Mem.* i. 272)—the increase of Prussia's power beyond the Elbe being any serious menace to Austrian influence in Germany. Fortunately, however, for Bismarck's plans, Austria's distrust and jealousy of Prussia led her to oppose this settlement and at her instigation the duke of Augustenburg rejected it.

Diplomatic developments during the Danish War.

The Powers and Augustenburg.

On the 25th of June the London conference broke up without having arrived at any conclusion. On the 24th, in view of the end of the truce, Austria and Prussia had arrived at a new agreement, the object of the war being now declared to be the complete separation of the duchies from Denmark. As the result of the short campaign that followed, the preliminaries of a treaty of peace were signed on the 1st of August, the king of Denmark renouncing all his rights in the duchies in favour of the emperor of Austria and the king of Prussia. The definitive treaty was signed at Vienna on the 30th of October 1864. By Article XIX., a period of six years was allowed during which the inhabitants of the duchies might "opt" for Danish nationality and transfer themselves and their goods to Denmark; and the right of "indigenacy" was guaranteed to all, whether in the kingdom or the duchies, who enjoyed it at the time of the exchange of ratifications of the treaty.[2]

Treaty of Vienna, 1864.

The Schleswig-Holstein Question from this time onward became merged in the larger question of the general relations of Austria and Prussia, and its later developments are sketched in the article GERMANY: *History*. So far as Europe was concerned it was settled by the decisive result of the war of 1866. It survived, however, as between Danes and Germans, though narrowed down to the question of the fate of the Danish population of the northern duchy. This question is of great interest to students of international law and as illustrating the practical problems involved in the assertion of the modern principle of "nationality."

The last phase of the question.

[1] *Parl. Papers* (1864), lxv. 124 seq. Beust (*Mem.* i. 252) says that Queen Victoria personally intervened to prevent British action in favour of Denmark.

[2] The full text of the treaty is in *La Question du Slesvig*, p. 173 et seq.

The position of the Danes in Schleswig after the cession was determined, so far as treaty rights are concerned, by two instruments —the Treaty of Vienna (October 30, 1864) and the Treaty of Prague (August 23, 1866). By Article XIX. of the former treaty subjects domiciled in the ceded territories had the right, within six years of the exchange of ratifications, of opting for the Danish nationality and transferring themselves, their families and their personal property to Denmark, while keeping their landed property in the duchies. The last paragraph of the Article ran: "Le droit d'indigénat, tant dans le royaume de Danemark que dans les Duchés, est conservé à tous les individus qui le possèdent à l'époque de l'échange des ratifications du présent Traité." By Article V. of the Treaty of Prague Schleswig was ceded by Austria to Prussia with the reservation that "the populations of the North of Schleswig shall be again united with Denmark in the event of their expressing a desire so to be by a vote freely exercised." Taking advantage of the terms of these treaties, about 50,000 Danes from North Schleswig (out of a total population of some 150,000) opted for Denmark and migrated over the frontier, pending the *plébiscite* which was to restore their country to them. But the *plébiscite* never came. Its inclusion in the treaty had been no more than a diplomatic device to save the face of the emperor Napoleon III.; Prussia had from the first no intention of surrendering an inch of the territory she had conquered; the outcome of the Franco-German War made it unnecessary for her even to pretend that she might do so; and by the Treaty of Vienna of October 11, 1878, the clause relating to the *plébiscite* was formally abrogated with the assent of Austria.

The Danish "optants."

Meanwhile the Danish "optants," disappointed of their hopes, had begun to stream back over the frontier into Schleswig. By doing so they lost, under the Danish law, their rights as Danish citizens, without acquiring those of Prussian subjects; and this disability was transmitted to their children. By Article XIX. of the Treaty of 1864, indeed, they should have been secured the rights of "indigenacy," which, while falling short of complete citizenship, implied, according to Danish law, all the essential guarantees for civil liberty. But in German law the right of *Indigenat* is not clearly differentiated from the *status* of a subject; and the supreme court at Kiel decided in several cases that those who had opted for Danish nationality had forfeited their rights under the *Indigenat* paragraph of the Treaty of Vienna. There was thus created in the frontier districts a large and increasing class of people who dwelt in a sort of political limbo, having lost their Danish citizenship through ceasing to be domiciled in Denmark, and unable to acquire Prussian citizenship because they had failed to apply for it within the six years stipulated in the Treaty of 1864. Their exclusion from the rights of Prussian subjects was due, however, to causes other than the letter of the treaty. The Danes, in spite of every discouragement, never ceased to strive for the preservation and extension of their national traditions and language; the Germans were equally bent on effectually absorbing these recalcitrant "Teutons" into the general life of the German empire; and to this end the uncertain *status* of the Danish optants was a useful means. Danish agitators of German nationality could not be touched so long as they were careful to keep within the limits of the law; pro-Danish newspapers owned and staffed by German subjects enjoyed immunity in accordance with the constitution, which guarantees the liberty of the press. The case of the "optants" was far other. These unfortunates, who numbered a large proportion of the population, were subject to domiciliary visits, and to arbitrary perquisitions, arrest and expulsion. When the pro-Danish newspapers, after the expulsion of several "optant" editors, were careful to appoint none but German subjects, the vengeance of the authorities fell upon "optant" type-setters, printers and printers' devils. The Prussian police, indeed, developed an almost superhuman capacity for detecting optants: and since these pariahs were mingled indistinguishably with the mass of the people, no household and no business was safe from official inquisition. One instance out of many may serve to illustrate the type of offence that served as excuse for this systematic official persecution. On the 27th of April 1896 the second volume for 1895 of the *Sönderjyske Aarböger* was confiscated for having used the historic term *Sönderjylland* (South Jutland) for Schleswig. To add to the misery, the Danish government refused to allow the Danish optants expelled by Prussia to settle in Denmark, though this rule was modified by the Danish Nationality Law of 1898 in favour of the children of optants born after the passing of the law. It was not till the signature of the treaty between Prussia and Denmark on the 11th of January 1907 that these intolerable conditions were ended. By this treaty the German government undertook to allow all children born of Danish optants before the passing of the new Danish Nationality Law of 1898 to acquire Prussian nationality on the usual conditions and on their own application. This provision was not to affect the ordinary legal rights of expulsion as exercised by either power, but the Danish government undertook not to refuse to the children of Schleswig optants who should not seek to acquire or who could not legally acquire Prussian nationality permission to reside in Denmark. The provisions of the treaty apply not only to the children of Schleswig optants, but to their direct descendants in all degrees.

Treaty of January 11, 1907.

This adjustment, brought about by the friendly intercourse between the courts of Berlin and Copenhagen, seemed to close the last phase of the Schleswig question. Yet, so far from allaying, it apparently only served to embitter the inter-racial feud. The "autochthonous Germans of the Northern Marches" regarded the new treaty as a betrayal, and refused "to give the kiss of peace" to their hereditary enemies. For forty years Germanism, backed by all the weight of the empire and imposed with all the weapons of official persecution, had barely held its own in North Schleswig; in spite of an enormous emigration, in 1905, of the 148,000 inhabitants of North Schleswig 139,000 spoke Danish, while of the German-speaking immigrants it was found that more than a third spoke Danish in the first generation; and this in spite of the fact that, from 1864 onward, German had gradually been substituted for Danish in the churches, the schools, and even in the playground. But the scattered outposts of Germanism could hardly be expected to acquiesce without a struggle in a situation that threatened them with social and economic extinction. Forty years of dominance, secured by official favour, had filled them with a double measure of aggressive pride of race, and the question of the rival nationalities in Schleswig, like that in Poland, remained a source of trouble and weakness within the frontiers of the German empire.

AUTHORITIES.—The literature on the subject is vast. From the German point of view the most comprehensive treatment is in C. Jansen and K. Samwer, *Schleswig-Holsteins Befreiung* (Wiesbaden, 1897); see also H. C. L. von Sybel, *Foundation of the German Empire* (Eng. trans., New York, 1890–1891); Bismarck's *Reflections and Reminiscences*, and L. Hahn, *Bismarck* (5 vols., 1878–1891). The Danish point of view is ably and moderately presented in *La Question du Slesvig*, a collection of essays by various writers edited by F. de Jessen (Copenhagen, 1906), with maps and documents. (W. A. P.)

SCHLETTSTADT, a town of Germany, in the imperial province of Alsace-Lorraine, on the Ill; 26 m. S. of Strassburg by the railway to Basel. Pop. (1905) 9700. It possesses two fine Roman Catholic churches, a Protestant church, numerous remains of its old walls and some quaint houses of the 15th and 16th centuries. It has a theatre, a municipal library, a gymnasium, and other educational establishments. The Roman Catholic churches are the cathedral church of St George, a fine Gothic building founded in the 13th century, and the church of St Fides, dating from the 11th century. Its industries comprise wire-drawing, tanning and saw-milling, and there is a considerable trade in wine, fruit and other agricultural produce.

Schlettstadt is a place of very early origin. It was a royal residence in Carolingian times and became a free town of the Empire in the 13th century. In the 15th century it was the seat of a celebrated academy, founded by the humanist Rodolphus Agricola, which contributed not a little to the revival of learning in this part of Germany; Erasmus of Rotterdam was one of its students. In 1634 the town came into the possession of France, and it was afterwards fortified by Vauban. It offered little resistance, however, to the Germans in 1870, and the fortifications have since been razed. The Hoh-Königsburg, a great castle standing at an elevation of 2475 ft., was presented to the emperor William II. by the town of Schlettstadt in 1899, and was completely restored in 1908. The site is first mentioned as bearing a castle in the 8th century.

See Naumann, *Die Eroberung von Schlettstadt* (Berlin, 1876); and J. Gény, *Die Reichstadt Schlettstadt 1490–1536* (Freiburg i. B., 1900).

SCHLEY, WINFIELD SCOTT (1839–), American naval officer, was born at Richfields, near Frederick, Maryland, on the 9th of October 1839. He graduated at the United States Naval Academy in 1860, and during the Civil War was in active service as a lieutenant until July 1863. In 1867–1869 he was an instructor in the U.S. Naval Academy. He took part in Rear-Admiral John Rodgers's expedition to Korea in 1871, and was adjutant of the American land forces in the attack on the Korean forts on Salee river on the 10th and 11th of June. In 1872–1875 he was head of the department of modern languages in the U.S. Naval Academy. He was promoted commander in June 1874; in 1876–1879 commanded the "Essex," most of the time in the South Atlantic, and then until October 1883 was inspector of the second lighthouse district. In February 1884, after the failure in 1883 of the second expedition (under Lieut. E. A. Garlington) for the relief of the Lady Franklin Bay Expedition commanded by Lieut. A. W. Greely, Schley was appointed to command the third Greely relief expedition; and near Cape Sabine on the 22nd of June rescued Greely and six (of his twenty-four) companions. He was chief of the bureau of equipment and recruiting

in 1885–1889; and in April 1888 was promoted captain. He commanded the "Baltimore" in Rear-Admiral George Brown's squadron off the coast of Chile in 1891. Early in 1892 he was again transferred to the lighthouse bureau, and until February 1895 was inspector of the third lighthouse district; and in 1897–1898 he was a member (and chairman) of the Lighthouse Board. He was commissioned commodore on the 6th of February 1898, and on the 24th of March, although lowest on the list of commodores, he was put in command of the "flying squadron," with the "Brooklyn" as his flagship, for service in the war with Spain. The command of the fleet off Santiago de Cuba was taken from Schley by Acting Rear-Admiral W. T. Sampson on the 1st of June. In the battle of Santiago on the 3rd of July Schley, in Sampson's absence, was the senior officer and the "Brooklyn" did especial service, with the "Oregon," in overhauling and disabling the "Christobal Colón." On the 10th of August Schley was advanced six numbers and was made rear-admiral for "eminent and conspicuous conduct in battle." On the 19th he was appointed a commissioner of the United States to arrange the evacuation of Porto Rico. When the Navy Department recommended that Sampson be promoted eight numbers and over the head of Schley, who had ranked him for forty-two years, there was a bitter controversy, and the Senate did not confirm the promotion. On the 14th of April 1899 Schley was commissioned rear-admiral, ranking as major-general. In November 1899 he was put in command of the South Atlantic Station, and in October 1901 he retired from active service upon reaching the age limit. At his request, because of the charges made against him in E. S. Maclay's *History of the Navy*, a court of inquiry investigated Schley's conduct before and during the battle of Santiago; on the 13th of December 1901 the court pronounced Schley guilty of delay in locating Cervera's squadron, of carelessness in endangering the "Texas" by a peculiar "loop" movement or turn of the "Brooklyn" which blanketed the fire of other American vessels, and of disobedience to a departmental order of the 25th of May, but it recommended that no action be taken. Admiral Schley filed a protest against the court's findings, which, however, were approved by the secretary of the Navy.

Schley wrote, with James Russell Soley, *The Rescue of Greely* (New York, 1885). See Schley's *Forty-five Years under the Flag* (New York, 1904).

SCHLIEMANN, HEINRICH (1822–1890), German archaeologist, was born on the 6th of January 1822 at Neu Buckow in Mecklenburg-Schwerin, the son of a poor pastor. He has stated in his autobiography that through all his early years of struggle, when he was successively grocer's apprentice at Fürstenberg, cabin-boy on the "Dorothea" bound for Venezuela, and, after her wreck, office attendant and then book-keeper in Amsterdam, he nourished a passion for the Homeric story and an ambition to become a great linguist. In the end, thanks to an unusually powerful memory and determined energy, he acquired a knowledge of seven or eight tongues besides his own, including ancient and modern Greek. The house of B. H. Schröder of Amsterdam sent him in 1846 to St Petersburg, where he established a business of his own and embarked in the indigo trade. He made a fortune at the time of the Crimean War, partly as a military contractor. Happening to be in California when made a state of the Union, in 1850, he became and remained an American citizen. After travels in Greece, Tunisia, India, China and Japan, and writing a short sketch of the last two countries, he took his large fortune to Greece in 1868, and proceeded to visit Homeric sites. In an ensuing book—*Ithaka, der Peloponnes, und Troja*—he propounded two theories which he was destined eventually to test in practice, viz. that Hissarlik, not Bunarbashi, was the site of Troy, and that the Atreid graves, seen by Pausanias at Mycenae, lay within the citadel wall. Two years later he took up Calvert's work on the former site, and, convinced that Troy must be on the lowest level, hewed his way down, regardless of the upper strata, wherein lay unseen the remains of which he was really in search. By 1873 he had laid bare considerable fortifications and other remains of a burnt city of very great antiquity, and discovered a treasure of gold jewelry. We now know this city to have belonged to the middle pre-Mycenaean period, long prior to the generation of Homer's Archaeans; but Schliemann far and wide proclaimed it "Troy," and was backed by Gladstone and a large part of the European public. Trying to resume his work in February 1874, he found himself inhibited by the Ottoman government, whose allotted share of the gold treasure had not been satisfactory, and it was not till April 1876 that he obtained a *firman*. During the delay he issued his *Troy and its Remains* (1875), and betook himself to Mycenae. There in August 1876 he began work in the Dome-tombs and by the Lion Gate, and opened a large pit just within the citadel. The famous double ring of slabs and certain stone reliefs came to light. Schliemann, thinking it was only a platform levelled as a place of Achaean assembly, paused, and did not resume till November. Then, resolved to explore to the rock, he cleared away some three feet more of earth and stones, and lighted on the five shaft graves which have placed him first among fortunate excavators. A sixth grave was found immediately after his departure. The immense treasure of gold, silver, bronze, fine stone and ivory objects, which was buried with the sixteen corpses in this circle, is worth intrinsically more than any treasure-trove known to have been found in any land, and it revealed once for all the character of a great civilization preceding the Hellenic. The find was deposited at Athens, and gradually cleaned and arranged in the Polytechnic; and the discoverer, publishing his *Mycenae* in English in 1877, had his full share of honours and fame. He had now settled in Athens, where he married a Greek lady, and built two splendid houses, which became centres of Athenian society. In 1878 he dug unsuccessfully in Ithaca, and in the same year and the following resumed work at Hissarlik, and summed up his results in a discursive memoir, *Ilios*, upon which a sequel, *Troja*, issued in 1884, after Wilhelm Dörpfeld, associated in 1882, had introduced some archaeological method into the explorations, was a considerable improvement.

In 1880 and 1881 Schliemann cleared out the ruined dome-tomb of Orchomenus, finding little except remains of its beautiful ceiling; and in 1885, with Dörpfeld, he laid bare the upper stratum on the rock of Tiryns, presenting scholars with a complete ground plan of a Mycenaean palace. This was his last fortunate excavation. While Tsountas, for the Greek Archaeological Society, picked up his work at Mycenae in 1886, and gradually cleared the Acropolis, with notable results, Schliemann tried for traces of the Caesareum at Alexandria, of the Palace of Minos at Knossos, in Crete, and of the Aphrodite temple at Cythera (1888); but he was not successful, meeting in the two former enterprises with a local opposition which his wealth was unable to bear down. In 1889 he entertained at Hissarlik a committee of archaeological experts, deputed to examine Bötticher's absurd contention that the ruins represented not a city, but a cremation necropolis; and he was contemplating a new and more extensive campaign on the same site when, in December 1890, he was seized at Naples with an illness which ended fatally on the morning of Christmas Day. His great wealth was left mainly to the two families that he had in Russia and Greece; but a sum was reserved for Hissarlik, where Dörpfeld in 1891 and 1892, by clearing away the debris of the former excavations, exposed the great walls of the sixth stratum which Schliemann had called Lydian, and proved their synchronism with Mycenae, and identity with Mycenaean remains; that is to say, with Homer's Troy, if Troy ever was.

Schliemann was on several occasions in England, in 1883 to receive honours from the great universities, and in 1886 to confute, at a special gathering of the Hellenic Society, the assertion of Stillman and Penrose that the Tirynthian palace was posterior to the Christian era. Nowhere was he better appreciated, and most of his books were first issued in English. (D. G. H.)

SCHLIPPE'S SALT, or sodium thioantimoniate, $Na_3SbS_4 \cdot 9H_2O$, named after K. F. Schlippe (1799–1867), is prepared by dissolving the calculated quantities of antimony trisulphide, sulphur

and sodium hydroxide in water, or by fusing sodium sulphate (16 parts), antimony sulphide (13 parts) and charcoal (4-5 parts), dissolving the melt in water and boiling the solution with 2½ parts of sulphur. The liquid is then filtered and evaporated. The salt crystallizes in large tetrahedra, which are easily soluble in water, and have a specific gravity 1·806. The anhydrous salt melts easily on heating, and in the hydrated condition, on exposure to moist air becomes coated with a red film. It combines with sodium thiosulphate to form $Na_3SbS_4 \cdot Na_2S_2O_3 \cdot 2OH_2O$.

SCHLOSSER, FRIEDRICH CHRISTOPH (1776–1861), German historian, was born at Jever in East Friesland on the 17th of November 1776. He took up the study of theology, mainly at Göttingen, and began life as a private tutor. Turning to the study of history, he carried with him the tendency to construct his syntheses upon the scanty basis of 18th-century generalizations; yet in spite of the growing scientific school he became and remained for a quarter of a century the most popular German historian. In 1807, inspired by his study of Dante, he published his first work *Abalard und Dulcin*, a defence of scholasticism and medieval thought. Two years later biographical studies of Theodore Beza and Peter Martyr Vermili (*Leben des Theodor de Beza und des Peter Martyr Vermili*, Heidelberg, 1809) revealed more genuine scholarship. In 1812 appeared his *History of the Iconoclastic Emperors of the East* (*Geschichte der bilderstürmenden Kaiser des oströmischen Reichs*), in which he controverted some points in Gibbon and sought to avoid painting the past in present-day colours. His own strong predispositions prevented him from accomplishing this, however, and the history remains open to grave scientific criticism. But it won for him the favour of Archbishop Karl Theodor Dalberg, and secured for him a professorship in the Frankfort Lyceum. He left Frankfort in 1819 to become professor of history at Heidelberg, where he resided until his death on the 23rd of September 1861.

In 1815 appeared the first volume of his *World History* (*Weltgeschichte in zusammenhängender Erzählung*). This work, though never completed, was extended through many volumes, bespeaking an inexhaustible energy and a vast erudition. But it lacks both accuracy of fact and charm of style, and is to-day deservedly quite forgotten. On the other hand a translation of the pedagogical handbook of Vincent of Beauvais and the accompanying monograph are still of value. The next noteworthy work was a history of antiquity and its culture (*Universalhistorische Übersicht der Geschichte der alten Welt und ihrer Kultur*, 1st part, 1826; 2nd part, 1834), which, while revealing little knowledge of the new criticism of sources inaugurated by F. A. Wolf and B. G. Niebuhr, won its way by its unique handling of the subject and its grand style. In 1823 he published in two volumes a *Geschichte des 18ten Jahrhunderts*; then, enlarged and improved, this work appeared in six volumes as *Geschichte des 18ten Jahrhunderts und des 19ten bis zum Sturz des französischen Kaiserreichs* (1836–1848). The history had a most extraordinary success, especially among the common people, owing, not to its scientific qualities, but to the fact that the author boldly and sternly sat in judgment upon men and events, and in his judgments voiced the feelings of the German nation in his day. For this very reason it is no longer read. It has been translated into English by D. Davison (8 vols., 1843–1852). Finally, Schlosser undertook a popular *World History for the German People* (*Weltgeschichte für das deutsche Volk*, 1844–1857), which also enjoyed the favour of those for whom it was written.

Schlosser stands apart from the movement towards scientific history in Germany in the 19th century. Refusing to limit himself to political history, as did Ranke, he never learned to handle his literary sources with the care of the scientific historian. History was to him, as it had been to Cicero, a school for morals; but he had perhaps a juster conception than Ranke of the breadth and scope of the historian's field.

See G. G. Gervinus (Schlosser's pupil), *F. C. Schlosser, ein Nekrolog* (1861); G. Weber, *F. C. Schlosser, der Historiker, Erinnerungsblätter* (Leipzig, 1876); and O. Lorenz, *F. C. Schlosser* (Vienna, 1878).

SCHLOTHEIM, ERNST FRIEDRICH, BARON VON (1764–1832), German palaeontologist, was born in Grafschaft Schwarzburg on the 2nd of April 1764. He was Privy Councillor and President of the Chamber at the court of Gotha. Becoming interested in geology he gathered together a very extensive collection of fossils. In 1804 he published descriptions and illustrations of remarkable remains of (Carboniferous) plants, *Ein Beitrag zur Flora der Vorwelt*. His more important work was entitled *Die Petrefactenkunde* (1820). In this he incorporated the plates used in his previous memoir and supplemented it by a folio atlas (1822), in which he illustrated his collection "of petrified and fossil remains of the animal and vegetable kingdom of a former world." For the first time in Germany the fossils were named according to the binomial system. The specimens are preserved in the Berlin Museum. He died at Gotha on the 28th of March 1832.

SCHLÖZER, AUGUST LUDWIG VON (1735–1809), German historian, was born at Gaggstedt, in the county of Hohenlohe-Kirchberg, on the 5th of July 1735. Having studied theology and oriental languages at the universities of Wittenberg and Göttingen, he went in 1755 as a tutor to Stockholm, and afterwards to Upsala; and while in Sweden he wrote in Swedish an *Essay on the General History of Trade and of Seafaring in the most Ancient Times* (1758). In 1759 he returned to Göttingen, where he began the study of medicine. In 1761 he went to St Petersburg with Gerhardt Friedrich Müller, the Russian historiographer, as Müller's literary assistant and as tutor in his family. Here Schlözer learned Russian and devoted himself to the study of Russian history. In 1762 a quarrel with Müller placed him in a position of some difficulty, from which he was delivered by an introduction to Count Rasumovski, who procured his appointment as adjunct to the Academy. In 1765 he was appointed by the empress Catherine an ordinary member of the Academy and professor of Russian history. In 1767 he left Russia on leave and did not return. He settled at Göttingen, where in 1764 he had been made professor extraordinarius, and doctor *honoris causa* in 1766, and in 1769 he was promoted to an ordinary professorship. In 1804 he was ennobled by the emperor Alexander I. of Russia and made a privy councillor. He retired from active work in 1805 and died on the 9th of September 1809.

Schlözer's activity was enormous, and he exercised great influence by his lectures as well as by his books, bringing historical study into touch with political science generally, and using his vast erudition in an attempt to solve practical questions in the state and in society. He was "a journalist before the days of journalism, a travellor before that of travelling, a critic of authorities before that of political oppositions." His most important works were his *Allgemeine nordische Geschichte*, 2 vols. (Halle, 1772) and his translation of the Russian chronicler Nestor to the year 980, 5 vols. (Göttingen, 1802–1809). He awoke much intelligent interest in universal history by his *Weltgeschichte im Auszuge und Zusammenhange*, 2 vols. (2nd ed., Göttingen, 1792–1801); and in several works he helped to lay the foundations of statistical science. He also produced a strong impression by his political writings, the *Briefwechsel*, 10 vols. (1776–1782) and the *Staatsanzeigen*, 18 vols. (1782–1793).

Schlözer, who in 1769 married Caroline Roederer, daughter of Johann Georg Roederer (1726–1763), professor of medicine at Göttingen and body physician to the king of England, left five children. His daughter Dorothea, born on the 10th of August 1770, was one of the most beautiful and learned women of her time, and received in 1787 the degree of doctor. She was recognized as an authority on several subjects, especially on Russian coinage. After her marriage with Rodde, the burgomaster of Lübeck, she devoted herself to domestic duties. She died on the 12th of July 1825 (see Reuter, *Dorothea Schlözer*, Göttingen, 1887). Schlözer's son Christian (1774-1831) was a professor at Bonn, and published *Anfangsgründe der Staatswirthschaft* (1804–1806) and his father's *Öffentliches und Privat-Leben aus Originalurkunden* (1828). The youngest son, Karl von Schlözer, a merchant and Russian consul-general at Lübeck, was the father of Kurd von Schlözer (1822–1894), the historian

and diplomatist, who in 1871 was appointed German ambassador to the United States and in 1882 to the Vatican, when he was instrumental in healing the breach between Germany and the papacy caused by the "May Laws."

See Zermelo, *August Ludwig Schlözer* (Berlin, 1875); Wesendonck, *Die Begründung der neuern deutschen Geschichtsschreibung durch Gatterer und Schlözer* (Leipzig, 1876) and F. Frensdorff in *Allgemeine deutsche Biog.* vol. xxxi.

SCHLÜSSELBURG, a town of Russia, in the government of St Petersburg, situated on low ground surrounded by marshes, at the issue of the river Neva from Lake Ladoga, 40 m. by steamer E. of the city of St Petersburg. Pop. (1897) 5285. It was founded in 1323 by the Novgorodians, and though afterwards lost by Russia, was reconquered by Peter the Great in 1702. It has a cathedral and a fortress, built on an island in the Neva, which is now used as a political prison.

SCHLÜTER, ANDREAS (1664–1714), German sculptor and architect, was born in Hamburg. Much of his activity as a sculptor was exercised in Warsaw, but in 1694 he was summoned to Berlin. Two years later he began his designs for the rebuilding of the royal palace. The execution of these occupied him from 1699 to 1706, and the palace became a conspicuous example of barocco style in Germany. In 1713 Schlüter went to St Petersburg, where he did architectural work for Peter the Great. His principal works in Berlin are the monument of the great elector Frederick William and the 21 masks of dying warriors in the courtyard of the arsenal, the tombs of King Frederick I. and his wife, and the marble pulpit in the Marienkirche.

See C. Gurlitt, *Andreas Schluter* (1891); C. F. von Kloeden, *Andreas Schlüter* (1855).

SCHMALKALDEN, a town of Germany, in the Prussian province of Hesse-Nassau, situated in a narrow valley at the south-western slope of the Thuringian forest, 30 m. S.W. of Erfurt, on the railway Wernshausen-St Blasii. Pop. (1905) 9529. It has a Gothic parish church, a palace—Schloss Wilhelmsburg—with an interesting chapel and a collection of antiquities, and possesses a Gothic town hall in which the important Protestant League of Schmalkalden, or Smalkald, was concluded in 1531, and also the house in which the articles of Schmalkalden were drawn up in 1537 by Luther, Melanchthon and other reformers. It has three other Evangelical churches, a Roman Catholic church and several schools. Its industries are chiefly connected with ironwares, but leather, beer, soap and toys are also manufactured. Karl Wilhelms (1815–1873), the composer of "Die Wacht au Rhein," was born here, and there is a memorial of him in the market-place. Schmalkalden, which was first mentioned in 874, came wholly into the possession of Hesse in 1583, having been a town since 1335.

See Wagner, *Geschichte der Stadt und Herrschaft Schmalkalden* (Marburg, 1849); and Wilisch, *Schmalkalden und seine Umgebungen* (Schmalkalden, 1884).

SCHMERLING, ANTON VON (1805–1893), Austrian statesman, was born on the 23rd of August 1805 at Vienna, where his father held a high position on the judicial side of the civil service. After studying law at Vienna, in 1829 he entered the public service, and during the next eighteen years was constantly occupied, chiefly in Lower Austria. In 1847, as a member of the lesser nobility, he entered the Estates of Lower Austria, and took an active part in the Liberal movement for administrative and constitutional reform of which they were the centre. On the outbreak of the revolution in Vienna in March 1848, when the mob broke into the Assembly, Schmerling was one of the deputation which carried to the palace the demands of the people, and during the next few days he was much occupied in organizing the newly formed National Guard. At the end of the month he was sent by the ministry to Frankfort as one of the men of "public confidence." He soon succeeded Count Colleredo as president of the Diet, and in this capacity officially transferred to the archduke John, who had been elected regent of Germany, the powers of the Diet. For this he was violently attacked in the German parliament by the extreme Radicals; but on this and other occasions (he had himself been elected to the parliament) he defended moderate and constitutional principles, all the more effectively because he depended not on eloquence but on a recognition of what has been called the "irony of facts"—to which the parliament as a whole was so blind. He was the first and the most influential member of the ministry which the regent formed; he held the ministry of the interior and, later, also that of foreign affairs, and it was almost entirely due to him that at least for a short time this phantom government maintained some appearance of power and dignity. A defeat in the parliament when he defended the armistice of Malmö led to his resignation; but he was immediately called to office again, with practically dictatorial power, in order to quell the revolt which broke out in Frankfort on the 18th of September. His courage and resolution averted what nearly became a terrible catastrophe. It was his hope to establish in Germany the supremacy of a Liberal and reformed Austria. This brought him into opposition to the party of Prussian supremacy; and when they attained a majority, he resigned, and was succeeded by Gagern. He remained at Frankfort, holding the post of Austrian envoy, and was the leader of the so-called Great German party until the dissolution of the Austrian parliament showed that the forces of reaction had conquered at Vienna and shattered all hopes of Austria attaining the position he had hoped for her.

After the abortive election of the king of Prussia to be emperor, he, with the other Austrians, left Frankfort. On his return to Vienna he became minister of justice, and the reforms which he carried out added to his reputation. His popularity among all Liberals was increased by his resignation in 1851, as a protest against the failure of the government to establish the constitution they had promised. During the next few years he was judge of the supreme court of appeal. When his forecast was fulfilled, and the system of absolutism broke down, he became minister in January 1862. His first act was the publication of the constitution by which the whole of the empire was to be organized as a single state with a parliamentary government. The experiment failed, chiefly because of the opposition of the Croatians and Magyars, whom he bitterly offended by his celebrated saying that "Hungary could wait." Faults of manner, natural in a man whose life had been spent as an official and a judge, prevented him from keeping together the German Liberals as a strong and united party; he was opposed by a powerful faction at court, and by the Clerical leaders. After the first few months the emperor gave him only a very lukewarm support; and with his retirement in 1865 the attempt to carry out the ideals of Joseph II. to Germanize while he liberalized the whole of the empire, and to compel Hungarians, Poles, Czechs and Croatians to accept a system in which the government of the whole should be carried on by a German-speaking parliament and bureaucracy, failed. The constitution of 1862, though suspended on Schmerling's fall, was still regarded as legally valid for the cis-Leithan territories, and is the basis on which the present constitution for half the empire was framed. On his retirement he returned to his judicial duties; in 1867 he was made life-member of the Upper House in the Reichsrath, of which he became vice-president, and in 1871 president. This post he laid down in 1879, and came forward as leader of the Liberal German opposition to the administration of Count Taaffe. In 1891 he retired from public life, and died at Vienna on the 23rd of May 1893.

Schmerling married, in 1835, Pauline, daughter of Field-Marshal-Lieutenant Baron von Koudelka. Frau von Schmerling, who was distinguished by literary and artistic abilities, at that time rare in the Austrian capital, died in 1840, leaving two daughters.

See Arneth, *Anton v. Schmerling* (Prague, 1895). This contains a full account of Schmerling's life during 1848–1849, but does not deal with his later life. Wurzbach, *Biographisches Lexicon des Kaiserthums Österreich*; Friedjung, *Der Kampf um die Vorherrschaft in Deutschland*; Rogge, *Geschichte Österreichs*. (J. W. He.)

SCHMIDT, HEINRICH JULIAN (1818–1886), German journalist and historian of literature, was born at Marienwerder in East Prussia on the 7th of March 1818, and after studying history and philosophy at the university of Königsberg was appointed, in 1842, to a mastership in the Luisenstadt Realschule in Berlin. In 1847 he joined the editorial staff of the *Grenzboten*

in Leipzig, and in the following year became, with Gustav Freytag, joint owner of that periodical. In 1861 he removed to Berlin as editor-in-chief of the *Berliner allgemeine Zeitung*, and in 1878 was rewarded for the journalistic services rendered to the government, by a pension from the emperor William I. He died at Berlin on the 27th of March 1886.

Julian Schmidt's principal contributions to literary history are *Geschichte der Romantik im Zeitalter der Revolution und Restauration* (1848); *Geschichte der deutschen Nationalliteratur im 19. Jahrhundert* (1853); *Geschichte des geistigen Lebens in Deutschland von Leibniz bis auf Lessings Tod* (1861–1863). These works subsequently appeared as *Geschichte der deutschen Literatur von Leibniz bis auf unsere Zeit* (5 vols., 1886–1896); Schmidt also wrote a *Geschichte der französischen Literatur seit der Revolution* (1857), and a biography of Schiller (1859).

SCHMIDT, KARL VON (1817–1875), Prussian cavalry general, was born at Schwedt on the Oder, on the 12th of January 1817, and entered the 4th Ulans as a second lieutenant in 1834. His long regimental service was varied by staff service and instructional work, and in the mobilization of 1859 he had the command of a landwehr cavalry regiment. In 1863 he was made colonel of the 4th Cuirassiers, which he commanded in the, for the cavalry arm, uneventful campaigns of 1864 and 1866. He then commanded a newly raised regiment of Schleswig-Holstein troops, the 16th Hussars, but at the outbreak of the Franco-German War he was still an obscure and perhaps a mistrusted officer, though his grasp of every detail of cavalry work was admitted. But an opportunity for distinction was grasped in the cavalry fighting around Mars-la-Tour (Aug. 16), in which he temporarily led a brigade and was severely wounded. He was soon promoted major-general and succeeded to the temporary command of his division on the disablement of its leader. In this post he did brilliant work in the campaign on the Loire, and even in the winter operations towards Le Mans, and earned a reputation second to none amongst the officers and men of his arm. After the war he took a leading part in the reorganization of the Prussian cavalry, which in ten years raised its efficiency to a point far beyond that of any other cavalry in Europe. In 1875, though his health was failing, he refused to give up the conduct of certain important cavalry manœuvres with which he had been entrusted. But a few days of heavy work in the field brought on a fatal illness, and he died at Danzig on the 25th of August 1875. In 1889 the 4th Ulans, in which his regimental service was almost entirely spent, were given the name "Von Schmidt."

His drill and manœuvre instructions were codified and published after his death by his staff officer, Captain von Vollard Bockelberg, who was authorized by Prince Frederick Charles to do so. An English translation, *Instructions for Cavalry*, has been published by the War Office. Von Schmidt himself wrote a pamphlet, *Auch ein Wort über die Ausbildung der Cavallerie* (1862). The original German edition of the *Instructions for Cavalry* is prefaced by a memoir of Von Schmidt's life and services, written by Major Kaehler.

SCHMIDT, WILHELM ADOLF (1812–1887), German historian, was born in Berlin on the 26th of September 1812. He became in 1851 professor of history at Zürich, and nine years later professor at Jena, where he died on the 10th of April 1887. He was a member of the Frankfort parliament in 1848, and of the German Reichstag from 1874 to 1876. His historical works deal mainly with modern German history, and the most important of them are:—

Preussens deutsche Politik (Berlin, 1850, and other editions); *Geschichte der preussisch-deutschen Unionsbestrebungen* (Berlin, 1851); *Zeitgenössische Geschichten* (Berlin, 1859); *Elsass und Lothringen* (Leipzig, 1859 and 1870); and *Geschichte der deutschen Verfassungsfrage während der Befreiungskriege und des Wiener Kongresses* (Stuttgart, 1890), which was published after his death by A. Stern. Schmidt also wrote: *Tableaux de la Révolution Française publiés sur les papiers inédits du département de la police secrète de Paris* (Leipzig, 1867–1870); *Pariser Zustände während der Revolutionszeit* (Jena, 1874–1876), translated into French by P. Viollet (Paris, 1880–1885); *Das Perikleische Zeitalter* (Jena, 1877–1879); *Handbuch der griechischen Chronologie* (Jena, 1888); and *Abhandlungen zur alten Geschichte* (Leipzig, 1888).

See F. Landwehr, *Zur Erinnerung an Adolf Schmidt* (Berlin, 1887).

SCHMOLLER, GUSTAV (1838–), German political economist, was born at Heilbronn on the 24th of June 1838. He studied political science, philosophy and history at the university of Tübingen from 1857 to 1861, when he obtained an appointment at the Wurttemberg Statistical Department. In 1864 Schmoller became extraordinary—and in the following year, ordinary—professor of political economy and science at Halle, was transferred in a like capacity to Strasburg in 1872 and finally in 1882 to Berlin. In 1884 he was admitted a member of the Prussian Staatsrath, in 1887 a member of the Prussian Academy of Sciences, and in 1899 was called to the Prussian Herrnhaus (Upper Chamber) as representative of the university of Berlin. Schmoller is famous for his researches in the field of the history of political economy and is one of the founders of the *Verein für Social Politik* (Social Political Society).

Among his numerous scientific works must be specially mentioned: *Der französische Handelsvortrag und seine Gegner* (1862); *Zur Geschichte des deutschen Kleingewerbe im 19ten Jahrhundert* (1869); *Über einige Grundfragen des Rechts und der Volkswirtschaft* (1875). In late years Schmoller concentrated his attention more upon the history of Prussian administration, and besides editing the *Jahrbuch fur preussische Geschichte und Landeskunde*, published the result of his labours in this department in the *Umrisse und Untersuchungen zur Verfassungs- Verwaltungs- und Wirtschaftsgeschichte, besonders des preussischen Staates, im 17ten und 18ten Jahrhundert* (1898).

For an estimate of Schmoller's work cf. Stampfer, *Gustav Schmoller* (1901).

SCHNEEBERG, a town of Germany, in the kingdom of Saxony, in the Erzegebirge, 14 m. S.E. from Zwickau by rail. Pop. (1905) 9034. It contains a handsome Gothic parish church, one of the largest ecclesiastical buildings in Saxony, dedicated to St Wolfgang, with an altar-piece by Lucas Cranach the elder, and numerous tombs; a gymnasium; a school of lace-making and a hospital. Hand-made lace and silver mining, formerly its two most important industries, have greatly declined. The first has been almost entirely superseded by machine-made goods, while the second appears to have languished owing to exhaustion of the mines. Cobalt, bismuth and nickel are worked and yield satisfactory results, and machine-made lace, embroidery, porcelain, corsets, shoes and colours are among the chief of its other industrial products. Schneeberg is also noted for a snuff made of aromatic herbs, which commands a ready sale in the district.

See Lehmann, *Chronik von Schneeberg* (Schneeberg, 1837-1840).

SCHNEEKOPPE, a mountain of Germany, on the Silesian Bohemian frontier, the highest peak (5100 ft.) of the Riesengebirge, situated immediately above the town of Schmiedeberg, 8 m. S. from Hirschberg. From the crest, which is about 50 yds. sq. and across which runs the frontier line between Silesia and Bohemia, a magnificent view is obtained across the Oder plain to Breslau on the north and over Bohemia to the south-west. Just below the ridge, on the Prussian side, lies the chapel of St Lawrence, which was used as a hospice for travellers from 1824 to 1850, when a new hostel was erected. Since 1900 a meteorological station has been established here.

See Zetzmann, *Panorama von der Schneekoppe* (Berlin, 1903).

SCHNEIDEMÜHL (Polish *Pila*), a town of Germany, in the Prussian province of Posen, situated on the Cüddow, 60 m. N. of Posen and 145 m. N.E. of Berlin on the main line to Königsberg, and at the junction of lines to Stargard and Thorn. Pop. (1905), 21,624. It has five churches, a classical school and a Roman Catholic teachers' seminary. Schneidemühl carries on a trade in wood, grain and potatoes, and possesses an iron foundry, several glass works and machine-shops, and other industrial establishments. Considerable damage was done to the town in 1893 by a violent overflow of water from a deep artesian well.

SCHNEIDER, JOHANN GOTTLOB (1750–1822), German classical scholar and naturalist, was born at Kollmen in Saxony on the 18th of January 1750. In 1774, on the recommendation of Heyne, he became secretary to the famous Strassburg scholar, R. F. Brunck, and in 1811 professor of ancient languages and eloquence at Breslau (chief librarian, 1816) where he died on the 12th of January 1822. Of his numerous works the most important was his *Kritisches griechisch-deutsches Handwörterbuch* (1797–1798), the first independent work of the kind since Stephanus's *Thesaurus*, and the basis of F. Passow's and all succeeding Greek lexicons. A special improvement was the

introduction of words and expressions connected with natural history and science. The scientific writings of ancient authors especially attracted him. He published editions of Aelian, *De natura animalium*; Nicander, *Alexipharmaca* and *Theriaca*; the *Scriptores rei rusticae*; Aristotle, *Historia animalium* and *Politica*; Epicurus, *Physica* and *Meteorologica*; Theophrastus, *Eclogae physicae*; Oppian, *Halieutica* and *Cynegetica*; the complete works of Xenophon and Vitruvius; the *Argonautica* of the so-called Orpheus (for which Ruhnken nicknamed him "Orpheomastix"); an essay on the life and writings of Pindar and a collection of his fragments. His *Eclogae physicae* is a selection of extracts of various length from Greek and Latin writers on scientific subjects, containing the original text and commentary, with essays on natural history and science in ancient times.

See F. Passow, *Opuscula academica* (1835); C. Bursian, *Geschichte der classischen Philologie in Deutschland* (1883).

SCHNEIDER, LOUIS (1805–1878), German actor and author, was born at Berlin on the 29th of April 1805, the son of George Abraham Schneider (1770–1839). At an early age he was engaged at the Royal Theatre, Berlin, where he soon rose to play leading comedy parts. His reputation as a comedian grew with his success in such rôles as Zierl in the *Einfahrt vom Lande*, Peter in the *Kapellmeister von Venedig*, Schikaneder in the *Schauspieldirektor* and Basileo in *Figaro's Hochzeit*, and he became the favourite of Berlin. In 1845 he was appointed head of the Royal opera in Berlin. But his bold patriotic couplets and impromptus during the revolutionary year 1848 necessitated his retirement, and thereafter he translated and adapted for the stage Mozart's *Cosi fan tutti*; published, under the pseudonym "L. W. Both," *Das Buhnenrepertoire des Auslandes;* and founded, as a result of his experiences as a soldier in the Danish war of 1849, the periodical *Der Soldatenfreund*. He also wrote *Geschichte der Oper und des Opernhauses in Berlin* (1845-1852). Soon after his retirement he was appointed reader to King Frederick William IV. of Prussia, and subsequently he received the title of Geheimen Hofrat. He continued to enjoy the favour of the court, and, as correspondent of the *Staatsanzeiger*, was attached to the headquarters staff of the Prussian army during the campaign of 1866; and, by special invitation, accompanied the emperor William during the war of 1870. Schneider also wrote a novel, *Das böse Gluck*, and several volumes of reminiscences: *König Wilhelm* (1869), *Kaiser Wilhelm, 1867–1871* (1875). He died at Potsdam on the 16th of December 1878.

See his posthumous memoirs, *Aus meinem Leben* (Berlin, 1879–1880), and *Aus dem Leben Kaiser Wilhelms* (1888), which caused some sensation on their publication.

SCHNEIDEWIN, FRIEDRICH WILHELM (1810–1856), German classical scholar, was born at Helmstedt on the 6th of June 1810. In 1833 he became a teacher at the Brunswick gymnasium, in 1837 extraordinary and in 1842 ordinary professor of classical languages and literature in the university of Göttingen, where he died on the 11th of January 1856. Schneidewin's work on Sophocles and the Greek lyric poets is of permanent value. His most important publications are: *Ibyci Rhegini reliquiae* (1833), severely criticized by G. Hermann; *Simonidis Cei reliquiae* (1835); *Delectus poësis Graecorum elegiacae, iambicae, melicae* (1838–1839), in which the fragments of the lyric poets were for the first time published in a convenient form; *Paroemiographi graeci* (1839, with E. von Leutsch); *Sophocles* (1849–1854, revised after his death by A. Nauck). He also edited the fragments of the speeches of Hypereides on behalf of Euxenippus and Lycophron (already published by Churchill Babington from a papyrus discovered in Egyptian Thebes in 1847) and a Latin poem on rhetorical figures by an unknown author (*Incerti auctoris de figuris vel schematibus versus heroici*, 1841), found by Jules Quicherat in MS. in the Paris library. Schneidewin was also the founder of *Philologus* (1846), a journal devoted to classical learning, and dedicated to the memory of K. O. Müller.

See A. Baumeister in *Allgemeine deutsche Biographie*; E. von Leutsch in *Philologus*, x.; and M. Lechner, *Zur Erinnerung an K. F. Hermann, F. W. Schneidewin* (1864).

SCHNORR VON KAROLSFELD, JULIUS (1794–1872), German painter, was born in 1794 at Leipzig, where he received his earliest instruction from his father Johann Veit Schnorr (1764–1841), a draughtsman, engraver and painter. At seventeen he entered the Academy of Vienna, from which Overbeck and others who rebelled against the old conventional style had been expelled about a year before. In 1818 he followed the founders of the new school of German pre-Raphaelites in the general pilgrimage to Rome. This school of religious and romantic art abjured modern styles and reverted to and revived the principles and practice of earlier periods. At the outset an effort was made to recover fresco painting and "monumental art," and Schnorr found opportunity of proving his powers, when commissioned to decorate with frescoes, illustrative of Ariosto, the entrance hall of the Villa Massimo, near the Lateran. His fellow-labourers were Cornelius, Overbeck and Veit. His second period dates from 1825, when he left Rome, settled in Munich, entered the service of King Ludwig, and transplanted to Germany the art of wall-painting learnt in Italy. He showed himself qualified as a sort of poet-painter to the Bavarian court; he organized a staff of trained executants, and set about clothing five halls in the new palace with frescoes illustrative of the *Nibelungenlied*. Other apartments his prolific pencil decorated with scenes from the histories of Charlemagne, Frederick Barbarossa and Rudolph of Habsburg. These interminable compositions are creative, learned in composition, masterly in drawing, but exaggerated in thought and extravagant in style.

Schnorr's third period is marked by his "Bible Pictures" or Scripture History in 180 designs. The artist was a Lutheran, and took a broad and unsectarian view which won for his Pictorial Bible ready currency throughout Christendom. Frequently the compositions are crowded and confused, wanting in harmony of line and symmetry in the masses; thus they suffer under comparison with Raphael's Bible. The style is severed from the simplicity and severity of early times, and surrendered to the florid redundance of the later Renaissance. Yet throughout are displayed fertility of invention, academic knowledge with facile execution; and modern art has produced nothing better than "Joseph Interpreting Pharaoh's Dream," the "Meeting of Rebecca and Isaac" and the "Return of the Prodigal Son." Biblical drawings and cartoons for frescoes formed a natural prelude to designs for church windows. The painter's renown in Germany secured commissions in Great Britain. Schnorr made designs, carried out in the royal factory, Munich, for windows in Glasgow cathedral and in St Paul's cathedral, London. This Munich glass provoked controversy: medievalists objected to its want of lustre, and stigmatized the windows as coloured blinds and picture transparencies. But the opposing party claimed for these modern revivals "the union of the severe and excellent drawing of early Florentine oil-paintings with the colouring and arrangement of the glass-paintings of the latter half of the 16th century." Schnorr died at Munich in 1872. His brother Ludwig Ferdinand (1789–1853) was also a painter.

SCHOFIELD, JOHN McALLISTER (1831–1906), American soldier, was born at Gerry, Chautauqua county, New York, on the 29th of September 1831. He graduated at West Point in 1853, served for two years in the artillery, was assistant professor of natural and experimental philosophy at West Point in 1855–1860, and while on leave (1860–1861) was professor of physics at Washington university, St Louis. When the Civil War broke out, he became a major in a Missouri volunteer regiment and served as chief of staff to Major-General Nathaniel Lyon until the death of that officer. (In 1892 he received a Congressional medal of honour for "conspicuous gallantry at the battle of Wilson's Creek.") In 1861–1863 he performed various military duties in Missouri. In April 1863 he took command of a division in the Army of the Cumberland, and in 1864, as commander of the Army of the Ohio, he took part in the Atlanta campaign under Major-General W. T. Sherman. In October 1864 Schofield was sent to Tennessee to join Major-General G. H. Thomas in opposing General J. B. Hood, and on the 30th of November he fought with General Hood the desperate and

indecisive battle of Franklin. Two weeks later he took part in Thomas's crowning victory at Nashville. For his services at Franklin he was awarded the rank of brigadier-general (November 1864) and the brevet rank of major-general (March 1865) in the regular army. Being ordered to co-operate with Sherman in North Carolina, Schofield moved his corps by rail and sea to Fort Fisher, North Carolina, in seventeen days, occupied Wilmington on the 22nd of February 1865, fought the action at Kinston on the 8–10th of March, and on the 23rd joined Sherman at Goldsboro. After the war he was sent on a special diplomatic mission to France, on account of the presence of French troops in Mexico; and from June 1868 to March 1869 he served as secretary of war under President Andrew Johnson, after the retirement of E. M. Stanton (*q.v.*). From 1876 to 1881 he was superintendent of the Military Academy at West Point, and from 1888 until his retirement in 1895 he was commanding general of the United States army. He had become major-general in March 1869, and in February 1895 he was made lieutenant-general. He died at St Augustine, Florida, on the 4th of March 1906. General Schofield published *Forty-six Years in the Army* (New York, 1897).

SCHOLAR, SCHOLARSHIP. The term "scholar," primarily meaning a "learner," is secondarily applied to one who has thoroughly learnt all that "the school" can teach him, one who by early training and constant self-culture has attained a certain maturity in precise and accurate knowledge. Hence the term "scholarship" in the sense of the knowledge or method of a scholar. Similarly "classical scholarship" may be defined as the sum of the mental attainments of a classical scholar. Scholarship is sometimes identified with classical *learning* or erudition; it is more often contrasted with it. The contrast is thus drawn by Donaldson in his *Classical Scholarship and Classical Learning* (1856), and by Mark Pattison, in his *Essay on Oxford Studies* (1855). "I maintain," says Donaldson, "that not all learned men are accomplished scholars, though any accomplished scholar may, if he chooses to devote the time to the necessary studies, become a learned man" (p. 149). "It is not a knowledge," writes Mark Pattison, "but a discipline, that is required; not science, but the scientific habit; not erudition, but scholarship" (*Essays*, i. 425).

The expression "a scholarship" is also used in England for a money payment made by a school, college or university, as a prize (either for one year or a series of years) to the successful competitors at an examination at which one or more such scholarships are to be awarded; and the successful candidate is called a "scholar," as the holder of a "scholarship." In this sense the word is almost synonymous with "an exhibition," but the latter is usually considered inferior in merit and dignity, if not in amount.

On the general history of classical scholarship, see CLASSICS: *Greek and Latin.*

SCHOLASTICISM, the name usually employed to denote the most typical products of medieval thought. After the centuries of intellectual darkness which followed upon the closing of the philosophical schools in Athens (529), and the death of Boetius, the last of the ancient philosophers, the first symptoms of renewed intellectual activity appear contemporaneously with the consolidation of the empire of the West in the hands of Charlemagne. He endeavoured to attract to his court the best scholars of Britain and Ireland, and by imperial decree (787) commanded the establishment of schools in connexion with every abbey in his realms. Peter of Pisa and Alcuin of York were his advisers, and under their care the opposition long supposed to exist between godliness and secular learning speedily disappeared. Besides the celebrated school of the Palace, where Alcuin had among his hearers the members of the imperial family and the dignitaries of the empire as well as talented youths of humbler origin, we hear of the episcopal schools of Lyons, Orleans and St Denis, the cloister schools of St Martin of Tours, of Fulda, Corbie, Fontenelle and many others, besides the older monasteries of St Gall and Reichenau. These schools became the centres of medieval learning and speculation, and from them the name Scholasticism is derived (cf. Sandys, *Hist. of Class. Schol.*, i. 471, 1906). They were designed to communicate instruction in the seven liberal arts which constituted the educational curriculum of the middle ages (see TRIVIUM). The name *doctor scholasticus* was applied originally to any teacher in such an ecclesiastical gymnasium, but gradually the study of dialectic or logic overshadowed the more elementary disciplines, and the general acceptation of "doctor" came to be one who occupied himself with the teaching of logic. The philosophy of the later Scholastics is more extended in its scope; but to the end of the medieval period philosophy centres in the discussion of the same logical problems which began to agitate the teachers of the 9th and 10th centuries.

Scholasticism in the widest sense thus extends from the 9th to the end of the 14th or the beginning of the 15th century—from Erigena to Occam and his followers. The belated Scholastics who lingered beyond the last mentioned date served only as marks for the obloquy heaped upon the schools by the men of the new time. Erigena is really of the spiritual kindred of the Neoplatonists and Christian mystics rather than of the typical Scholastic doctors, and, in fact, the activity of Scholasticism is mainly confined within the limits of the 11th and the 14th centuries. It is divisible into two well-marked periods—the first extending to the end of the 12th century and embracing as its chief names Roscellinus, Anselm, William of Champeaux and Abelard, while the second extended from the beginning of the 13th century to the Renaissance and the general distraction of men's thoughts from the problems and methods of Scholasticism. In this second period the names of Albertus Magnus, Thomas Aquinas and Duns Scotus represent (in the 13th century and the first years of the 14th century) the culmination of Scholastic thought and its consolidation into system.

Chronological limits.

Prantl says that there is no such thing as philosophy in the middle ages; there are only logic and theology. The remark overlooks two facts—firstly that the main objects of theology and philosophy are identical, though the method of treatment is different, and secondly that logical discussion commonly leads up to metaphysical problems, and that this was pre-eminently the case with the logic of the Schoolmen. But the saying draws attention to the two great influences which shaped medieval thought—the tradition of ancient logic and the system of Christian theology. Scholasticism opens with a discussion of certain points in the Aristotelian logic; it speedily begins to apply its logical distinctions to the doctrines of the church; and when it attains its full stature in St Thomas it has, with the exception of certain mysteries, rationalized or Aristotelianized the whole churchly system. Or we might say with equal truth that the philosophy of St Thomas is Aristotle Christianized. The Schoolmen contemplate the universe of nature and man not with their own eyes but in the glass of Aristotelian formulae. Their chief works are in the shape of commentaries upon the writings of "the philosopher."[1] Their problems and solutions alike spring from the master's dicta—from the need of reconciling these with one another and with the conclusions of Christian theology.

Logic and theology.

The fact that the channels of thought during the middle ages were determined in this way is usually expressed by saying that reason in the middle age is subject to authority. It has not the free play which characterizes its activity in Greece and in the philosophy of modern times. Its conclusions are predetermined, and the initiative of the individual thinker is almost confined, therefore, to formal details in the treatment of his thesis. To the church, reason is the handmaid of faith (*ancilla fidei*). But this principle of the subordination of the reason wears a different aspect according to the century and writer referred to. In Scotus Erigena, at the beginning of the Scholastic era, there is no such subordination contemplated, because philosophy and theology in his work are in implicit unity. "Conficitur inde veram esse philosophiam veram religionem, conversimque veram religionem esse veram

Reason and authority.

[1] The common designation of Aristotle in the middle ages.

philosophiam" (*De divina praedestinatione*, Proem). Reason in its own strength and with its own instruments evolves a system of the universe which coincides, according to Erigena, with the teaching of Scripture. For Erigena, therefore, the speculative reason is the supreme arbiter; and in accordance with its results the utterances of Scripture and of the church have not infrequently to be subjected to an allegorical or mystical interpretation. But this is only to say again that Erigena is more of a Neoplatonist than a Scholastic. Hence Cousin suggested in respect of this point a threefold chronological division—at the outset the absolute subordination of philosophy to theology, then the period of their alliance, and finally the beginning of their separation. In other words, we note philosophy gradually extending its claims. Dialectic is, to begin with, a merely secular art, and only by degrees are its terms and distinctions applied to the subject-matter of theology. The early results of the application, in the hands of Berengarius and Roscellinus, did not seem favourable to Christian orthodoxy. Hence the strength with which a champion of the faith like Anselm insists on the subordination of reason. To Bernard of Clairvaux and many other churchmen the application of dialectic to the things of faith appears as dangerous as it is impious. Later, in the systems of the great Schoolmen, the rights of reason are fully established and acknowledged. The relation of reason and faith remains external, and certain doctrines—an increasing number as times goes on—are withdrawn from the sphere of reason. But with these exceptions the two march side by side; they establish by different means the same results. For the conflicts which accompanied the first intrusion of philosophy into the theological domain more profound and cautious thinkers with a far ampler apparatus of knowledge had substituted a harmony. "The constant effort of Scholasticism to be at once philosophy and theology"[1] seemed at last satisfactorily realized. But the further progress of Scholastic thought consisted in a withdrawal of doctrine after doctrine from the possibility of rational proof and their relegation to the sphere of faith. Indeed, no sooner was the harmony apparently established by Aquinas than Duns Scotus began this negative criticism, which is carried much farther by William of Occam. But this is equivalent to a confession that Scholasticism had failed in its task, which was to rationalize the doctrines of the church. The Aristotelian form refused to fit a matter for which it was never intended; the matter of Christian theology refused to be forced into an alien form. The end of the period was thus brought about by the internal decay of its method and principles quite as much as by the variety of external causes which contributed to transfer men's interests to other subjects.

Scholasticism not unprogressive.

But, although the relation of reason to an external authority thus constitutes the badge of medieval thought, it would be unjust to look upon Scholasticism as philosophically barren, and to speak as if reason, after an interregnum of a thousand years, resumed its rights at the Renaissance. Such language was excusable in the men of the Renaissance, fighting the battle of classic form and beauty and of the manysidedness of life against the barbarous terminology and the monastic ideals of the schools, or in the protagonists of modern science. The new is never just to the old. In the schools and universities of the middle age the intellect of the semi-barbarous European peoples had been trained for the work of the modern world. But we may go further and say that, in spite of their initial acceptance of authority, the Scholastics are not the antagonists of reason; on the contrary they fight its battles. The attempt to establish *by argument* the authority of faith is in reality the unconscious establishment of the authority of reason. Reason, if admitted at all, must ultimately claim the whole man. Anselm's motto, *Credo ut intelligam*, marks well the distance that has been traversed since Tertullian's *Credo quia absurdum est*. The claim of reason has been recognized to manipulate the data of faith, at first blindly and immediately received, and to weld them into a system such as will satisfy its own needs. Scholasticism that has outlived its day may be justly identified with obscurantism, but not so the systems of those who, by their intellectual force alone, once held all the minds of Europe in subjection. The scholastic systems are not the free products of speculation; in the main they are *summae theologiae*, or they are modified versions of Aristotle. But each system is a fresh recognition of the rights of reason, and Scholasticism as a whole may be regarded as the history of the growth and gradual emancipation of reason which was completed in the movements of the Renaissance and the Reformation.

[1] Milman's *Latin Christianity*, ix. 101.

"Universals."

In speaking of the origin of Scholasticism—name and thing—it has been already noted that medieval speculation takes its rise in certain logical problems. To be more precise, it is the nature of "universals" which forms the central theme of Scholastic debate (see NOMINALISM, REALISM). This is the case almost exclusively during the first period, and only to a less extent during the second, where it reappears in a somewhat different form as the difficulty concerning the principle of individuation. The controversy was between Nominalists and Realists; and, exclusively logical as the point may at first sight seem to be, adherence to one side or the other is an accurate indication of philosophic tendency. The two opposing theories express at bottom, in the phraseology of their own time, the radical divergence of pantheism and individualism—the two extremes between which philosophy seems pendulum-wise to oscillate, and which may be said still to await their perfect reconciliation. First, however, we must examine the form which this question assumed to the first medieval thinkers, and the source from which they derived it.

Porphyry's "Isagoge."

A single sentence in Porphyry's *Isagoge* or "introduction" to the *Categories* of Aristotle furnished the text of the discussion. The treatise of Porphyry deals with the notions of genus, species, difference, property and accident (see PREDICABLES); and he mentions, but declines to discuss, the various theories that have been held as to the ontological import of genera and species. In the Latin translation of Boetius, in which alone the *Isagoge* was then known, the sentence runs as follows:—

"Mox de generibus et speciebus illud quidem sive subsistant, sive in solis nudis intellectibus posita sint, sive subsistentia corporalia sint an incorporalia, et utrum separata a sensibilibus an in sensibilibus posita et circa haec consistentia, dicere recusabo; altissimum enim negotium est hujusmodi et majoris egens inquisitionis."

This passage indicates three possible positions with regard to universals. It may be held that they exist merely as conceptions in our minds; this is Nominalism or Conceptualism (*q.v.*). It may be held that they have a substantial existence of their own, independent of their existence in our thoughts. This is Realism, which may be of two varieties, according as the substantially existent universals are supposed to exist apart from the sensible phenomena or only in and with the objects of sense as their essence. The first form of Realism corresponds to the Platonic theory of the transcendence of the ideas; the second reproduces the Aristotelian doctrine of the essence as inseparable from the individual thing. But, though he implies an ample previous treatment of the questions by philosophers, Porphyry gives no references to the different systems of which such distinctions are the outcome, nor does he give any hint of his own opinion on the subject, definite enough though that was. He simply sets the discussion aside as too difficult for a preliminary discourse, and not strictly relevant to a purely logical inquiry. Porphyry, the Neoplatonist, the disciple of Plotinus, was an unknown personage to those early students of the *Isagoge*. The passage possessed for them a mysterious charm, largely due to its isolation and to their ignorance of the historic speculations which suggested it. And accordingly it gave rise to the three great doctrines which divided the medieval schools: Realism of the Platonic type, embodied in the formula *universalia ante rem*; Realism of the Aristotelian type, *universalia in re*; and Nominalism, including Conceptualism, expressed by the phrase *universalia post rem*, and also claiming to be based upon the Peripatetic doctrine.

To form a proper estimate of the first stage of Scholastic discussion it is requisite above all things to have a clear idea of the appliances then at the disposal of the writers. What was the extent of their knowledge of ancient philosophy? To begin with, we know that till the 13th century the middle age was ignorant of Greek, and possessed no philosophical works in their Greek original (see CLASSICS). In translations they had only the *Categories* and the *De interpretatione* of Aristotle in the versions of Boetius, the *Timaeus* of Plato in the version of Chalcidius, and Boetius's translation of Porphyry's *Isagoge*. Some general information as to the Platonic doctrines (chiefly in a Neoplatonic garb) was obtainable from the commentary with which Chalcidius (6th century) accompanied his translation, from the work of Apuleius (2nd century) *De dogmate Platonis*, and indirectly from the commentary of Macrobius (*c.* 400) on the *Somnium Scipionis* of Cicero, and from the writings of St Augustine. As aids to the study of logic, the doctors of this period, beside the commentaries and treatises of Boetius (*q.v.*), possessed two tracts attributed to St Augustine, the first of which, *Principia dialecticae*, is probably his, but is mainly grammatical in its import. The other tract, known as *Categoriae decem*, and taken at first for a translation of Aristotle's treatise, is really a rapid summary of it, and certainly does not belong to Augustine. To this list must be added: (1) the *Satyricon* of Martianus Capella (*q.v.*), the greater part of which is a treatise on the seven liberal arts, the fourth book dealing with logic; (2) the *De artibus ac disciplinis liberalium literarum* of Cassiodorus (*q.v.*); (3) the *Origines* of Isidore of Seville (*ob.* 636), which is little more than a reproduction of (2). The above constitutes the whole material which the earlier middle age had at its disposal.

Extent of the early Schoolmen's knowledge.

The grandly conceived system of Erigena (see ERIGENA and MYSTICISM) stands by itself in the 9th century like the product of another age. John the Scot was still acquainted with Greek, seeing that he translated the work of the pseudo-Dionysius; and his speculative genius achieved the fusion of Christian doctrine and Neoplatonic thought in a system of quite remarkable metaphysical completeness. It is the only complete and independent system between the decline of ancient thought and the system of Aquinas in the 13th century, if indeed we ought not to go further, to modern times, to find a parallel. Erigena pronounces no express opinion upon the question which was even then beginning to occupy men's minds; but his Platonico-Christian theory of the Eternal Word as containing in Himself the exemplars of created things is equivalent to the assertion of *universalia ante rem*. His whole system, indeed, is based upon the idea of the divine as the exclusively real, of which the world of individual existence is but the theophany; the special and the individual are immanent, therefore, in the general. And hence at a much later date (in the beginning of the 13th century) his name was invoked to cover the pantheistic heresies of Amalrich of Bena.

Erigena.

Erigena does not separate his Platonic theory of pre-existent exemplars from the Aristotelian doctrine of the universal as *in* the individuals. As Ueberweg points out, his theory is rather a result of the transference of the Aristotelian conception of substance to the Platonic Idea, and of an identification of the relation of accidents to the substance in which they inhere with that of the individuals to the Idea of which, in the Platonic doctrine, they are copies (*Hist. of Philosophy*, i. 363, Eng. trans.). Hence it may be said that the universals are in the individuals, constituting their essential reality (and it is an express part of Erigena's system that the created but creative Word, the second division of Nature, should pass into the third stage of created and non-creating things); or rather, perhaps, we ought to say that the individuals exist in the bosom of their universal. At all events, while Erigena's Realism is pronounced, the Platonic and Aristotelian forms of the doctrine are not distinguished in his writings. Prantl has professed to find the headstream of Nominalism also in Scotus Erigena; but beyond the fact that he discusses at considerable length the categories of thought and their mutual relations, occasionally using the term *voces* to express his meaning, Prantl appears to adduce no reasons for an assertion which directly contradicts Erigena's most fundamental doctrines. Moreover, Erigena again and again declares that dialectic has to do with the stadia of a real or divine classification: "Intelligitur quod ars illa, quae dividit genera in species et species in genera resolvit, quae διαλεκτικὴ dicitur, non ab humanis machinationibus sit facta, sed in natura rerum ab auctore omnium artium, quae verae artes sunt, condita et a sapientibus inventa" (*De divisione naturae*, iv. 4).

The immediate influence of Erigena's system cannot have been great, and his works seem soon to have dropped out of notice in the centuries that followed. The real germs of Realism and Nominalism are to be found in the 9th century, in scattered commentaries and glosses upon the statements of Porphyry and Boetius. Boetius in commenting upon Porphyry had already started the discussion as to the nature of universals. He is definitely anti-Platonic, and his language sometimes takes even a nominalistic tone, as when he declares that the species is nothing more than a thought or conception gathered from the substantial similarity of a number of dissimilar individuals. The expression "substantial similarity" is still, however, sufficiently vague to cover a multitude of views. He concludes that the genera and species exist as universals only in thought; but, inasmuch as they are collected from singulars on account of a real resemblance, they have a certain existence independently of the mind, but not an existence disjoined from the singulars of sense. "Subsistunt ergo circa sensibilia, intelliguntur autem praeter corpora." Or, according to the phrase which recurs so often during the middle ages, "universale intelligitur, singulare sentitur." Boetius ends by declining to adjudicate between Plato and Aristotle, remarking in a semi-apologetic style that, if he has expounded Aristotle's opinion by preference, his course is justified by the fact that he is commenting upon an introduction to Aristotle. And, indeed, his discussion cannot claim to be more than semi-popular in character. The point in dispute has not in his hands the all-absorbing importance it afterwards attained, and the keenness of later distinctions is as yet unknown. In this way, however, though the distinctions drawn may still be comparatively vague, there existed in the schools a Peripatetic tradition to set over against the Neoplatonic influence of John the Scot, and amongst the earliest remains of Scholastic thought we find this tradition asserting itself somewhat vigorously. There were Nominalists before Roscellinus among these early thinkers.

Influence of Boetius.

Alcuin (*q.v.*) does nothing more in his *Dialectic* than abridge Boetius and the other commentators. But in the school of Fulda, presided over by his pupil Hrabanus Maurus (776–856), there are to be found some fresh contributions to the discussion. The collected works of Hrabanus himself contain nothing new, but in some glosses on Aristotle and Porphyry, first exhumed by Cousin, there are several noteworthy expressions of opinion in a Nominalistic sense. The author interprets Boetius's meaning to be "Quod eadem res individuum et species et genus est, et non esse universalia individuis quasi quoddam diversum." He also cites, apparently with approval, the view of those who held Porphyry's treatise to be not *de quinque rebus*, but *de quinque vocibus*. A genus, they said, is essentially something which is predicated of a subject; but a thing cannot be a predicate (*res enim non praedicatur*). These glosses, it should be added, however, have been attributed by Prantl and Kaulich, on the ground of divergence from doctrines contained in the published works of Hrabanus, to some disciple of his rather than to Hrabanus himself. Fulda had become through the teaching of the latter an intellectual centre. Eric or Heiricus, who studied there under Haimon, the successor of Hrabanus, and afterwards taught at Auxerre, wrote glosses on the margin of his copy of the pseudo-Augustinian *Categoriae*, which have been published by Cousin and Hauréau. He there says in words which recall the language of Locke (*Essay*, iii. 3) that because proper names are innumerable, and no intellect or memory would suffice for the knowing of them, they are all as it were comprehended in the species. Taken strictly his words state the position of extreme Nominalism; but even if we were not forbidden to do so by other passages, in which the doctrine of moderate Realism is adopted (under cover of the current distinction between the singular as felt and the pure universal as understood), it would still be unfair to press any passage in the writings of this period. As Cousin says, "Realism and Nominalism were undoubtedly there in germ, but their true principles with their necessary consequences remained profoundly unknown; their connexion with all the great questions of religion and politics was not even suspected. The two systems were nothing more as yet than two different ways of interpreting a phrase of Porphyry, and they remained unnoticed in the

Hrabanus Maurus.

Eric.

obscurity of the schools. . . . It was the 11th century which gave Nominalism to the world." [1]

Remigius of Auxerre, pupil of Eric, became the most celebrated professor of dialectic in the Parisian schools of the 10th century. As he reverted to Realism, his influence, first at Rheims and then in Paris, was doubtless instrumental in bringing about the general acceptance of that doctrine till the advent of Roscellinus as a powerful disturbing influence. "There is one genus more general than the rest," says Remi (J. B. Hauréau, *Histoire de la philosophie scolastique*, i. 146), "beyond which the intellect cannot rise, called by the Greeks οὐσία, by the Latins *essentia*. The essence, indeed, comprehends all natures, and everything that exists is a portion of this essence, by participation in which everything that is hath its existence." And similarly with the intermediate genera. "Homo est multorum hominum substantialis unitas." Remigius is thus a Realist, not so much in the sense of Plato as in the spirit of Parmenides, and Hauréau applies to this form of Realism Bayle's description of Realism in general as "le Spinosisme non développé." The 10th century as a whole is especially marked out as a dark age, being partly filled with civil troubles and partly characterized by a reaction of faith against reason. In the monastery of St Gall there was considerable logical activity, but nothing of philosophical interest is recorded. The chief name of the century is that of Gerbert (died as Pope Silvester II. in 1003). His treatise *De rationali et ratione uti* is more interesting as a display of the logical acquirements of the age than as possessing any direct philosophical bearing. The school of Chartres, founded in 990 by Fulbert, one of Gerbert's pupils, was distinguished for nearly two centuries not so much for its dialectics and philosophy as for its humanistic culture. The account which John of Salisbury gives of it in the first half of the 12th century, under the presidency of Theodoric and Bernard, affords a very pleasant glimpse into the history of the middle ages. Since then, says their regretful pupil, "less time and less care have been bestowed on grammar, and persons who profess all arts, liberal and mechanical, are ignorant of the primary art, without which a man proceeds in vain to the rest. For albeit the other studies assist literature, yet this has the sole privilege of making one lettered." [2]

Remigius. ***Gerbert.*** ***School of Chartres.***

Hitherto, if dialectical studies had been sometimes viewed askance by the stricter churchmen, it was not because logic had dared to stretch forth its hands towards the ark of God, but simply on the ground of the old opposition between the church and the world. But now bolder spirits arose who did not shrink from applying the distinctions of their human wisdom to the mysteries of theology. It was the excitement caused by their attempt, and the heterodox conclusions which were its first result, that lifted these Scholastic disputations into the central position which they henceforth occupied in the life of the middle ages. The next centuries show that peculiar combination of logic and theology which is the mark of Scholasticism, especially in the period before the 13th century.

Application of logic to theology.

One of the first of these attacks was made by Berengarius of Tours (999–1088) upon the doctrine of transubstantiation; he denied the possibility of a change of substance in the bread and wine without some corresponding change in the accidents. M. de Rémusat characterizes his view on the Eucharist as a specific application of Nominalism. More intimately connected with the progress of philosophical thought was the tritheistic view of the Trinity propounded by Roscellinus as one of the results of his Nominalistic theory of knowing and being. The sharpness and onesidedness with which he formulated his position were the immediate occasion of the contemporaneous crystallization of Realism in the theories of Anselm and William of Champeaux. Henceforth discussion is carried on with a full consciousness of the differences involved and the issues at stake; and, thanks to the heretical conclusion disclosed by Roscellinus, Realism became established for several centuries as the orthodox philosophical creed. Roscellinus (d. *c.* 1125) was looked upon by later times as the originator of the *sententia vocum*, that is to say, of Nominalism proper. From the scanty and ill-natured notices of his opponents (Anselm and Abelard), we gather that he refused to recognize the reality of anything but the individual; he treated "the universal substance," says Anselm, as no more than "flatum vocis," a verbal breathing or sound; and in a similar strain he denied any reality to the parts of which a whole, such as a house, is commonly said to be composed. The parts in the one case, the general name or common attributes in the other, are only, he seems to have argued, so many subjective points of view from which we choose to regard that which in its own essence is one and indivisible, existing in its own right apart from any connexion with other individuals. This pure individualism, consistently interpreted, involves the denial of all real relation whatsoever; for things are related and classified by means of their general characteristics. Accordingly, if these general characteristics do not possess reality, things are reduced to a number of characterless and mutually indifferent points. It is possible, as Hauréau maintains, that Roscellinus meant no more than to refute the extreme Realism which asserts the substantial and, above all, the independent existence of the universals. Some of the expressions used by Anselm in controverting his position favour this idea. He upbraids Roscellinus, for example, because he was unable to conceive whiteness apart from its existence in something white. But this is precisely an instance of the hypostatization of abstractions in exposing which the chief strength and value of Nominalism lie. Cousin is correct in pointing out, from the Realistic point of view, that it is one thing to deny the hypostatization of an accident like colour or wisdom, and another thing to deny the foundation in reality of those "true and legitimate universals" which we understand by the terms genera and species. It is not to be supposed that the full scope of his doctrine was present to the mind of Roscellinus; but Nominalism would hardly have made the sensation it did had its assertions been as innocent as Hauréau would make them. Like most innovators, Roscellinus stated his position in bold language, which emphasized his opposition to accepted doctrines; and his words, if not his intentions, involved the extreme Nominalism which, by making universality merely subjective, pulverizes existence into detached particulars. And, though we may acquit Roscellinus of consciously propounding a theory so subversive of all knowledge, his criticism of the doctrine of the Trinity is proof at least of the determination with which he was prepared to carry out his individualism. If we are not prepared to say that the three Persons are one thing—in which case the Father and the Holy Ghost must have been incarnate along with the Son—then, did usage permit, he says, we ought to speak of three Gods.

Berengarius. ***Roscellinus.***

This theological deduction from his doctrine drew upon Roscellinus the polemic of his most celebrated opponent, Anselm of Canterbury (1033–1109). Roscellinus appears at first to have imagined that his tritheistic theory had the sanction of Lanfranc and Anselm, and the latter was led in consequence to compose his treatise *De fide Trinitatis*. From this may be gathered his views on the nature of universals. "How shall he who has not arrived at understanding how several men are in species one man comprehend how in that most mysterious nature several persons, each of which is perfect God, are one God?" The manner in which humanity exists in the individual was soon to be the subject of keen discussion, and to bring to light diverging views within the Realistic camp; but St Anselm does not go into detail on this point, and seems to imply that it is not surrounded by special difficulties. In truth, his Realism was of a somewhat uncritical type. It was simply accepted by him in a broad way as the orthodox philosophic doctrine, and the doctrine which, as a sagacious churchman, he perceived to be most in harmony with Christian theology. Anselm's natural element was theology, and the high metaphysical questions which are as it were the obverse of theology. On the other hand, as the first to formulate the ontological argument (in his *Proslogion*) for the existence of God, he joins hands with some of the profoundest names in modern philosophy. To Anselm specially belongs the motto *Credo ut intelligam*, or, as it is

Anselm.

[1] Victor Cousin, *Ouvrages inédits d'Abélard*, Introd. p. lxxxv.

[2] *Metalogicus*, i. 27, quoted in Poole's *Illustrations of Medieval Thought*.

otherwise expressed in the sub-title of his *Proslogion*, *Fides quaerens intellectum*. He endeavoured to give a philosophical demonstration not only of the existence of God but also of the Trinity and the Incarnation, which were placed by the later Scholastics among the "mysteries." The Christological theory of satisfaction expounded in the *Cur Deus Homo* falls beyond the scope of the present article. But the Platonically conceived proof of the being of God contained in the *Monologion* shows that Anselm's doctrine of the universals as substances in things (*universalia in re*) was closely connected in his mind with the thought of the *universalia ante rem*, the exemplars of perfect goodness and truth and justice, by participation in which all earthly things are judged to possess these qualities. In this way he rises like Plato to the absolute Goodness, Justice and Truth, and then proceeds in Neoplatonic fashion to a deduction of the Trinity as involved in the idea of the divine Word (see further ANSELM).

Besides its connexion with the speculations of Anselm, the doctrine of Roscellinus was also of decisive influence within the schools in crystallizing the opposite opinion. William of Champeaux (1070–1121), who is reputed the founder of a definitely formulated Realism, much as Roscellinus is regarded as the founder of Nominalism, was instructed by Roscellinus himself in dialectic. Unfortunately none of William's philosophical works have survived, and we depend upon the statements of his opponent Abelard, in the *Historia calamitatum mearum*, and in certain manuscripts discovered by Cousin. From these sources it appears that he professed successively two opinions on the nature of the universals, having been dislodged from his first position by the criticism of Abelard, his quondam pupil. There is no obscurity about William's first position. It is a Realism of the most uncompromising type, which by its reduction of individuals to accidents of one identical substance seems to tremble on the very verge of Spinozism. He taught, says Abelard, that the same thing or substance was present in its entirety and essence in each individual, and that individuals differed no whit in their essence but only in the variety of their accidents. Thus "Socratitas" is merely an accident of the substance "humanitas," or, as it is put by the author of the treatise *De generibus et speciebus*,[1] "Man is a species, a thing essentially one (*res una essentialiter*), which receives certain forms which make it Socrates. This thing, remaining essentially the same, receives in the same way other forms which constitute Plato and the other individuals of the species man; and, with the exception of those forms which mould that matter into the individual Socrates, there is nothing in Socrates that is not the same at the same time under the forms of Plato. . . . According to these men, even though rationality did not exist in any individual, its existence in nature would still remain intact" (Cousin, *Introduction*, &c., p. cxx.). Criticism was speedily at work upon William of Champeaux's position. He had said expressly that the universal essence, by the addition of the individual forms, was individualized and present *secundum totam suam quantitatem* in each individual. But if *homo* is wholly and essentially present in Socrates, then it is, as it were, absorbed in Socrates; where Socrates is not, it cannot be, consequently not in Plato and the other *individua hominis*. This was called the argument of the *homo Socraticus*; and it appears to have been with the view of obviating such time and space difficulties, emphasized in the criticism of Abelard, that William latterly modified his form of expression. But his second position is enveloped in considerable obscurity. Abelard says, "Sic autem correxit sententiam, ut deinceps rem eamdem non essentialiter sed individualiter diceret." In other words, he merely sought to avoid the awkward consequences of his own doctrine by substituting "individualiter" for "essentialiter" in his definition. If we are to put a sense upon this new expression, William may probably have meant to recall any words of his which seemed, by locating the universal in the entirety of its essence in each individual to confer upon the individual an independence which did not belong to it—thus leading in the end to the demand for a separate universal for each individual. In opposition to this Nominalistic view, which implied the reversal of his whole position, William may have meant to say that, instead of the universal being multiplied, it is rather the individuals which are reduced to unity in the universal. The species is essentially one, but it takes on individual varieties or accidents. If, however, we are more ill-natured, we may regard the phrase, with Prantl, as simply a meaningless makeshift in extremities; and if so, Abelard's account of the subsequent decline of William's reputation would be explained. But there is in some of the manuscripts the various reading of "indifferenter" for "individualiter," and this is accepted as giving the true sense of the passage by Cousin and Rémusat (Hauréau and Prantl taking, on different grounds, the opposite view). According to this reading, William sought to rectify his position by asserting, not the numerical identity of the universal in each individual, but rather its sameness in the sense of indistinguishable similarity. Ueberweg cites a passage from his theological works which apparently bears out this view, for William there expressly distinguishes the two senses of the word "same." Peter and Paul, he says, are the same in so far as they are both men, although the humanity of each is, strictly speaking, not identical but similar. In the Persons of the Trinity, on the other hand, the relation is one of absolute identity.

William of Champeaux.

Whether this view is to be traced to William or not, it is certain that the theory of "indifference" or "non-difference" (*indifferentia*) was a favourite solution in the Realistic schools soon after his time. The inherent difficulties of Realism led to a variety of attempts to reach a more satisfactory formula. John of Salisbury, in his account of the controversies of these days (*Metalogicus*, ii. 17) reckons up nine different views which were held on the question of the universals, and the list is extended by Prantl (ii. 118) to thirteen. In this list are included of course all shades of opinion, from extreme Nominalism to extreme Realism. The doctrine of indifference as it appears in later writers certainly tends, as Prantl points out, towards Nominalism, inasmuch as it gives up the substantiality of the universals. The universal consists of the non-different elements or attributes in the separate individuals, which alone exist substantially. If we restrict attention to these non-different elements, the individual becomes for us the species, the genus, &c.; everything depends on the point of view from which we regard it. "Nihil omnino est praeter individuum, sed et illud aliter et aliter attentum species et genus et generalissimum est." Adelard of Bath (whose treatise *De eodem et diverso* must have been written between 1105 and 1117) was probably the author or at all events the elaborator of this doctrine, and he sought by its means to effect a reconciliation between Plato and Aristotle:—"Since that which we see is at once genus and species and individual, Aristotle rightly insisted that the universals do not exist except in the things of sense. But, since those universals, so far as they are called genera and species, cannot be perceived by any one in their purity without the admixture of imagination, Plato maintained that they existed and could be beheld beyond the things of sense, to wit, in the divine mind. Thus these men, although in words they seem opposed, yet held in reality the same opinion." Prantl distinguishes from the system of indifference the "status" doctrine attributed by John of Salisbury to Walter of Mortagne (d. 1174), according to which the universal is essentially united to the individual, which may be looked upon, *e.g.* as Plato, man, animal, &c., according to the "status" or point of view which we assume. But this seems only a different expression for the same position, and the same may doubtless be said of the theory which employed the outlandish word "maneries" (Fr. *manière*) to signify that genera and species represented the different ways in which individuals might be regarded. The concessions to Nominalism which such views embody make them representative of what Hauréau calls "the Peripatetic section of the Realistic school."

Theory of indifference.

Somewhat apart from current controversies stood the teaching of the school of Chartres, humanistically nourished on the study of the ancients, and important as a revival of Platonism in opposition to the formalism of the Aristotelians. Bernard of Chartres, at the beginning of the 12th century, endeavoured, according to John of Salisbury, to reconcile Plato and Aristotle; but his doctrine is almost wholly derived from the former through St Augustine and the commentary of Chalcidius. The *universalia in re* have little place in his thoughts, which are directed by preference to the eternal exemplars as they exist in the supersensible world of the divine thought. His *Megacosmus* and *Microcosmus* are little more than a poetic gloss upon the *Timaeus*. William of Conches, a pupil of Bernard's, devoting himself to psychological and physiological questions, was of less importance for the specific logico-metaphysical problem. But Gilbert de la Porrée, according to Hauréau, is the most eminent logician of the Realistic

School of Chartres.

[1] This treatise, first published by Cousin in his *Ouvrages inédits d'Abélard*, was attributed by him to Abelard, and he was followed in this opinion by Hauréau; but Prantl adduces reasons which seem satisfactory for believing it to be the work of an unknown writer of somewhat later date (see Prantl, *Geschichte d. Logik*, ii. 143).

school in the 12th century and the most profound metaphysician of either school. The views which he expressed in his commentary on the pseudo-Boetian treatise, *De Trinitate*, are certainly much more important than the mediatizing systems already referred to. The most interesting part of the work is the distinction which Gilbert draws between the manner of existence of genera and species and of substances proper. He distinguishes between the *quod est* and the *quo est*. Genera and species certainly exist, but they do not exist in their own right as substances. What exists as a substance and the basis of qualities or forms (*quod est*) may be said *substare*; the forms on the other hand by which such an individual substance exists qualitatively (*quo est*) *subsistunt*, though it cannot be said that they *substant*. The intellect collects the universal, which exists but not as a substance (*est sed non substat*), from the particular things which not merely are (*sunt*) but also, as subjects of accidents, have substantial existence (*substant*), by considering only their substantial similarity or conformity. The universals are thus forms inherent in things—"native forms," according to the expression by which Gilbert's doctrine is concisely known. The individual consists of an assemblage of such forms; and it is individual because nowhere else is exactly such an assemblage to be met with. The form exists concretely in the individual things (*sensibilis in re sensibili*), for in sensible things form and matter are always united. But they may be conceived abstractly or non-sensuously by the mind (*sed mente concipitur insensibilis*), and they then refer themselves as copies to the Ideas their divine exemplars. In God, who is pure form without matter, the archetypes of material things exist as eternal immaterial forms. In this way Gilbert was at once Aristotelian and Platonist. The distinctions made by him above amount to a formal criticism of categories, and in the same spirit he teaches that no one of the categories can be applied in its literal sense to God (see further GILBERT DE LA PORRÉE).

Abelard.

But the outstanding figure in the controversies of the first half of the 12th century is Abelard. There is considerable difference of opinion as to his system, some, like Ritter and Erdmann, regarding it as a moderate form of Realism—a return indeed to the position of Aristotle—while others, like Cousin, Rémusat, Hauréau and Ueberweg, consider it to be essentially Nominalistic, only more prudently and perhaps less consistently expressed than was the case with Roscellinus. His position is ordinarily designated by the name Conceptualism (*q.v.*), though there is very little talk of concepts in Abelard's own writings. There can be no doubt, at all events, that Abelard himself intended to find a compromise. As against Realism he maintains consistently *Res de re non praedicatur*; genera and species, therefore, which are predicated of the individual subject, cannot be treated as things or substances. This is manifestly true, however real the facts may be which are designated by the generic and specific names; and the position is fully accepted, as has been seen, by a Realist like Gilbert, who perhaps adopted it first from Abelard. Abelard also perceived that Realism, by separating the universal substance from the forms which individualize it, makes the universal indifferent to these forms, and leads directly to the doctrine of the identity of all beings in one universal substance or matter—a pantheism which might take either an Averroistic or a Spinozistic form. Against the system of non-difference Abelard has a number of logical and traditional arguments to bring, but it is sufficiently condemned by his fundamental doctrine that only the individual exists in its own right. For that system still seems to recognize a generic substance as the core of the individual, whereas, according to Cousin's rendering of Abelard's doctrine, "only individuals exist, and in the individual nothing but the individual." Holding fast then on the one hand to the individual as the only true substance, and on the other to the traditional definition of the genus as that which is predicated of a number of individuals (*quod praedicatur de pluribus*), Abelard declared that this definition of itself condemns the Realistic theory; only a name, not a thing, can be so predicated—not the name, however, as a *flatus vocis* or a collection of letters, but the name as used in discourse, the name as a sign, as having a meaning—in a word, not *vox* but *sermo*. *Sermo est praedicabilis.*

By these distinctions Abelard hoped to escape the consequences of extreme Nominalism, from which, as a matter of history, his doctrine has been distinguished under the name of Conceptualism, seeing that it lays stress not on the word as such but on the thought which the word is intended to convey. Moreover, Abelard evidently did not mean to imply that the distinctions of genera and species are of arbitrary or merely human imposition. His favourite expression for the universal is "quod de pluribus natum est praedicari" (a translation of Aristotle, *De interpretatione*, 7), which would seem to point to a real or objective counterpart of the products of our thought; and the traditional definitions of Boetius, whom he frequently quotes, support the same view of the concept as gathered from a number of individuals in virtue of a real resemblance. What Abelard combats is the substantiation of these resembling qualities, which leads to their being regarded as identical in all the separate individuals, and thus paves the way for the gradual undermining of the individual, the only true and indivisible substance. But he modifies his Nominalism so as to approach, though somewhat vaguely, to the position of Aristotle himself. At the same time he has nothing to say against the Platonic theory of *universalia ante rem* (see IDEALISM). Abelard's discussion of the problem (which it is right to say is on the whole incidental rather than systematic) is thus marked by an eclecticism which was perhaps the source at once of its strength and its weakness. But his brilliant ability and restless activity made him the central figure in the dialectical as in the other discussions of his time. To him was indirectly due, in the main, that troubling of the Realistic waters which resulted in so many modifications of the original thesis; and his own somewhat eclectic ruling on the question in debate came to be tacitly accepted in the schools, as the ardour of the disputants began to abate after the middle of the century.

Bernard of Clairvaux.

Abelard's application of dialectic to theology betrayed the Nominalistic basis of his doctrine. He zealously combated the Tritheism of Roscellinus, but his own views on the Trinity were condemned by two councils (at Soissons in 1121 and at Sens in 1140). Of the alternatives—three Gods or *una res*—which his Nominalistic logic presented to Roscellinus, Roscellinus had chosen the first; Abelard recoiled to the other extreme, reducing the three Persons to three aspects or attributes of the Divine Being (Power, Wisdom and Love). For this he was called to account by Bernard of Clairvaux (1091–1153), the recognized guardian of orthodoxy in France. Nor can it be said that the instinct of the saint was altogether at fault. The germs of Rationalism were unquestionably present in several of Abelard's opinions, and still more so, the traditionalists must have thought, in his general attitude towards theological questions. "A doctrine is believed," he said, "not because God has said it, but because we are convinced by reason that it is so." "Doubt is the road to inquiry, and by inquiry we perceive the truth." The application of dialectic to theology was not new. Anselm had made an elaborate employment of reason in the interest of faith, but the spirit of pious subordination which had marked the demonstrations of Anselm seemed wanting in the argumentations of this bolder and more restless spirit; and the church, or at least an influential section of it, took alarm at the encroachments of Rationalism. Abelard's remarkable compilation *Sic et Non* was not calculated to allay their suspicions. In bringing together the conflicting opinions of the fathers on all the chief points of Christian dogmatics, it may be admitted that Abelard's aim was simply to make these contradictions the starting point of an inquiry which should determine in each case the true position and *via media* of Christian theology. Only such a determination could enable the doctrines to be summarily presented as a system of thought. The book was undoubtedly the precursor of the famous *Books of Sentences* of Abelard's own pupil Peter Lombard and others, and of all the *Summae theologiae* with which the church was presently to abound. But the antinomies, as they appeared in Abelard's treatise, without their solutions, could not but seem to insinuate a deep-laid scepticism with regard to authority. And even the proposal to apply the unaided reason to solve questions which had divided the fathers must have been resented by the more rigid churchmen as the rash intrusion of an over-confident Rationalism.

Realism was in the beginning of the 12th century the dominant doctrine and the doctrine of the church; the Nominalists were the innovators and the especial representatives of the Rationalistic

tendency. In order to see the difference in this respect between the schools we have only to compare the peaceful and fortunate life of William of Champeaux (who enjoyed the friendship of St Bernard) with the agitated and persecuted existence of Roscellinus and, in a somewhat less degree, of Abelard. But now the greater boldness of the dialecticians awakened a spirit of general distrust in the exercise of reason on sacred subjects, and we find even a Realist like Gilbert de la Porrée arraigned by Bernard and his friends before a general council on a charge of heresy (at Rheims, 1148). Though Gilbert was acquitted, the fact of his being brought to trial illustrates the growing spirit of suspicion. Those heresy-hunts show us the worst side of St Bernard, yet they are in a way just the obverse of his deep mystical piety. The same attitude is maintained by the mystical school of St Victor. Hugo of St Victor (1097–1141) declares that "the uncorrupted truth of things cannot be discovered by reasoning." The perils of dialectic are manifold, especially in the overbold spirit it engenders. Nevertheless Hugo, by the composition of his *Summa sententiarum*, endeavoured to give a methodical or rational presentation of the content of faith, and was thus the first of the so-called Summists. Richard of St Victor, prior of the monastery from 1162 to 1173, is still more absorbed in mysticism, and his successor Walter loses his temper altogether in abuse of the dialecticians and the Summists alike. The Summists have as much to say against the existence of God as for it, and the dialecticians, having gone to school to the pagans, have forgotten over Aristotle the way of salvation. Abelard, Peter Lombard, Gilbert de la Porrée and Peter of Poitiers he calls the "four labyrinths of France."

Hugo of St Victor and the Summists.

This anger and contempt may have been partly justified by the discreditable state into which the study of logic had fallen. The speculative impulse was exhausted which marks the end of the 11th and the first half of the 12th century —a period more original and more interesting in many ways than the great age of Scholasticism in the 13th century. By the middle of the century, logical studies had lost to a great extent their real interest and application, and had degenerated into trivial displays of ingenuity. On the other hand, the Summists[1] occupied themselves merely in the systematizing of authorities. The mystics held aloof from both, and devoted themselves to the practical work of preaching and edification. The intellect of the age thus no longer exhibited itself as a unity. And it is significant of this that the ablest and most cultured representative of the second half of the century was rather an historian of opinion than himself a philosopher or a theologian. John of Salisbury (Johannes Sarisberiensis) was educated in France in the years 1136–1148. The autobiographical account of these years contained in his *Metalogicus* is of the utmost value as a picture of the schools of the time; it is also one of the historian's chief sources as a record of the many-coloured logical views of the period. John recoiled from the idle casuistry which occupied his own logical contemporaries; and, mindful probably of their aimless ingenuity, he adds the caution that dialectic, valuable and necessary as it is, is "like the sword of Hercules in a pigmy's hand" unless there be added to it the accoutrement of the other sciences. Catholic in spirit rather than dogmatic, John ranks himself at times among the Academics, "since, in those things about which a wise man may doubt, I depart not from their footsteps." It is not fitting to subtilize overmuch, and in the end John of Salisbury's solution is the practical one, his charitable spirit pointing him in particular to that love which is the fulfilling of the law.

Decline of logic.

John of Salisbury.

[1] Among these may be mentioned Robert Pulleyn (d. 1150), Peter Lombard (d. 1164), called the *Magister sententiarum*, whose work became the text-book of the schools, and remained so for centuries. Hundreds of commentaries were written upon it. Peter of Poitiers, the pupil of Peter the Lombard, flourished about 1160–1170. Other names are Robert of Melun, Hugo of Amiens, Stephen Langton and William of Auxerre. More important is Alain de Lille (Alanus de Insulis), who died at an advanced age in 1203. His *De arte seu de articulis catholicae fidei* is a *Summa* of Christian theology, but with a greater infusion than usual of philosophical reasoning. Alanus was acquainted with the celebrated *Liber de causis*.

The first period of Scholasticism being thus at an end, there is an interval of nearly half a century without any noteworthy philosophical productions. The cause of the new development of Scholasticism in the 13th century was the acquisition for the first time of the complete works of Aristotle (see CLASSICS and ARABIAN PHILOSOPHY). The doctrines and the works of Aristotle had been transmitted by the Nestorians to the Arabs, and among those kept alive by a succession of philosophers, first in the East and afterwards in the West. The chief of these, at least so far as regards the influence which they exerted on medieval philosophy, were Avicenna, Avempace and Averroes. The unification by the last-mentioned of Aristotle's active intellect in all men, and his consequent denial of individual immortality are well known. The universal human intellect is made by him to proceed from the divine by a series of Neoplatonic emanations. In the course of the 12th century the writings of these men were introduced into France by the Jews of Andalusia, of Marseilles and Montpellier. "These writings contained," says Hauréau, "the text of the *Organon*, the *Physics*, the *Metaphysics*, the *Ethics*, the *De anima*, the *Parva naturalia* and a large number of other treatises of Aristotle, accompanied by continuous commentaries. There arrived besides by the same channel the glosses of Theophrastus, of Simplicius, of Alexander of Aphrodisias, of Philoponus, annotated in the same sense by the same hands. This was the rich but dangerous present made by the Mussulman school to the Christian" (i. 382). To these must be added the Neoplatonically inspired *Fons Vitae* of the Jewish philosopher and poet Ibn Gabirol (*q.v.*), or Avicebron.

Extension of knowledge of the works of Aristotle.

By special command of Raimund, archbishop of Toledo, the chief of these works were translated from the Arabic through the Castilian into Latin by the archdeacon Dominicus Gonzalvi with the aid of Johannes Avendeath (= ben David), a converted Jew, about 1150. About the same time, or not long after, the *Liber de causis* became known—a work destined to have a powerful influence on Scholastic thought, especially in the period immediately succeeding. Accepted at first as Aristotle's, and actually printed in the first Latin editions of his works, the book is in reality an Arabian compilation of Neoplatonic theses. Of a similar character was the pseudo-Aristotelian *Theologia* which was in circulation at least as early as 1200.

The first effects of this immense acquisition of new material were markedly unsettling on the doctrinal orthodoxy of the time. The apocryphal Neoplatonic treatises and the views of the Arabian commentators obscured for the first students the genuine doctrine of Aristotle, and the 13th century opens with quite a crop of mystical heresies. The mystical pantheism taught at Paris by Amalrich of Bena (d. 1207; see AMALRIC and MYSTICISM), though based by him upon a revival of Scotus Erigena, was doubtless connected in its origin with the Neoplatonic treatises which now become current. The immanence of God in all things and His incarnation as the Holy Spirit in themselves appear to have been the chief doctrines of the Amalricans. They are reported to have said, "Omnia unum, quia quicquid est est Deus." About the same time David of Dinant, in a book *De tomis* (rendered by Albertus *De divisionibus*), taught the identity of God with matter (or the indivisible principle of bodies) and nous (or the indivisible principle of intelligences)—an extreme Realism culminating in a materialistic pantheism. If they were diverse, he argued, there must exist above them some higher or common element or being, in which case this would be God, nous, or the original matter. The spread of the Amalrican doctrine led to fierce persecutions, and the provincial council which met at Paris in 1209 expressly decreed "that neither the books of Aristotle on natural philosophy, nor commentaries on the same, should be read, whether publicly or privately, at Paris." In 1215 this prohibition is renewed in the statutes of the university of Paris, as sanctioned by the papal legate. Permission was given to lecture on the logical books, both those which had been known all along and those introduced since 1128, but the veto upon the *Physics* is extended to the *Metaphysics* and the summaries of the Arabian commentators. By 1231, however, the fears of the church were beginning to be allayed. A bull of Gregory IX. in that year makes no mention of any Aristotelian works except the *Physics*. Finally, in 1254, we find the university officially prescribing how many hours are to be devoted to the explanation of the *Metaphysics* and the principal physical treatises of Aristotle. These dates enable us to measure accurately the stages by which the church accommodated itself to, and as it were took possession of, the Aristotelian philosophy. Growing knowledge of Aristotle's works and the multiplication of translations enabled students to

First effects of the new knowledge.

distinguish the genuine Aristotle from the questionable accompaniments with which he had made his first appearance in Western Europe. Fresh translations of Aristotle and Averroes had already been made from the Arabic (Περὶ τὰ ζῷα ἱστορίαι from the Hebrew) by Michael Scot, and Hermannus Alamannus, at the instance of the emperor Frederick II.; so that the whole body of Aristotle's works was at hand in Latin translations from about 1210 to 1225. Soon afterwards efforts began to be made to secure more literal translations direct from the Greek. Robert Grosseteste (d. 1253) was one of the first to stir in this matter, and he was followed by Albertus Magnus and Thomas Aquinas. Half a century thus sufficed to remove the ban of the church, and soon Aristotle was recognized on all hands as "the philosopher" *par excellence*, the master of those that know. It even became customary to draw a parallel between him as the *praecursor Christi in naturalibus* and John the Baptist, the *praecursor Christi in gratuitis*.

This unquestioned supremacy was not yielded, however, at the very beginning of the period. The earlier doctors who avail themselves of Aristotle's works, while bowing to his authority implicitly in matters of logic, are generally found defending a Christianized Platonism against the doctrine of the *Metaphysics*.

So it is with Alexander of Hales (d. 1245), the first Scholastic who was acquainted with the whole of the Aristotelian works and the Arabian commentaries upon them. He was more of a theologian than a philosopher; and in his chief work, *Summa universae theologiae*, he simply employs his increased philosophical knowledge in the demonstration of theological doctrines. So great, however, did his achievement seem that he was honoured with the titles of *Doctor irrefragabilis* and *Theologorum monarcha*. Alexander of Hales belonged to the Franciscan order, and it is worth remarking that it was the mendicant orders which now came forward as the protagonists of Christian learning and faith and, as it were, reconquered Aristotle for the church. During the first half of the 13th century, when the university of Paris was plunged in angry feuds with the municipality, feuds which even led at one time (1229) to the flight of the students in a body, the friars established teachers in their convents in Paris. After the university had settled its quarrels these continued to teach, and soon became formidable rivals of the secular lecturers. After a severe struggle for academical recognition they were finally admitted to all the privileges of the university by a bull of Alexander IV. in 1253. The Franciscans took the lead in this intellectual movement with Alexander of Hales and Bonaventura, but the Dominicans were soon able to boast of two greater names in Albert the Great and Thomas Aquinas. Still later Duns Scotus and Occam were both Franciscans. Alexander of Hales was succeeded in his chair of instruction by his pupil John of Rochelle, who died in 1271 but taught only till 1253. His treatise *De anima*, on which Hauréau lays particular stress, is interesting as showing the greater scope now given to psychological discussions. This was a natural result of acquaintance with Aristotle's *De anima* and the numerous Greek and Arabian commentaries upon it, and it is observable in most of the writers that have still to be mentioned. Even the nature of the universals is no longer discussed from a purely logical or metaphysical point of view, but becomes connected with psychological questions. And, on the whole, the widening of intellectual interests is the chief feature by which the second period of Scholasticism may be distinguished from the first. In some respects there is more freshness and interest in the speculations which burst forth so ardently in the end of the 11th and the first half of the 12th century. Albert and Aquinas no doubt stood on a higher level than Anselm and Abelard, not merely by their wider range of knowledge but also by the intellectual massiveness of their achievements; but it may be questioned whether the earlier writers did not possess a greater force of originality and a keener talent. Originality was at no time the strong point of the middle ages, but in the later period it was almost of necessity buried under the mass of material suddenly thrust upon the age, to be assimilated. On the other hand, the influence of this new material is everywhere evident in the wider range of questions which are discussed by the doctors of the period. Interest is no longer to the same extent concentrated on the one question of the universals. Other questions, says Hauréau, are "placed on the order of the day—the question of the elements of substance, that of the principle of individuation, that of the origin of the ideas, of the manner of their existence in the human understanding and in the divine thought, as well as various others of equal interest" (i. 420). Some of these, it may be said, are simply the old Scholastic problem in a different garb; but the extended horizon of which Hauréau speaks is amply proved by mere reference to the treatises of Albert and St Thomas. They there seek to reproduce for their own time all the departments of the Aristotelian system.

Alexander of Hales.

Mendicant friars.

John of Rochelle.

General characteristics of second period.

John of Rochelle was succeeded in 1253 by John Fidanza, better known as Bonaventura (*q.v.*), who also had been a pupil of Alexander of Hales. But the fame of "the Seraphic Doctor" is connected more closely with the history of mysticism (see MYSTICISM) than with the main stream of Scholastic thought. Like his master, he defended Plato or what he considered to be the Platonic theory—against the attacks of Aristotle. Thus he defended the *universalia ante rem* as exemplars existent in the divine intelligence, and censured Aristotle's doctrine of the eternity of the world. Among the earlier teachers and writers of this century we have also to name William of Auvergne (d. 1249), whose treatises *De universo* and *De anima* make extensive use of Aristotle and the Arabians, but display a similar Platonic leaning. The existence of intellections in our minds is, he maintains, a sufficient demonstration of the existence of an intelligible world, just as the ideas of sense are sufficient evidence of a sensible world. This archetypal world is the Son of God and true God. Robert Grosseteste, important in the sphere of ecclesiastical politics, has been already mentioned as active in procuring translations of Aristotle from the Greek. He also wrote commentaries on logical and physical works of Aristotle. Michael Scot, the renowned wizard of popular tradition, earned his reputation by numerous works on astrology and alchemy. His connexion with philosophy was chiefly in the capacity of a translator. Vincent of Beauvais (d. 1264) was the author of an encyclopaedic work called *Speculum majus*, in which, without much independent ability, he collected the opinions of ancient and medieval writers on the most diverse points, transcribing the fragments of their works which he deemed most interesting.

Bonaventura.

William of Auvergne.

Grosseteste.

Michael Scot.

Vincent of Beauvais.

Albertus Magnus introduces us at once to the great age of Scholasticism (1193–1280). The limits of his long life include that of his still greater pupil, Thomas Aquinas (1227–1274). For this reason and because the system of Thomas is simply that of Albert rounded to a greater completeness and elaborated in parts by the subtle intellect of the younger man, it will be convenient not to separate the views of master and scholar, except where their differences make it necessary. Albert was "the first Scholastic who reproduced the whole philosophy of Aristotle in systematic order with constant reference to the Arabic commentators, and who remodelled it to meet the requirements of ecclesiastical dogma" (Ueberweg, i. 436). On this account he was called "the Universal Doctor." But in Albert it may be said that the matter was still too new and too multifarious to be thoroughly mastered. In St Thomas this is no longer so. The pupil, entering into his master's labours, was able from the first to take a more comprehensive survey of the whole field; and in addition he was doubtless endowed with an intellect which was finer, though it might not be more powerful, than his master's.

Albert and Aquinas.

The monotheistic influence of Aristotle and his Arabian commentators shows itself in Albert and Aquinas, at the outset, in the definitive fashion in which the "mysteries" of the Trinity and the Incarnation are henceforth detached from the sphere of rational or philosophical theology. So long as the Neoplatonic influence remained strong, attempts were still made to demonstrate the doctrine of the Trinity, chiefly in a mystical sense as in Erigena, but also by orthodox churchmen like Anselm. Orthodoxy, whether Catholic or Protestant, has since generally adopted Thomas's distinction. The existence of God is maintained by Albert and Aquinas to be demonstrable by reason; but here again they reject the ontological argument of Anselm, and restrict themselves to the *a posteriori* proof, rising after the manner of Aristotle from that which is prior for us to that which is prior by nature or in itself. God is not fully comprehensible by us, says Albert, because the finite is not able to grasp the infinite, yet he is not altogether beyond our knowledge; our intellects are touched by a ray of his light, and through this contact we are brought into communion with him. God, as the only self-subsistent and necessary being, is the creator of all things. Here the Scholastic philosophy comes into conflict with Aristotle's doctrine of the eternity of the world. Albert and Aquinas alike maintain the beginning of the world in time; time itself only exists since the moment of this miraculous creation. But Aquinas, though he holds the fact of creation to be rationally demonstrable, regards the beginning of the world *in time* as only

"Mysteries" excluded from philosophy.

an article of faith, the philosophical arguments for and against being inconclusive.

The question of universals, though fully discussed, no longer forms the centre of speculation. The great age of Scholasticism presents, indeed, a substantial unanimity upon this vexed point, maintaining at once, in different senses, the existence of the universals *ante rem*, *in re* and *post rem*. Albert and Aquinas both profess the moderate Aristotelian Realism which treats genera and species only as *substantiae secundae*, yet as really inherent in the individuals, and constituting their form or essence. The universals, therefore, have no existence, as universals, *in rerum natura*; and Thomas endorses, in this sense, the polemic of Aristotle against Plato's hypostatized abstractions. But, in the Augustinian sense of ideas immanent in the divine mind, the universal *ante rem* may well be admitted as possessing real existence. Finally, by abstraction from the individual things of sense, the mind is able to contemplate the universal apart from its accompaniments (*animal sine homine, asino, et aliis speciebus*); these subjective existences are the *universalia post rem* of the Nominalists and Conceptualists. But the difficulties which embarrassed a former age in trying to conceive the mode in which the universal exists in the individual reappear in the systems of the present period as the problem of the *principium individuationis*. The universal, as the form or essence of the individual, is called its *quidditas* (its "what-ness" or nature); but, besides possessing a general nature and answering to a general definition (*i.e.* being a "what"), every man, for example, is this particular man, here and now. It is the question of the particularity or "this-ness" (*haecceitas*, as Duns Scotus afterwards named it) that embarrasses the Scholastics. Albert and Aquinas agree in declaring that the principle of individuation is to be found in matter, not, however, in matter as a formless substrate but in determinate matter (*materia signata*), which is explained to mean matter quantitatively determined in certain respects. "The variety of individuals," says Albert, "depends entirely upon the division of matter," and Aquinas says "the principle of the diversity of individuals of the same species is the quantitative division of matter," which his followers render by the abbreviated phrase *materia quanta*. A tolerably evident shortcoming of such a doctrine is that, while declaring the quantitative determination of matter to be the individual element in the individual, it gives no account of how such quantitative determination arises. Yet the problem of the individual is really contained in this prior question; for determinate matter already involves particularity or this-ness. This difficulty was presently raised by Duns Scotus and the realistically-inclined opponents of the Thomist doctrine. But, as Ueberweg points out, it might fairly be urged by Aquinas that he does not pretend to explain how the individual is actually created, but merely states what he finds to be an invariable condition of the existence of individuals. Apart from this general question, a difficulty arises on the Thomist theory in regard to the existence of spirits or disembodied personalities. This affects first of all the existence of angels, in regard to whom Aquinas admits that they are immaterial or separate forms (*formae separatae*). They possess the principle of individuation in themselves, he teaches, but plurality of individuals is in such a case equivalent to plurality of species (*in eis tot sunt species quot sunt individua*). The same difficulty, however, affects the existence of the disembodied human spirit. If individuality depends in matter, must we not conclude with Averroes that individuality is extinguished at death, and that only the universal form survives? This conclusion, it is needless to say, is strenuously opposed both by Albert and by Aquinas. It is still admissible, however, to doubt whether the hateful consequence does not follow consistently from the thoory laid down. Aquinas regards the souls of men, like the angels, as immaterial forms; and he includes in the soul-unit, so to speak, not merely the *anima rationalis* of Aristotle, but also the vegetative, sensitive, appetitive and motive functions. The latter depend, it is true, on bodily organs during our earthly sojourn, but the dependence is not necessary. The soul is created by God when the body of which it is the entelechy is prepared for it. It is the natural state of the soul to be united to a body, but being immaterial it is not affected by the dissolution of the body. The soul must be immaterial since it has the power of cognizing the universal; and its immortality is further based by St Thomas on the natural longing for unending existence which belongs to a being whose thoughts are not confined to the "here" and "now," but are able to abstract from every limitation.

The principle of individuation.

Thomism, which was destined to become the official philosophy of the Roman Catholic Church, became in the first instance the accepted doctrine of the Dominican order, who were presently joined in this allegiance by the Augustinians. The Franciscan order, on the other hand, early showed their rivalry in attacks upon the doctrines of Albert and Aquinas. One of the first of these was the *Reprehensorium seu correctorium fratris Thomae*, published in 1285 by William Lamarre, in which the Averroistic consequences of the Thomist doctrine of individuation are already pressed home. More important was Richard of Middletown (d. *c.* 1300), who anticipated many of the objections urged soon after him by Duns Scotus (*q.v.*). His system is conditioned throughout by its relation to that of Aquinas, of which it is in effect an elaborate criticism. The chief characteristic of this criticism is well expressed in the name bestowed on Duns by his contemporaries—*Doctor subtilis*. It will be sufficient therefore to note the chief points in which the two antagonists differ. In general it may be said that Duns shows less confidence in the power of reason than Aquinas, and to that extent Erdmann and others are right in looking upon his system as the beginning of the decline of Scholasticism. For Scholasticism, as perfected by Aquinas, implies the harmony of reason and faith, in the sense that they both teach the same truths. To this general position Aquinas, it has been seen, makes several important exceptions; but the exceptions are few in number and precisely defined. Scotus extends the number of theological doctrines which are not, according to him, susceptible of philosophical proof, including in this class the creation of the world out of nothing, the immortality of the human soul, and even the existence of an almighty divine cause of the universe (though he admits the possibility of proving an ultimate cause superior to all else). His destructive criticism thus tended to reintroduce the dualism between faith and reason which Scholasticism had laboured through centuries to overcome, though Scotus himself, of course, had no such sceptical intention. But the way in which he founded the leading Christian doctrines (after confessing his inability to rationalize them) on the arbitrary will of God was undoubtedly calculated to help in the work of disintegration. And it is significant that this primacy of the undetermined will (*voluntas superior intellectu*) was the central contention of the Scotists against the Thomist doctrine. Voluntary action, Aquinas had said, is action originating in self or in an internal principle. The freedom here spoken of is a freedom from the immediacy of impulse—a freedom based upon our possession of reason as a power of comparison, memory and forethought. Nothing is said of an absolute freedom of the will; the will is, on the contrary, subordinated to the reason in so far as it is supposed to choose what reason pronounces good. Accordingly, the Thomist doctrine may be described as a moderate determinism. To this Scotus opposed an indeterminism of the extremest type, describing the will as the possibility of determining itself motivelessly in either of two opposite senses. Transferred to the divine activity, Aquinas's doctrine led him to insist upon the *perseitas boni*. The divine will is, equally with the human, subject to a rational determination; God commands what is good because it is good. Scotus, on the other hand, following out his doctrine of the will, declared the good to be so only by arbitrary imposition. It is good because God willed it, and for no other reason; had He commanded precisely the opposite course of conduct, that course would have been right by the mere fact of His commanding it. Far removed from actuality as such speculations regarding the priority of intellect or will in the Divine Being may seem to be, the side taken is yet a sure index of the general tendency of a philosophy. Aquinas is on the side of rationalism, Scotus on the side of scepticism.

Duns Scotus.

Freedom of the will.

While agreeing with Albert and Thomas in maintaining the threefold existence of the universals, Duns Scotus attacked the Thomist doctrine of individuation. The distinction of the universal essence and the individualizing determinations in the individual does not coincide, he maintained, with the distinction between form and matter. The additional determinations are as truly "form" as the universal essence. If the latter be spoken of as *quidditas*, the former may be called *haecceitas*. Just as the genus becomes the species by the addition of formal determinations called the difference, so the species becomes the individual by the addition of fresh forms of difference. As *animal* becomes *homo* by the addition of *humanitas*, so *homo* becomes Socrates by the addition of the qualities signified by *Socratitas*. It is false, therefore, to speak of matter as the principle of individuation; and if this is so there is no longer any foundation for the Thomist view that in angelic natures every individual constitutes a species apart. Notwithstanding the above doctrine, however, Scotus holds that all created things possess both matter and form—the soul, for example, possessing a matter of its own before its

union with the body. But the matter of spiritual beings is widely different from the matter of corporeal things. In his treatment of the conception of matter, Duns shows that he inclined much more to the Realism which makes for pantheism than was the case with the Aristotelianism of Thomas. A perfectly formless matter (*materia prima*) was regarded by him as the universal substratum and common element of all finite existences. He expressly intimates in this connexion his acceptance of Avicebron's position.

Thomists and Scotists.

In the end of the 13th century and the beginning of the 14th the Thomists and Scotists divided the philosophical and theological world between them. Among the Thomists may be named John of Paris, Aegidius of Lessines (wrote in 1278), Bernard of Trilia (1240–1292) and Peter of Auvergne. More important was Aegidius of Colonna (1247–1316), general of the Augustinian order, surnamed *Doctor Fundatissimus* or *Fundamentarius*. Hervaeus Natalis (d. 1323) and Thomas Bradwardine (d. 1349) were determined opponents of Scotism. Siger of Brabant and Gottfried of Fontaines, chancellor of the university of Paris, taught Thomism at the Sorbonne; and through Humbert, abbot of Prulli, the doctrine won admission to the Cistercian order. Among the disciples of Duns Scotus are mentioned John of Bassolis, Francis of Mayrone (*q.v.*), Antonius Andreae (d. *c.* 1320), John Dumbleton and Walter Burleigh (Burley) (b. 1275) of Oxford, Nicolaus (*q.v.*) of Lyra, Peter of Aquila and others. Henry Goethals or Henry of Ghent (Henricus Gandavensis, 1217–1293), surnamed *Doctor solennis*, occupied on the whole an independent and pre-Thomist position, leaning to an Augustinian Platonism (see HENRY OF GHENT). Gerard of Bologna (d. 1317) and Raoul of Brittany are rather to be ranked with the Thomists. So also is Petrus Hispanus (Pope John XXI.), who is chiefly important, however, as the author of the much-used manual *Summulae logicales*, in which the logic of the schools was expanded by the incorporation of fresh matter of a semi-grammatical character. Petrus Hispanus had predecessors, however, in William of Shyreswood (died 1249 as chancellor of Lincoln) and Lambert of Auxerre, and it has been hotly disputed whether the whole of the additions are not originally due to the Byzantine *Synopsis* of Psellus. By far the greatest disciple of Aquinas is Dante Alighieri, in whose *Divina Commedia* the theology and philosophy of the middle ages, as fixed by Saint Thomas, have received the immortality which poetry alone can bestow. Two names stand apart from the others of the century—Raimon Lull (1234–1315) and Roger Bacon (1214–1294). The *Ars magna* of the former professed by means of a species of logical machine to give a rigid demonstration of all the fundamental Christian doctrines, and was intended by its author as an unfailing instrument for the conversion of the Saracens and heathen. Roger Bacon was rather a pioneer of modern science than a Scholastic, and persecution and imprisonment were the penalty of his opposition to the spirit of his time.

The last stage of Scholasticism preceding its dissolution is marked by the revival of Nominalism in a militant form. This doctrine is already to be found in Petrus Aureolus (*q.v.*), a Franciscan trained in the Scotist doctrine, and in William Durand of St Pourçain (d. 1332), a Dominican who passed over from Thomism to his later position. But the name with which the Nominalism of the 14th century is historically associated is that of the "Invincible Doctor," William of Occam (*q.v.*), who, as the author of a doctrine which came to be almost universally accepted, received from his followers the title *Venerabilis inceptor*. The hypostatizing of abstractions is the error against which Occam is continually fighting. The Realists, he considers, have greatly sinned against this maxim in their theory of a real universal or common element in all the individuals of a class. From one abstraction they are led to another, to solve the difficulties which are created by the realization of the first. Thus the great problem for the Realists is how to derive the individual from the universal. But the whole inquiry moves in a world of unrealities. Everything that exists, by the mere fact of its existence, is individual (*Quaelibet res, eo ipso quod est, est haec res*). It is absurd, therefore, to seek for a cause of the individuality of the thing other than the cause of the thing itself. The individual is the only reality, whether the question be of an individual thing in the external world or an individual state in the world of mind. It is not the individual which needs explanation but the universal. Occam reproaches the "modern Platonists" for perverting the Aristotelian doctrine by these speculations, and claims the authority of Aristotle for his own Nominalistic doctrine. The universal is not anything really existing; it is a *terminus* or predicable (whence the followers of Occam were at first called Terminists). It is no more than a "mental concept signifying univocally several singulars." It is a natural sign representing these singulars, but it has no reality beyond that of the mental act by which it is produced and that of the singulars of which it is predicated. As regards the existence (if we may so speak) of the universal *in mente*, Occam indicates his preference, on the ground of simplicity, for the view which identifies the concept with the *actus intelligendi*, rather than for that which treats ideas as distinct entities within the mind. And in a similar spirit he explains the *universalia ante rem* as being, not substantial existences in God, but simply God's knowledge of things—a knowledge which is not of universals but of singulars, since these alone exist *realiter*. Such a doctrine, in the stress it lays upon the singular, the object of immediate perception, is evidently inspired by a spirit differing widely even from the moderate Realism of Thomas. It is a spirit which distrusts abstractions, which makes for direct observation, for inductive research. Occam, who is still a Scholastic, gives us the Scholastic justification of the spirit which had already taken hold upon Roger Bacon, and which was to enter upon its rights in the 15th and 16th centuries. Moreover, there is no denying that the new Nominalism not only represents the love of reality and the spirit of induction, but also contains in itself the germs of that empiricism and sensualism so frequently associated with the former tendencies. Aquinas had regarded the knowledge of the universal as an intellectual activity which might even be advanced in proof of the immortality of the soul. Occam, on the other hand, maintains in the spirit of Hobbes that the act of abstraction does not presuppose any activity of the understanding or will, but is a spontaneous secondary process by which the first act (perception) or the state it leaves behind (*habitus derelictus ex primo actu* = Hobbes's "decaying sense") is naturally followed, as soon as two or more similar representations are present.

William of Occam.

The Twofold Truth.

In another way also Occam heralds the dissolution of Scholasticism. The union of philosophy and theology is the mark of the middle ages, but in Occam their severance is complete. A pupil of Scotus, he carried his master's criticism farther, and denied that any theological doctrines were rationally demonstrable. Even the existence and unity of God were to be accepted as articles of faith. The *Centilogium theologicum* has often been cited as an example of thoroughgoing scepticism under a mask of solemn irony. But if that were so, it would still remain doubtful, as Erdmann remarks, whether the irony is directed against the church or against reason. The most interesting example of this method is seen in the *Tractatus de sacramento altaris* where Occam accepts the doctrine of Real Presence as a matter of Faith, and sets forth a rational theory of the Eucharist (afterwards adopted by Luther) known as "Consubstantiation." On the whole, there is no reason to doubt Occam's honest adhesion to each of the two guides whose contrariety he laboured to display. None the less is the position in itself an untenable one and the parent of scepticism. The principle of the twofold nature of truth[1] thus embodied in Occam's system was unquestionably adopted by many merely to cloak their theological unbelief; and it is significant of the internal dissolution of Scholasticism. Occam denied the title of a science to theology, emphasizing, like Scotus, its practical character. He also followed his master in laying stress on the arbitrary will of God as the foundation of morality.

Nominalism was at first met by the opposition of the church and the constituted authorities. In 1339 Occam's treatises were put under a ban by the university of Paris, and in the following year Nominalism was solemnly condemned. Nevertheless the new doctrine spread on all hands. Dominicans like

[1] This principle appeared occasionally at an earlier date, for example in Simon of Tournay about 1200. It was expressly censured by Pope John XXI. in 1276. But only in the period following Occam did it become a current doctrine.

Armand de Beauvoir (d. 1334) and Gregory of Rimini accepted it. It was taught in Paris by Albert of Saxony (about 1350–1360) and Marsilius of Inghen (about 1364–1377, afterwards at Heidelberg), as well as by Johannes Buridanus, rector of the university as early as 1327. We find, however, as late as 1473 the attempt made to bind all teachers in the university of Paris by oath to teach the doctrines of Realism; but this expiring effort was naturally ineffectual, and from 1481 onward even the show of obedience was no longer exacted. Pierre d'Ailly (1350–1425) and John Gerson (Jean Charlier de Gerson, 1363–1429), both chancellors of the university of Paris, and the former a cardinal of the church, are the chief figures among the later Nominalists. Both of them, however, besides their philosophical writings, are the authors of works of religious edification and mystical piety. They thus combine temporarily in their own persons what was no longer combined in the spirit of the time, or rather they satisfy by turns the claims of reason and faith. Both are agreed in placing repentance and faith far above philosophical knowledge. They belong indeed (Gerson in particular) to the history of mysticism rather than of Scholasticism, and the same may be said of another cardinal, Nicolaus of Cusa (1401–1464), who is sometimes reckoned among the last of the Scholastics, but who has more affinity with Erigena than with any intervening teacher. The title "last of the Scholastics" is commonly given to Gabriel Biel (*q.v.*), the summarizer of Occam's doctrine. The title is not actually correct, and might be more fitly borne by Francisco Suarez (*q.v.*), who died in 1617. But after the beginning of the 15th century Scholasticism was divorced from the spirit of the time, and it is useless to follow its history further. As has been indicated in the introductory remarks, the end came both from within and from without. The harmony of reason and faith had given place to the doctrine of the dual nature of truth. While this sceptical thesis was embraced by philosophers who had lost their interest in religion, the spiritually minded sought their satisfaction more and more in a mysticism which frequently cast itself loose from ecclesiastical trammels. The 14th and 15th centuries were the great age of German mysticism, and it was not only in Germany that the tide set this way. Scholasticism had been the expression of a universal church and a common learned language. The university of Paris, with its scholars of all nations numbered by thousands, was a symbol of the intellectual unity of Christendom; and in the university of Paris, it may almost be said, Scholasticism was reared and flourished and died. But the different nations and tongues of modern Europe were now beginning to assert their individuality, and men's interests ceased to be predominatingly ecclesiastical. Scholasticism, therefore, which was in its essence ecclesiastical, had no longer a proper field for its activity. It was in a manner deprived of its accustomed subject-matter and died of inanition. Philosophy, as Hauréau finely says, was the passion of the 13th century; but in the 15th humanism, art and the beginnings of science and of practical discovery were busy creating a new world, which was destined in due time to give birth to a new philosophy.

Spread of Nominalism.

The "last of the Scholastics."

AUTHORITIES.—Besides the numerous works quoted in articles on the individual philosophers, see Hauréau, *Histoire de la philosophie scolastique* (2 vols., 1850; revised and expanded in 1870 as *Histoire de la phil. scol.*), Kaulich, *Geschichte d. schol. Philosophie*; Stöckl, *Gesch. der Phil. des Mittelalters*; Karl Werner, *Die Scholastik des späteren Mittelalters*; and, on a smaller scale, de Wulf's *Histoire de la phil. médiévale* (1900). Supplementary details are given in Hauréau's *Singularités historiques et littéraires* (1861) and in R. L. Poole's *Illustrations of the History of Mediaeval Thought* (1884), while much light is thrown upon the minuter history of the period by the *Chartularium Universitatis Parisiensis* edited by Denifle and Chatelain in 1894, by Hauréau's *Notices et extraits de quelques MS. latins de la Bibliothèque Nationale* (6 vols., 1890–1895) and by the *Beiträge zur Geschichte d. Phil. d. Mittelalters*, in course of publication since 1891 by Baeumker and others. A critical survey of recent literature on Scholasticism is given by Baeumker in the *Archiv für Geschichte der Philosophie*, vols. v. and x. The accounts of medieval thought given by Ritter, Erdmann and Ueberweg in their general histories of philosophy are exceedingly good. That of Windelband, though going less into detail, is a remarkably fresh treatment of the problems involved. There are also notices of the leading systems in Milman's *History of Latin Christianity*; and the same writers are considered from the theological side in many works devoted to theology, and the history of dogma. The psychology of the Scholastic writers is ably dealt with in Siebeck's *Die Psychologie von Aristoteles bis zu Thomas von Aquino* (1885). Jourdain's *Recherches critiques sur l'âge et l'origine des traductions latines d'Aristote* (Paris, 1819; 2nd ed. 1843); Rousselot's *Études sur la philosophie dans le moyen âge* (1840–1842), Cousin's Introduction to his *Ouvrages inédits d'Abélard* (1836), and Prantl's *Geschichte der Logik im Abendlande* (4 vols., 1855–1870) are invaluable aids in studying the history of medieval thought. (A. S. P.-P.; X.)

SCHOLEFIELD, JAMES (1789–1853), English classical scholar, was born at Henley-on-Thames on the 15th of November 1789. He was educated at Christ's Hospital and Trinity College, Cambridge, and was in 1825 appointed professor of Greek in the university and canon of Ely (1849). He was for some time curate to Charles Simeon, the evangelical churchman, and his low church views involved him in disputes with his own parishioners at St Michael's, Cambridge, of which he was perpetual curate from 1823 till his death at Hastings on the 4th of April 1853. Scholefield was an excellent teacher. His most useful work was his edition of the *Adversaria* of P. P. Dobree (*q.v.*), his predecessor in the chair of Greek. He also published editions of Aeschylus (1828), in which he dealt very conservatively with the text, and of Porson's four plays of Euripides. His *Hints for an improved Translation of the New Testament* met with considerable success. He was one of the examiners in the first Classical Tripos (1824). The Scholefield Theological Prize at Cambridge was established in commemoration of him in 1856.

See *Memoirs of James Scholefield* (1855), by his wife, Harriet Scholefield; *Gentleman's Magazine* (June 1853, p. 644).

SCHOLIUM[1] (σχόλιον), the name given to grammatical, critical and explanatory notes, extracted from existing commentaries and inserted on the margin of the MS. of an ancient author. These notes were altered by successive copyists and owners of the MS. and in some cases increased to such an extent that there was no longer room for them in the margin, and it became necessary to make them into a separate work. At first they were taken from one commentary only, subsequently from several. This is indicated by the repetition of the *lemma* ("catchword"), or by the use of such phrases as "or thus," "or otherwise," "according to some," to introduce different explanations. The name of "the first scholiast" has been given to Didymus of Alexandria (*q.v.*), and the practice of compiling scholia continued till the 15th or 16th century A.D. The word σχόλιον itself is first met with in Cicero (*Ad Att.* xvi. 7). The Greek scholia we possess are for the most part anonymous, the commentaries of Eustathius on Homer and Tzetzes on Lycophron being prominent exceptions. Although frequently trifling, they contain much information not found elsewhere, and are of considerable value for the correction and interpretation of the text. The most important are those on Homer (especially the Venetian scholia on the *Iliad*, discovered by Villoison in 1781 in the library of St Mark), Hesiod, Pindar, Sophocles, Aristophanes and Apollonius Rhodius; and, in Latin, those of Servius on Virgil, of Acro and Porphyrio on Horace, and of Donatus on Terence.

See E. F. Gräfenhan, *Geschichte der classischen Philologie*, iii. (1843–1850); W. H. Suringar, *Historia critica scholiastarum Latinorum* (1835).

SCHOLL, AURELIEN (1833–), French author and journalist, was born at Bordeaux on the 13th of July 1833. He was successively editor of the *Voltaire* and of the *Écho de Paris*. He wrote largely for the theatre, and also a number of novels dealing with Parisian life.

SCHOLTEN, JAN HENDRIK (1811–1885), Dutch Protestant theologian, was born at Vleuter near Utrecht on the 17th of August 1811. After studying at Utrecht University, he was appointed professor of theology at Franeker. From Franeker in 1843 he went to Leiden as professor extraordinarius, and in 1845 was promoted to the rank of ordinarius. Through Scholten, A. Kuenen became interested in theology; Scholten was not then the radical theologian he became later. The two scholars in course of time created a movement resembling that of the

[1] To be distinguished from *scolium* (σκόλιον), an after-dinner song.

Tübingen School in Germany. Pursuing first the study of dogmatic theology and the philosophy of religion, Scholten published a work on the *Principles of the Theology of the Reformed Church* (2 vols., 1848–1850, 4th ed. 1861–1862). He then gave special attention to the New Testament, and wrote *A Critical Study of the Gospel of John* (1864, in German 1867). He died on the 10th of April 1885.

Scholten's other works include: *Historical and Critical Introduction to the New Testament* (1853–1856); *The Oldest Witnesses to the Writings of the New Testament* (1866); *The Oldest Gospel* (1868); and *The Pauline Gospel* (1870). An account of his theological development is given in *Afscheidsrede bij het Neerleggen van het Hoogleeraarsambt* (1881), and in the biography written by A. Kuenen, *Levensbericht van J. Henricus Scholten* (1885).

SCHÖMANN, GEORG FRIEDRICH (1793–1879), German classical scholar, was born at Stralsund in Pomerania on the 28th of June 1793. In 1827 he was appointed professor of ancient literature and eloquence in the university of Greifswald, where he died on the 25th of March 1879. Schömann's attention was chiefly devoted to the constitutional and religious antiquities of Greece. His first works on the subject were *De comitiis Atheniensium* (1819), the first independent account of the forms of Athenian political life, and a treatise *De sortitione judicum apud Athenienses* (1820). In conjunction with M. H. E. Meier, Schömann wrote *Der attische Process* (1824, revised ed. by J. H. Lipsius, 1883–1887), which, although in some respects out of date, still has considerable value.

Among his other works are:—editions of Isaeus (1831) and Plutarch's *Agis and Cleomenes* (1839, important for the Attic law of inheritance and the history of the Spartan constitution); *Antiquitates juris publici Graecorum* (1838); a critical examination of Grote's account of the Athenian constitution (1854, Eng. trans. by B. Bosanquet, 1878) from a conservative point of view; and lastly, *Griechische Alterthümer* (1855–1859; 4th ed. by J. H. Lipsius, 1897–1902; Eng. trans. of vol. i. by E. G. Hardy and J. S. Mann, 1880), treating of the general historical development of the Greek states, followed by a detailed account of the constitutions of Sparta, Crete and Athens, the cults and international relations of the Greek tribes. The question of the religious institutions of the Greeks, which he considered an essential part of their public life, had early engaged his attention, and he held the opinion that everything really religious was akin to Christianity, and that the greatest intellects of Greece produced intuitively Christian, dogmatic ideas. From this point of view he edited the *Theogony* of Hesiod (1868), with a commentary, chiefly mythological, and Cicero's *De natura deorum* (1850, 4th ed. 1876); translated with introduction and notes Aeschylus's *Prometheus Bound*, and wrote a *Prometheus Unbound* (1844), in which Prometheus is brought to see the greatness of his offence and is pardoned by Zeus. Of his contributions on grammatical subjects special mention may be made of *Die Lehre von den Redetheilen nach den Alten dargestellt* (1862), an introduction to the elements of the science of grammar. His many-sidedness is shown in his *Opuscula academica* (4 vols., 1856–1871).

See F. S(usemihl) in C. Bursian's *Biog. Jahrbuch für Altertumskunde* (1879); A. Baumeister in *Allgemeine deutsche Biographie*, xxxii.; C. Bursian, *Gesch. der class. Philologie in Deutschland* (1883), and J. E. Sandys, *Hist. of Classical Scholarship*, iii. (1908), p. 165.

SCHOMBERG (originally SCHONBERG), **FRIEDRICH HERMANN** (or FREDERIC ARMAND), DUKE OF (*c.* 1615–1690), marshal of France and English general, was descended from an old family of the Palatinate, and was born in December 1615 or January 1616, at Heidelberg, the son of Hans Meinard von Schönberg (1582–1616) and Anne Sutton, daughter of the 9th Lord Dudley. An orphan within a few months of his birth, he was educated by various friends, among whom was the "Winter King," Frederick V. of the Palatinate, in whose service his father had been. He began his military career under Frederick Henry, prince of Orange, and passed about 1634 into the Swedish service, whence he entered that of France in 1635. His family, and the allied house of the Saxon Schönbergs had already attained eminence in France.[1] After a time he retired to his family estate at Geisenheim on the Rhine, but in 1639 he re-entered the Dutch army, in which, apparently, with a few intervals spent at Geisenheim, he remained until about 1650. He then rejoined the French army as a general officer (*maréchal de camp*), served under Turenne in the campaigns against Condé, and became a lieutenant-general in 1665, receiving this rapid promotion perhaps partly owing to his relationship with the duc d'Halluin, but mainly because he was looked upon as the eventual successor of the great generals then at the height of their fame.

After the peace of the Pyrenees (1659) the independence of Portugal being again menaced by Spain, Schomberg was sent as military adviser to Lisbon with the secret approval of Charles II. of England (who knew him personally and about this time created him baron of Tetford) and Louis XIV., who in order not to infringe the treaty just made with Spain, deprived Schomberg of his French offices. After meeting in the three first campaigns many difficulties from the insubordination of many of the Portuguese officers, Schomberg won the victory of Montes Claros on the 17th of June 1665 over the Spaniards under the prince of Parma. After participating with his army in the revolution which deposed the reigning king in favour of his brother dom Pedro, and ending the war with Spain, Schomberg returned to France, became a naturalized Frenchman and bought the lordship of Coubert near Paris. He had been rewarded by the king of Portugal, in 1663, with the rank of Grandee, the title of count of Mertola and a pension of £5000 a year. In 1673 he was invited by Charles to England, with the view of taking command of the army, but sentiment was so strong against the appointment, as savouring of French influence, that it was not carried into effect. He therefore again entered the service of France. His first operations in Catalonia were unsuccessful owing to the disobedience of subordinates and the rawness of his troops, but he retrieved the failure of 1674 by retaking Bellegarde in 1675. For this he was made a marshal, being included in the promotion that followed the death of Turenne. The tide had now set against the Huguenots, and Schomberg's merits had been long ignored on account of his adherence to the Protestant religion. The revocation of the edict of Nantes (1685) compelled him to quit his adopted country. Ultimately he became general-in-chief of the forces of the elector of Brandenburg, and at Berlin he was the acknowledged leader of the thousands of Huguenot refugees there. Soon afterwards, with the elector's consent, he joined the prince of Orange on his expedition to England in 1688, as second in command to the prince. The following year he was made a knight of the Garter, was created successively baron, marquis and duke, was appointed master-general of the ordnance, and received from the House of Commons a vote of £100,000, to compensate him for the loss of his French estates, of which Louis had deprived him. In August he was appointed commander-in-chief of the expedition to Ireland against James II. After capturing Carrickfergus he marched unopposed through a country desolated before him to Dundalk, but, as the bulk of his forces were raw and undisciplined as well as inferior in numbers to the enemy, he deemed it imprudent to risk a battle, and entrenching himself at Dundalk declined to be drawn beyond the circle of his defences. Shortly afterwards pestilence broke out, and when he retired to winter quarters in Ulster his forces were more shattered than if they had sustained a severe defeat. His conduct was criticized in ill-informed quarters, but the facts justified his inactivity, and he gave a striking example of his generous spirit in placing at William's disposal for military purposes the £100,000 recently voted him. In the spring he began the campaign with the capture of Charlemont, but no advance southward was made until the arrival of William. At the Boyne (July 1, 1690) Schomberg gave his opinion against the determination of William to cross the river in face of the opposing army. In the battle he commanded the centre, and while riding through the river without his cuirass to rally his men, was surrounded by Irish horsemen and instantly killed. He was buried in St. Patrick's cathedral, Dublin, where there is a monument to him, erected in 1731, with a Latin inscription by Dean Swift.

[1] Of the Misnian Schönbergs in French history may be named Gaspard de Schomberg, count of Nanteuil (d. 1599), French soldier and statesman, his son, Henri, count of Nanteuil and Duretal, marquis d'Espinoy (1575–1632) grandmaster of the artillery, marshal of France, and Henri's son Charles (d. 1656), who by marriage became duc d'Halluin, and was marshal of France and also, during the war with Spain, viceroy of Catalonia. Of the Palatinate family, Theodoric (d. 1590) was killed at Ivry in the service of Henry IV.

His eldest son Charles, the second duke in the English peerage, died in the year 1693 of wounds received at the battle of Marsaglia.

The most important work on Schomberg's life and career is Kazner's *Leben Friedrichs von Schomberg oder Schönberg* (Mannheim, 1780). The military histories and memoirs of the time should also be consulted.

SCHOMBURGK, SIR ROBERT HERMANN (1804–1865), British traveller, was born at Freiburg, Prussian Saxony, on the 5th of June 1804, the son of a Protestant minister. In 1829 he went to the United States, but in 1830 left for Anegada, one of the Virgin Isles. He surveyed the island at his own expense, and sent to the Royal Geographical Society, London, a report which created such an impression that, in 1835, he was entrusted by that body with the conduct of an exploring expedition to British Guiana. He fulfilled his mission with great success, incidentally discovering the Victoria Regia lily. In 1841 he returned to Guiana to survey the colony and fix the boundary for the British Government. The result was the provisional boundary between British Guiana and Venezuela known as the "Schomburgk Line," for which see the articles on those two countries. On his return to England he was knighted. In 1848 he was appointed British consul to St Domingo, and, in 1857, British consul to Bangkok. While holding these posts he continued his geographical surveys. He retired from the public service in 1864, and died at Berlin on the 11th of March 1865. He was the author of a *Description of British Guiana* and a *History of Barbadoes*.

SCHÖNBEIN, CHRISTIAN FRIEDRICH (1799–1868), chemist, was born at Metzingen, Swabia, on the 18th of October 1799, and died at Sauersberg, near Baden Baden, on the 29th of August 1868. After studying at Tübingen and Erlangen, he taught chemistry and physics, first at Keilhau, Thuringia, and then at Epsom, England, but most of his life was spent at Basel, where he undertook the duties of the chair of chemistry and physics in 1828 and was appointed full professor in 1835. His name is chiefly known in connexion with ozone, which he began to investigate in 1839, and with guncotton, which he prepared and applied as a propellant in fire-arms early in 1846. He was a most prolific writer, 364 papers appearing under his name in the Royal Society's *Catalogue*, and he carried on a large correspondence with other men of science, such as Berzelius, Faraday, Liebig and Wöhler.

Many of his letters together with a life will be found in G. W. A. Kahlbaum's *Monographien aus der Geschichte der Chemie*, vols. iv. and vi. (1899 and 1901).

SCHÖNEBECK, a town of Germany, in the province of Prussian Saxony, on the left bank of the Elbe, 9 m. S. of Magdeburg by the railway to Halle and Leipzig. Pop. (1905) 17,786. It contains manufactories of chemicals, machinery, starch, white lead and various other articles, but is chiefly noted for its extensive salt springs and works, which produce about 75,000 tons of salt per annum. Large beds of rock-salt also occur in the neighbourhood, in which shafts have been sunk to a depth of more than 1200 ft. There is a harbour on the Elbe here, and a brisk trade is carried on in coal, grain and timber.

See Magnus, *Geschichte der Stadt Schönebeck* (Berlin, 1880).

SCHÖNEBERG, a town of Germany, in the Prussian province of Brandenburg, forming a suburb of Berlin, which it adjoins on the south-west. Pop. (1905) 141,010. It has four churches, a statue of the emperor William I. and several educational establishments. It contains the railway station of the military line to Zossen and is connected with the metropolis by electric trams and omnibuses. Its chief manufactures are railway plant, cigars, soap, paper and chemicals. The foundation of Alt-Schöneberg is ascribed to Albert the Bear, margrave of Brandenburg, in the 12th century, while Neu-Schöneberg was founded by Frederick the Great in 1750 to accommodate some Bohemian weavers exiled for their religion. It was made a town in 1898.

SCHÖNFELD, EDUARD (1828–1891), German astronomer, was born at Hildburghausen, in the duchy of Meiningen, on the 22nd of December 1828. He had a distinguished career at the gymnasium of his native town, and on leaving desired to devote himself to astronomy, but abandoned the idea in deference to his father's wishes. He went first to Hanover, and afterwards to Cassel to study architecture, for which he seems to have had little inclination. In 1849 we find him studying chemistry under Bunsen at Marburg, where his love for astronomy was revived by Gerling's lectures. In 1851 he visited the Bonn Observatory, and studied astronomy under Argelander. In 1853 he was appointed assistant, and in the following year won a doctor's degree with his treatise *Nova elementa Thetidis*. At Bonn he took an important part in preparing the *Durchmusterung* of the northern heavens. He took up the investigation of the light-changes in variable stars, devoting to this work nights which, on account of moonlight, were unsuitable for zone observations. The results of these researches are published in the *Sitz. Berich. Wien. Akad.* vol. xlii. For a short time he was a *Privatdozent* at Bonn, but in 1859 he was appointed director of the Mannheim Observatory. The instrumental equipment of that observatory was somewhat antiquated, his largest telescope being a small refractor of 73 lines aperture, but he selected a line of work to suit the instruments at his disposal, observing nebulae and variable stars and keeping a watch on comets and new planets. The results of his observations of nebulae are contained in two catalogues published in the *Astronomische Beobachtungen der Grossherzoglichen Sternwarte zu Mannheim*, 1st and 2nd parts (1862 and 1875), and those of his variable star observations appeared in the *Jahresberichte des Mannheimer Vereins fur Naturkunde*, Nos. 32 and 39 (1866 and 1875). On the death of Argelander, which occurred on February 17th 1875, Schönfeld was appointed to succeed him as director of the Bonn Observatory, and soon after his appointment he began his last and greatest piece of work, the extension, on Argelander's plan, of the survey of the heavens down to 23° of south declination. The experience gained on the northern survey under Argelander's direction enabled Schönfeld to introduce some improvements in the methods employed, which increased the accuracy of this work, which was practically accomplished in March 1881, some revision only remaining to be done. These zone observations afforded 363,932 separate places of stars, and form the groundwork of the catalogue of 133,659 stars between 2° and 23° south declination, which was published in 1886 as the eighth volume of the Bonn observations.

Schönfeld was a member of the Astronomische Gesellschaft from its foundation in 1863, being a member of Council up to 1869, and in 1875 becoming editor of its publications and secretary in conjunction with Winnecke. In 1878 he was elected a Foreign Associate of the Royal Astronomical Society. He died on the 1st of May 1891. (A. A. R.*)

SCHONGAUER (or SHÖN), **MARTIN** (*c.* 1445–*c.* 1488), the most able engraver and painter of the early German school. His father was a goldsmith named Casper, a native of Augsburg, who had settled at Colmar, where the chief part of Martin's life was spent.[1] Schongauer established at Colmar a very important school of engraving, out of which grew the "little masters" of the succeeding generation, and a large group of Nuremberg artists. As a painter, Schongauer was a pupil of the Flemish Roger van der Weyden the Elder, and his rare existing pictures closely resemble, both in splendour of colour and exquisite minuteness of execution, the best works of contemporary art in Flanders. Among the very few paintings which can with certainty be attributed to him, the chief is a magnificent altar-piece in the church of St Martin at Colmar. The Colmar Museum

[1] The date of Schongauer's birth is usually given wrongly as *c.* 1420; he was really born twenty-five or thirty years later, and is mentioned by A. Dürer as being a young apprentice in 1470. His portrait in the Munich Pinakothek is now known to be a copy by Burgkmair, painted after 1510, from an original of 1483—not 1453 as has been supposed. The date (1499) for Schongauer's death, written on the back of the panel by Burgkmair, is obviously a blunder; see Hensler in *Naumann's Archiv* (1867), p. 129, and Wurzbach, *M. Schongauer* (Vienna, 1880). These contradict the view of Goutzwiller, in his *Martin Schongauer et son école* (Paris, 1875). Cf. Schnaase, "Gesch. M. Schongauers," in the *Mittheil. der K. K. Commission* (1863), No. 7.

possesses eleven panels by him, and a small panel of "David with Goliath's Head" in the Munich Gallery is attributed to him. The miniature painting of the "Death of the Virgin" in the English National Gallery is probably the work of some pupil.[1] In 1488 Schongauer died at Colmar, according to the register of St Martin's church. Other authorities state that his death occurred in 1491.

The main work of Schongauer's life was the production of a large number of beautiful engravings, which were largely sold, not only in Germany, but also in Italy and even in England. Vasari says that Michelangelo copied one of his engravings—the "Trial of St Anthony."[2] Schongauer was known in Italy by the names "Bel Martino" and "Martino d'Anversa." His subjects are always religious; more than 130 prints from copper by his hand are known, and about 100 more are the production of his *bottega*.[3] Most of his pupils' plates as well as his own are signed M+S. Among the most beautiful of Schongauer's engravings are the series of the "Passion" and the "Death and Coronation of the Virgin," and the series of the "Wise and Foolish Virgins." All are remarkable for their miniature-like treatment, their brilliant touch, and their chromatic force. Some, such as the "Death of the Virgin" and the "Adoration of the Magi" are richly-filled compositions of many figures, treated with much largeness of style in spite of their minute scale.

The British Museum possesses a fine collection of Schongauer's prints. Fine facsimiles of his engravings have been produced by Amand-Durand with text by Duplessis (Paris, 1881).

SCHÖNINGEN, a town of Germany, in the duchy of Brunswick, 29 m. by rail W. of Magdeburg. Pop. (1905) 9298. It has three churches, and manufactures of chemicals, machinery and sausages. The place is mentioned as early as 747 and received municipal rights in 1370. It has the remains of a ducal residence and some interesting wooden houses.

SCHOOLCRAFT, HENRY ROWE (1793–1864), American traveller, ethnologist and author, was born on the 28th of March 1793 at Watervliet (now Guilderland), New York, and died at Washington on the 10th of December 1864. After studying chemistry and mineralogy in Union College he had several years' experience of their application, especially at a glass-factory of which his father was manager, and in 1817 published his *Vitreology*. In the following year he collected geological and mineralogical specimens in Missouri and Arkansas, and in 1819 he published his *View of the Lead Mines of Missouri*. In 1820 he accompanied General Lewis Cass as geologist in his expedition to the Upper Mississippi and the Lake Superior copper region, and in 1823 he was appointed Indian agent for the Lake Superior country. More than sixteen millions of acres were ceded by the Indians to the United States in treaties which he negotiated. He married the granddaughter of an Indian chief; and during several years' official work near Lake Superior, and later under authorisation of an Act of Congress of 1847, he acquired much information as to institutions, &c., of the American natives. From 1828 to 1831 Schoolcraft was an active member of the Michigan legislature. In 1832, when on an embassy to some Indians, he ascertained the real source of the Mississippi to be Lake Itasca.

In 1825 he published *Travels in the Central Portions of the Mississippi Valley*, and in 1839 appeared his *Algic Researches*, containing Indian legends, notably, "The Myth of Hiawatha and other Oral Legends." He composed a considerable quantity of poetry and several minor prose works, especially *Notes on the Iroquois* (1846); *Scenes and Adventures in the Ozark Mountains* (1853). His principal book, *Historical and Statistical Information respecting the Indian Tribes of the United States*, illustrated with 336 plates from original drawings, in part a compilation, was issued under the patronage of Congress in six quarto volumes, from 1851 to 1857.

[1] Another painting of the same subject in the Doria Palace in Rome (usually attributed to Dürer) is given to Schongauer by Crowe and Cavalcaselle, *Flemish Painters* (London, 1872), p. 359; but the execution is not equal to Schongauer's wonderful touch.

[2] An interesting example of Schongauer's popularity in Italy is given by the lovely Faenza plate in the British Museum, on which is painted a copy of Martin's beautiful engraving of the "Death of the Virgin."

[3] See Bartsch, *Peintre Graveur*, and Willshire, *Ancient Prints*, best edition of 1877. According to a German tradition Schongauer was the inventor of printing from metal plates; he certainly was one of the first who brought the art to perfection. See an interesting article by Sidney Colvin in the *Jahrbuch der k. preussischen Kunstsammlung*, vi. p. 69 (Berlin, 1885).

SCHOOLS. As is the case with so many of the institutions of modern civilization, so with schools; the name, the thing, the matter, the method have been derived from Greece through Rome. A strange fortune has converted the Greek word σχολή, which originally meant leisure, particularly the "retired leisure that in trim gardens takes his pleasure" of men, into the proper term for the modern school.

Greek Schools.—The term and the institution date, not from the great or what may be called the Hellenic age of Greece, but from the later Macedonian or Hellenistic period. The account given by K. I. Freeman in his *Schools of Hellas* (1907) may be summed up in the statement, "There were no schools in Hellas." That is, there were no schools in our sense, where, during boyhood and youth, boys spent their whole time in a continuous course of instruction. There were professional teachers of three kinds: (1) the *grammatistes*, who taught reading, with writing and perhaps arithmetic, in the *grammateion*; (2) the *citharistes*, who taught music, *i.e.* playing and singing to the cithara—it is significant that there was no word for the music school; (3) the *paedotribes*, who taught gymnastic, wrestling, boxing, running, jumping, throwing the javelin, &c., in the *palaistra*. To these teachers the boys were taken by slaves, called boy-leaders (παιδαγωγοί, whence our pedagogues), as single pupils, and they were taught not in classes but singly.

That all boys did not go through all three schools is clear. For we hear of Socrates, when he was grown up, repairing to a lyre-school to learn music, because he thought his education was not complete without it. Roughly, the age for the grammar-school and song-school was 7 to 14, for the gymnastic school 12 to 18. A certain amount of literature was imparted, as, especially in the song-school, Homer and other early poets, the very Bibles of Hellas, were learnt by heart. In later days, under the Sophists, and Socrates, "the greatest of the Sophists," 450–400 B.C., something approaching to secondary education was developed. But it was wholly unorganized, though a similar division of labour between separate private tutors took place as in primary education. The orators or rhetoricians taught oratory, and the learning that was considered necessary to the political orator, a smattering of Greek history, constitutional law and elementary logic. The philosophers, such as Protagoras, discoursed vaguely on natural science, "things in the heavens above and the earth beneath," and divinity, "whether there are gods or not," mathematics and ethics, or any subject which attracted them, while the lawyers, in the same unsystematic way, taught what law was necessary in a state where the constitution was at the mercy of chance majorities in a sovereign assembly of 30,000 people, and trials at law were settled by 600 jurymen-judges. The orators and sophists were popular lecturers, here to-day and gone to-morrow. There was no co-ordination between them, no regular curriculum, and the youths wandered from one to another as their own or their parents' prejudices and purses dictated.

In the next generation, the orators and the philosophers, by settling down in fixed places, began to establish something more like schools. Plato, though like his master Socrates he taught without asking fees, was the first to give a regular educational course extending over three or four years, and in a fixed place, the Academy. The gymnasium was originally a parade or practice ground for the militia or conscript army of the state, which derived its name from the exercises being in that climate performed naked (γυμνός). At the age of 15 or 16 the boys left the palaestra, or private gymnasium, for this public training school, maintained at the public expense, preparatory to their admission as youths (ἔφηβοι), to take the oath of citizenship and undergo two years' compulsory training in regiments on the frontier. After those two years were over, they still required continuous exercise to keep themselves in training; consequently men of all ages, from 16 to 60, were to be found in the gymnasium. Though the gymnasium was free, the teachers and trainers in gymnastics were paid, and as the poorer citizens had to earn their own living, the Athenian gymnasium, like the modern university, was for educational purposes chiefly frequented

by the well-to-do. So the Academy became a fashionable lounge, and here developed the walking and talking clubs, which became the Platonic or Academic Schools. Logic and ethics, built on a foundation of geometry and mathematics, seem to have been the staple subjects. An inner circle met, and dined together in Plato's private house and garden, close to the Academy. Plato devised the house and garden to his successor Speusippus, who passed them on to Xenocrates. They thus became the first endowment of the first endowed college, which grew very rich and lasted till the disestablishment and disendowment of the old learning by Justinian in A.D. 529. Aristotle, a pupil of Plato for twenty years, set up a school of his own in the Lyceum, another public gymnasium, where he lectured twice a day, in the morning esoterically to the inner circle of regular attendants, in the afternoon to the public. From these two institutions three nations of Europe have derived three different terms for a school, the Germans their gymnasium, the French their lycée, and the Scotch their academy. Yet neither of the originals was a school in any real sense of the word. In the days of their founders they were like discussion forums; at the most, courses of lectures. In later years, the gilded youth who flocked to Athens from the whole Greco-Roman world were enrolled among the ephebi, and the so-called "university of Athens" was evolved (Dumont, *L'Éphébie attique*).

Meanwhile the intellectual hegemony of Greece had for a time passed with the political hegemony from Athens to Alexandria. It is to the Alexandrines, either to Antiodorus or to Eratosthenes, *c.* 250 (J. E. Sandys, *Hist. of Classical Scholarship*, 7), that grammar, as a term and a science, which included literary criticism and scholarship, and the grammar school are due. The earliest extant treatise on grammar is by Dionysius of Thrace (born *c.* 146), a pupil of the Homeric critic, Aristarchus. It defines grammar as "the practical knowledge of the usage of writers of poetry and prose" and includes exegesis or explanation of the author in the widest sense as well as mere verbal or syntactical grammar. It was from the term thus understood that the grammar school (*scola grammaticalis*), the term which described the typical secondary school from that day to 1869, derived its denotation and its connotation. For a true conception of the history of secondary schools it cannot be repeated too often and too emphatically that to this day the true title of the greatest English "public schools" is grammar school. Winchester and Eton are the grammar schools of the colleges of the Blessed Mary of Winchester and of Eton respectively, and Westminster is the grammar school of the collegiate church of St Peter, Westminster. Throughout the thirteen centuries which intervened between Dionysius Thrax and Dr Kennedy, Dionysius's grammar was the standard work and the foundation, directly or indirectly, of all other grammars, while the grammar school has always meant, and, in the hands of the better class of teachers, has always been, not a gerund-grinding machine, but a place for the training and exercise of the mind by the study of literature. The word "school," as well as the word "grammar," seems to be due to Alexandria. Plato in the *Laws* had spoken of a learned discussion or teaching, the product of leisure, as a *scholē*. But it does not appear that the word was transferred to the place where such discussion took place before the Alexandrian epoch. The first known use of it in that sense seems to be in Dionysius Halicarnassus' Letter to Ammaeus, *c.* 30 B.C. But as Plautus (*c.* 210) uses the corresponding Latin term, *ludus literarius*, some two centuries earlier, we may safely infer that he used it, not on the principle of *ludus a non ludendo*, but as a translation of grammar school.

Roman Schools.—At Rome schools began with intercourse with Greeks. According to Suetonius, the emperor Hadrian's secretary, who wrote *The School Masters* (*De grammaticis*) about A.D. 140, literary teaching and the science of grammar began with Livius Andronicus, a Greek from Magna Graecia in the south of Italy, who, being brought to Rome as a slave in 272 B.C., became a freed man, translated the *Odyssey* into Latin, and taught both Greek and Latin. Ennius, the first Latin poet, was also half-Greek, and came to Rome in 209 B.C., where he also taught both languages. According to Plutarch (*Quaest. Rom.* 59) the first grammar school (*grammatodidaskaleion*) was opened by Spurius Carvilius, a freedman of Carvilius, who was the first Roman to divorce his wife. Like master, like man. These two innovations in morals and manners took place about 230 B.C. According to Suetonius, Crates of Mallus in Cilicia, who about 169 B.C. came to Rome as ambassador from Attalus, king of Pergamum, a great centre of learning, and was kept there by a broken leg, occupied himself in giving lectures. His example was soon followed by Romans. Schools of grammar, in which, even as late as Cicero's time, the Laws of the Twelve Tables were the chief text-book and were learnt by heart, were kept by Greeks or freedmen. These seem to have been of the nature of elementary schools. But at Rome, as at Athens, the working-classes were for the most part slaves; and elementary schools were like English preparatory schools rather than public elementary schools. The teachers were called *litteratores*, a translation of the Greek γραμματισταί. Schools of rhetoric, which were more like secondary schools, were also opened after the model of that of Isocrates at Athens. Their teachers were called *litterati*, corresponding to the Greek γραμματικοί. Suetonius says that "the early litteratores also taught rhetoric, and we have many of their treatises which include both sciences." In 92 B.C. schools of Latin rhetoric were put down as an innovation. Yet among the treatises written by Cato, the praiser of the past at the expense of the present, was one on public speaking, the chief rule in which was "take care of the sense, and the sounds will take care of themselves." Cicero learned to declaim both in Greek and Latin, and the Gracchi had studied rhetoric under Greek teachers. Neither the gymnasium or palaestra, nor the music school, flourished at Rome. As at Athens, so at Rome the boys were sent to school in charge of a slave, a *pedagogus*, *comes* or *custos*. But it would seem that at Rome the pedagogus, generally a Greek slave, often himself gave elementary instruction. In Varro's much-debated phrase, "Educat nutrix, instituit pedagogus, docet magister," "the nurse brings up, the pedagogue instils the elements, the master teaches." *Magister*, which in English became "maister" and then "master," remained the term for the teacher of the public school from that day to this, though attempts were made at the time of the Reformation to introduce the Greek word *didascalus* in its place.

The Roman school was very much like the modern school. All the methods of torture which have made the service of the Muses for most boys a veritable slavery were in full vogue. Instruction was now in a foreign language, and grammar became prominent. Early rising, loud speaking and hard flogging were in the ascendant. Martial curses the master of a neighbouring school whose shouts and blows woke him up at cock crow. Horace assures us that he admires the old Latin poets in spite of their having been flogged into him by the *pedagogus*, Orbilius, whose name has become proverbial. The staple of instruction in the Roman schools was the works of the poets, Greek and Latin, Homer and Virgil, Hesiod and Aesop, Menander and Terence. Horace says (*Ep.* i. 19. 40) "that he was not thought worthy of going the round of the schoolmasters' desks"; but it was a fate not long delayed, and the writings of the poets of the silver age, Lucan and Statius, became school-books in their own lifetimes.

Our knowledge of the Roman curricula is mainly due to Quintilian's *Institutio oratoria*, *c.* A.D. 91. Fabius Quintilianus, born on the banks of the Ebro, was not only the son of a man who kept a rhetoric school, but himself kept one, and is said by St Jerome to have been the first who kept a public school, in the sense that he was the first who received a stipend from the emperor. In endeavouring to create the perfect orator, Quintilian discusses the whole of education from the cradle upwards. It is clear from him that the grammar school had trenched on the rhetoric school. The latter was then restricted to actual oratory, the rules and practice of public speaking, while the grammar school gave much the same teaching as English grammar schools did until 1850.

The first definitely endowed school we hear of is one founded by Pliny the younger, a pupil of Quintilian, at his native place Como. In a letter to the historian Tacitus (iv. 12) he informs him that he found a Como boy was at school at Milan, because there were no teachers at Como, whereupon he lectured the parents on the "small additional expense" a day-school at Como would be, compared to the cost of boarding boys at Milan. He therefore offered to find a third of the cost, and would have found the whole did he not "fear that such an endowment might be corrupted . . . to private

interests, which he saw happen in many places where teachers are hired by the public" (*preceptores publice conducuntur*). The choice of the master he left to the parents. Later historians say that the emperor Antoninus Pius (138–161) assigned offices and salaries (*honores et salaria*) for rhetoricians throughout the provinces; and that Alexander Severus did the same, and also established exhibitions for poor boys, with the limitation, curiously repeated a thousand years later in the statutes of All Souls College and of Eton, *modo ingenuos, i.e.* provided only that they should be free-born.

There were complaints that the masters were ill-paid. The only definite statement as to tuition fees appears to be a line of Horace (*Sat.* i. 6. 76), who says his father took him to school at Rome as he did not care to send him where the sons of his country neighbours went, at 8 asses a month, said to represent 4d. a month, equivalent to "about a shilling"; even this is founded on a disputed reading. Quintilian made a fortune by his school, but Juvenal calls him in this respect a white crow. As in modern times the winning jockey, so then the victorious charioteer, received more pay for a single race than the master for a whole year's labours.

Grammar and rhetoric schools spread throughout the Roman world and continued substantially unchanged in method and subject to the days of Gregory the Great and Augustine the apostle of the English. The *Confessions* of St Augustine of Hippo, a schoolmaster at Carthage, Rome and Milan, before his baptism in the year 387, and the poems of his contemporary Ausonius, educated in the grammar school at Toulouse, and himself a schoolmaster at Bordeaux before becoming prefect of Illyria and of Gaul, show that the schools were much the same in the 4th century as in the first. Ausonius celebrated in verse all the Bordeaux schoolmasters, some coming from schools at Athens, Constantinople, Syracuse and Corinth, one the son of a Druid at Bayeux, others schoolmasters from Poitou, Narbonne, Toulouse, who went to Lerida and other places in Spain. Ausonius had for his pupil the emperor Gratian, who in 376 established a legal tariff for schoolmasters' salaries. "In every town which is called a metropolis, a noble professor shall be elected." The rhetoric master (rhetor) was to have at least 24 annonae (an annona being a year's wages of a working man); while the grammar masters were to receive half that. But at Trier, then the capital of the Western empire, the rhetor was to have 30, the Latin grammarian 20, and the Greek grammarian, if one can be found, 12 annonae (*Cod. Theod.* xiii. 3. 11). The works of Ennodius, bishop of Pavia, 513–521, preserve many school declamations delivered in Milan school. The same century saw Priscian, a schoolmaster at Constantinople, compose the Latin grammar, which, itself for the most part a mere translation from Greek, reigned without a rival till the Reformation, and is represented by over 1000 MSS. Venantius Fortunatus, educated in the grammar school at Treviso, wrote in 570 a life of St Martin of Tours in three books of hexameter verse, and lives of saints and bishops. His era was one of transition, and marks the passing of the schools from secular to ecclesiastical control. His contemporary Pope Gregory rates Desiderius, "bishop of Gaul," at Vienne (*Ep.* xi. 54), because "as we cannot relate without shame, it has come to our knowledge that your brotherhood teaches grammar to certain persons: which we take all the worse as it converts what we formerly said in your favour to lamentation and mourning, since the praise of Christ cannot lie in one mouth with the praise of Jupiter. Consider yourself what a crime it is for bishops to recite what would be improper for religiously minded laymen"—words which are an adaptation of a sentiment of Jerome at his worst.

This letter is the more remarkable, because it ends with commending to Desiderius the monks whom Gregory was sending with Laurence the priest and Mellitus the abbot to Augustine of Canterbury, thus bringing the grammar-school-teaching bishop into direct connexion with the conversion of the English, and the foundation of the first English school.

English Schools.—St Augustine of Canterbury landed in Kent in 596, and the king of Kent, Ethelbert, was christened two years later. He "did not defer giving his teachere a settled residence in his metropolis of Canterbury, with such possessions as were necessary for their subsistence," says Bede. We may therefore attribute the establishment of the Church of England and the first English school to the year 598. For as nowadays the first thing modern missionaries do is to establish a school, so did Augustine. Indeed a school was even more necessary then. Now the Scriptures are always translated into the native tongue, and services conducted in it. But in those days the converted heathen, to understand the church service and to read the Scriptures, had to learn Latin and begin with Latin grammar; and indeed as the *kyrie*, the creed and the *gloria* were still rendered in Greek, if he was thoroughly to comprehend it he had to learn some Greek.

The first actual mention of Canterbury school is in 631. Sigebert of Essex, Bede tells us (*Eccl. Hist.* iii. 18, ed. Plummer, p. 162), while in exile in Gaul, was baptized. "On his return, as soon as he obtained the kingdom (of the East Saxons), wishing to imitate what he had seen well done in Gaul, he founded a grammar school (*scolam in qua pueri litteris erudirentur*), with the assistance of Bishop Felix, whom he had received from Kent, who provided them with ushers and masters (*pedagogos et magistros*) after the manner of the Canterburians (*more Cantuariorum*)." If the last words are translated Kentish folk the meaning is the same, as naturally the first and chief school of the Kentish folk was at Canterbury. Felix was a Burgundian, who had come over to Honorius, one of the last survivors of the original band of Augustine, who became archbishop in 627. The East Saxon see was placed at Dunnoc, now Dunwich, and the school there has been claimed by patriotic Suffolk historians as the first school in England. Though long before the Conquest Dunwich had ceased to be an episcopal see, being deposed in favour of Thetford, while half of it was swallowed up by the sea, yet, when between 1076 and 1083 the priory of Eye was founded by Robert Malet, he appropriated to it all the churches of Dunwich "the tithes of the whole town both of money and herrings . . . the school also of the same town." So the school of Sigebert and Felix was still existing 400 years afterwards. It afterwards perished at the dissolution of the priory, to which it had been handed over.

As the model must be older than the copy, Canterbury school must be allowed the primacy over Dunwich. Being spoken of as an existing institution, with no suggestion that it was then newly established, we need not doubt that it was founded by St Augustine as part of the cathedral establishment of Christ Church, Canterbury. This church was not then monastic, but like all other cathedrals, a college of priests, the monks being placed apart, outside the city walls in the abbey, first called St Paul's, afterwards known as St Augustine's. Enthusiastic "Grecians" have attributed Canterbury school rather to the Greek archbishop, the monk Theodore, who reached Canterbury on the 27th of May 669. "Soon after" he "travelled through the whole English parts of the island," and first established a united church of England, being "the first archbishop whom the whole English church consented to obey." He travelled with Hadrian, a Latin-African monk, who had been first offered the archbishopric, and was sent by the pope to look after Theodore "lest after the fashion of Greeks he should introduce something against the true faith." "Because both were abundantly learned in sacred and profane literature, they collected crowds of disciples, and streams of saving knowledge daily flowed from them, as together with holy writ they gave their hearers instruction both in the arts of metre and astronomy and ecclesiastical arithmetic," or, as the Anglo-Saxon translation has it, "metercraft, tungolcraft and grammaticraft" (Bede, *Eccl. Hist.* iv. 2). "The proof is," says Bede, "that even to this day," *c.* 735, "some of their pupils survive who know Latin and Greek as well as their own language in which they were born." It is a strange misconception of this passage which has narrowed a triumphant record of the first metropolitical visitation of England, the very point of which is that the archbishop left Canterbury to travel to the farthest parts of the heptarchy, into the foundation of a school at Canterbury. Though it is clear that Theodore did not found, there is evidence that he did actually teach in the school at Canterbury, since Albinus, who succeeded Hadrian as abbot of St Paul's, is said to have been "the most learned man of his time in everything, having been educated in the church of Canterbury" (not, it may be noted, in the monastery of St Paul's) by Theodore and Hadrian. Tobias, who died bishop of Rochester in 726, is also described as "a most learned man, for he was a pupil of Theodore and Hadrian, and so, together with a knowledge of literature ecclesiastical and general, Greek and Latin were as familiar to him as his native tongue." We may therefore credit Rochester with its school at least as early as Toby's episcopate.

Of schools still existing, we must give the precedence after Canterbury and Rochester to St Peter's school, the cathedral grammar school at York. If it was originally started by Paulinus, the Roman

missionary, in 630 or 633, and there was no church or bishop there till the time of Wilfrid, *c.* 700, it cannot claim to be older than his day. Whoever may be the originator of York school, it is at all events earlier than Archbishop Egbert (Ecgberht), to whom it has been credited by many writers (cf. *Dict. Christian Biog.*). But their authority is a life of Alcuin by a French monk, in a MS. said to have existed at Reims in 1017, but never seen since, a mere piece of hagiology, and certainly not contemporary. It makes a mystic monastic chain of Greek learning from Theodore to Bede, Bede to Egbert, Egbert to Alcuin, Alcuin to Hrabanus Maurus, the monks of St Gall and so on. It is flattering to insular pride, as it makes England the mother of all continental schools. But the chain breaks at the second link. Egbert was neither a pupil of Bede's, nor Alcuin's master. Nor was Egbert ever a monk, and Alcuin only became one late in life. Had Bede been Egbert's master, he could not have failed to mention it in the well-known letter he wrote to him on becoming archbishop, in which he addresses him, not as a master might have written to a pupil, but as a rather humble but lecturing friend. Moreover, Alcuin himself, in the poem on the bishops and saints of the church of York (*Hist. Ch. York.*, Rolls ser. i. 390), written when schoolmaster at York, only says of Egbert that he was of royal blood, an illustrious ruler of the church and an admirable teacher (*egregius doctor*). He finds no space for more about him, because his "muse hastens to the end of his song and the doings of his own master, who, after Egbert, received the insignia of the venerable see, Albert, called the wise." On Albert's merits, Alcuin descants in many verses. Nearly related to Egbert, Albert "was sent to the Minster to school in his boyish years and became a priest quite young, and by Egbert was made advocate of the clergy and preferred as master in the city of York." This phrase exactly describes the duties of the later chancellor of the Minster, who was the chief lawyer of the college of canons and also head of the school; while it shows that the school was the school, not only of the church, but of the city, of the laity as well as of the clergy. Albert taught grammar, rhetoric, law, singing, playing on the flute and lyre, natural history and the church calendar: above all, theology. There were boarders. For "whatever youths he saw of eminent intelligence, these he joined to himself, taught, fed and loved, and so he had many pupils, advanced in various arts." Albert travelled abroad, went to Rome and was received "as the prince of doctors, and kings and princes invited him to irrigate their lands with learning." But he preferred to return home. Even when he became archbishop, he still continued to teach. Two years before his death he retired, and, of his two chief pupils, Eanbald succeeded him in the archbishopric. But "he gave the dearer treasures of his books to the other son, who was always close to his father's side, thirsting to drink the floods of learning. To the one the rule of the church, its treasures and lands; to the other the school (*studium*), the chair, the books." This other son was Alcuin himself. A catalogue of the books is given. Besides the "Fathers," including Boethius and Cassiodorus, Popes Leo and Gregory, there were Aldhelm of Sherborne and Bede the wise. There were Pliny and Pompeius Trogus, Aristotle and Cicero (*De oratore*). Among poets, there were Virgil, Statius and Lucan. But of four lines full of the names of poets, these are the only ones whom the ordinary classical scholar has heard of. The rest were Christian poets, who versified various parts of the Bible; Juvencus (*c.* 330), Paulinus (353–431), Prosper of Aquitaine (379–431), Sedulius (*c.* 460), Venantius Fortunatus (535–600), Arator (*c.* 550). Among grammarians were Valerius Probus, Donatus, Priscian, Servius (the great Virgilian commentator). Phocas (who wrote a life of Virgil in verse), Comminianus (probably Commodianus), of the 5th century. There were "many other masters eminent in the schools, in art, in oratory, who have written many a volume of sound sense, but whose names it seemed too long to write in verse." Alcuin himself wrote dialogues on grammar, rhetoric and dialectic. In the first, the speakers were an English boy of 15 and a Frank boy of 14; in the latter, Charlemagne and Alcuin himself. For Alcuin yielded to the temptation which his master, Albert, had resisted, and meeting Charlemagne, on a visit to Rome, accepted the headship of an itinerant school attached to his court, the so-called Palace School. Except for a short visit in 792–793, Alcuin deserted England for Frankland. But he continued to take an interest in the school of York, and in one of his poems expresses the hope that the youth of York will handle Virgil's bow and fill the Frisian ships with poems. When Eanbald II. was appointed archbishop of York in 796 Alcuin wrote to congratulate him, and recommended him to divide the school and have different masters for grammar, for song and for writing; and also to establish hospitals, which he calls by their Greek name (xenodochia), one of the many proofs that he had a tincture of Greek learning. The advice seems to have been taken, as in later times we find here, as elsewhere, the song school under the precentor quite separate from the grammar school under the chancellor, and St Peter's hospital just outside the cathedral precinct, which was endowed by King Athelstan, and afterwards known as St Leonard's hospital. In another letter Alcuin sends one of his pupils to King Offa of Mercia to act as master in the school Offa was establishing, and expresses his pleasure at Offa's intention to study and make the light of wisdom, which was extinct in so many places, shine in his kingdom. Whether this refers to the establishment of a school at Lichfield, or elsewhere, does not appear. It is to be noticed that Alcuin, all the time he was master at York and master of the so-called palace school of Charlemagne, was not a monk but a secular clerk. He always describes himself as Alcuin the levite, or deacon, until in his old age he retired to an abbacy by way of retiring pension. So too Augustine himself, though a monk, when he became a bishop and set up a school, had been advised by Pope Gregory to abandon the monastic seclusion and live with his clergy like an ordinary bishop.

The recognition of this fact is vital to an understanding of the history of schools in England and other modern countries. The history of medieval and modern schools has, thanks to the superior industry and research of the French and Germans, started with Charlemagne and Alcuin. Though the schools of France came straight from the Roman grammar and rhetoric schools, and the English schools, by new importation, direct from Italy, it has always been assumed that their origin was monastic and that monks were the chief educators. This is because Charlemagne, largely it would seem under Alcuin's influence, did make a distinct effort to convert the monasteries practically into colleges and public schools. How far he succeeded in this is very doubtful, but if the monasteries ever did become the seats of public schools, or if the monks did anything for general education, it was only during his reign. Save for that short period, alike in England and on the continent general education and public schools were the exclusive duty and privilege of the secular clergy from the days of Augustine to the days of Laud. The monks from first to last were never public schoolmasters or educators, they never acted as teachers, and the monasteries never kept schools, except for their own novices, and they never, except incidentally as lords of manors or trustees, or transferees of the spiritual rights of secular colleges, even controlled schools.

The early monasteries and monks, as may be seen by the example of even Jerome, not only did not cultivate learning other than that of the scriptures, but even repudiated it as heathenish. It was not till Cassiodorus, about 550, composed his *Institutions* for the two monasteries he founded in Calabria, that the copying of MSS. and reading came to be regarded as a monkish duty. The original Benedictine rule a few years earlier set apart only two hours a day for reading, except in Lent. Then, lack of food making the monks less able to labour with their hands, they had three hours' reading in the morning, and had to read one book through in the course of the 40 days. Even this rule was not absolute, special provision being made for work for those who were too lazy to read. There is not a word in the rule to suggest that education was one of the duties of monks or of the objects of a monastery. The only reference to boys is apropos of the reception of new brethren, boy novices "offered" (*oblati*) at the altar. The Celtic monasteries, according to Dr Skene (*Celtic Scotland*, ii. 75), became "great educational seminaries, in which the youth of the tribe were sent, not only to be trained to monastic life, but also for the purpose of receiving secular education." But the quotations given from the ancient laws of Ireland and the life of St Brendan in support of this statement by no means bear it out. It may be questioned whether even in Ireland, or its daughter settlement in Wales, at Iona in Scotland and at Lindisfarne in England, anyone other than sucking monks imbibed the milk of learning in the nurseries of the monasteries. Where, however, as in these communities, the church and secular clergy were practically swallowed up in the monastery and monks, where even the bishops became kept officials under an abbot, it is perhaps not possible to draw a distinction between the regular and the secular clergy. The mission of St Columban in 590 took the Celtic monastery to the borders of Alsace, while indirectly through Lindisfarne it may have been known to Alcuin, as it certainly was at Fulda (Skene, 43).

Charlemagne was perhaps consciously acting under Celtic influence when in the council of Aachen (Aix-la-Chapelle), on the 23rd of March 789–790, he entreated the congregations of monks as well as those of the secular canons "not only to get together children of slaves but also the sons of freemen, and take them into their societies," and directed that "schools of reading boys should be established in every monastery and cathedral, where psalms, music (*notas*), arithmetic and grammar, and the writing of good editions of books should be taught; not allowing the boys, however, to corrupt the gospels, psalters or mass books by reading or writing, but employing men of full age for that purpose." It must have been in pursuance of this design of turning the monasteries to account as schools, that the extant plan of the monastery of St Gall (see ABBEY) was prepared. This plan shows an "inner" school of the novices, and an "outer" school for the young gentlemen. The novices' school is shown as a replica on a smaller scale of the monastery, complete in itself with chapel, dormitory, refectory and infirmary. On the plan of it is written, "In this cloister the oblates are associated with the postulants," *i.e.* the boys offered to God, set apart for the monastic life from infancy, were brought up with the ordinary novices of riper years seeking for admission. This school was at the east end of the church, next to the infirmary of the monks. But the other school, the public school, stood on the north side of the church, as far as possible from the monks' quarters, which, at St Gall, as elsewhere when topography permitted, were on the south. This school was close to the guest hall for gentlemen, near the public entrance to the church from the street. It shows provision for about 150

boarders. The plan is credited to Charlemagne's son-in-law, Eginhard. But it is known not to have been carried out in its entirety; and whether any "outer" school was ever actually erected or carried on we do not know. But, if in Charlemagne's time the monasteries in general admitted lay or clerical boys even in a separate outer school, it is certain that the next generation saw them excluded again. A council at Aachen on the 9th of July 817 (Baluze, Capit. i. 581), attended by abbots and a large number of monks, decreed "No school shall be kept in a monastery except for oblates." That this was considered as binding, or at least was followed, in England, is clear from the decrees of this council being included with the rules of Benedict, Dunstan and Ethelwold in the great Saxon monastic collection now in the British Museum (Cott. Tib. A, iii.). In England, at all events from this time, we always find public schools taught not by the monks, but by the secular clergy.

The notion that schools were monastic and monasteries schools is partly due to a verbal confusion, ecclesiastical and monastic having been ignorantly treated as convertible terms. Education and schools were the province of the church, they were subject to the canon law, and every one connected with them was reckoned as a clerk with the privilege of clergy. The secular courts could take no cognizance of pleas concerning the conduct of schools or schoolmasters, as was emphatically reaffirmed in the Gloucester School Case in 1410, any more than they could as to churches or the conduct of rectors and vicars. Just as they could entertain suits about the patronage of livings, so they could about the appointment of schoolmasters, patronage being regarded as property, and a temporal not a spiritual right, as was settled in a case against the Abbot of Battle in 1343. Both these cases have unfortunately been misrepresented as establishing that the common law of England not only "allowed all to be taught but also controlled the administration of educational foundations" (J. E. G. de Montmorency, *State Intervention in English Education*, 1902, p. 16). In truth, that was solely the business of the clergy, and especially of the bishops as the ecclesiastical judges of first instance, with appeal to the court of Canterbury and thence to the supreme court of the pope at Rome. There is a decree of Pope Eugenius II. in a synod held in 826 (Dec. prima pars. Dist. xxxvii. c. 12): "From certain places complaint is made to us that neither are masters found nor care taken for a school of letters (*i.e.* grammar school), wherefore let all care and diligence be taken by all bishops and their subjects, and in other places where necessary, that masters and teachers should be established to teach continually grammar schools (*studia litterarum*) and the principles of the liberal arts, as in them chiefly are the divine commands set forth and declared." This canon only crystallized into statute what had for two centuries at least been the customary law of the church, that schools should be kept in every cathedral city, as we have seen they were at Canterbury, Dunwich and York.

After York the next place in England in which we have actual evidence of a school is at Winchester, to which intellectual superiority seems to have passed with the political suzerainty. In the history of education in the 9th century the name of Alfred takes the place of Alcuin in the 8th. Of Alfred's own education we have no real knowledge, as the tales of the so-called Asser are mere fairy stories ("The Real Alfred," *The Times*, London, 17 March 1898). But Asser's account of the education of Alfred's children may be accepted as applying to Winchester, and as at all events evidence that there was a public school there in the days when "Asser" wrote, about a hundred years after Alfred's death. Edward the eldest son and Ælfthryth the eldest daughter were bred in the king's court, "nor among their other pursuits appertaining to this life were they suffered to pass their time idly and unprofitably without liberal learning. For they carefully learn the Psalms and Saxon books, especially Saxon poems, and are continually in the habit of making use of books." But "Ethelward the youngest, by the divine counsels and the admirable prudence of the king, was sent to the Grammar School (*ludis litterariae disciplinae*), where with the children of almost all the nobility of the country, and many also who were not noble, he prospered under the diligent care of his masters. Books in both languages, namely Latin and Saxon, were diligently read in the school. They also learned to write, so that before they were of an age to practise manly arts, namely hunting and such pursuits as befit gentlemen (*nobilibus*), they became studious and clever in the liberal arts." This passage so entirely coincides with the description of York school given by Alcuin in its evidence that the grammar school was frequented by laymen as well as clerics, and it is so improbable that "Asser" borrowed from Alcuin, that we may take it to be the normal thing that young Englishmen of good birth were brought up in the public grammar schools then as now.

Anglo-Saxon schools were not confined to bishops' sees. Apart from Malmesbury, the story of which has been so obscured by monastic writers as to make it impossible to ascertain whether it had a public school or not, there were public schools in all the principal centres of population, generally marked by being also the sites of collegiate churches. At least, wherever Ethelfleda, the Lady of the Mercians, and her brother, Edward the Elder, are recorded as building "burhs" through the Midlands to consolidate their conquests from the Danes, there we find also collegiate churches of pre-Conquest origin and early grammar schools; *e.g.* at Stafford and Derby, Huntingdon, Bedford and Leicester, at Bridgenorth, Tamworth and Warwick.

It is perhaps only at the last place that the direct evidence of the continuance of the school from pre-Conquest to post-Conquest times is preserved. There, in 1123 (Leach, *Hist. Warwick School*, 1908), the earl of Warwick, having granted to the canons of St Mary's collegiate church in the town "the school of the church, that the service of God in the same may be improved by the attendance of scholars," the older church of All Saints in the castle appealed to the crown, and Henry I. issued a writ to "command that the church of All Saints have all its customs and ordeals . . . as fully as it used to have them in the time of King Edward and my father and brother and the school (*scolas*) in like manner." In the result the two collegiate churches were united, the canons of All Saints being transferred to St Mary's and "the school of Warwick" confirmed to the united church, which was to enjoy the same liberties as London, Lincoln, Salisbury and York churches, *i.e.* be like a cathedral church of secular canons. That this included the maintenance of a school is clear from a reply to one of a number of questions as to their liberties and customs put by the Warwick chapter to the dean and chapter of Salisbury in 1155, viz. "the scholars to their own master stand and fall," *i.e.* the master not the chapter was to look after the boys.

Even the Danes became founders of churches and schools. Thus Herman, the historian of Bury, writing in 1098 (*Mem. Bury St Edmunds*, Rolls ser. i. 46), and speaking of Canute little more than a generation after his death, recalls his charities, how "when he came to a minster or fortified town, he handed over, to be taught at his own expense, for the clerical or the monastic order, not any chance boy of good birth, but the more select of the poor." Abbot Sampson, writing about a century later, *c.* 1180 (*ibid.* 126), credits Canute with "instituting public schools (*publicas scolas*; the earliest use probably of the term public school in any English writer) in the cities and towns, and, establishing masters at the state expense, sent to them boys of good promise to be taught grammar, including even freed sons of slaves." Canute is praised because he turned out the canons from Bury to put in monks. But the school, though it thus fell under the sway of the abbot, continued in the town, outside the precinct of the abbey, and was served by secular masters. So when Earl, afterwards King, Harold founded the college of Holy Cross at Waltham, the chief officer next the dean was the schoolmaster, Master Athelard, imported from Liége, whose "lessons in grammar and verses and composition did not prevent equal knowledge of singing and divine service. The boys knew the psalter by heart, and entered the choir in procession from school, and on leaving choir returned to school with all the gravity of the regular canons" who in 1177 supplanted the seculars. The secular canon, one of the expelled, who wrote the history about 1180, was himself the pupil of Master Peter, son of Athelard; for secular canons married and had children.

In the half century which followed the Conquest, the cathedral and many of the collegiate churches were reconstituted and enlarged, the normal number of seven canons being increased, and reaching in some cases as many as fifty. In this reconstitution schools were not forgotten. The statutes called "The Institution of St Osmund," said to have been made at the foundation of Salisbury Cathedral in 1091, are in almost identically the same words as the statutes of Lincoln, York and Wells, and they established, instead of two principal persons, provost or dean and schoolmaster, four, viz. dean, singer (*cantor*), schoolmaster or chancellor (*cancellarius*) and treasurer. Of these, "the cantor ought to rule the choir as to singing; the treasurer in keeping the ornaments, the chancellor in teaching school (*scolis regendis*), correcting the books; the *archiscola* ought to hear the lessons and determine, carry the church seal, and compose letters and deeds, note the readers on the table as the cantor does the singers." The York statutes codified in 1307 expressly state that the chancellor was "anciently called the schoolmaster" (*magister scolarum*, a variant of which was *scolasticus*). At St Paul's a series of documents relating to the chancellor are

endorsed "of the schoolmaster, now the chancellor." When he dropped the title of schoolmaster, the chancellor ceased himself to teach any school except the theological school, in which he continued to lecture until the Reformation, but he always remained the educational officer of the chapter. Thus at York in 1307 he was bound to be a master in theology, *i.e.* D.D., and "to him belongs the collation to grammar schools; but the school of York, he ought to give to a regent in arts" (*i.e.* an M.A. who has not taken his degree more than two years) "to hold for three years, and not longer, except by grace for four years." The grammar schools outside York to which he was to appoint were probably those in York diocese, outside special liberties, such as Beverley (itself a collegiate church), but except for an appointment by the chapter, when the chancellorship was vacant, to Doncaster grammar school in 1351 (A. F. Leach, *Early Yorks. Schools*, i. 22), we do not know what they were. At Lincoln "no one can teach in the city of Lincoln without his (the chancellor's) licence and all the schools in Lincolnshire he confers at his own pleasure" (*Vict. County Hist.: Lincs.* ii.).

In London the chancellor was called schoolmaster until 1205. The original writ is still extant (*Mem. St Paul's*, A. ii. 25), in which, in 1138, Henry of Blois, bishop of Winchester, acting as bishop of London, holding the see *in commendam* during a vacancy, enforced the exclusive privilege of Henry the Schoolmaster (*scolarum magistro*) of St Paul's, ordering the dean and archdeacon "to excommunicate those who without a licence from schoolmaster Henry presume to teach in the city of London, except those teaching the schools of St Mary le Bow and St Martin's le Grand." St Martin's le Grand was itself a collegiate church with a dean and chapter and the duty and right of keeping a grammar school, and St Mary le Bow was a "peculiar" of the archbishop of Canterbury and extra diocesan to London.

Precisely similar provisions prevailed at the great collegiate churches like Beverley and Ripon in Yorkshire, and Southwell in Nottinghamshire (A. F. Leach, *Mem. of Southwell Minster*, xli. ii. 13, 205), all pre-Conquest churches and secondary cathedrals to the vast diocese of York. At the former, where we hear (*Hist. Ch. of York*, Rolls ser., i. 281) a curious tale about the schoolmaster (*scolasticus*), *c.* 1100, falling in love with a girl he saw in church, the schoolmaster also became chancellor. In 1304-1306 we find a series of reported cases in which he enforced by excommunication the monopoly of the grammar schoolmaster he appointed against unlicensed rivals teaching in the chapter liberty (A. F. Leach, *Beverley Chap. Act Book*, i. 42, 48, 55, 102, 108, 114). Similarly the collegiate churches in the castles of Pontefract and Hastings (*Vict. County Hist.: Sussex*, ii.) had their grammar schoolmasters about 1100. They were spread all over the kingdom.

The grammar school was a public school open to every one. It has been indeed repeatedly asserted that the cathedral schools were choristers' schools and taught nothing but the psalter and a little elementary Latin grammar. The assertion is founded on a complete misunderstanding. It is a question whether there were any choristers in the 12th century or whether they are not a later introduction, the canons and their vicars choral or choir deputies at first doing the singing themselves. Choristers at Salisbury are not mentioned in the Institution of St Osmund, and they first appear in the 1220 edition of that document. At Lincoln we first find choristers mentioned in a statute of 1236, "To the Precentor belongs the instruction and discipline of the boys and their admission and ordering in choir." At York the 1307 edition of the statutes says "the collection (*i.e.* appointment of masters) to song schools belongs to the singer," now called precentor, "and cases affecting them ought to be heard and decided by him, though execution belongs to the chapter" (Leach, *Early Yorks. Schools*, i. 12). At St Paul's there was no precentor till the 13th century and there is no mention of choristers till 1263, though school-boys (*pueri scolarum*) appear as witnessing a deed between 1142 and 1148 and receiving 4d. for cherries for doing so. It must be remembered also how very small the number of choristers was and how incapable of constituting a school. At St Paul's they were only eight until the 15th century, at York only seven in the 14th. So far from the grammar school being a school solely or even chiefly for choristers, there are several cases in which contests arose whether they had any right of admission to the grammar school. Thus the 14th century register of the almoner or almsgiver of St Paul's, who about 1180 was given a house for the poor, in which later the choristers were boarded, records that the grammar schoolmaster claimed five shillings a year for teaching them grammar. At Beverley in 1312 a contest between the grammar schoolmaster and the song schoolmaster took place as to whether the grammar schoolmaster was bound to admit all choristers free, or only the original number of seven. It was held after evidence as to old custom that all must be admitted free. But there could have been no doubt if the grammar school had been for their sole or chief benefit. A contest at Warwick between the grammar schoolmaster and the music schoolmaster, about 1215 (or 1315), owing to the latter intruding on the domain of the former, was settled by the chapter on the basis that the latter was to teach no grammar, but only "those learning their letters, the psalter, music and song" (A. F. Leach, *Hist. Warwick School*, 62-66). Everywhere from the 13th century onwards the song or choristers' school was of the nature of an elementary school, like that attended by Chaucer's "litel clergeon" in the Prioress' Tale, in which the boy "sat in the scole at his prymer" but could not construe the *Alma Redemptoris* because "I lerne song, I can (*i.e.* know) but smal grammere." Even in quite small places, as at Northallerton, Yorkshire, the distinction between the grammar school and the song school was at first strictly drawn, but tended to disappear in the dearth of M.A.s after the Black Death (*Early Yorks. Schools*, ii. 60-62). In the larger places the distinction was strictly maintained until the Reformation, when the song schools disappeared, except in the cathedrals and the few collegiate churches, including Winchester and Eton, which survived it, and at Newark and Coventry.

The cathedral and collegiate church grammar schools under the control of the secular clergy in the person of the chancellor of the church furnished the chief, and perhaps in the 12th century the sole, supply of schools. There is, however, some excuse for the notion that monasteries kept them, in the fact that in England, differing from the rest of the world, the cathedral churches had, in many of the chief places, notably Canterbury, Winchester and Worcester, during the monastic outburst connected with the names of Ethelwold bishop of Winchester and Dunstan of Canterbury, been taken from the secular clergy, and monks placed in their room. In those places there was no chancellor. But so essentially was education regarded as the business, not of monks, but of the secular clergy, that even in these places the grammar schools were not placed under the monks but remained under the immediate care of the bishop, either personally or through his archdeacon, a secular. Thus we find at Winchester about 1154 Master Jordan Fantosme and John Joichel (Jekyll), "clerks of the bishop of Winchester," carrying an appeal from the bishop about the right to teach the school at Winchester first to the Court of Arches and then to the pope, and as late as 1488 Bishop William Waynflete appointing a master to the grammar school "called in the vulgar tongue, the High School" (A. F. Leach, *Hist. Win. Coll.*). This school was in Symonds Street outside the monastic precinct. So at Canterbury the grammar schoolmaster appears among lay witnesses in 1259; his right to excommunicate anyone assaulting his scholars or carrying on a rival school was allowed on appeal to the Court of Arches, on production of a confirmation by the archbishop of the right as already ancient in 1292, and appointments by the archbishops of the master in 1306, 1311, 1375 and 1443 are preserved (*The Times*, Sept. 1897). Here also the school was outside the monastic precinct, by the parish church of St Alphege in the town (*Guardian*, 12 and 19 Jan. 1898). Similar evidence is forthcoming at Worcester, Norwich, Carlisle and elsewhere.

At the end of the 11th and beginning of the 12th century a renewed movement began for the further extrusion of the secular clergy, on the ground of their wicked lives, the wickedness being that they insisted on the liberty to marry, and for the conversion of collegiate churches into monasteries of the new orders, first of Cluniac monks, then of Augustinian, Black or regular canons, who eschewed matrimony. Thus Dunwich School passed under the rule of Eye Priory (Cluniacs) between 1076 and 1083; and Thetford School to Thetford Priory (Cluniacs) in 1094, though it was released again to the secular dean of Thetford in 1114. Similarly the government of Gloucester School was handed over to Llanthony Abbey (Augustinians) in 1137; Reading School was given to the newly-founded

Reading Abbey (Cluniacs) in 1139; Dunstable School to Dunstable Priory in 1130; Derby School to Darley Priory (Augustinian) about 1150. Bedford collegiate church was converted into a priory and moved to Newnham, and its right to the school acknowledged by the archdeacon of Bedford in 1155. A similar acknowledgment is found at Christ Church, Hants, in 1161; while Bristol School was taken from the Kalenders Gild and handed to Keynsham Abbey in 1171; and Arundel School to Arundel Priory at some date unknown (see articles on "Schools" in *Victoria County History* for the several counties in which these places occur). But these transfers did not make the schools monastic in the sense that the schools were kept in the monasteries or taught, much less frequented, by monks. The schools remained secular, outside the monastic precincts, frequented by lay boys and secular clerks, and taught by secular clerks, sometimes in holy orders—and at that time even subdeacons were reckoned as holy orders—but more often only in minor orders, and not seldom married men. Thus in 1420 the Patent Rolls show us one Ralph Strode, master of the scholars of the city of Winchester, bringing an action with Dionysia his wife. All that was transferred to the monks was the right of appointing the schoolmaster and the power and duty of protecting the authorized schoolmaster's monopoly. At Bury St Edmunds indeed the extrusion of seculars had gone so far that even the archdeaconry of Bury was vested in the monastery and exercised by the sacrist of it, subject to appeal to the abbot (*Vict. County Hist.: Suffolk Schools*, ii.). The substitution of regulars for seculars ceased in the latter part of the 12th century, owing chiefly to the secular clergy at length, under papal pressure, accepting the rule of celibacy, and to the growth of universities.

The universities were developed out of the cathedral and collegiate church schools. In the days of Alcuin, as we saw, the one schoolmaster taught all subjects from the elements of grammar to theology and philosophy. In Italy the faculties of law and medicine had early in the 12th century developed schools of their own. In France theology similarly segregated itself, and, owing to the fortunate independence which the collegiate church of St Geneviève enjoyed from the jurisdiction of the *scolasticus* or chancellor of Notre Dame, much as in London the master of St Martin's le Grand did from that of the chancellor of St Paul's, rival schools of theology became possible, and the university of Paris, essentially a theological university, was born. The first university teaching in England came, not from France, but Italy, and was not in theology but law, and at Oxford the two collegiate churches of St Frideswide and St George's in the castle occupied much the same relative position as Notre Dame and St Geneviève at Paris. It is rather in their development and rivalry, not in a purely imaginary colony from Paris, that the origin of Oxford University must be sought. But the story of universities (*q.v.*) is told elsewhere. The important thing for the schools was that the university movement made the cathedral schoolmasters devote themselves to theology and to grown-up students, to the exclusion of grammar and arts, and left the grammar school entirely for boys and youths to be instructed in classical literature, rhetoric and the elements of logic, preparatory for the university. Moreover, the movement for university colleges perhaps caused a new crop of collegiate churches to spring up, of which grammar schools formed an integral and important part. In the quinquennium 1260 to 1265, the collegiate church of Howden was founded on the Yorkshire estates of the bishop and priory of Durham at one end of the kingdom, and that of Glasney in Cornwall on the estate of the bishop of Exeter at the other. These were ordinary colleges of secular canons with grammar schools attached, and the schools outlived the colleges at the Reformation. They were contemporary with the first university colleges. The college of St Nicholas, with 20 university students, was founded by Bishop Giles Bridport of Salisbury at Salisbury in 1261, Merton College by Walter of Merton at Malden in Surrey in 1265, and St Edmund's College at Salisbury by Bishop Wyly in 1270, and Merton College was moved to Oxford in 1275. The difference between these colleges and the ordinary collegiate churches was simply that the former were *ad orandum et studendum*, the latter *ad studendum et orandum*. So closely did Merton College follow the ordinary collegiate church model, that its chapel was an impropriated parish church and it contained the usual appendage of a grammar school, though it was limited to 13 boys, who were to be of the founder's kin. The master who taught them was called the "master of glomery," an odd corruption found also at Salisbury, Cambridge and Orleans. A similar grammar school was found at Queen's College in 1340, but this from lack of endowment was never developed according to its founder's intentions. These two colleges formed a starting point for yet another new development, when William of Wykeham, in founding New College on a scale more than twice as large as Merton, separated the grammar students from the theological and legal students, and placed the former as the main object of a separate, though connected and more or less subordinate college, at Winchester in 1382. Though Winchester was the first boys' school-college, Oxford itself had been apparently the first place in medieval England at which grammar schools were maintained as separate entities, not attached to cathedrals or colleges, and practically as private adventure schools. The university apparently placed no limit on their number and rivalry, though retaining control and supervision over their efficiency, through two grammar school surveyors elected by convocation.

In the first quarter of the 14th century even the monasteries contributed to the spread of education by almonry schools, which were now built as quasi-separate institutions by, or just outside, their outer gates, under the management of the almoner or almsgiver of the house. The almonry boys were apparently introduced as choristers to sing in the Lady chapels, which had become almost necessary appendages to great churches. At Canterbury a staff of six secular priests with clerks and scholars was established in the Lady chapel to sing for the soul of Edward I. in 1319. The scholars were admitted at ten years old and might stay to twenty-five, but were expected to be ordained sub-deacons and retire at twenty. They were lodged in a separate hall (*Aula Puerorum*), but waited on the sick and infirm monks who lived in the infirmary. At first they were taught wholly in the city or archbishop's grammar school. But by 1362 they had a separate grammar master, probably only as a house master, as the one mentioned in that year found Kingston school a better post, to which he had gone off without notice. The master was always a secular, and in 1451 was a married man. There is no evidence as to how many boys there were. At Westminster boys first appear in the almonry in 1354, and they first had a master in 1367, who from 1387 onwards, but not before, is called schoolmaster. The boys numbered thirteen in 1373, twenty-eight in 1385, twenty-two in 1387. The normal number seems to have been twenty-four (A. F. Leach in *Journal of Education*, Jan. 1905). This almonry school for charity boys is the only school, other than the novices' school, which existed at Westminster Abbey before, on its conversion into a cathedral by Henry VIII., the present school with forty scholars and unlimited town boys was established on the model of the old cathedral grammar schools. At Durham the almonry school first occurs in 1352; their master is first called schoolmaster in 1362 (*Ibid.* Oct. 1905). At the dissolution there were thirty boys, who waited on the monks in the infirmary, prayed all night round dead monks, sang in the Lady chapel, were fed on the broken meats from the novices' table and lodged in a hospital or infirmary opposite but outside the great gate of the monastery. At Reading almonry boys first appear in 1346, and were ten in number. They seem to have attended the town grammar school. At St Albans statutes were made for apparently thirteen almonry boys in 1399, who lodged by the great gate but attended the grammar school in the town. At Coventry there were fourteen boys in the almonry school, and the town quarrelled with the prior in 1439 for trying to interfere with the town grammar school for the benefit of the almonry school. The Carthusian monastery at Coventry had twelve boys in its almonry. At St Mary's Abbey, York, the almonry had fifty boys who attended St Peter's, *i.e.* the city and cathedral grammar school (*Early Yorks. Schools*, i.).

Taken altogether these almonry schools provided for the education of, or gave exhibitions to, a large number of boys, probably not less than 1000 in all. But they were not "monastic"; the boys themselves were not novices or oblates, and were looked after and taught by seculars. Various efforts were made in the 14th century and onwards to make the monks themselves learned. By papal statute in 1337 the Benedictine monasteries were each to send 5 % of their number to the universities. Though Gloucester College had been established at Oxford in 1283 (reorganized in 1291) to receive them, not ¼ % of the monks went there, for there is reason to think it never had more than sixty, and in 1537 had only thirty-two students (*Vict. Co. Hist.: Gloucester*, ii. 342). Also the monasteries

were ordered to provide a grammar master who might be, and in fact nearly always was, to teach the young monks and novices. Yet in 1387 the Winchester cathedral monks were found by William of Wykeham to be "wholly ignorant of grammar" and to make the lessons in church unintelligible by wild false quantities. In the visitations of Norwich monasteries in the late 15th century (Dr Jessopp, Camd. Soc. 1892) hardly one had its grammar master as it ought to have had. In 1495 Osney Abbey provided for the monks a grammar master who was a secular (Boase, *Oxford, Historic Towns*). At Canterbury itself Archbishop Warham in 1511 found the monks totally ignorant of the meaning of the mass and of the lessons which they read, and ordered them to have a grammar master to teach the young monks. In 1531 Bishop Longland of Lincoln issued injunctions to Messenden Priory in English "for that ye be ignorant and have small understanding of Latin." At the Dissolution a grammar master was teaching the monks at Winchester grammar, but he was not a monk but ex-second-master of Winchester College (*Hist. Winchester Coll.* 26), and other Wykehamists were to be found teaching grammar at the London Charterhouse and Netley Abbey, Hants. It is clear that the monks were by no means a learned body.

It is chiefly from the London and Oxford schools that we learn what grammar schools actually taught in the 12th to the 15th centuries. The *local classicus* is Fitzstephen's Description of London (*Mat. Hist. Becket*, Rolls series, iii. 4), as it was in the youth of Thomas à Becket when about 1127 he attended St Paul's school, "the city school," before going to Paris university. Fitzstephen describes the contests of the scholars from it and the other two schools on saints' days, when the elders contended in logic and rhetoric, and the boys "vie with each other in verses, or in the principles of the art of grammar or the rules of preterites and supines, others in epigrams, rhymes and metres"; while on Shrove Tuesday, after a cock-fight in the morning, they had a great game of (foot?) ball in Smithfield. About a century later, 1267, Oxford University statutes show us that B.A.s had to read for their degree Priscian *On Constructions* twice, and Donatus's *Barbarismus* once; books which imply an advanced knowledge of Latin syntax. The Oxford grammar school statutes, not dated but of the 13th century, provide for grammar masters being examined in verse-making and prose composition and knowledge of Latin authors before being licensed to teach. The only authors actually mentioned, and that for the sake of being forbidden as improper, are Ovid's *Art of Love* and Pamphilus who wrote *De Amore*. Every fortnight the masters were to set a copy of verses and letters to write, which the boys were to do the next holiday, and show up on the following whole school-day. Special attention was to be paid to the smaller boys in hearing and examining them on their rules as to parts of speech and accidence. It was particularly ordered that they were to observe the rule in Latin and Roman (*Romanis*), *i.e.* translations were to be done not into English but Romance, *i.e.* French. For after the Conquest French was the vernacular language of the upper classes, and while the pre-Conquest school glossary of Ælfric translated Latin into English, the post-Conquest glossaries, such as Neckam of St Albans school, give the translation in French. Though by the 13th century English was supplanting French, the schools as usual lagged behind, and the fiction was kept up that French was still the vernacular of England till after the victories of Edward III. John of Trevisa, translating the *Polychronicon* of Higden, who, writing in 1327, commented on the corruption of English due to the strange custom of boys in school being compelled to construe in French, tells us that this custom of construing into French "was changed after the first murrain (the Black Death of 1349) by John Cornwal, a 'mayster of gramere,'" followed by Richard Pencrych, so that "now, A.D. 1385, in al the gramer scoles of Engelond children leaveth Frensch and construeth and lurneth an Englysch," the advantage of which was that they learnt Latin quicker, but the disadvantage was that they knew "no more French than their left heel." Master John Cornwall was an Oxford grammar schoolmaster, being paid 10d. in 1347 for "salary" of his school for the six founder's-kin boys at Merton; and Pencrych was not, as supposed by Mr de Montmorency (*State Intervention*, 22) through a strange misunderstanding, a schoolmaster at Penkridge in Staffordshire (though he no doubt took his name from that place), but was another Oxford man, living in 1367 in a hall by Merton, afterwards called Pencrych Hall. Though this very rational innovation thus began in Oxford, yet a new edition of the Oxford Grammar School Statutes in the late 14th or early 15th century provided that the masters should in construing teach the meaning of words by turns in English and French, "lest the French tongue should be utterly lost," as it came to be.

It is extremely difficult to ascertain what books were actually read in English schools before the 16th century. Whether the Christian poets such as Sedulius and Juvencus, the staple of Alcuin and recommended by Colet for St Paul's in 1518, were much read in the intermediate times, is doubtful. Vincent of Beauvais, who wrote about 1245 "on the education of noblemen" for the queen of France, quotes Horace, Ovid, Apuleius and Valerius Maximus, but would like to substitute the Christians for the classics. But he was a Dominican friar. It is certain that classical authors were not expelled. In 1356 Bishop Grandison of Exeter abused the schoolmasters of his diocese for taking the boys, "as soon as they could read the Lord's Prayer, the creed or matins and the hours of the Virgin, and before they could construe or parse them," to "other school books and poets as if they were heathens instead of Christians." Books of manners in verse were read in schools from the days of John de Garlandia, *c.* 1220, to the *Quos decet in mensa* of Sulpicius, a Roman schoolmaster of 1498, which was read in the lower forms of Winchester and Eton in 1535. The metrical grammar of Alexander of De villa Dei (Dol) was almost as popular as Donatus. In rhetoric Cicero *De oratore* was the staple work. In dialectic or logic successive manuals were founded on Boëthius and Isidore of Seville. The 15th century saw a reaction against the logic, which, valuable as it was, was begun much too early and was strongly reprobated by Wyneflete, who at Magdalen School insisted that his "demyes," or scholars, should not go on to logic till perfect in grammar. The wide knowledge of the classics shown by Chaucer, who no doubt, like Becket before him and Milton after him, went to St Paul's school, indicates what the average layman and cleric learnt in the average grammar school.

A question has been raised as to who attended the grammar schools. The answer appears to be, all classes. Theoretically, sons of slaves and villeins were excluded. But it seems certain that picked specimens even of this class were admitted. The bulk of early schools were then, as now, in cities and boroughs, where all were free. Ælfric's Anglo-Saxon colloquies represent sons of smiths, huntsmen, cowherds, shepherds attending school and learning Latin. That villeins' sons did go to school is clear from two instances alone. In 1312 Walter of Merton, fellow of Merton College, Oxford, a villein, was manumitted by the prior of Durham. In 1344 the manor rolls at Great Waltham, Essex, show a villein fined 3d. for sending his son to school without licence from the lady of the manor (*Hist. Rev.*, July 1905). In 1391, after the Peasants' Revolt, the Commons sent up a bill to Richard II. "that no neif" (said to mean a female villein) "or villein may henceforth send their children to school (*a escoles*) for their advancement by clergy, and that for the maintenance and salvation of the honour of all the freemen of the realm." The petition was rejected. In 1406 the statute of artisans, while putting numerous restrictions on their freedom, adds. "provided always that every man or woman of whatever estate or condition shall be free to send their son or daughter to learn grammar (*litterature*) at any school in our kingdom." Henry VI., in the statutes of Eton, bears witness to the admission of the unfree to schools by inserting a reactionary prohibition against villeins (*nativi*) or illegitimate children being admitted scholars. Illegitimates were theoretically excluded from the priesthood, but the papal registers are crammed with indulgences to scholars who were illegitimate for admission to holy orders. As to the upper class, an erroneous inference that gentlemen's sons were not sent to school has been drawn from the passage of Higden above quoted, because, after saying that children in grammar schools learnt no French now, he adds that neither did gentlemen teach their sons French. But the two classes are not mutually exclusive. Elder sons, who were going to be knights or squires, did not as a rule go to school, but the younger sons did. The vast majority of bishops, and the higher clergy, were the younger sons of noblemen and gentlemen, and had certainly been to school. It is made a reproach against Bishop Grosseteste of Lincoln in his contest with his chapter that he was not a gentleman. We find Giffard, archbishop of York, son of a great Gloucestershire magnate, sending three wards to Beverley grammar school in 1276, and another archbishop of York, William Melton, ex-privy seal and lord chancellor, sending two nephews to Newark school in 1338. The only known mention of the school of Taunton before the days of its wrongly-reputed founder, Bishop Fox, is preserved in an inquisition in 1310 to prove the age of a royal ward, Hugh, son and heir of Thomas de la Tour. John of Kent, 60 years old, knows Hugh's age because he had a son at the school of Taunton with him seventeen years before (*The Genealogist*, iii. 211). This cannot have been an isolated instance. William of Wykeham would not have provided for "10 sons of noblemen and gentlemen, special friends of the college," being admitted as commensales or boarders with the scholars, nor have forbidden the scholars of Winchester and New College to quarrel as to whether their birth was noble or otherwise, nor would the earliest lists of scholars and commoners there contain the names

of sons of judges and masters in chancery and country gentlemen, like the Pophams of Dorset and the ffaringtons of Lancashire, if the gentle classes were not already in the habit of going to school. At Eton the number of noblemen and gentlemen commoners was doubled. The first or second headmaster and third provost of Eton, William Westbury, a Winchester and New College scholar, was almost certainly the son of the chief justice of that name. In 1464 Mr Thomas Bourchier, son of the earl of Essex and of Eu, nephew of the archbishop of Canterbury, was a commoner outside college at Winchester, and in 1479 the son of William Paston, the judge and Norfolk landowner, was writing verses at Eton in his letters home. In 1502 Sir John Percyvale founded Macclesfield grammar school expressly for "gentlemen's and other good men's sons thereabout."

Tuition fees were normally paid in grammar schools. In 1277 the fee paid to the "master of glomery" at Oxford for five Merton founder's-kin boys was 20d., or 4d. a head a term; in 1306 the "scolagium" of eight boys in the winter term was 3s., of seven boys in the Lent term 2s. 11d. and in the summer term 2s. 4d., a variation from 4d. to 4½d. and 5d. a term, probably owing to variation in the length of the term, and representing ½d. a week. In that year the *dica* of the usher was ½d. a term, and in 1310 the usher was paid 4d. for three terms for eight boys, or ½d. a term. The usher must have been paid something by the master, as even in that age, when the majority of livings were under £3 a year, a halfpenny could hardly have been a living wage for eight weeks. Perhaps the usher got a share of the levy of 2d. a head for offerings to the light of St Nicholas, the school boys' patron saint. For at Worcester in 1291 the bishop was called in to settle a quarrel between the schoolmaster and the rector of St Nicholas church as to the right to the wax which guttered from St Nicholas' light, which the boys maintained. An undated Oxford statute of the 15th century fixes the upward limit of grammar school fees at 8d. a term (*Reg. Giffard*, f. 341). The tariff settled by the bishop of Norwich for Ipswich grammar school in 1476–1477 was 10d. for grammarians, 8d. for psalterians, or those learning to read the psalter in Latin, and 6d. for primerians, or those learning the primer or accidence (*Vict. Co. Hist., Suffolk*, ii.). But the corporation rebelled against the fee of 10d. for grammarians, and in 1482 cut it down to 8d. a term. This was certainly the normal fee. In the return of chantries at their dissolution in 1548, the school at Newland is reported (Leach, *English Schools at the Reformation*, 78) to have been founded in 1446, to be "half-free, that is to say, taking of scholars learning grammar 8d. the quarter, and of others learning to read 4d. a quarter."

At successive epochs there have been attempts to make education free (*Journ. of Educ.*, June and July 1908). Hitherto after every attempt fees have crept back under some guise or other, as the endowments provided to ensure freedom were often inadequate to start with, and anyhow became inadequate by change in the value of money, while the inveterate habit of the rich in giving "tips" to secure special attention forced contributions on others. The movement began under the Roman Empire, Pliny founding a practically free school at Como, while successive emperors from Vespasian onwards extended the area and pay of public schools at the state expense, both of rhetoric and grammar. There can be little doubt that the cathedral schools were intended to be free just as much as the church services. Yet it had become necessary by the Lateran Council in 1179 for the canon law definitely to provide that, "to prevent the poor who could not be helped by their parents' means from being deprived of the opportunity of learning and advancement," every cathedral church should provide a competent benefice for a master to teach the clerks of the church and poor scholars gratis: and that in other churches if any endowment had been assigned for the purpose it should be restored, while no fees were to be exacted for licences to teach. At the next Lateran council in 1215 this canon was recited and its non-observance in many places lamented. The canon was confirmed and extended from cathedrals to all churches of sufficient means, while the cathedrals were also directed to provide a theological lecturer. That the first canon was not everywhere a dead letter is proved by the grant about 1180 of Archbishop Roger to the chapter of York of £5 a year "to the fee of your school," charged on the synodals of three archdeaconries, confirmed by Archbishop Geoffrey (1191–1212), and arrears demanded in a violent letter by the chancellor to Archbishop Giffard in 1271 (A. F. Leach, *Early Yorkshire Schools*, c. 12-16). So at Bury St Edmunds in 1180 Abbot Sampson, who had himself when a boy and a secular clerk been admitted to the grammar school free as a special personal favour, first made the grammar school free of fees for "school-hire" by giving it a school house outside the abbey in the town, and a few years later endowed it with half of a living worth £5 a year, for which the master was to teach 40 boys free, relations of the monks being preferred. There were also many exhibition endowments, which made schools free or partially free for poor boys, such as the provision at St Cross Hospital, Winchester, founded in 1130, of free meals daily for twelve boys from the High School, Winchester; and an endowment given to the Durham Abbey almoner about 1180 for board and lodging of three boys from Durham grammar school, while at St Nicholas' Hospital, Pontefract, the custom was ancient in 1267 to provide 40 loaves a week "except in vacations" for the scholars of Pontefract school, which is mentioned about 1100 as granted to the collegiate church in the castle there. It is significant that while the inquisition which established this custom was taken in French in 1267 it was confirmed in a mixture of Latin and English in 1464. In connexion with Stapledon Hall, now Exeter College, Oxford, Bishop Stapledon about 1327 provided for twelve scholars of Exeter Cathedral grammar school being boarded and clothed gratis in St John's Hospital by one of the gates of the city. In 1441 St Anthony's school was established in St Anthony's Hospital, London. Later, as in the famous case of Banbury Hospital, under Stanbridge in 1501, hospitals were bodily converted into schools, a precedent frequently followed since. Henry VI., in 1441, under the guidance of Chicheley and Waynefiete, copied Winchester down to the minutest particulars, and the wording of its statutes, but with the important difference that its school was declared, what Winchester was not, a free grammar school open to all from all parts of England. Another class of school, which if not free at first generally became so, was that of the grammar schools established by joint stock effort of the numerous gilds, or trades unions, which studded the towns. As the London City gilds still keep chaplains, so nearly every gild maintained one or more priests to perform the gild masses, say grace at the gild feasts, and bury the gild brethren and sisters and pray for their souls. Some of the larger ones converted parish churches, as at Boston, into little less than cathedrals in size and splendour, with a staff of priests and singing clerks as large as that of the greatest collegiate churches. Some of these priests or clerks kept schools of grammar and of song. There are unfortunately no accounts of such gilds preserved earlier than the 15th or 16th centuries. But there can be no doubt that they kept schools much earlier than that. The grammar schools at Louth and Boston, which appear, the former in the 15th century and the latter in the 14th, in gild documents, occur in other documents in 1276 and 1329 respectively. The school of the gild of Wisbech in Cambridgeshire is similarly mentioned in 1446. At Stratford-on-Avon the school appears in the earliest extant gild accounts, in 1402, but existed more than a century earlier, when, in 1295, its master or "rector" was ordained a subdeacon side by side with the rector of the parish church, William Grenfield, a future archbishop of York. It was converted into a free school by endowments given by one of the gild priests in 1482, and has continued without intermission to the present day (*Vict. Co. Hist., Warwick*, ii. 329).

Probably the most numerous schools were those kept by chantry priests, endowed by single benefactors to pray for their souls, who sometimes by express terms of the foundation, more often perhaps to occupy their time or eke out not too substantial endowments, kept schools. These were sometimes free, more often at first not. But we know scarcely anything of these schools before the 14th century, the foundation deeds of those isolated institutions not having been preserved like those of colleges. We find, however, Oswestry endowed as a free school by David Holbeach, a lawyer, about 1406; Middleton, Lancashire, by Bishop Langley of Durham, in 1412; Durham itself by the same in 1414; Sevenoaks by William Sennock (Sevenock), a London grocer, the schoolmaster of which was "by no means to be in holy orders," in 1432; Newport, Shropshire, by Thomas Draper,

1442; Newland, Gloucestershire, by Robert Gryndour esquire, 1446; Alnwick, Northumberland, by William Alnwick, bishop of Lincoln, 1448; Deritend, now in Birmingham, 1448; Towcester by Archdeacon Sponne in 1449. There was somewhat of a stoppage of such foundations during the Wars of the Roses, but it was resumed with renewed vigour during the later years of Edward IV., and under Henry VII., and continued to the dissolution of monasteries. Among colleges may be noticed Acaster College for three schools of grammar, song and scrivener craft, *i.e.* writing and accounts, by ex-chancellor Bishop Stillingfleet about 1472; Rotherham College with three similar schools by ex-chancellor Archbishop Rotherham, 1484; Ipswich by the chancellor Cardinal Wolsey, 1528; and among chantry schools, Hull, 1482; Long Melford, 1484; Chipping Camden and Stow on the Wold, 1487; Stockport, by ex-Lord Mayor Sir Edmund Shaa, 1487; Macclesfield, by ex-Lord Mayor Sir John Percival, 1502; Cromer, by ex-Lord Mayor Read, 1505; Week St Mary, by the ex-Lady Mayoress Percival, 1508; and so on. The re endowment of the old St Paul's school, London, by Dean Colet in 1510–1512, with the property he inherited from Lord Mayor Colet, and its transfer under papal, episcopal, capitular and royal licence from the dean and chapter of St Paul's to the Mercers' Company, and its conversion into a school free for 153 boys, created no small stir. Especially was this so, because it is the first instance in which the teaching of Greek is mentioned in school statutes, though only in the tentative form of a direction that the high master should be learned in Latin "and also in Greek yf suyche may be gotten." Though Greek was probably taught at Eton and Winchester under William Horman, headmaster of Eton (1485) and Winchester (1494), whose *Vulgaria*, composed when headmaster, contains frequent references to Greek, and even to a Greek play seemingly prepared by the boys, it did not become a regular school subject till the reign of Elizabeth. School exercises in Greek at Winchester under Edward VI. are preserved, but Sir Thomas Pope says it had been dropped at Eton under Mary. There is no evidence of it at St Paul's before Elizabeth's reign. At the time of the meeting of the Reformation parliament in 1535 there were between 300 and 400 grammar schools in England, the majority of which were free schools, charging no fees for teaching.

Free schools received a notable accession, on the dissolution of monasteries, in the schools attached to all the cathedrals "of the new foundation," except Winchester, by Henry VIII. in 1540, including Gloucester, Bristol, Peterborough, Chester and Westminster, which had not been cathedrals before. On the other hand, the list of free schools and endowed schools was much reduced by the doctrine which treated the endowments of schools under the control of monasteries not only through the 12th century transfers but even by much later and known foundations as trustees, as included in the confiscation of the monastery itself. Coventry, St Albans, Eye, Reading, Bury St Edmunds, Abingdon, Faversham are some out of many which suffered from this doctrine, and if they did not in fact cease, were for a time deprived of their endowments and only revived with new ones. Reading school was actually granted to its master, an Eton and King's scholar. St Albans was restored by the munificence of its last and well-pensioned abbot; Bury St Edmunds, like a good many more, by grant of Edward VI.; Abingdon by a private donor; Faversham by restoration of the trust-property on cause shown. But many, like Dunwich, perished irretrievably.

Spite of the dissolution of monasteries, the creation of chantry schools and other grammar schools went on. In this very year, 1540, John Harmon (who is generally known by his assumed name Veysey or Voysey), bishop of Exeter, endowed Sutton Coldfield grammar school, and in 1544 made its gild the governors. One of the latest of great schools, that of Berkhamsted, was founded by John Incent, dean of St Paul's, in 1541; while archbishop Holgate of York founded three free grammar schools, though without any chantry provisions, at York, Malton and Hemsworth in 1546. In 1548 all the endowed schools in England, other than the cathedral schools, were threatened and the vast majority destroyed by the act for the dissolution of colleges and chantries. Only Winchester, Eton and Magdalen College School were exempted, and they owed their exemption to being regarded as part of the universities with which (through New College, King's and Magdalen) they were connected; and even they had been included in the similar act passed in 1546, which was, however, permissive and lasted for Henry VIII.'s life only. The Chantries Act, while providing for the abolition of colleges, gilds and chantries, contained indeed provision for the continuance by special order of all schools attached to them, which were grammar schools by foundation, and for their increase and enlargement out of the confiscated lands. Unfortunately there was neither time nor money to spare for the purpose. A commission consisting of Sir Walter Mildmay, afterwards chancellor of the exchequer, and Robert Keylway, or Kelway, afterwards serjeant-at-law and author of *Kelway's Reports*, continued by warrant of the 20th of June 1548 "until further order" such schools as were clearly shown to be grammar schools by foundation, at the net income specifically enjoyed by the schoolmasters at the time. The "further order," which was to re-endow them with lands, never came. Only in a comparatively few places, where the inhabitants or powerful persons bestirred themselves to beg, or more often to buy, chantry lands from the Crown, were the schools restored and re-endowed. The few that were restored, and even by an irony of fate some of those which were deprived of their lands by Edward VI. but managed to struggle on, got the name of Free Grammar Schools of King Edward VI. So Edward VI. has been credited with being not only the founder of schools, estimated by various writers at 22, 30 and 44 in number, of which in the most favourable cases he increased the endowment, but also with being the promoter instead of the spoiler of a grammar school system. The earliest school actually restored by him was Berkhamsted, which was refounded by act of parliament in 1549; St Albans, Stamford and Pocklington being also refounded by acts of the same year. Acts of parliament were found too cumbrous. Some, as at Morpeth, Northumberland, and Saffron Walden in Essex, were refounded by grant to a town corporation of gild property with a grammar school attached. Most of the later refoundations were by letters patent. The first refoundation by patent for a school *per se* under a governing body created *ad hoc* was that of Sherborne, 13th of May 1550, Bury St Edmunds often, but wrongly, claimed as the first, not being till the 3rd of August 1550. The bulk were refounded in 1551–1553.

The notion that there was any great advance or change in the curriculum of schools at the Reformation is erroneous. There is hardly any difference between the authors prescribed at Bury in 1550 and those at Ipswich in 1528; Cato's *Moralia*, Aesop, Terence, Ovid, Erasmus, Sallust, Caesar, Virgil and Horace appearing in the statutes of both. If anything Ipswich was the more advanced, as Wolsey directed his boys to be taught précis writing in English, and essays and themes, also apparently in English, which are not mentioned at Bury. But Ipswich was a school of the first grade with eight forms, whereas at Bury only five were contemplated. The reign of Mary did not affect the schools as such one way or the other. Several, like Basingstoke grammar school and St Peter's school, York, were re-endowed in her reign, the former by restoration of gild lands, the latter by appropriation of the endowment of a hospital for poor priests. "Heretic" masters were extruded, and occasionally, like the master of Reading school, Julian Palmer, burnt. Similar extrusions of Romanists followed on the accession of Elizabeth. In 1580 and subsequent years the bishops were ordered to inquire as to schoolmasters who did not attend church or had not licences from the ordinaries to teach. The visitations of the chapter of Southwell as ordinaries in their liberty show schoolmasters in many small towns and villages, some of them "popish recusants," and others inhibited until they had been duly licensed. How far they taught grammar schools and not elementary schools is not very clear. But one unfortunate result of the suppression of the song schools was that attempts were now made, as at Wellingborough in Northamptonshire, to make the grammar schools serve the two

incompatible purposes of grammar and elementary schools, with the result too often that the grammar school was degraded and the elementary school inefficient.

The number of school foundations credited to Queen Elizabeth or her era is very much larger than the facts justify. The greatest of all, Westminster, which during the 18th century was *facile princeps* in the numbers, social rank and academic and literary achievement of its scholars, had in fact never ceased after its foundation, or refoundation, as a cathedral school under Henry VIII. Though Mary had restored the monks, the school went on throughout her reign [1] and until Elizabeth formally refounded it with the restored canons. It is more extraordinary to find St Albans, founded under act of parliament of Edward VI., with Coventry, restored under patent of Henry VIII., and Lincoln, which had existed uninterruptedly from the 11th century, credited to her time. Similarly Bristol, Mansfield, Worcester, Darlington, Leicester, Eye, Bromyard, Richmond, Bodmin, Penryn, Fotheringay and others long previously existing and deriving no benefit from her or augmentation in her time, are erroneously dubbed Elizabethan.

In the curriculum of the schools, the change made by the Reformation has been much exaggerated. Already in 1446, in founding at Cambridge the college of God's House, now included in Christ's College, which was the first training college for grammar or secondary schoolmasters, Bingham had put forward the necessity of Latin, not only for translating the scriptures and carrying on the law and business of the realm, but also for communication with strangers and foreigners. In the Elizabethan schools the preparation for public life was slightly more emphasized. But methods and authors were little changed. The growth of Greek in all the great schools, and the attempt, as theological discussion grew keener towards the end of the reign, to acclimatize Hebrew, are the chief features. Under James I. and the Commonwealth the mention of Hebrew in statutes and the teaching of it in schools became quite common. It was advocated even by John Comenius, the Czech-German, who created a stir a few years before the Civil War by denouncing Latin as a subject of instruction except for boys going to the universities, and advocating the substitution of teaching in the vernacular language of each country instead.

There is one not wholly novel but notable feature which may be remarked in Elizabethan school foundations, mostly no doubt replacing old ones, and that is that many were the product of joint effort, partly in annual subscriptions and partly in donations of land or money down, not from one benefactor but from many persons. This is the case in many which have been attributed to the queen herself or to individual founders. Wakefield and Halifax in Yorkshire; Ashbourne, Derbyshire; Sandwich, Kent; Hexham, Northumberland; and St Saviour's and St Olave's, Southwark, are cases in which the evidence of joint stock enterprise has been fortunately preserved, as it has in that of Nottingham, which, after an existence of at least 300 years as a fee school, was refounded as a free school in 1512. Another and less fortunate feature may be observed in the frequent attempt to make the grammar schools do double work, and supply the loss caused by the suppression of the song schools, by doing duty also as elementary schools to teach the three R's. It is an attempt which is being continually renewed and always results in failure; generally ending in degrading the secondary school while not making the elementary school efficient. Wellingborough in Northamptonshire is a remarkable example of this. It is a school which, founded by joint effort and out of common town estate, always languished until in recent years it shook off the elementary school and became one of the most flourishing secondary schools in the county (*Vict. Co. Hist., Northants.*, ii.).

During the Civil War and the Commonwealth, when new ideas on every subject were broached, education received new impetus, and under the fostering care of parliament schools were increased in numbers. Many new schools were created, many old schools obtained an increase of endowment and efficiency. Among the great schools it was during this time that Westminster, with a parliamentary committee of lords and commons substituted for the dean and chapter, under Busby, definitely placed itself in that position of pre-eminence which it retained till the first decade of the 19th century. It is significant that the two oldest extant school-lists are of this period, that for Winchester, which flourished under a Puritan warden and headmaster, for 1653, and that for Westminster for 1655. The care that parliament showed for schools was most conspicuous, where it might have least been expected, in regard to the cathedral schools. On the 14th of October 1642 the estates of deans and chapters were ordered to be sequestered, subject to a direction that "allowances assigned for scholars, almsmen and other charitable uses might not be interrupted." On the 9th of October 1643 parliament extended to schoolmasters the functions of the Committee for Plundered Ministers, to remove those scandalous in life or doctrine or who had deserted their cures.

As the property of deans and chapters was gradually sequestrated in 1643–1646, power was given this committee to relieve poor ministers and schoolmasters out of the proceeds. By act of parliament, on the 30th of April 1649, deans and chapters were abolished, but the schools were expressly saved by a clause that all payments from their revenues which before the 1st of December 1641 had been or ought to have been paid to the maintenance of any grammar school or scholars should continue to be paid. The temporal estates were ordered to be sold, but the spiritual property, *i.e.* livings and tithes, devolved on thirteen trustees, and afterwards on the University Reform Committee, for salaries and augmentations for preaching ministers and schoolmasters, of which £2000 a year was to go to the increase of the universities. Under these two provisions not only were all the cathedral grammar schools preserved intact, the existing masters being left in undisturbed possession where they attended to their business and did not bear arms against parliament, but in many cases they received large increases of stipend. The chapters had kept the schoolmasters at the fixed amounts prescribed by Henry VIII.'s statutes or older custom, though their own incomes they had increased to many times the statutable amounts by dividing fines amongst themselves. They had not even properly maintained the school buildings. At Canterbury, parliament had at once to spend the large sum of £50 in repairing the school and masters' houses; and at Rochester similar amounts. The committee augmented salaries at Chester, the master from £22 to £36 and the usher from £10 to £19; at Salisbury the master from £10 to £20 and the usher from £5 to £15; at Chichester the masters from £20 to £30; at Rochester they doubled the former stipend of £13, 6s. 8d.; at Durham the allowance of £20 was doubled. So at St Anthony's school, London, which by a grievous error the local historians killed under Elizabeth though it survived till the Fire of London, the salary, paid by St George's, Windsor, settled in 1442, at the rate of £16, was now increased to £36 a year. Other schools paid from chapter or crown revenues received similar increases, Grimston £30; Newcastle under Lyme £20; Bridport, Dorset, £15, 10s. Two of the most backward districts had each obtained a special "act for the propagation of the gospel and the maintenance of godly and able ministers and schoolmasters there,"—Wales on the 22nd of February, and the four northern counties on the 1st of March 1650. Under these acts, the school at Llanrwst was increased by £8 and at Abergavenny by £10 a year, while new schools were established at some twenty-four places, including Carnarvon, Cardiff, Cardigan, Montgomery and Denbigh, with salaries ranging from £10 a year at Glenberiog to £40 for the master and £25 for the usher at Wrexham. In fact, the act was an anticipation of the Welsh Intermediate Education Act 1888. So in the northern counties the stipends of the Durham Cathedral grammar schoolmasters were doubled; and the masters of Darlington grammar school and of Bishop Auckland grammar school each received an augmentation of £20 or more than double, and the master of Heighington of £10 a year; while new grammar schools were established at Barnard Castle and Ferry Hill. New schools, perhaps elementary, were erected at Stanhope, Staindrop, Brancepeth, Aycliffe and Whickham, while a new departure was taken in the erection of navigation schools at Sunderland and Nether Heworth. The greatest effort was the establishment of the university college of Durham, anticipating by near 200 years the present university, while an elaborate plan was published in 1647 for the establishment of a university of London. But none of the good work of parliament was allowed to stand at the Restoration, and the revenues appropriated to education went back to the prebendaries whom Archbishop Cranmer wished to turn out of the hive as drones 100 years before. The master of Durham grammar school alone, on an express letter from the king, was allowed to receive an augmentation of £20 a year.

A more permanent result of the abolition of bishops and chapters and their licensing powers was the immense development given to private schools all over the country, and not least in London. Among them, John Farnaby, a royalist, who had been employed to produce a revised Lilly's grammar in anticipation of Kennedy's *Latin Primer* of two centuries later, was the most famous and successful at the time; and John

[1] Nicholas Udal (*q.v.*) was master in 1555–1556.

Milton, though he was perhaps rather a private tutor than a schoolmaster, is the most famous now. Another of them, Charles Hoole, royalist and ex-master of Rotherham, who taught first close to Milton in Aldersgate Street and then in Tokenhouse Garden in Lothbury, produced a most novel and useful school book in his *New Discovery of the Old Art of Teaching School*, written in 1637 and published "after 14 years' diligent trial in practice in London" in 1660. There is no more illuminating work for demonstrating the absurdity of the notion that thought and theorizing were not brought to bear on education in those days. Milton's *Tractate on Education* (1643) is but a series of vague generalities compared with Hoole's book, and is chiefly noticeable for its denunciation, not of education being wholly classical, which is assumed as a matter of course, but of the absurd method which devoted ten years to not learning a smattering of Latin when Italian or French were learnt in a year. But Milton's own idea of cramming the unfortunate boys with Varro and Columella, with agriculture and fishing, tactics and strategics in Greek and Latin authors, so that the pupils might learn things instead of words, was as visionary a one as could be conceived.

The Restoration parliament not only cut off the supply of new schools and new endowments, but by the Act of Uniformity in 1662 and the Five Mile Act in 1665, imposing prohibitory penalties on all teaching in public or private schools, except by rigid Church of England men, did its best to stop all advance. The very ferocity of the attempt in the long run defeated itself. By a series of decisions of the courts all the schools but the endowed grammar schools were (in defiance, it must be admitted, of the law and historical right) freed from the control of the bishops, and even some grammar schools. Thus in Bates's case, 1670, it was held that where a master was put in by lay patrons he could not be turned out for teaching without the licence of the ordinary, but only censured, and that the statutory penalty was a bar to proceedings in the ecclesiastical courts. Next year in Cox's case it was settled that the bishop's licence was only required in grammar schools. Private schools nominally to teach writing, arithmetic, French, geography and navigation were outside ecclesiastical cognizance and gradually monopolized the education of the middle classes. Singleton, expelled from the headmastership of Eton at the Restoration, is said to have had 300 boys in a school in St Mary Axe. Foubert, banished from France for Protestantism, had an academy in the Haymarket under royal patronage. No dissenter, however, could be a member of a governing body or master of an endowed school, and if a dissenter went as a scholar he had to go to church and learn the church catechism. The church was therefore left in sole control of the endowed schools, with the result that at the end of the 18th century the schools were in a more decrepit condition than they were at any time in their long history. Only those which had great possessions and attracted the aristocracy flourished.

The post-Restoration period is distinguished, however, by one great innovation, the development of girls' schools. There were girls' schools at Hackney and at Chelsea, at Oxford and at Bicester, boarding-schools where "young gentlewomen learnt to play, dance and sing," and where needlework was usually taught. In 1673 Mrs Makin, who had a ladies' school at Tottenham High Cross, and had been governess to the Princess Elizabeth, published an "Essay to Revive the Antient Education of Gentlewomen," dedicated to the princess, afterwards queen, Mary. She advocates the education of girls in the same subjects as men, including Latin, though not by learning Lily's grammar by heart, but by learning grammar in English.

In the 18th century, with the progress of the means of communication, a few great schools, of which Westminster, Eton, Winchester, Harrow were the greatest, throve at the expense of the country grammar schools to which the local nobility and gentry used to resort. They were conducted, however, like private schools—the town boys at Westminster, the dames' houses at Eton, the Commoners' houses at Winchester, being in fact private ventures. The process was imitated at Harrow from 1725, and Rugby from 1765, which emulated and sometimes surpassed the three old schools: while Charterhouse and Shrewsbury (which in the latter days of Elizabeth had been one of the largest schools in the country) also developed on the same lines. But there was little change even in their matter or method. In those schools in which French was taught and English poetry and prose were cultivated it was in a sort of amateur way and as a by-study. The serious work of scholarship was still confined to classics, though they were made the medium of excursions into history, geography and political science. The grammar schools in the country towns, with on the whole inferior teachers, clung more closely to the ancient ways. As the growth of commerce and manufactures brought into the ranks of the local aristocracy men mostly dissenters, the grammar schools, which refused to admit them either as governors or scholars, and which despised, if they did not, as they often did, wholly reject modern languages and modern subjects, were relegated to the free boys, who went there not for love of learning but because learning was free. Where some enterprising man got together a boarding-school his "young gentlemen," who paid relatively high fees, were carefully secluded even in work, still more in play, from the common herd of free boys.

Never probably since the 9th century was the condition of the public schools of England worse than in the years 1750 to 1840. In the *Victoria County Histories*, in Carlisle's *Endowed Grammar Schools*, in the reports of Lord Brougham's Commission of Inquiry concerning Charities (1818-1837), it may be read in the case of county after county and school after school how the grammar schools, where they still struggled to preserve a semblance of higher education, were often taught by the nearest vicar or curate, and were reduced to ten or even to no boys. Thus at Stamford in 1729 there were five boys; at Birmingham in 1734 none; at Moulton in 1744 none; at Wainfleet in 1753 none; at Oundle in 1762 one entry, in 1779 four in the school, in 1785 none. At Repton between 1779 and 1800 fifteen boys were admitted; at Abingdon from 1792 to 1803 there were from three to ten boys; at Derby in 1826 four boys; at Chesterfield in 1827 four boys, and from 1832 to 1836 one boy constituted the whole school. Often for half a century no more than half a dozen boys had been known to attend the school; sometimes this was the case for a century, while a large proportion of the schools had been definitely converted into elementary schools, and bad ones at that. Great, if partial, improvement followed after the publication of the reports of Lord Brougham's commission and the suits in Chancery and private acts of parliament for the restitution of endowments of schools which followed them. But the Public Schools Commission Report of 1863 and the Schools Inquiry Report of 1868 revealed still a deplorable state of things. This has largely been remedied by the removal of religious disabilities, the introduction of the principle of representative government in the governing bodies of schools, and the widening of the curriculum through special commissions with drastic powers, in the case of the great public schools under the Public Schools Commission, and in the case of the lesser public schools by the Endowed Schools Commissioners and the Charity Commissioners under the Endowed Schools Act 1869, and the carving of endowed grammar or high schools for girls out of the old schools for boys.

It is satisfactory to end this review of the history of schools with the conclusion that however much might still require to be done, the conditions in 1910 showed a complete alteration. English schools of all grades had never been so full of pupils, so well equipped with buildings and appliances, or staffed with such devoted and active bands of teachers.

Elementary Schools.—Elementary teaching prevailed in medieval England to an infinitely wider extent than has been commonly supposed. It was at first the duty of every parish priest. Its origin has been credited, even as lately as 1908 (Foster Watson, *English Grammar Schools to 1660*), to a decree of Theodulf, bishop of Orleans in France, in 787, and to a law

of King Ethelbert in England in 994 (De Montmorency, *State Intervention in English Education*, 1902): "mass priests ought always to have in their houses a school of disciples, and if any good man desires to commit his little ones to them for instruction they ought gladly to receive and kindly teach them." These decrees were, in fact, merely re-issues of the 5th canon of the 6th council of Constantinople: "Let priests throughout the towns and villages have schools, and if any of the faithful wish to commend their little ones to them to learn their letters, let them not refuse to receive them, exacting however no price nor taking anything from them, except what the parents voluntarily offer," a phrase repeated again and again in the foundation documents of free schools, grammar or other, to the middle of the 18th century. The mass priests, however, neglected their duty. In 1295, John of Pontissera, bishop of Winchester, tried to recall those of his diocese to it by a synodal statute: "Let rectors, vicars and parish priests see that the sons of their parishioners know the Lord's Prayer, Creed and Salutation of the Virgin . . . and the parents should be induced to let their boys, when they know how to read the psalter, learn singing also." It may be observed that now the rectors are not required to teach boys themselves. but to see them taught. The duty of the parson had in fact been devolved on the clerk. In a decretal of Gregory IX., *c.* 1234, every parish priest was ordered to have a clerk to sing with him, read the epistle and lesson, and be able to keep school and warn the parishioners to send their sons to the church to learn the faith, whom he is to teach with all chastity (Decret. lib. iii., tit. i., c. iii.). This seems to be only an amplification of Leo IV., *c.* 850, *omnis presbyter clericum habeat scholarem qui epistolam*, &c. Many parish clerks duly did their duty in teaching. So we find in 1481 at St Nicholas, Bristol, "The clerks ought not to take no boke oute of the quere for childeryne to lerne in with owte licence of the procurators," *i.e.* the churchwardens. At Faversham in 1506, "Item the said clarkis or one of theym as moche as in theym is shall endeavour theymself to teche children to rede and synge . . . as of olde tyme hath be accustomed." But probably most neglected their duty, as we find in many places other provision for elementary instruction; sometimes by reading and writing schools, more often, as already stated, by the song schools. At Barnack, Northamptonshire, the rector had licence in 1359 from the bishop of Lincoln to establish a master to teach reading, song and grammar. A reading school is mentioned at Howden, Yorkshire, in 1394, but it had then become united to the song school, and a chaplain, *i.e.* a priest, was appointed to it (*scholas tam lectuales quam cantuales*). In 1401 William Coke "alias clerk," probably because he was the parish clerk, not apparently in orders, was appointed to this joint song and reading school, a reservation, however, being made to one John Lowyke of the right to teach a reading school only (*studium lectuale*) for 18 boys. Next year, 1402, William Lowyke, probably John's son, was appointed to the reading and song school, an appointment repeated in 1412, while another person was appointed to the two schools in 1426. But in 1456 the reading school was combined with the grammar school under John Armandson, B.A. At Northallerton in 1426 the reading and song school are combined; the grammar school separate; but in 1440 reading, grammar and song schools were combined in the hands of John Leuesham, chaplain.

We owe our knowledge of these schools to the casual preservation in the British Museum of a letter book of the prior of Durham cathedral monastery, who was the "Ordinary" for the Yorkshire possessions of St Cuthbert, among which were the two places named. But they can hardly have been as exceptional in fact as they are in records. Separate reading schools must have existed elsewhere. Nor can the two Yorkshire colleges of Acaster and Rotherham, founded about 1472 and 1484, be as unique as they appear to be in having, besides a grammar and song school, a writing school. At Acaster a "third [master] to teche to write and all such thing as belonged to scrivener craft," and at Rotherham "because that country produces many youths endowed with the light and acuteness of ability, but all do not wish to attain the dignity and height of the priesthood, that they may be the better fitted for the mechanical arts and other worldly concerns, a third fellow, knowing and skilled in the art of writing and accounts," was added to the grammar and song masters (A. F. Leach, *Early Yorkshire Schools*, ii. 62, 84-87, 89, 110, 151). At Aldwinkle, Northants, the chantry priest was by foundation ordinance of 1489 to teach six of the poorest boys spelling and reading (*syllabilacione et lectura*). At Barking, in Essex, a chantry priest was founded in 1392 to "teache the childerne to wrytte and read," while the chantry priest at Bromyard, Herefordshire, was founded in 1394 to "brynge upe the childerne borne in the parish in reading, wrytynge and gramar." At Normanton, Yorkshire, the chantry of Our Lady was "for good educatcion as well in grammar as wrytinge," and at Burgh under Stanmore, Westmorland, the stipendiary priest was "to kepe a Free Grammar Schole and also to teche scholers to wryte." At Kingsley, Staffordshire, the chantry priest was also "to kepe scole and teche pore men's children of the said parishe grammar and to rede and singe." At Montgomery, on the other hand, it is made matter of complaint, in 1548, that the fraternity of Our Lady hired a "prest or lerned man to kepe scole" for thirty years past, but he now "taught but yonge begynners onelye to write and syng and to reade soo far as the accidens rules and noo grammer." At Farthinghoe, Northants, was apparently a purely elementary school, the chantry priest being directed by foundation in 1443 by a London mercer to teach the little ones (*parvulos*), later translated *petits*, freely. At Ipswich in 1477 the litle ones called Apeseyes (ABC's) and Songe were not under the grammar schoolmaster but an independent teacher. The most elementary school was the ABC school. At Christ's College, Brecon, founded, or refounded, by Henry VIII., besides a grammar master at £13, 6s. 8d. a year and an usher at half that, there was a chaplain to sing mass and "to teache the yonge children resorting to the said scoole there ABC" at the same pay as the usher. This seems to have been really a song school. At the college of Glasney, Cornwall, founded, or refounded, in 1264, the bell-ringer had £2 a year "as well for teachyng of pore mens children their ABC as for ringing"; while at Launceston the grammar master had £16 a year, and 13s. 4d. was "yerly distributed to an aged man chosen by the mayre to teache younge chylderne the ABC." At Saffron Walden, Essex, in 1423, it was settled after legal proceedings, that the chantry priests at the parish church might teach children the alphabet and graces, but not further. Anything more was the privilege of the grammar schoolmaster.

In 1542 an injunction of Bonner as bishop of London shows an attempt on Henry VIII.'s part to recall the clergy to the duty of teaching "every of you that be parsons, vicars, curates and also chantry priests and stipendiaries to . . . teach and bring up in learning the best ye can all such children of your parishioners as shall come to you, or at the least teach them to read English." The advisers of Edward VI. at first appear to have contemplated a similar development by an injunction in 1547 that "all chauntry priests shall exercise themselves in teaching youth to read and write and bring them up in good manners and other virtuous exercises." But the Chantries Act next year swept all the chantries away by Easter 1548; and while professing to apply their endowments to education, struck a deadly blow at elementary education by omitting any saving clause for elementary schools, whether song, reading, writing or ABC schools. The first duty of a song or of a reading school being "to teach a child to help a priest to sing mass," they were regarded as superstitious; and the rest were presumably looked on as tainted with the same poison. So of all the hundreds of song schools in the country, only two, outside the cathedrals and the university colleges and those of Winchester and Eton, Westminster and Windsor colleges, survived. These were the song school of the archdeacon Magnus foundation of a grammar school and song school at Newark in 1532; and that forming part of the grammar school in St John's Hospital, Coventry, established by John Hales under royal licence in 1545, though not legally settled till 1572. The gap left by these schools took long to fill, and probably the ignorance of the masses and of the lower middle classes in Elizabethan and Jacobean times was greater than before the Reformation. In the big towns, like London, during the reign of Elizabeth, voluntary rates, or application of the rates, were made to partly fill the gap. Christ's Hospital in 1553 with its 280 foundling children had, besides its grammar schoolmaster and usher, "a teacher of pricksonge, a teacher to wrighte and two schoole masters for the Petties ABC." But in Mary's reign, Grafton the printer was "clapt in the Flete for two daies because he suffered the children to learne the Englishe prymer" for "the Lattin abseies." In Southwark, while St Saviour's parish set up a grammar school in 1559, St Olave's parish in 1560 directed the churchwardens to ask the inhabitants "watte they will gyve

towards the settyng up of a free skolle," which was started next year to "teche the cheldarne to write and rede and cast accompthe." At St Lawrence Jewry in 1568 a school was kept over the vestry. At St Ethelwyn's in 1589 Smythe "the schoolmaster" paid 10s. "for kepinge scole in the belfry." At Stevenage in 1561–1562 the old Brotherhood house and some endowment was bought by subscription for a school "to teach scholars called pettits to read English, write, cast accounts and learn the accidence."

Some of these and other like schools were rather junior or preparatory departments of the grammar school than independent elementary schools. The foundation of purely elementary schools was rare in Elizabeth's reign. In Warwickshire, Alcester in 1582, Henley-in-Arden in 1586, in-Salop, Onibury in 1593, in Essex, Littlebury in 1595, appear to be pretty well all those known. Those mentioned in Mr de Montmorency's "State Intervention," taken from the *Digest of Schools* of 1842, are mostly of charities afterwards applied to elementary education, not founded for the purpose. In most counties the earliest elementary endowed schools are of James I.'s reign, such as Appleton, Berkshire, in 1604, Northiam, Sussex, in 1614, Sir William Borlase's school at Great Marlow in Buckinghamshire (now a secondary school) in 1624. A great impetus was given to them by the Commonwealth, and many were founded by state action, only to be destroyed at the Restoration. Conspicuous among Commonwealth schools was that of Polesworth, Warwickshire, founded by deed of 10th March 1655, the first endowed school which provided for girls as well as boys, the boys under a master to learn to write and read English, the girls in a separate schoolroom under a mistress to learn to read and work with the needle. In Wales Thomas Gouge, an ejected minister, in 1672, started voluntary schools.

After 1670 there was a large increase in elementary school foundations. The reign of Queen Anne saw a new development take place of the charity schools. The movement was started in 1698 by the Society for Promoting Christian Knowledge, and taken up by the bishops with an organized propaganda for getting subscriptions. The schools founded were commonly called blue or blue-coat schools, though there were red maids', green and even yellow schools. Many were boarding-schools on the model of Christ's Hospital, where slum children, girls and boys, in separate schools of course, were taken in and prepared for service and work. But there were many day schools. All, however, provided a uniform of the Christ's Hospital type. They were chiefly in the large towns, and still comprise some of the richest endowed elementary schools. Over 100 of them were established between 1698 and 1715 in London and Westminster, and in 1729 there were 1658 schools with 34,000 children. In that year the curious development of "circulating schools" was started in Wales, the masters residing for a certain time in one district and then passing on to another. (This was a device known in medieval times, and notable examples of it were Sir Robert Hitcham's rotatory school for Earl's Colne and two other places in Essex during the Commonwealth.) Griffith Jones was the principal promoter, and at his death in 1761 there were 10,000 children in the schools. In 1801 the Lancasterian system of schools, not of a few boys or girls, but of several hundreds taught in classes of 60 or 80, chiefly by pupil teachers, was inaugurated in the Borough Road by Joseph Lancaster. Out of it grew the British and Foreign School Society. This was undenominational. In 1811 the National Society adopted the similar, but rival, Bell or "Madras system" for Church of England teaching. The effect of these two organizations was to cover the country with elementary schools, partly endowed, chiefly supported by voluntary contributions and low fees. These completed the system, if system it could be called, of sporadic elementary schools. After the Reform Act of 1832 the state stepped in with grants and has gradually made elementary education universal. (A. F. L.)

See further under EDUCATION.

SCHOONER, a vessel rigged with fore and aft sails, properly with two masts, but now often with three, four and sometimes more masts; they are much used in the coasting trade, and require a smaller crew in proportion to their size than square-rigged vessels (see RIGGING and SHIP). According to the story, which is probably true, the name arose from a chance spectator's exclamation "there she scoons," *i.e.* glides, slips free, at the launch of the first vessel of this type at Gloucester, Massachusetts, in 1713, her builder being one Andrew Robinson. The spelling "schooner" is due to a supposed derivation from the Dutch *schooner*, but that and the other European equivalents, Ger. *Schoner*, Dan. *skonnert*, Span. and Portuguese *escuna*, &c., are all from English. "To scoon," according to Skeat, is a Scottish (Clydesdale) dialect word, meaning to skip over water like a flat stone, and is ultimately connected with the root, implying quick motion, seen in shoot, scud, &c. In American colloquial usage "schooner" is applied to the covered prairie-wagons used by the emigrants moving westward before the construction of railways, and to a tall, narrow, lager-beer glass.

SCHOPENHAUER, ARTHUR (1788–1860), German philosopher, was born in Danzig on the 22nd of February 1788. His parents belonged to the mercantile aristocracy · the bankers and traders of Danzig. His father, Heinrich Floris Schopenhauer, the youngest of a family to which the mother had brought the germs of mental malady, was a man of strong will and originality, and so proud of the independence of his native town that when Danzig in 1793 surrendered to the Prussians he and his whole establishment withdrew to Hamburg. At the age of forty he married Johanna Henrietta Trosiener, then only twenty, but the marriage owing to difference of temperament was unhappy. Their two children, Arthur and Adele (born 1796), bore the penalty of their parents' incompatibilities. They were burdened by an abnormal urgency of desire and capacity for suffering, which no doubt took different phases in the man and the woman, but linked them together in a common susceptibility to ideal pain.[1]

In the summer of 1787, a year after the marriage, the elder Schopenhauer, whom commercial experiences had made a cosmopolitan in heart, took his wife on a tour to western Europe. It had been his plan that the expected child should see the light in England, but the intention was frustrated by the state of his wife's health. The name Arthur was chosen because it remains the same in English, French and German.

During the twelve years which followed the removal of the family to Hamburg (1793–1805) the Schopenhauers made frequent excursions. From 1797 to 1799 Arthur was a boarder with M. Gregoire, a merchant of Havre, and friend of the Hamburg house, with whose son Anthime he formed a fast friendship. Returning to Hamburg, for the next four years he had but indifferent training. When he reached the age of fifteen the scholarly and literary instincts began to awaken. But his father, steeped in the spirit of commerce, was unwilling that a son of his should worship knowledge and truth. Accordingly he offered his son the choice between the classical school and an excursion to England. A boy of fifteen could scarcely hesitate. In 1803 the Schopenhauers and their son set out on a lengthened tour, of which Johanna has given an account, to Holland, England, France and Austria. Six months were spent in England. He found English ways dull and precise and the religious observances exacting; and his mother had—not for the last time—to talk seriously with him on his unsocial and wilful character. At Hamburg in the beginning of 1805 he was placed in a merchant's office. He had only been there for three months when his father, who had shown

[1] Johanna Schopenhauer (1766–1838) was in her day an author of some reputation. Besides editing the memoirs of Fernow, she published *Notes on Travels in England, Scotland and Southern France* (1813–1817); *Johann van Eyck and his Successors* (1823); three romances, *Gabriele* (1819–1820), *Die Tante* (1823) and *Sidonia* (1828), besides some shorter tales. These novels teach the moral of renunciation (*Entsagung*). Her daughter Adele (1796–1849) seems to have had a brave, tender and unsatisfied heart, and lavished on her brother an affection he sorely tried. She also was an authoress, publishing in 1844 a volume of *Haus-, Wald-, und Feld-Märchen*, full of quaint poetical conceits, and in 1845 *Anna*, a novel, in two vols. See Laura Frost, *Johanna Schopenhauer: ein Frauenleben* (1905).

symptoms of mental alienation, fell or threw himself into the canal. After his death the young widow (still under forty), leaving Arthur at Hamburg, proceeded with her daughter Adele in the middle of 1806 to Weimar, where she arrived only a fortnight before the tribulation which followed the victory of Napoleon at Jena. At Weimar her talents, hitherto held in check, found an atmosphere to stimulate and foster them; her aesthetic and literary tastes formed themselves under the influence of Goethe and his circle, and her little salon gained a certain celebrity. Arthur, meanwhile, became more and more restless, and his mother allowed him to leave his employment. He began his education again at Gotha, but a satire on one of the teachers led to his dismissal. He was then placed with the Greek scholar Franz Passow, who superintended his classical studies. This time he made so much progress that in two years he read Greek and Latin with fluency and interest.

In 1809 his mother handed over to him (aged twenty-one) the third part of the paternal estate, which gave him an income of £150, and in October 1809 he entered the university of Göttingen. The direction of his philosophical reading was fixed by the advice of G. E. Schulze to study, especially, Plato and Kant. For the former he soon found himself full of reverence, and from the latter he acquired the standpoint of modern philosophy. The names of "Plato the divine and the marvellous Kant" are conjunctly invoked at the beginning of his earliest work. But even at this stage of his career the pessimism of his later writings began to manifest itself, together with a susceptibility to morbid fears which led him to keep loaded weapons always at his bedside. He was a man of few acquaintances, amongst the few being Bunsen, the subsequent scholar-diplomatist, and Bunsen's pupil, W. B. Astor, the son of Washington Irving's millionaire hero. Even then he found his trustiest mate in a poodle, and its bearskin was an institution in his lodging. Yet, precisely because he met the world so seldom in easy dialogue, he was unnecessarily dogmatic in controversy; and many a bottle of wine went to pay for lost wagers. But he had made up his mind to be not an actor but an onlooker and critic in the battle of life; and when Wieland, whom he met on one of his excursions, suggested doubts as to the wisdom of his choice, Schopenhauer replied, "Life is a ticklish business; I have resolved to spend it in reflecting upon it."

After two years at Göttingen he took two years at Berlin. Here also he dipped into divers stores of learning, notably classics under Wolf. In philosophy he heard Fichte and Schleiermacher. Between 1811 and 1813 the lectures of Fichte (subsequently published from his notes in his *Nachgelassene Werke*) dealt with what he called the "facts of consciousness" and the "theory of science," and struggled to present his final conception of philosophy. These lectures Schopenhauer attended—at first, it is allowed, with interest, but afterwards with a spirit of opposition which is said to have degenerated into contempt, and which in after years never permitted him to refer to Fichte without contumely. Yet the words Schopenhauer then listened to, often with baffled curiosity, certainly influenced his speculation.

In Berlin Schopenhauer was lonely and unhappy. One of his interests was to visit the hospital La Charité and study the evidence it afforded of the interdependence of the moral and the physical in man. In the early days of 1813 sympathy with the national enthusiasm against the French carried him so far as to buy a set of arms; but he stopped short of volunteering for active service, reflecting that Napoleon gave after all only concentrated and untrammelled utterance to that self-assertion and lust for more life which weaker mortals feel but must perforce disguise. Leaving the nation and its statesmen to fight out their freedom, he hurried away to Weimar, and thence to the quiet Thuringian town of Rudolstadt, where in the inn "Zum Ritter," out of sight of soldier and sound of drum, he wrote, helped by books from the Weimar library, his essay for the degree of doctor in philosophy. On the 2nd of October 1813 he received his diploma from Jena; and in the same year from the press at Rudolstadt there was published—without winning notice or readers—his first book, *Über die vierfache Wurzel des Satzes vom zureichenden Grunde*, trans. in Bohn's Philological Library (1889).

In November 1813 Schopenhauer returned to Weimar, and for a few months boarded with his mother. But the strain of daily association was too much for their antagonistic natures. His splenetic temper and her volatility culminated in an open rupture in May 1814. From that time till her death in 1838 Schopenhauer never saw his mother again. During these few months at Weimar, however, he made some acquaintances destined to influence the subsequent course of his thought. Conversations with the Orientalist F. Mayer directed his studies to the philosophical speculations of ancient India. In 1808 Friedrich Schlegel had in his *Language and Wisdom of the Old Hindus* brought Brahmanical philosophy within the range of European literature. Still more instructive for Schopenhauer was the imperfect and obscure Latin translation of the *Upanishads* which in 1801–1802 Anquetil Duperron had published from a Persian version of the Sanskrit original. Another friendship of the same period had more palpable immediate effect, but not so permanent. This was with Goethe, who succeeded in securing his interest for those investigations on colours on which he was himself engaged. Schopenhauer took up the subject in earnest, and the result of his reflexions (and a few elementary observations) soon after appeared (Easter 1816) as a monograph, *Über das Sehen und die Farben* (ed. Leipzig, 1854). The essay, which must be treated as an episode or digression from the direct path of Schopenhauer's development, due to the potent force of Goethe, was written at Dresden, to which he had transferred his abode after the rupture with his mother. It had been sent in MS. to Goethe in the autumn of 1815, who, finding in it a transformation rather than an expansion of his own ideas, inclined to regard the author as an opponent rather than an adherent.

Essay on sight and colours.

The pamphlet begins by re-stating with reference to sight the general theory that perception of an objective world rests upon an instinctive causal postulation, which even when it misleads still remains to haunt us (instead of being, like errors of reason, open to extirpation by evidence), and proceeds to deal with physiological colour, *i.e.* with colours as felt (not perceived) modifications of the action of the retina. First of all, the distinction of white and black, with their mean point in grey, is referred to the activity or inactivity of the total retina in the graduated presence or absence of full light. Further, the eye is endowed with polarity, by which its activity is divided into two parts qualitatively distinct. It is this circumstance which gives rise to the phenomenon of colour. All colours are complementary, or go in pairs; each pair makes up the whole activity of the retina, and so is equivalent to white; and the two partial activities are so connected that when the first is exhausted the other spontaneously succeeds. Such pairs of colour may be regarded as infinite in number; but there are three pairs which stand out prominently, and admit of easy expression for the ratio in which each contributes to the total action. These are red and green (each $\frac{1}{2}$), orange and blue (2 : 1), and yellow and violet (3 : 1).[1] This theory of complementary colours as due to the polarity in the qualitative action of the retina is followed by some criticism of Newton and the seven colours, by an attempt to explain some facts noted by Goethe, and by some reference to the external stimuli which cause colour.

The grand interest of his life at Dresden was the composition of a work which should give expression in all its aspects to the idea of man's nature and destiny which had been gradually forming within him. Without cutting himself altogether either from social pleasures or from art, he read and took notes with regularity. More and more he learned from Cabanis and Helvetius to see in the will and the passions the determinants of intellectual life, and in the character and the temper the source of theories and beliefs. The conviction was borne in upon him that scientific explanation could never do more than systematize and classify the mass of appearances which to our habit-blinded eyes seem to be the reality. To get at this reality and thus to reach a standpoint higher than that of aetiology was the problem of his as of all philosophy. It is only by such a tower of speculation that an

[1] In this doctrine, so far as the facts go, Schopenhauer is indebted to a paper by R. Waring Darwin in vol. lxxvi. of the *Transactions of the Philosophical Society*.

escape is possible from the spectre of materialism, theoretical and practical; and so, says Schopenhauer, "the just and good must all have this creed: I believe in a metaphysic." The mere reasonings of theoretical science leave no room for art, and practical prudence usurps the place of morality. The higher life of aesthetic and ethical activity—the beautiful and the good—can only be based upon an intuition which penetrates the heart of reality. Towards the spring of 1818 the work was nearing its end, and Brockhaus of Leipzig had agreed to publish it and pay the author one ducat for every sheet of printed matter. But, as the press loitered, Schopenhauer, suspecting treachery, wrote so rudely and haughtily to the publisher that the latter broke off correspondence with his client. In the end of 1818, however, the book appeared (with the date 1819) as *Die Welt als Wille und Vorstellung*, in four books, with an appendix containing a criticism of the Kantian philosophy (Eng. trans. by R. B. Haldane and J. Kemp, 1883). Long before the work had come to the hands of the public Schopenhauer had rushed off to Italy. He stayed for a time in Venice, where Byron was then living; but the two did not meet. At Rome he visited the art galleries, the opera, the theatre, and gladly seized every chance of conversing in English with Englishmen. In March 1819 he went as far as Naples and Paestium. About this time the fortunes of his mother and sister and himself were threatened by the failure of the firm in Danzig. His sister accepted a compromise of 70%, but Schopenhauer angrily refused this, and eventually recovered 9400 thalers.

After some stay at Dresden, hesitating between fixing himself as university teacher at Göttingen, Heidelberg or Berlin, he finally chose the last-mentioned. He was, however, not a good lecturer, and his work soon came to an end. His failure he attributed to Hegelian intrigues. Thus, except for some attention to physiology, the first two years at Berlin were wasted. In May 1822 he set out by way of Switzerland for Italy. After spending the winter at Florence and Rome, he left in the spring of 1823 for Munich, where he stayed for nearly a year, the prey of illness and isolation. When at the end of this wretched time he left for Gastein, in May 1824, he had almost entirely lost the hearing of his right ear. Dresden, which he reached in August, no longer presented the same hospitable aspect as of old, and he was reluctantly drawn onwards to Berlin in May 1825.

The six years at Berlin were a dismal period in the life of Schopenhauer. In vain did he watch for any sign of recognition of his philosophic genius. Hegelianism reigned in the schools and in literature and basked in the sunshine of authority. Thus driven back upon himself, Schopenhauer fell into morbid meditations, and the world which he saw, if it was stripped naked of its disguises, lost its proportions in the distorting light. The sexual passion had a strong attraction for him at all times, and, according to his biographers, the notes he set down in English, when he was turned thirty, on marriage and kindred topics are unfit for publication. Yet in the loneliness of life at Berlin the idea of a wife as the comfort of gathering age sometimes rose before his mind—only to be driven away by cautious hesitations as to the capacity of his means, and by the shrinking from the loss of familiar liberties. He wrote nothing material. In 1828 he made inquiries about a chair at Heidelberg; and in 1830 he got a shortened Latin version of his physiological theory of colours inserted in the third volume of the *Scriptores ophthalmologici minores* (edited by Radius).

Another pathway to reputation was suggested by some remarks he saw in the seventh number of the *Foreign Review*, in an article on Damiron's *French Philosophy in the 19th Century*. With reference to some statements in the article on the importance of Kant, he sent in very fair English a letter to the writer, offering to translate Kant's principal works into English. He named his wages and enclosed a specimen of his work. His correspondent, Francis Haywood, made a counter-proposal which so disgusted Schopenhauer that he addressed his next letter to the publishers of the review. When they again referred him to Haywood, he applied to Thomas Campbell, then chairman of a company formed for buying up the copyright of meritorious but rejected works. Nothing came of this application.[1] A translation of selections from the works of Balthazar Gracian, which was published by Frauenstädt in 1862, seems to have been made about this time.[2]

In 1833 he settled finally at Frankfort, gloomily waiting for the recognition of his work, and terrified by fears of assassination and robbery. As the years passed he noted down every confirmation he found of his own opinions in the writings of others, and every instance in which his views appeared to be illustrated by new researches. Full of the conviction of his idea, he saw everything in the light of it, and gave each *aperçu* a place in his alphabetically arranged note-book. Everything he published in later life may be called a commentary, an excursus or a scholium to his main book; and many of them are decidedly of the nature of commonplace books or collectanea of notes. But along with the accumulation of his illustrative and corroborative materials grew the bitterness of heart which found its utterances neglected and other names the oracles of the reading world. The gathered ill-humour of many years, aggravated by the confident assurance of the Hegelians, found vent at length in the introduction to his next book, where Hegel's works are described as three-quarters utter absurdity and one-quarter mere paradox—a specimen of the language in which during his subsequent career he used to advert to his three predecessors Fichte, Schelling, but above all Hegel. This work, with its wild outcry against the philosophy of the professoriate, was entitled *Über den Willen in der Natur*, and was published in 1836 (revised and enlarged, 1854; Eng. trans., 1889).

In 1837 Schopenhauer sent to the committee entrusted with the execution of the proposed monument to Goethe at Frankfort a long and deliberate expression of his views, in general and particular, on the best mode of carrying out the design. But his fellow-citizens passed by the remarks of the mere writer of books. More weight was naturally attached to the opinion he had advocated in his early criticism of Kant as to the importance, if not the superiority, of the first edition of the *Kritik*; in the collected issue of Kant's works by Rosenkranz and Schubert in 1838 that edition was put as the substantive text, with supplementary exhibition of the differences of the second.

In 1841 he published under the title *Die beiden Grundprobleme der Ethik* two essays which he had sent in 1838–1839 in competition for prizes offered. The first was in answer to the question "Whether man's free will can be proved from self-consciousness," proposed by the Norwegian Academy of Sciences at Drontheim. His essay was awarded the prize, and the author elected a member of the society. But proportionate to his exultation in this first recognition of his merit was the depth of his mortification and the height of his indignation at the result of the second competition. He had sent to the Danish Academy at Copenhagen in 1839 an essay "On the Foundations of Morality" in answer to a vaguely worded subject of discussion to which they had invited candidates. His essay, though it was the only one in competition, was refused the prize on the grounds that he had failed to examine the chief problem (*i.e.* whether the basis of morality was to be sought in an intuitive idea of right), that his explanation was inadequate, and that he had been wanting in due respect to the *summi philosophi* of the age that was just passing. This last reason, while probably most effective with the judges, only stirred up more furiously the fury in Schopenhauer's breast, and his preface is one long fulmination against the ineptitudes and the charlatanry of his *bête noire*, Hegel.

In 1844 appeared the second edition of *The World as Will and Idea*, in two volumes. The first volume was a slightly altered reprint of the earlier issue; the second consisted of a series of chapters forming a commentary parallel to those into which the original work was now first divided. The longest of these new chapters deal with the primacy of the will, with death and with the metaphysics of sexual love. But, though only a small edition was struck off (500 copies of vol. i. and 750 of vol. ii.),

[1] It was not till 1841 that a translation of Kant's *Kritik* in English appeared.

[2] He also projected a translation of Hume's *Essays* and wrote a preface for it.

the report of sales which Brockhaus rendered in 1846 was unfavourable, and the price had afterwards to be reduced. Yet there were faint indications of coming fame, and the eagerness with which each new tribute from critic and admirer was welcomed is both touching and amusing. From 1843 onwards a jurist named F. Dorguth had trumpeted abroad Schopenhauer's name. In 1844 a letter from a Darmstadt lawyer, Joh. August Becker, asking for explanation of some difficulties, began an intimate correspondence which went on for some time (and which was published by Becker's son in 1883). But the chief evangelist (so Schopenhauer styled his literary followers as distinct from the apostles who published not) was Frauenstädt, who made his personal acquaintance in 1846. It was Frauenstädt who succeeded in finding a publisher for the *Parerga und Paralipomena*, which appeared at Berlin in 1851 (2 vols., pp. 465, 531; sel. trans. by J. B. Saunders, 1889; French by A. Dietrich, 1909). Yet for this bulky collection of essays, philosophical and others, Schopenhauer received as honorarium only ten free copies of the work. Soon afterwards, Dr E. O. Lindner, assistant editor of the *Vossische Zeitung*, began a series of Schopenhauerite articles. Amongst them may be reckoned a translation by Mrs Lindner of an article by John Oxenford which appeared in the *Westminster Review* for April 1853, entitled "Iconoclasm in German Philosophy," being an outline of Schopenhauer's system. In 1854 Frauenstädt's *Letters on the Schopenhauerean Philosophy* showed that the new doctrines were become a subject of discussion—a state of things made still more obvious by the university of Leipzig offering a prize for the best exposition and examination of the principles of Schopenhauer's system. Besides this, the response his ideas gave to popular needs and feelings was evinced by the numerous correspondents who sought his advice in their difficulties. And for the same reason new editions of his works were called for—a second edition of his degree dissertation in 1847, of his *Essay on Colours* and of *The Will in Nature* in 1854, a third edition of *The World as Will and Idea* in 1859, and in 1860 a second edition of *The Main Problems of Ethics*.

In 1854 Richard Wagner sent him a copy of the *Ring of the Nibelung*, with some words of thanks for a theory of music which had fallen in with his own conceptions. Three years later he received a visit from his old college friend Bunsen, who was then staying in Heidelberg. On his seventieth birthday congratulations flowed in from many quarters. In April 1860 he began to be affected by occasional difficulty in breathing and by palpitation of the heart. Another attack came on in autumn (9th September), and again a week later. On the evening of the 18th his friend and subsequent biographer, Dr Gwinner, sat with him and conversed. On the morning of the 21st September he rose and sat down alone to breakfast; shortly afterwards his doctor called and found him dead in his chair. By his will, made in 1852, with a codicil dated February 1859, his property, with the exception of some small bequests, was devised to the above-mentioned institution at Berlin. Gwinner was named executor, and Frauenstädt was entrusted with the care of his manuscripts and other literary remains.

It is often said that a philosophic system cannot be rightly understood without reference to the character and circumstances of the philosopher. The remark finds ample application in the case of Schopenhauer. The conditions of his training, which brought him in contact with the realities of life before he learned the phrases of scholastic language, give to his words the stamp of self-seen truth and the clearness of original conviction. They explain at the same time the naïveté which set a high price on the products his own energies had turned out, and could not see that what was so original to himself might seem less unique to other judges. Preoccupied with his own ideas, he chafed under the indifference of thinkers who had grown *blasé* in speculation and fancied himself persecuted by a conspiracy of professors of philosophy. It is not so easy to demonstrate the connexion between a man's life and doctrine. But it is at least plain that in the case of any philosopher, what makes him such is the faculty he has, more than other men, to get a clear idea of what he himself is and does. More than others he leads a second life in the spirit or intellect alongside of his life in the flesh—the life of knowledge beside the life of will. It is inevitable that he should be especially struck by the points in which the sensible and temporal life comes in conflict with the intellectual and eternal. It was thus that Schopenhauer by his own experience saw in the primacy of the will the fundamental fact of his philosophy, and found in the engrossing interests of the selfish ἔρως the perennial hindrances of the higher life. For his absolute individualism, which recognizes in the state, the church, the family only so many superficial and incidental provisions of human craft, the means of relief was absorption in the intellectual and purely ideal aims which prepare the way for the cessation of temporal individuality altogether. But theory is one thing and practice another; and he will often lay most stress on the theory who is most conscious of defects in the practice. It need not, therefore, surprise us that the man who formulated the sum of virtue in justice and benevolence was unable to be just to his own kinsfolk and reserved his compassion largely for the brutes, and that the delineator of asceticism was more than moderately sensible of the comforts and enjoyments of life.

Philosophy from Kant to Schopenhauer.

The philosophy of Schopenhauer, like almost every system of the 19th century, can hardly be understood without reference to the ideas of Kant. Anterior to Kant the gradual advance of idealism had been the most conspicuous feature in philosophic speculation. That the direct objects of knowledge, the realities of experience, were after all only our ideas or perceptions was the lesson of every thinker from Descartes to Hume. And this doctrine was generally understood to mean that human thought, limited as it was by its own weakness and acquired habits, could hardly hope to cope successfully with the problem of apprehending the real things. The idealist position Kant seemed at first sight to retain with an even stronger force than ever. But it is darkest just before the dawn; and Kant, the Copernicus of philosophy, had really altered the aspects of the doctrine of ideas. It was his purpose to show that the forms of thought (which he sought to isolate from the peculiarities incident to the organic body) were not merely customary means for licking into convenient shape the data of perception, but entered as underlying elements into the constitution of objects, making experience possible and determining the fundamental structure of nature. In other words, the forms of knowledge were the main factor in making objects. By Kant, however, these forms are generally treated psychologically as the action of the several faculties of a mind. Behind thinking there is the thinker. But in his successors, from Fichte to Hegel, this axiom of the plain man is set aside as antiquated. Thought or conception without a subject-agent appears as the principle—thought or thinking in its universality without any individual substrata in which it is embodied: τὸ νοεῖν or νόησις is to be substituted for νοῦς. This is the step of advance which is required alike by Fichte when he asks his reader to rise from the empirical ego to the ego which is subject-object (*i.e.* neither and both), and by Hegel when he tries to substitute the *Begriff* or notion for the *Vorstellung* or pictorial conception. As spiritism asks us to accept such suspension of ordinary mechanics as permits human bodies to float through the air and part without injury to their members, so the new philosophy of Kant's immediate successors requires from the postulant for initiation willingness to reverse his customary beliefs in quasi-material subjects of thought.

But, besides removing the psychological slag which clung to Kant's ideas from their matrix and presenting reason as the active principle in the formation of a universe, his successors carried out with far more detail, and far more enthusiasm and historical scope, his principle that in reason lay the a priori or the anticipation of the world, moral and physical. Not content with the barren assertion that the understanding makes nature, and that we can construct science only on the hypothesis that there is reason in the world, they proceeded to show how the thing was actually done. But to do so they had first to brush away a stone of stumbling which Kant had left in the way. Thus was the thing as it is by itself and apart from our knowledge of it—the something which we know, when and as we know it not. This somewhat is what Kant calls a limit-concept. It marks only that we feel our knowledge to be inadequate, and for the reason that there may be another species of sensation than ours, that other beings may not be tied by the special laws of our constitution, and may apprehend, at Plato says, by the soul itself apart from the senses. But this limitation, say the successors of Kant, rests upon a misconception. The sense of inadequacy is only a condition of growing knowledge in a being subject to the laws of space and time; and the very feeling is a proof of its implicit removal. Look at reason not in its single temporal manifestations but in its eternal operation, and then this universal thought, which may be called God, as the sense-conditioned reason is called man, becomes the very breath and structure

of the world. Thus in the true idea of things there is no irreducible residuum of matter: mind is the Alpha and Omega, at once the initial postulate and the final truth of reality.

In various ways a reaction arose against this absorption of everything in reason. In Fichte himself the source of being is primeval activity, the groundless and incomprehensible deed-action (*That-Handlung*) of the absolute ego. The innermost character of that ego is an infinitu le in act and effort. "The will is the living principle of reason," he says again. "In the last resort," says Schelling (1809), in his *Inquiries into the Nature of Human Freedom*, "there is no other being but will. *Wollen ist Ursein* (will is primal being); and to this alone apply the predicates fathomless, eternal, independent of time, self-affirming." It is unnecessary to multiply instances to prove that idealism was never without a protest that there is a heart of existence, life, will, action, which is presupposed by all knowledge and is not itself amenable to explanation. We may, if we like, call this element, which is assumed as the basis of all scientific method, irrational—will instead of reason, feeling rather than knowledge.

It is under the banner of this protest against rationalizing idealism that Schopenhauer advances. But what marks out his armament is its pronounced realism. He fights with the weapons of physical doctrine and on the basis of the material earth. He knows no reason but the human, no intelligence save what is exhibited by the animals. He knows that both animals and men have come into existence within assignable limits of time, and that there was an anterior age when no eye or ear gathered the life of the universe into perceptions. Knowledge, therefore, with its vehicle, the intellect, is dependent upon the existence of certain nerve-organs located in an animal system; and its function is originally only to present an image of the interconnexions of the manifestations external to the individual organism, and so to give to the individual in a partial and reflected form that feeling with other things, or innate sympathy, which it loses as organization becomes more complex and characteristic. Knowledge or intellect, therefore, is only the surrogate of that more intimate unity of feeling or will which is the underlying reality—the principle of all existence, the essence of all manifestations, inorganic and organic. And the perfection of reason is attained when man has transcended those limits of individuation in which his knowledge at first presents him to himself, when by art he has risen from single objects to universal types, and by suffering and sacrifice has penetrated to that innermost sanctuary where the euthanasia of consciousness is reached—the blessedness of eternal repose.

Schopenhauer and Herbert Spencer.

In substantials the theory of Schopenhauer may be compared with a more prosaic statement of Herbert Spencer (modernizing Hume). All psychical states may, according to him, be treated as incidents of the correspondence between the organism and its environment. In this adjustment the lowest stage is taken by reflex action and instinct, where the change of the organs is purely automatic. As the external complexity increases, this automatic regularity fails; there is only an incipient excitation of the nerves. This feeble echo of the full response to stimulus is an idea, which is thus only another word for imperfect organization or adjustment. But gradually this imperfect correspondence is improved, and the idea passes over again into the state of unconscious or organic memory. Intellect, in short, is only the consequence of insufficient response between stimulus and action. Where action is entirely automatic, feeling does not exist. It is when the excitation is partial only, when it does not inevitably and immediately appear as action, that we have the appearance of intellect in the gap. The chief and fundamental difference between Schopenhauer and Spencer lies in the refusal of the latter to give this "adjustment" or "automatic action" the name of will. Will, according to Mr Spencer, is only another aspect of what is reason, memory or feeling—the difference lying in the fact that as will the nascent excitation (ideal motion) is conceived as passing into complete or full motion. But he agrees with Schopenhauer in basing consciousness, in all its forms of reason, feeling or will, upon "automatic movement—psychical change," from which consciousness emerges and in which it disappears.

Main tendencies of his system.

What Schopenhauer professed, therefore, is to have dispelled the claims of reason to priority and to demonstrate the relativity and limitation of science. Science, he reminds us, is based on final inexplicabilities; and its attempts by theories of evolution to find an historical origin for humanity in rudimentary matter show a misconception of the problem. In the successions of material states there can nowhere be an absolute first. The true origin of man, as of all else, is to be sought in an action which is everlasting and which is ever present: *nec te quaesiveris extra*. There is a source of knowledge within us by which we know, and more intimately than we can ever know anything external, that we will and feel. That is the first and the highest knowledge, the only knowledge that can strictly be called immediate; and to ourselves we as the subject of will are truly the "immediate object." It is in this sense of will—of will without motives, but not without consciousness of some sort—that reality is revealed. Analogy and experience make us assume it to be omnipresent. It is a mistake to say will means for Schopenhauer only force. It means a great deal more; and it is his contention that what the scientist calls force is really will. In so doing he is only following the line predicted by Kant[1] and anticipated by Leibnitz. If we wish, said Kant, to give a real existence to the thing in itself or the noumenon we can only do so by investing it with the attributes found in our own internal sense, viz. with thinking or something analogous thereto. It is thus that Fechner in his "day-view" of things sees in plants and planets the same fundamental "soul" as in us—that is, "one simple being which appears to none but itself, in us as elsewhere wherever it occurs self-luminous, dark for every other eye, at the least connecting sensations in itself, upon which, as the grade of soul mounts higher and higher, there is constructed the consciousness of higher and still higher relations."[2] It is thus that Lotze declares[3] that "behind the tranquil surface of matter, behind its rigid and regular habits of behaviour, we are forced to seek the glow of a hidden spiritual activity." So Schopenhauer, but in a way all his own, finds the truth of things in a will which is indeed unaffected by conscious motives and yet cannot be separated from some faint analogue of non-intellectual consciousness.

In two ways Schopenhauer has influenced the world. He has shown with unusual lucidity of expression how feeble is the spontaneity of that intellect which is so highly lauded, and how overpowering the sway of original will in all our action. He thus reasserted realism, whose gospel reads, "In the beginning was appetite, passion, will," and has discredited the doctrinaire belief that ideas have original force of their own. This creed of naturalism is dangerous, and it may be true that the pessimism it implies often degenerates into cynicism and a cold-blooded denial that there is any virtue and any truth. But in the crash of established creeds and the spread of political indifferentism and social disintegration it is probably wise, if not always agreeable, to lay bare the wounds under which humanity suffers, though pride would prompt their concealment. But Schopenhauer's theory has another side. If it is daringly realistic, it is no less audacious in its idealism. The second aspect of his influence is the doctrine of redemption of the soul from its sensual bonds, first by the medium of art and second by the path of renunciation and ascetic life. It may be difficult in each case to draw the line between social duty and individual perfection. But Schopenhauer reminds us that the welfare of society is a temporal and subordinate aim, never to be allowed to dwarf the full realization of our ideal being. Man's duty is undoubtedly to join in the common service of sentient beings; but his final goal is to rise above the toils and comforts of the visible creature into the vast bosom of a peaceful Nirvana.

BIBLIOGRAPHY.—Complete works edited by J. Frauenstädt (6 vols., Leipzig, 1873, 1874); with notes and introduction, M. Brasch (3rd ed., Leipzig, 1891); E. Grisebach (6 vols., Leipzig, 1892). There are many translations of special works in all languages; among English translators are R. B. Haldane, T. B. Saunders, W. M. Thompson, A. B. Bullock. *Arthur Schopenhauers handschriftlicher Nachlass* was published by Grisebach in 4 vols. (1896), from MSS. in the Royal Library at Berlin. On Schopenhauer's life see Gwinner, *Schopenhauers Leben* (1878); E. Grisebach, *Schopenhauer, Geschichte seines Lebens* (1897); J. Volkelt, *Schopenhauer* (1907). A list of works is given by Balan, *Schopenhauer-Literatur* (1880); see also G. F. Wagner, *Encyklopädisches Register zu Schopenhauers Werken* (1909), and W. L. Hertslet, *Schopenhauer-Register* (1890). Among earlier criticisms see: Frauenstädt and Lindner, *A. Schopenhauer; von ihm; über ihn* (1863); Helen Zimmern, *Schopenhauer and his Philosophy* (1877); O. Busch, *A. Schopenhauer* (1878); K. Peters, *Schopenhauer als Philosoph* (1883); Koeber, *Schopenhauers Erlösungslehre* (1881), and *Die Philos. A. Schopenhauers* (1888). More recent works are: T. Whittaker, *Schopenhauer* (1909); G. Simmel, *Schopenhauer und Nietzsche* (1907); F. Paulsen, *Schopenhauer. Hamlet. Mephistopheles* (1900), three studies in pessimism; T. Lorenz, *Zur Entwicklungsgeschichte der Metaphysik Schopenhauers* (1897); Mobius, *Schopenhauer* (1899); R. Lehmann, *Schopenhauer und die Entwickelung der monistischen Weltanschauung* (1892); and *Schopenhauer. Ein Beitrag zur Psychologie der Metaphysik* (1894); Th. Ribot, *La Philosophie de Schopenhauer* (9th ed., 1903); H. Bamberger, *Das Tier in der Philosophie Schopenhauers* (1897); Kuno Fischer, *Schopenhauer* (in the *Gesch. d. neuer. Philos.*, 1893); R. Böttger, *Das Grundproblem der Schopenhauerschen Philos.* (1898); W. Caldwell, *Schopenhauer's System* (1896); O. Damm, *Schopenhauers Ethik im Verhältnis zu seiner Erkenntnislehre* (1898) and *Schopenhauers Rechts- und Staatsphilosophie* (1901); W. Hauft, *Die Überwindung des Schopenhauerschen Pessimismus durch F. Nietzsche* (1904); M. Kelly, *Kant's Ethics and Schopenhauer's criticism* (1910). (W. W.; X.)

SCHOPPE, CASPAR (1576–1649), German controversialist and scholar, was born at Neumarkt in the upper Palatinate on the 27th of May 1576 and studied at several German universities. Having become a convert to Roman Catholicism about 1599, he obtained the favour of Pope Clement VIII., and, even

[1] *Kritik* (Trans. Anal.), bk. ii. Appendix.
[2] *Über die Seelenfrage*, p. 9 (Leipzig, 1861).
[3] *Mikrokosmus*, i. 408 (2nd ed.).

in an age of violent polemics, distinguished himself by the virulence of his writings against the Protestants. He became involved in a controversy with Joseph Justus Scaliger, formerly his intimate friend, and others, wrote *Ecclesiasticus auctoritati Jacobi regis oppositus* (1611), an attack upon James I. of England; and in *Classicum belli sacri* (1619) urged the Catholic princes to wage war upon the Protestants. About 1607 Schoppe entered the service of Ferdinand, archduke of Styria, afterwards the emperor Ferdinand II., who found him very useful in rebutting the arguments of the Protestants, and who sent him on several diplomatic errands. According to Pierre Bayle, he was almost killed by some Englishmen at Madrid in 1614, and again fearing for his life he left Germany for Italy in 1617, afterwards taking part in an attack upon the Jesuits. Schoppe, as the long list of his writings shows, knew also something of grammar and philosophy, and had an excellent acquaintance with Latin. His chief work is, perhaps, his *Grammatica philosophica* (Milan, 1628). Schoppe died at Padua on the 19th of November 1649. In his *Life of Sir Henry Wotton* Izaac Walton, calling him Jasper Scioppius, refers to Schoppe as "a man of a restless spirit and a malicious pen."

Besides the works already noticed, he wrote *De arte critica* (1597); *De Antichristo* (1605); *Pro auctoritate ecclesiae in decidendis fidei controversiis libellus*; *Scaliger hypololymaeus* (1607), a virulent attack on Scaliger; and latterly the anti-jesuitical works, *Flagellum Jesuiticum* (1632); *Mysteria patrum jesuitorum* (1633); and *Arcana societatis Jesu* (1635). For a fuller list of his writings see J. P. Nicéron, *Mémoires* (1727–1745). See also C. Nisard, *Les Gladiateurs de la république des lettres* (Paris, 1860).

SCHORL, in mineralogy, the name given to coarse black varieties of tourmaline (*q.v.*). The *schorl rocks* are crystalline aggregates of quartz and tourmaline. They are granular and massive, not banded or foliated as a rule, grey of various shades, the darkest coloured being most rich in schorl. Some are very fine grained, but in most cases the individual crystals are easily discernible with the unaided eye. They are hard, splintery, and very resistant to weathering. Veined, brecciated, porous and banded varieties occur, but are less common than the granular massive rocks.

Schorl rocks occur practically always in association with tourmaline-bearing granites. Most of them are of igneous origin and, though there may be a few which are direct products of consolidation from a plutonic magma, in the vast majority of cases they originate by the action of gases and vapours on granites, porphyries and other rocks. All magmas contain vapours in solution and give them off more or less readily as they crystallize. Water, carbonic acid and hydrochloric acid (or chlorides) are the commonest dissolved substances, but fluorine, boron, lithium and phosphoric acid occur also, and as they pass outwards these last may act on the surrounding rocks, probably still at a high temperature and produce minerals of a special kind. This action is said to be pneumatolytic. Tourmaline contains boron and fluorine, hence the presence of these elements in the emanations from the granite may be assumed. Schorl rocks often also contain varieties of white mica which are rich in fluorine and lithium; in addition apatite is usually present. Lastly, many of the rocks of this group contain tinstone or are associated with tin-bearing veins, and it is probable that the ores of this metal were brought up in solution as fluorides or chlorides and deposited in the situations where now they are found.

Along the sides of fissures, through which, no doubt, the gases ascended, the granite is converted into schorl rock for a distance ranging from a fraction of an inch to several feet, and vein-like masses of grey schorl rock branching and uniting are thus produced. In other places considerable areas of granite are changed in this way, principally near the margin of the granite, and an interrupted belt of this kind of rock encircles some of the larger outcrops of granite in Cornwall. A similar origin must be ascribed to *greisen* (*q.v.*), the aggregate of quartz and white mica commonly found in association with tin-bearing granites; there are complete gradations between schorl rock and greisen, according to the varying proportions of white mica and tourmaline which may be present in each specimen. Another mineral which is produced by the pneumatolytic alteration of granite is topaz (a silicate and fluoride of aluminium); an aggregate of quartz and topaz is called topaz-fels or topaz rock, and is largely developed in some of the tin-mining districts of Germany, though not found in Cornwall.

As might be expected every stage of the conversion of granite into schorl rock can be found. Tourmaline may have been to some extent an original constituent of the granite, but most of it is of new formation and must have resulted from the alteration of the biotite and the felspar of the original rock, both of these minerals having disappeared when the metamorphosis was complete. It is commonly found that the schorl is of a brown colour in the interior of the crystals but blue at the edges; probably the brown is primary or has been derived from biotite, but the blue principally from the replacement of felspar. The rock known as luxullianite, obtained near Luxullian village in Cornwall and used as an ornamental stone for the sarcophagus of the duke of Wellington's monument in St Paul's Cathedral, is a tourmaline granite in which the replacement of biotite and felspar by quartz and tourmaline can be seen in progress. The new tourmaline is in fine pointed needles which have a stellate or divergent arrangement, and is embedded in quartz: often these needles are planted on the surface of corroded crystals of primary brown schorl. This rock still contains a good deal of flesh-coloured felspar in large porphyritic crystals which contrast well with the dark matrix and give polished specimens a very handsome appearance. In the completely altered schorl rocks there are rarely needles of tourmaline, but this mineral occurs as irregular grains mingled in varying proportions with small crystals of quartz. In nearly all cases the structure of the granite has vanished, but at Trevalgan, St Austell, and other places in Cornwall there are schorl rocks which contain white pseudomorphs of quartz after porphyritic crystals of orthoclase.

In porphyries or "elvans" tourmalinization also is frequent, though not so common as greisening. Veins of quartz with stellate schorl needles may be seen spreading through the groundmass or when this has been previously converted into an aggregate of quartz and fine scaly white mica, the porphyritic crystals of felspar alone may be replaced by bunches of tourmaline embedded in quartz. Tinstone often makes its appearance in these rocks either in small crystals enclosed in quartz or lining fissures and cavities left by the removal of a portion of the rock in solution.

The same process goes on also in sedimentary rocks; a felspathic sandstone may yield a schorl rock which can hardly be distinguished from one derived from a fine-grained granite. In shales brown tourmaline is often deposited in the vicinity of fissures, and the whole mass may be converted into a hard splintery aggregate of quartz and schorl (often containing also rutile and tinstone). But these rocks are always banded, like the original slate; their original structures (bedding and cleavage) are probably never completely effaced and the ultimate product has been called schorl-schist (tourmaline hornfels, cornubianite).

The stanniferous veins which in large numbers intersect the granites of Devon and Cornwall and the slates around them, and have yielded a large part of the world's supply of tin consist mostly of quartz, tourmaline and chlorite (with varying proportions of cassiterite). The veinstones are typically very fine grained, hard and dark blue or dark green in colour. The green varieties contain much chlorite, the blue are richer in tourmaline, and both kinds are known to the miners as "peach." Essentially aqueous deposits in lines of fissure, these rocks show that quartz and tourmaline were carried up in hot solutions at a late period in the cooling of the granite, and the changes above described are due to the operation of these solutions as they spread outwards through the surrounding rocks. Their tourmaline crystals are very small and usually of dark-blue shades, but owing to repeated movements of the walls of the veins the ore deposits have sometimes an intricate history, as microscopic studies show that the first infillings of the fissures have been broken up and cemented together again by a later material of slightly different character. (J. S. F.)

SCHOTTISCHE, the German for "Scottish," a name given to a dance, *der schottische Tanz*, introduced into England about 1850. It was a form of polka, with two figures. The "Highland Schottische" is a lively dance resembling a fling. What is known as the "barn dance" was first known in America as the "Military Schottische."

SCHOULER, JAMES (1839–), American lawyer and historian, was born in West Cambridge (now Arlington), Massachusetts, on the 20th of March 1839, the son of William Schouler (1814–1872), who from 1847 to 1853 edited the *Boston Atlas*, one of the leading Whig journals of New England. The son graduated at Harvard in 1859, studied law in Boston and was admitted to the bar there in 1862. In 1869 he removed to Washington, where for three years he published the *United States Jurist*. After his return to Boston, in 1874, he devoted himself to office practice and to literary pursuits. He was a lecturer in the law school of Boston University between 1885 and 1903, a non-resident professor and lecturer in the National

University Law School, Washington, D.C., in 1887–1909, and a lecturer on American history and constitutional law at Johns Hopkins University in 1891–1908. In 1896–1897 he was president of the American Historical Association. His legal treatises are *The Law of Domestic Relations* (1870), *The Law of Personal Property* (1872–1876; new ed., 1907), *The Law of Bailments* (1880), *The Law of Executors and Administrators* (1883), *The Law of Husband and Wife* (1882) and *The Law of Wills* (1910). He is best known, however, as an historian; his most important work being a *History of the United States under the Constitution*, 1789–1865 (6 vols., 1880–1899). Among his other publications are *A Life of Thomas Jefferson* (1893); *Historical Briefs* (1896), containing a biography of Mr Schouler; *Constitutional Studies, State and Federal* (1897); a brief *Life of Alexander Hamilton* (1901); *Americans of 1776* (1906); and *Ideals of the Republic* (1908).

SCHRADER, EBERHARD (1836–1908), German orientalist, was born at Brunswick on the 7th of January 1836, and educated at Göttingen under Ewald. In 1858 he took a university prize for a treatise on the Ethiopian languages, and in 1863 became professor of theology at Zürich. Subsequently he occupied chairs at Giessen (1870) and Jena (1873), and finally became professor of oriental languages at Berlin. Though he turned first to biblical research, his chief achievements were in the field of Assyriology, in which he was a pioneer in Germany and acquired an international reputation. He died on the 4th of July 1908.

His publications include: *Studien zur Kritik und Erklärung der biblischen Urgeschichte* (1863); the 8th edition of De Wette's *Einleitung in das Alte Testament* (1869); *Die assyr.-babyl. Keilinschriften* (1872); *Die Keilinschriften und das Alt. Test.* (1872; 3rd ed. by Zimmern and Winckler, 1901–1902); *Keilinschriften und Geschichtsforschung* (1878); *Die Höllenfahrt der Istar* (text, trans., notes, 1874); *Zur Frage nach dem Ursprung der altbabylonischen Kultur* (1884); in conjunction with other scholars, *Keilinschriftliche Bibliothek* (1877).

SCHREIBER, LADY CHARLOTTE ELIZABETH (1812–1895), better known as Lady Charlotte Guest, Welsh scholar and connoisseur of china, daughter of Albemarle Bertie, 9th earl of Lindsey, was born at Uffington House, Lincolnshire, on the 19th of May 1812. She married in 1833 Sir Josiah John Guest, manager and afterwards owner of the Dowlais ironworks near Merthyr Tydvil. Lady Charlotte Guest studied the Welsh language and literature, and published (3 vols., 1838–1849) *The Mabinogion, from the Llyfr Coch o Hergest, and other ancient Welsh Manuscripts, with an English translation and notes*. A second edition without the Welsh text appeared in 1877, and in 1881 *The Boy's Mabinogion; being the earliest Welsh tales of King Arthur in the famous Red Book of Hergest, edited with an introduction by S. Lanier*. Sir Josiah Guest died in 1852, and Lady Charlotte married in 1855 Charles Schreiber, M.P. for Cheltenham and Poole. She made a valuable collection of English porcelain and china, now in the South Kensington Museum, another of fans and fan leaves, presented to the British Museum, and a third of playing cards, part of which is in the British Museum. On all three subjects she left elaborate treatises. She died on the 15th of January 1895 at Canford Manor, Dorset, at the house of her eldest son Ivor Guest, Baron Wimborne.

Editions of Lady Charlotte Guest's translation of the Mabinogion are in *The Temple Classics* (1902), *The Welsh Library* (1902), &c.

SCHREIBERHAU, a village and climatic health resort of Germany, in the Prussian province of Silesia, situated in the valley of the Zacken in the Riesengebirge, 1900 ft. above the sea, 16 m. S.W. from Hirschberg by the railway to Grünthal. Pop. (1905) 4994. It has two Roman Catholic and two Evangelical churches, and works for the making and polishing of glass. It is a popular resort, being visited by about 10,000 visitors annually.

See Kloidt, *Schreiberhau im Riesengebirge* (Breslau, 1893).

SCHREYER, ADOLF (1828–1899), German painter, was born at Frankfort-on-Main, and studied art first at the Staedel Institute in his native town, and then at Stuttgart, Munich, and Dusseldorf; but he formed his style in Paris, whilst he found his favourite subjects in his travels in the East. He first accompanied Prince Thurn and Taxis through Hungary, Wallachia, Russia and Turkey; then, in 1854, he followed the Austrian army across the Wallachian frontier. In 1856 he went to Egypt and Syria, and in 1861 to Algiers. In 1862 he settled in Paris, but returned to Germany in 1870; and settled at Cronberg near Frankfort, where he died in 1899. Schreyer was, and is still, especially esteemed as a painter of horses, of peasant life in Wallachia and Moldavia, and of battle incidents. His work is remarkable for its excellent equine draughtsmanship, and for the artist's power of observation and forceful statement; and has found particular favour among French and American collectors. Of his battle-pictures there are two at the Schwerin Gallery, and others in the collection of Count Mensdorff-Pouilly and in the Ravené Gallery, Berlin. His painting of a "Charge of Artillery of Imperial Guard" was formerly at the Luxembourg Museum. The Metropolitan Museum, New York, owns three of Schreyer's oriental paintings: "Abandoned," "Arabs on the March" and "Arabs making a détour"; and many of his best pictures are in the Rockefeller, Vanderbilt, J. J. Astor, W. Astor, A. Belmont, and W. Walters collections. At the Kunsthalle in Hamburg is his "Wallachian Transport Train," and at the Staedel Institute, Frankfort, are two of his Wallachian scenes.

SCHRIJVER, PETER (1576–1660), Dutch author, better known as SCRIVERIUS, was born at Haarlem on the 12th of January 1576. He was educated at the university of Leiden, where he formed a close intimacy with Daniel Heinsius. He belonged to the party of Oldenbarneveldt and Grotius, and brought down the displeasure of the government by a copy of Latin verses in honour of their friend Hoogerbeets. Most of his life was passed in Leiden, but in 1650 he became blind, and the last years of his life were spent in his son's house at Oudewater, where he died on the 30th of April 1660.

He is best known as a scholar by his notes on Martial, Ausonius, the *Pervigilium Veneris*; editions of the poems of Scaliger (Leiden, 1615), of the *De re militari* of Vegetius Renatus, the tragedies of Seneca (*P. Scriverii collectanea veterum tragicorum*, 1621), &c. His *Opera anecdota, philologica, et poëtica* (Utrecht, 1738) were edited by A. H. Westerhovius, and his *Nederduitsche Gedichten* (1738) by S. Dockes. He made many valuable contributions to the history of Holland: *Batavia Illustrata* (4 parts, Leiden, 1609); *Corte historische Beschryvinghe der Nederlandscher Oorlogen* (1612); *Inferioris Germaniae . . . historia* (1611, 4 parts); *Beschryvinghe van Out Batavien* (Arnheim, 1612); *Het oude gontsche Chronyckken van Hollandt*, edited by him, and printed at Amsterdam in 1663; *Principes Hollandiae Zelandiae et Frisiae* (Haarlem, 1650), translated (1678) into Dutch by Pieter Brugman.

See Peerlkamp, *Vitae Belgarum qui latina carmina scripserunt* (Brussels, 1822), and J. H. Hoeufft, *Parnassus latino-belgicus* (Amsterdam, 1819).

SCHRÖDER, FRIEDRICH LUDWIG (1744–1816), German actor, manager and dramatist, was born in Schwerin on the 3rd of November 1744. Shortly after his birth, his mother, Sophie Charlotte Schröder (1714–1792), separated from her husband, and joining a theatrical company toured with success in Poland and Russia. Subsequently she married Konrad Ernst Ackermann and appeared with his company in many German cities, finally settling in Hamburg. Young Schröder early showed considerable talent, but his childhood was rendered so unhappy by his stepfather that he ran away from home and learnt the trade of a shoemaker. He rejoined his parents, however, in 1759, and became an actor. In 1764 he appeared with the Ackermann company in Hamburg, playing leading comedy parts; but these he soon exchanged for the tragic rôles in which he became famous. These included Hamlet, Lear and Philip in Schiller's *Don Carlos*. After Ackermann's death in 1771 Schröder and his mother took over the management of the Hamburg theatre, and he began to write plays—largely adaptations from the English, making his first success with the comedy *Die Arglistige*. In 1780 he left Hamburg, and after a tour with his wife, Anna Christina Hart, a former pupil, accepted an engagement at the Court theatre in Vienna. In 1785 Schröder again took over his Hamburg management and conducted the theatre with marked ability until his retirement in 1798. The Hamburg theatre again falling into decay, the master was once more summoned to assist in its

rehabilitation, and in 1811 he returned to it for one year. He died on the 3rd of September 1816. As an actor Schröder was the first to depart from the stilted style of former tragedians; as a manager he raised the standard of plays presented and first brought Shakespeare before the German public. Schröder's *Dramatische Werke*, with an introduction by Tieck, were published in four volumes (Berlin, 1831).

See B. Litzmann, *Friedrich Ludwig Schröder* (Hamburg, 1890–1894); R. Blum in the *Allgemeines Theater-Lexikon* (1842); and Brunier, *Friedrich Ludwig Schröder* (Leipzig, 1864).

SCHRÖDER, SOPHIE (1781–1868), German actress, was born at Paderborn on the 23rd of February 1781, the daughter of an actor, Gottfried Bürger. She made her first appearance in opera at St Petersburg, in 1793. On Kotzebue's recommendation she was engaged for the Vienna Court theatre in 1798, and here and in Munich and Hamburg she won great successes in tragic rôles like Marie Stuart, Phèdre, Merope, Lady Macbeth, and Isabella in *The Bride of Messina*, which gave her the reputation of being "the German Siddons." She retired in 1840 and lived in Augsburg and Munich until her death on the 25th of February 1868. She had married, in 1795, an actor, Stollmers (properly Smets), from whom she separated in 1799. In 1804 she married the tenor Friedrich Schröder, and on his death in 1825, an actor, Kunst. Mme Schröder's eldest daughter was the opera singer, Wilhelmine Devrient-Schröder (*q.v.*).

See Ph. Schmidt, *Sophie Schröder* (Vienna, 1870); also *Das Lexikon der deutscher Buhnen-Angehörigen.*

SCHRÖDER - DEVRIENT, WILHELMINE (1804 – 1860), German operatic singer, was born on the 6th of December 1804, in Hamburg, being the daughter of the actress, Sophie Schröder (1781–1868). Her first impersonation was at the age of fifteen as Aricia in Schiller's translation of Racine's *Phèdre*, and in 1821 she was received with so much enthusiasm as Pamina in Mozart's *Zauberflöte* that her future career in opera was assured. In 1823 she married Karl Devrient, but was separated from him in 1828, afterwards making two other marriages. Meanwhile she had maintained her popularity at Dresden and elsewhere. She made her first Paris appearance in 1830, and she sang in London in 1833 and 1837. As a singer she combined a rare quality of tone with dramatic intensity of expression, which was as remarkable on the concert platform as in opera. She died in Coburg on the 26th of January 1860.

See E. von Glümer, *Erinnerungen an Wilhelmine Schröder-Devrient* (Leipzig, 1862); and A. von Wolzogen, *Wilhelmine Schröder-Devrient* (Leipzig, 1863).

SCHRÖTER, JOHANN HIERONYMUS (1745–1816), German astronomer, was born at Erfurt on the 30th of August 1745. Having studied law at Göttingen, he became chief magistrate at Lilienthal, near Bremen, in 1788. Here he built an observatory, and, equipped in 1785 by a 7-ft. reflector by Herschel, and later by a 13-ft. reflector by Johann Gottleib Friedrich Schrader of Kiel, he made his famous observations on the surface features of the moon and planets. His work was ruined in 1813 by the French under Vandamme, who destroyed his books, writings and observatory; he never recovered from the catastrophe, and died on the 29th of August 1816.

SCHUBART, CHRISTIAN FRIEDRICH DANIEL (1739–1791), German poet, was born at Obersontheim in Swabia (now the kingdom of Württemberg) on the 24th of March 1739, and entered the university of Erlangen in 1758 as a student of theology. He led a dissolute life, and after two years' stay was summoned home by his parents. After attempting to earn a livelihood as private tutor and as assistant preacher, his musical talents gained him the appointment of organist in Geislingen, and subsequently in Ludwigsburg; but in consequence of his wild life and blasphemy, which found expression in a parody of the litany, he was expelled the country. He then visited in turn Heilbronn, Mannheim, Munich and Augsburg. In the last-named town he made a considerable stay, began his *Deutsche Chronik* (1774–1778) and eked out a subsistence by reciting from the latest works of prominent poets. Owing to a bitter attack upon the Jesuits, he was expelled from Augsburg and fled to Ulm, where he was arrested in 1777 and confined in the fortress of Hohenasperg. Here he met with lenient treatment, and he beguiled the time by a study of mystical works and in composing poetry. His *Sämtliche Gedichte* appeared in two volumes at Stuttgart in 1785–1786 (new edition by G. Hauff, Leipzig, 1884, in Reclam's *Universal-Bibliothek*); in this collection most of the pieces are characterized by the bombast of the "Sturm und Drang" period. He was set at liberty in 1787, at the instance of Frederick the Great, king of Prussia, and expressed his gratitude in *Hymnus auf Friedrich den Grossen.* Schubart was now appointed musical director and manager of the theatre at Stuttgart, where he continued his *Deutsche Chronik* and began his autobiography, *Schubarts Leben und Gesinnungen* (2 vols., 1791–1793), but before its completion he died at Stuttgart on the 10th of October 1791. His *Gesammelte Schriften und Schicksale* appeared in 8 vols. (Stuttgart, 1839–1840).

See D. F. Strauss, *Schubarts Leben in seinen Briefen* (2 vols., 1849; 2nd ed., 1878); G. Hauff, *Christian Daniel Schubart* (1885), and E. Nägele, *Aus Schubarts Leben und Wirken* (1888).

SCHUBERT, FRANZ PETER (1797–1828), German composer, was born on the 31st of January 1797, in the Himmelpfortgrund, a small suburb of Vienna. His father, Franz, son of a Moravian peasant, was a parish schoolmaster; his mother, Elizabeth Fitz, had before her marriage been cook in a Viennese family. Of their fourteen children nine died in infancy; the others were Ignaz (b. 1784), Ferdinand (b. 1794), Karl (b. 1796), Franz and a daughter Theresia (b. 1801). The father, a man of worth and integrity, possessed some reputation as a teacher, and his school, in the Lichtenthal, was well attended. He was also a fair amateur musician, and transmitted his own measure of skill to his two elder sons, Ignaz and Ferdinand.

At the age of five Schubert began to receive regular instruction from his father. At six he entered the Lichtenthal school where he spent some of the happiest years of his life. About the same time his musical education began. His father taught him the rudiments of the violin, his brother Ignaz the rudiments of the pianoforte. At seven, having outstripped these simple teachers, he was placed under the charge of Michael Holzer, the Kapellmeister of the Lichtenthal Church. Holzer's lessons seem to have consisted mainly in expressions of admiration, and the boy gained more from a friendly joiner's apprentice, who used to take him to a neighbouring pianoforte warehouse and give him the opportunity of practising on a better instrument than the poor home could afford. The unsatisfactory character of his early training was the more serious as, at that time, a composer had little chance of success unless he could appeal to the public as a performer, and for this the meagre education was never sufficient.

In October 1808 he was received as a scholar at the Convict, which, under Salieri's direction, had become the chief music-school of Vienna, and which had the special office of training the choristers for the Court Chapel. Here he remained until nearly seventeen, profiting little by the direct instruction, which was almost as careless as that given to Haydn at St Stephen's, but much by the practices of the school orchestra, and by association with congenial comrades. Many of the most devoted friends of his after life were among his schoolfellows: Spaun and Stadler and Holzapfel, and a score of others who helped him out of their slender pocket-money, bought him music-paper which he could not buy for himself, and gave him loyal support and encouragement. It was at the Convict, too, that he first made acquaintance with the overtures and symphonies of Mozart—there is as yet no mention of Beethoven—and between them and lighter pieces, and occasional visits to the opera, he began to lay for himself some foundation of musical knowledge.

Meanwhile his genius was already showing itself in composition. A pianoforte fantasia, thirty-two close-written pages, is dated April 8–May 1, 1810: then followed, in 1811, three long vocal pieces written upon a plan which Zumsteeg had popularized, together with a "quintet-overture," a string quartet, a second pianoforte fantasia and a number of songs. His essay in chamber-music is noticeable, since we learn that at the time a regular quartet-party was established at his home "on Sundays

and holidays," in which his two brothers played the violin, his father the 'cello and Franz himself the viola. It was the first germ of that amateur orchestra for which, in later years, many of his compositions were written. During the remainder of his stay at the Convict he wrote a good deal more chamber-music, several songs, some miscellaneous pieces for the pianoforte and, among his more ambitious efforts, a *Kyrie* and *Salve Regina*, an octet for wind instruments—said to commemorate the death of his mother, which took place in 1812—a cantata, words and music, for his father's name-day in 1813, and the closing work of his school-life, his first symphony.

At the end of 1813 he left the Convict, and, to avoid military service, entered his father's school as teacher of the lowest class. For over two years he endured the drudgery of the work, which, we are told, he performed with very indifferent success. There were, however, other interests to compensate. He took private lessons from Salieri, who annoyed him with accusations of plagiarism from Haydn and Mozart, but who did more for his training than any of his other teachers; he formed a close friendship with a family named Grob, whose daughter Therese was a good singer and a good comrade; he occupied every moment of leisure with rapid and voluminous composition. His first opera—*Des Teufels Lustschloss*—and his first Mass—in F major—were both written in 1814, and to the same year belong three string quartets, many smaller instrumental pieces, the first movement of the symphony in B♭ and seventeen songs, which include such masterpieces as *Der Taucher* and *Gretchen am Spinnrade*. But even this activity is far outpaced by that of the *annus mirabilis* 1815. In this year, despite his school-work, his lessons with Salieri and the many distractions of Viennese life, he produced an amount of music the record of which is almost incredible. The symphony in B♭ was finished, and a third, in D major, added soon afterwards. Of church music there appeared two Masses, in G and B♭, the former written within six days, a new *Dona nobis* for the Mass in F, a *Stabat Mater* and a *Salve Regina*. Opera was represented by no less than five works, of which three were completed—*Der Vierjährige Posten*, *Fernando* and *Claudine von Villabella*—and two, *Adrast* and *Die beiden Freunde von Salamanca*, apparently left unfinished. Besides these the list includes a string quartet in G minor, four sonatas and several smaller compositions for piano, and, by way of climax, 146 songs, some of which are of considerable length, and of which eight are dated Oct. 15, and seven Oct. 19. "Here," we may say with Dryden, "is God's plenty." Music has always been the most generous of the arts, but it has never, before or since, poured out its treasure with so lavish a hand.

In the winter of 1814–1815 Schubert made acquaintance with the poet Mayrhofer: an acquaintance which, according to his usual habit, soon ripened into a warm and intimate friendship. They were singularly unlike in temperament: Schubert frank, open and sunny, with brief fits of depression, and sudden outbursts of boisterous high spirits; Mayrhofer grim and saturnine, a silent man who regarded life chiefly as a test of endurance; but there is good authority for holding that "the best harmony is the resolution of discord," and of this aphorism the ill-assorted pair offer an illustration. The friendship, as will be seen later, was of service to Schubert in more than one way.

As 1815 was the most prolific period of Schubert's life, so 1816 saw the first real change in his fortunes. Somewhere about the turn of the year Spaun surprised him in the composition of *Erlkönig*—Goethe's poem propped among a heap of exercise-books, and the boy at white-heat of inspiration "hurling" the notes on the music-paper. A few weeks later Von Schober, a law-student of good family and some means, who had heard some of Schubert's songs at Spaun's house, came to pay a visit to the composer and proposed to carry him off from school-life and give him freedom to practise his art in peace. The proposal was particularly opportune, for Schubert had just made an unsuccessful application for the post of Kapellmeister at Laibach, and was feeling more acutely than ever the slavery of the class-room. His father's consent was readily given, and before the end of the spring he was installed as a guest in Von Schober's lodgings. For a time he attempted to increase the household resources by giving music lessons, but they were soon abandoned, and he devoted himself to composition. "I write all day," he said later to an inquiring visitor, "and when I have finished one piece I begin another."

The works of 1816 include three ceremonial cantatas, one written for Salieri's Jubilee on June 16; one, eight days later, for a certain Herr Watteroth who paid the composer an honorarium of £4 ("the first time," said the journal, "that I have composed for money"), and one, on a foolish philanthropic libretto, for Herr Joseph Spendou "Founder and Principal of the Schoolmasters' Widows' Fund." Of more importance are two new symphonies, No. 4 in C minor, called the *Tragic*, with a striking andante, No. 5 in B♭, as bright and fresh as a symphony of Mozart: some numbers of church music, fuller and more mature than any of their predecessors, and over a hundred songs, among which are comprised some of his finest settings of Goethe and Schiller. There is also an opera, *Die Burgschaft*, spoiled by an illiterate book, but of interest as showing how continually his mind was turned towards the theatre.

All this time his circle of friends was steadily widening. Mayrhofer introduced him to Vogl, the famous baritone, who did him good service by performing his songs in the salons of Vienna; Anselm Hüttenbrenner and his brother Joseph ranged themselves among his most devoted admirers; Gahy, an excellent pianist, played his sonatas and fantasias; the Sonnleithners, a rich burgher family whose eldest son had been at the Convict, gave him free access to their home, and organized in his honour musical parties which soon assumed the name of Schubertiaden. The material needs of life were supplied without much difficulty. No doubt Schubert was entirely penniless, for he had given up teaching, he could earn nothing by public performance, and, as yet, no publisher would take his music at a gift; but his friends came to his aid with true Bohemian generosity—one found him lodging, another found him appliances, they took their meals together and the man who had any money paid the score. Schubert was always the leader of the party, and was known by half-a-dozen affectionate nicknames, of which the most characteristic is "kann er 'was?" his usual question when a new acquaintance was proposed.

1818, though, like its predecessor, comparatively unfertile in composition, was in two respects a memorable year. It saw the first public performance of any work of Schubert's—an overture in the Italian style written as an avowed burlesque of Rossini, and played in all seriousness at a Jäll concert on March 1. It also saw the beginning of his only official appointment, the post of music-master to the family of Count Johann Esterhazy at Zelesz, where he spent the summer amid pleasant and congenial surroundings. The compositions of the year include a Mass and a symphony, both in C major, a certain amount of four-hand pianoforte music for his pupils at Zelesz and a few songs, among which are *Einsamkeit*, *Marienbild* and the *Litaney*. On his return to Vienna in the autumn he found that Von Schober had no room for him, and took up his residence with Mayrhofer. There his life continued on its accustomed lines. Every morning he began composing as soon as he was out of bed, wrote till two o'clock, then dined and took a country walk, then returned to composition or, if the mood forsook him, to visits among his friends. He made his first public appearance as a song-writer on February 28, 1819, when the *Schäfers Klagelied* was sung by Jäger at a Jäll concert. In the summer of the same year he took a holiday and travelled with Vogl through Upper Austria. At Steyr he wrote his brilliant piano quintet in A, and astonished his friends by transcribing the parts without a score. In the autumn he sent three of his songs to Goethe, but, so far as we know, received no acknowledgment.

The compositions of 1820 are remarkable, and show a marked advance in development and maturity of style. The unfinished oratorio *Lazarus* was begun in February; later followed, amid a number of smaller works, the 23rd Psalm, the *Gesang der Geister*, the Quartettsatz in C minor and the great pianoforte fantasia on *Der Wanderer*. But of almost more biographical interest is

the fact that in this year two of Schubert's operas appeared at the Kärnthnerthor theatre, *Die Zwillingsbrüder* on June 14, and *Die Zauberharfe* on August 19. Hitherto his larger compositions (apart from Masses) had been restricted to the amateur orchestra at the Gundelhof, a society which grew out of the quartet-parties at his home. Now he began to assume a more prominent position and address a wider public. Still, however, publishers held obstinately aloof, and it was not until his friend Vogl had sung *Erlkönig* at a concert in the Kärnthnerthor (Feb. 8, 1821) that Diabelli hesitatingly agreed to print some of his works on commission. The first seven opus-numbers (all songs) appeared on these terms; then the commission ceased, and he began to receive the meagre pittances which were all that the great publishing houses ever accorded to him. Much has been written about the neglect from which he suffered during his lifetime. It was not the fault of his friends, it was only indirectly the fault of the Viennese public; the persons most to blame were the cautious intermediaries who stinted and hindered him from publication.

The production of his two dramatic pieces turned Schubert's attention more firmly than ever in the direction of the stage; and towards the end of 1821 he set himself on a course which for nearly three years brought him continuous mortification and disappointment. *Alfonso und Estrella* was refused, so was *Fierrabras*; *Die Verschworenen* was prohibited by the censor (apparently on the ground of its title); *Rosamunde* was withdrawn after two nights, owing to the badness of its libretto. Of these works the two former are written on a scale which would make their performances exceedingly difficult (*Fierrabras*, for instance, contains over 1000 pages of manuscript score), but *Die Verschworenen* is a bright attractive comedy, and *Rosamunde* contains some of the most charming music that Schubert ever composed. In 1822 he made the acquaintance both of Weber and of Beethoven, but little came of it in either case, though Beethoven cordially acknowledged his genius. Von Schober was away from Vienna; new friends appeared of a less desirable character; on the whole these were the darkest years of his life.

In the spring of 1824 he wrote the magnificent octet, "A Sketch for a Grand Symphony"; and in the summer went back to Zelesz, when he became attracted by Hungarian idiom, and wrote the *Divertissement à l'Hongroise* and the string quartet in A minor. Most of his biographers insert here a story of his hopeless passion for his pupil Countess Caroline Esterhazy; but whatever may be said as to the general likelihood of the romance, the details by which it is illustrated are apocryphal, and the song *l'Addio*, placed at its climax, is undoubtedly spurious. A more debatable problem is raised by the grand duo in C major (op. 140) which is dated from Zelesz in the summer of this year. It bears no relation to the style of Schubert's pianoforte music, it is wholly orchestral in character, and it may well be a transcript or sketch of the "grand symphony" for which the octet was a preparation. If so, it settles the question, raised by Sir George Grove, of a "Symphony in C major" which is not to be found among Schubert's orchestral scores.

Despite his preoccupation with the stage and later with his official duties he found time during these years for a good deal of miscellaneous composition. The Mass in Ab was completed and the exquisite "Unfinished Symphony" begun in 1822. The *Mullerlieder*, and several other of his best songs, were written in 1823; to 1824, beside the works mentioned above, belong the variations on *Trockne Blumen* and the two string quartets in E and Eb. There is also a sonata for piano and "Arpeggione," an interesting attempt to encourage a cumbersome and now obsolete instrument.

The mishaps of the recent years were compensated by the prosperity and happiness of 1825. Publication had been moving more rapidly; the stress of poverty was for a time lightened; in the summer there was a pleasant holiday in Upper Austria, where Schubert was welcomed with enthusiasm. It was during this tour that he produced his "Songs from Sir Walter Scott," and his piano sonata in A minor (op. 42), the former of which he sold to Artaria for £20, the largest sum which he had yet received for any composition. Sir George Grove, on the authority of Randhartinger, attributes to this summer a lost "Gastein" symphony which is possibly the same work as that already mentioned under the record of the preceding year.

From 1826 to 1828 Schubert resided continuously in Vienna, except for a brief visit to Graz in 1827. The history of his life during these three years is little more than a record of his compositions. The only events worth notice are that in 1826 he dedicated a symphony to the Gesellschaft der Musikfreunde, which voted him in return an honorarium of £10, that in the same year he applied for a conductorship at the opera, and lost it by refusing to alter one of his songs at rehearsal, and that in the spring of 1828 he gave, for the first and only time in his career, a public concert of his own works. But the compositions themselves are a sufficient biography. The string quartet in D minor, with the variations on "Death and the Maiden," was written during the winter of 1825-1826, and first played on Jan. 25. Later in the year came the string quartet in G major, the "Rondeau brilliant," for piano and violin, and the fine sonata in G which, by some pedantry of the publisher's, is printed without its proper title. To these should be added the three Shakespearian songs, of which "Hark! Hark! the Lark" and "Who is Sylvia?" were written on the same day, the former at a tavern where he broke his afternoon's walk, the latter on his return to his lodging in the evening. In 1827 he wrote the *Winterreise*, the fantasia for piano and violin, and the two piano trios: in 1828 the *Song of Miriam*, the C major symphony, the Mass in Eb, and the exceedingly beautiful *Tantum Ergo* in the same key, the string quintet, the second Benedictus to the Mass in C, the last three piano sonatas, and the collection of songs known as *Schwanengesang*. Six of these are to words by Heine, whose *Buch der Lieder* appeared in the autumn. Everything pointed to the renewal of an activity which should equal that of his greatest abundance, when he was suddenly attacked by typhus fever, and after a fortnight's illness died on Nov. 19 at the house of his brother Ferdinand. He had not completed his thirty-second year.

Some of his smaller pieces were printed shortly after his death, but the more valuable seem to have been regarded by the publishers as waste paper. In 1838 Schumann, on a visit to Vienna, found the dusty manuscript of the C major symphony and took it back to Leipzig, where it was performed by Mendelssohn and celebrated in the *Neue Zeitschrift*. The most important step towards the recovery of the neglected works was the journey to Vienna which Sir George Grove and Sir Arthur Sullivan made in the autumn of 1867. The account of it is given in Grove's appendix to the English translation of Kreissle von Hellborn: the travellers rescued from oblivion seven symphonies, the *Rosamunde* music, some of the Masses and operas, some of the chamber works, and a vast quantity of miscellaneous pieces and songs. Their success gave impetus to a widespread public interest and finally resulted in the definitive edition of Breitkopf and Härtel.

Schubert is best summed up in the well-known phrase of Liszt, that he was "le musicien le plus poète qui fut jamais." In clarity of style he was inferior to Mozart, in power of musical construction he was far inferior to Beethoven, but in poetic impulse and suggestion he is unsurpassed. He wrote always at headlong speed, he seldom blotted a line, and the greater part of his work bears, in consequence, the essential mark of improvisation: it is fresh, vivid, spontaneous, impatient of restraint, full of rich colour and of warm imaginative feeling. He was the greatest songwriter who ever lived, and almost everything in his hand turned to song. In his Masses, for instance, he seems to chafe at the contrapuntal numbers and pours out his whole soul on those which he found suitable for lyrical treatment. In his symphonies the lyric and elegiac passages are usually the best, and the most beautiful of them all is, throughout its two movements, lyric in character. The standpoint from which to judge him is that of a singer who ranged over the whole field of musical composition and everywhere carried with him the artistic form which he loved best.

Like Mozart, whose influence over him was always considerable, he wrote nearly all the finest of his compositions in the last ten years of his life. His early symphonies, his early quartets, even his early masses, are too much affected by a traditional style to establish an enduring reputation. It is unfair to call them imitative, but at the time when he wrote them he was saturated with Mozart, and early Beethoven, and he spoke what was in his mind with a boy's frankness. The Andante of the Tragic Symphony (No. 4) strikes a more distinctive note, but the fifth is but a charming adaptation of a past idiom, and the sixth, on which Schubert himself placed little value, shows hardly any appreciable advance. It is a very different matter when we come to the later works. The piano quintet in A major (1819) may here be taken as the turning-point; then come the Unfinished Symphony, which is pure Schubert in every bar; the three quartets in A minor, D minor, and G major, full of romantic colour; the delightful piano trios; the great string quintet; and the C major symphony which, though diffuse, contains many passages of surprising beauty. Every one of them is a masterpiece, and a masterpiece such as Schubert alone could have written. The days of brilliant promise were over and were succeeded by the days of full and mature achievement.

His larger operas are marred both by their inordinate length and by their want of dramatic power. The slighter comedies are pretty and tuneful, but, except as curiosities, are not likely to be revived. We may, however, deplore the fate which has deprived the stage of the Rosamunde music. It is in Schubert's best vein; the entractes, the Romance, and the ballets are alike excellent, and it is much to be hoped that a poet will some day arise and fit the music to a new play.

Of his pianoforte compositions, the sonatas, as might be expected, are the least enduring, though there is not one of them which does not contain some first-rate work. On the other hand his smaller pieces, in which the lyric character is more apparent, are throughout interesting to play and extremely pleasant to hear. He developed a special pianoforte technique of his own—not always "orthodox," but always characteristic. A special word should be added on his fondness for piano duets, a form which before his time had been rarely attempted. Of these he wrote a great many—fantasias, marches, polonaises, variations all bright and melodious with sound texture and a remarkable command of rhythm.

His concerted pieces for the voice are often extremely difficult, but they are of a rare beauty which would well repay the labour of rehearsal. The 23rd psalm (for female voices) is exquisite; so are the *Gesang der Geister*, the *Nachthalle*, the *Nachtgesang im Walde* (for male voices and horns), and that "dewdrop of celestial melody" which Novello has published with English words under the title of "Where Thou Reignest." Among all Schubert's mature works there are none more undeservedly neglected than these.

Of the songs it is impossible, within the present limits, to give even a sketch. They number over 600, excluding scenas and operatic pieces, and they contain masterpieces from the beginning of his career to the end. *Gretchen am Spinnrade* was written when he was seventeen, *Erlkönig* when he was eighteen; then there follows a continuous stream which never checks or runs dry, and which broadens as it flows to the *Müllerlieder*, the Scott songs, the Shakesperian songs, the *Winterreise*, and the *Schwanengesang*. He is said to have been undiscriminating in his choice of words. Schumann declared that "he could set a handbill to music," and there is no doubt that he was inspired by any lyric which contained, though even in imperfect expression, the germ of a poetic idea. But his finest songs are almost all to fine poems. He set over 70 of Goethe's, over 60 of Schiller's; among the others are the names of Shakespeare and Scott, of Schlegel and Ruckert, of Novalis and Wilhelm Müller—a list more than sufficient to compensate for the triviality of occasional pieces or the inferior workmanship of personal friends. It was a tragedy that he only lived for a few weeks after the appearance of the *Buch der Lieder*. We may conjecture what the world would have gained if he had found the full complement of his art in Heine.

In his earlier songs he is more affected by the external and pictorial aspect of the poem; in the later ones he penetrates to the centre and seizes the poetic conception from within. But in both alike he shows a gift of absolute melody which, even apart from its meaning, would be inestimable. Neither Handel nor Mozart—his two great predecessors in lyric tune—have surpassed or even approached him in fertility and variety of resource. The songs in *Acis* are wonderful; so are those in *Zauberflöte*, but they are not so wonderful as *Litaney*, and "Who is Sylvia?" and the *Ständchen*. To Schubert we owe the introduction into music of a particular quality of romance, a particular "addition of strangeness to beauty"; and so long as the art remains his place among its supreme masters is undoubtedly assured. (W. H. Ha.)

SCHÜCKING, LEVIN (1814–1883), German novelist, was born on the estate of Klemenswerth, near Meppen in Westphalia, on the 6th of September 1814. After studying law at Munich, Heidelberg and Göttingen, he wished to enter the government judicial service, but, confronted by serious difficulties, abandoned the legal career, and settling at Münster in 1837, devoted himself to literary work. In 1841 he removed to Schloss Meersburg on the Lake of Constance, joined in 1843 the editorial staff of the *Allgemeine Zeitung* in Augsburg, and in 1845 that of the *Kölnische Zeitung* in Cologne. In 1852 he retired to his estate, Sassenberg near Münster, and died at Pyrmont on the 31st of August 1883. Among his numerous romances, which are distinguished by good taste and patriotic feeling, largely reflecting the sound, sturdy character of the Westphalians, must be especially mentioned: *Ein Schloss am Meer* (1843); *Ein Sohn des Volkes* (1849); *Ein Staatsgeheimnis* (1854); *Verschlungene Wege* (1867); *Die Herberge der Gerechtigkeit* (1879). Schücking wrote a number of short stories: *Aus den Tagen der grossen Kaiserin* (1858) and *Neue Novellen* (1877). In *Annette von Droste-Hülshoff* (*q.v.*) (1862) he gives a sketch of this poet and acknowledges his indebtedness to her beneficial influence upon his mind. There appeared posthumously, *Lebenserinnerungen* (1886) and *Briefe von Annette von Droste-Hülshoff und Levin Schücking* (1893). His wife, Luise (1815–1855), daughter of the General Freiherr von Gall, in the Hessian service, published some novels and romances of considerable merit. Among the latter may be mentioned *Gegen den Strom* (1851) and *Der neue Kreuzritter* (1853).

Schücking's *Gesammelte Erzählungen und Novellen* appeared in 6 vols. (1859–1866); *Ausgewählte Romane* (12 vols., 1864; 2nd series, also 12 vols., 1874–1876).

SCHULTENS, the name of three Dutch Orientalists. The first and most important, Albert Schultens (1686–1750), was born at Groningen. He studied for the church at Groningen and Leiden, applying himself specially to Hebrew and the cognate tongues. His dissertation on *The Use of Arabic in the Interpretation of Scripture* appeared in 1706. After a visit to Reland in Utrecht he returned to Groningen (1708); then, having taken his degree in theology (1709), he again went to Leiden, and devoted himself to the study of the MS. collections there till in 1711 he became pastor at Wassenaer. Disliking parochial work, in 1713 he took the Hebrew chair at Franeker, which he held till 1729, when he was transferred to Leiden as rector of the *collegium theologicum*, or seminary for poor students. From 1732 till his death (at Leiden on the 26th of January 1750) he was professor of Oriental languages at Leiden. Schultens was the chief Arabic teacher of his time, and in some sense a restorer of Arabic studies, but he differed from J. J. Reiske and A. I. De Sacy in mainly regarding Arabic as a handmaid to Hebrew. He vindicated the value of comparative study of the Semitic tongues against those who, like Gousset, regarded Hebrew as a sacred tongue with which comparative philology has nothing to do. His principal works were *Origines Hebraeae* (2 vols., 1724, 1738), a second edition of which, with the *De defectibus linguae Hebraeae* (1731), appeared in 1761; *Job* (1737); *Proverbs* (1748); *Vetus et regia via hebraezandi* (1738); *Monumenta vetustiora Arabum* (1740), &c.

His son, John James Schultens (1716–1778), became professor at Herborn in 1742, and afterwards succeeded to his father's chair. He was in turn succeeded by his son, Henry Albert Schultens (1749–1793), who, however, left comparatively little behind him, having succumbed to excessive work while preparing an edition of Meidani, of which only a part appeared posthumously (1795).

SCHULTZ, HERMANN (1836–), German Protestant theologian, was born at Lüchow in Hanover on the 30th of December 1836. He studied at Göttingen and Erlangen, became professor at Basel in 1864, and eventually (1876) *professor ordinarius* at Göttingen. Here he has also held the appointments of chief university preacher, councillor to the consistory (from 1881) and abbot of Bursfelde (1890). Professor Schultz's theological standpoint was that of a moderate liberal. "It is thought by many that he has succeeded in discovering the *via media* between the positions of Biblical scholars like Delitzsch on the one hand and Stade on the other" (Prof. J. A. Paterson). He is well known to British and American students as the author of an excellent work on *Old Testament Theology* (2 vols., 1869, 5th ed., 1896; Eng. trans., 2nd ed., 1895).

In his work on the doctrine of the Divinity of Christ (*Die Lehre von der Gottheit Christi*, 1881) he follows the method of Ritschl, and contends that the deity of Christ ought to be understood as the expression of the experience of the Christian community. In his own person and work Christ represents to the community a personal revelation of God. Faith in the divinity of Christ does not rest upon a miracle in nature, but upon a miracle in the moral world.

Schultz's other works include: *Die Stellung des christl. Glaubens zur heiligen Schrift* (1876; 2nd ed., 1877), *Lehre vom heiligen Abendmahl* (1886); *Grundriss der evang. Dogmatik* (1890; 2nd ed., 1892), *Grundriss der evang. Ethik* (2nd ed., 1897), and *Grundriss der christl. Apologetik* (2nd ed., 1902).

SCHULTZE, MAX JOHANN SIGISMUND (1825–1874), German microscopic anatomist, was born at Freiburg in Breisgau (Baden) on the 25th of March 1825. He studied medicine at Greifswald and Berlin, and was appointed extraordinary professor at Halle in 1854 and five years later ordinary professor of anatomy and histology and director of the Anatomical Institute at Bonn. He died at Bonn on the 16th of January 1874. He founded, in 1865, and edited the important *Archiv fur mikroskopische Anatomie*, to which he contributed many papers, and he advanced the subject generally, by refining on its technical methods. His works included *Beiträge zur Naturgeschichte der Turbellarien* (1851), *Über den Organismus der Polythalamien* (1854), *Beiträge zur Kenntnis der Landplanarien* (1857), *Zur Kenntnis der elektrischen Organe der Fische* (1858) and *Zur Anatomie und Physiologie der Retina* (1866). His name is especially known for his work on the cell theory. Uniting F. Dujardin's conception of animal sarcode with H. von Mohl's of vegetable protoplasma, he pointed out their identity, and included them under the common name of protoplasm, defining the cell as "a nucleated mass of protoplasm with or without a cell-wall" (*Das Protoplasma der Rhizopoden und der Pflanzenzellen; ein Beitrag zur Theorie der Zelle*, 1863).

SCHULZE-DELITZSCH, FRANZ HERMANN (1808–1883), German economist, was born at Delitzsch, in Prussian Saxony, on the 29th of August 1808. The place-name Delitzsch was added in 1848 to distinguish him from other Schulzes in the National Assembly. He studied law at Leipzig and Halle universities and, when thirty, he became an assessor in the court of justice at Berlin, and three years later was appointed *patrimonialrichter* at Delitzsch. Entering the parliament of 1848, he joined the Left Centre, and, acting as president of the commission of inquiry into the condition of the labourers and artisans, became impressed with the necessity of co-operation to enable the smaller tradespeople to hold their own against the capitalists. He was a member of the Second Chamber in 1848–1849; but as matters ceased to run smoothly between himself and the high legal officials, he threw up his public appointments in October 1851, and withdrew to Delitzsch. Here he devoted himself to the organization and development of co-operation in Germany, and to the foundation of Vorschussvereine (people's banks), of which he had established the first at Delitzsch in 1850. These developed so rapidly that Schulze-Delitzsch in 1858, in *Die arbeitenden Klassen und das Assoziationswesen in Deutschland*, enumerated twenty-five as already in existence. In 1859 he promoted the first *Genossenschaftstag*, or co-operative meeting, in Weimar, and founded a central bureau of co-operative societies. In 1861 he again entered the Prussian Chamber, and became a prominent member of the Progressist party. In 1863 he devoted the chief portion of a testimonial, amounting to £7500, to the maintenance of his co-operative institutions and offices. This, however, was only to meet an exceptional outlay, for he always insisted that they must be self-supporting. The next three or four years were given to the formation of local centres, and the establishment of the Deutsche Genossenschafts-Bank, 1865.

The spread of these organizations naturally led to legislation on the subject, and this too was chiefly the work of Schulze-Delitzsch. As a member of the Chamber in 1867 he was mainly instrumental in passing the Prussian law of association, which was extended to the North German Confederation in 1868, and later to the empire. Schulze-Delitzsch also contributed to uniformity of legislation throughout the states of Germany, in 1869, by the publication of *Die Gesetzgebung uber die privatrechtliche Stellung des Erwerbs- und Wirthschaftsgenossenschaften*, &c. His life-work was now complete; he had placed the advantages of capital and co-operation within the reach of struggling tradesmen throughout Germany. His remaining years were spent in consolidating this work. Both as a writer and a member of the Reichstag his industry was incessant, and he died in harness on the 29th of April 1883 at Potsdam, leaving the reputation of a benefactor to the smaller tradesmen and artisans, in which light he must be regarded rather than as the founder of true co-operative principles in Germany. (See also CO-OPERATION.)

SCHUMACHER, HEINRICH CHRISTIAN (1780–1850), German astronomer, was born at Bramstedt in Holstein on the 3rd of September 1780. He was director of the Mannheim observatory from 1813 to 1815, and then became professor of astronomy in Copenhagen. From 1817 he directed the triangulation of Holstein, to which a few years later was added a complete geodetic survey of Denmark (finished after his death). For the sake of the survey an observatory was established at Altona, and Schumacher resided there permanently, chiefly occupied with the publication of *Ephemerides* (11 parts, 1822–1832) and of the journal *Astronomische Nachrichten*, of which he edited thirty-one volumes. He died at Altona on the 28th of December 1850.

His son, RICHARD SCHUMACHER (1827–1902), was his assistant from 1844 to 1850 at the observatory at Altona. Having become assistant to Carlos Guillelmo Moesta (1825–1884), director of the observatory at Santiago, in 1859, he was associated with the Chilean geodetic survey in 1864. Returning in 1869, he was appointed assistant astronomer at Altona in 1873, and afterwards at Kiel.

H. C. Schumacher's nephew, CHRISTIAN ANDREAS SCHUMACHER (1810–1854), was associated with the geodetic survey of Denmark from 1833 to 1838, and afterwards (1844–1845) improved the observatory at Pulkowa.

SCHUMANN, ROBERT ALEXANDER (1810–1856), German musical composer, was born on the 8th of June 1810 in Zwickau in Saxony. His father was a publisher, and it was in the cultivation of literature quite as much as in that of music that his boyhood was spent. He himself tells us that he began to compose before his seventh year. At fourteen he wrote an essay on the aesthetics of music and also contributed to a volume edited by his father and entitled *Portraits of Famous Men*. While still at school in Zwickau he read, besides Schiller and Goethe, Byron (whose *Beppo* and *Childe Harold* had been translated by his father) and the Greek tragedians. But the most powerful as well as the most permanent of the literary influences exercised upon him, however, was undoubtedly that of Jean Paul Richter. This influence may clearly be seen in his youthful novels *Juniusabende* and *Selene*, of which the first only was completed (1826). In 1828 he left school, and after a tour, during which he met Heine at Munich, he went to Leipzig to study law. His interest in music had been stimulated when he was a child by hearing Moscheles play at Carlsbad, and in 1827 his enthusiasm had been further excited by the works of Schubert and Mendelssohn. But his father, who had encouraged the boy's musical aspirations, had died in 1826, and neither his mother nor his guardian approved of a musical career for him. The question seemed to be set at rest by Schumann's expressed intention to study law, but both at Leipzig and at Heidelberg, whither he went in 1829, he neglected the law for the philosophers, and though—to use his own words—"but Nature's pupil pure and simple" began composing songs. The restless spirit by which he was pursued is disclosed in his letters of the period. At Easter 1830 he heard Paganini at Frankfurt. In July in this year he wrote to his mother, "My whole life has been a struggle between Poetry and Prose, or call it Music and Law," and by Christmas he was once more in Leipzig, taking piano lessons with his old master, Friedrich Wieck. In his anxiety to accelerate the process by which he could acquire a perfect execution he permanently injured his right hand. His ambitions as a pianist being thus

suddenly ruined, he determined to devote himself entirely to composition, and began a course of theory under Heinrich Dorn, conductor of the Leipzig opera. About this time he contemplated an opera on the subject of *Hamlet*.

The fusion of the literary idea with its musical illustration, which may be said to have first taken shape in *Papillons* (op. 2), is foreshadowed to some extent in the first criticism by Schumann, an essay on Chopin's variations on a theme from *Don Juan*, which appeared in the *Allgemeine musikalische Zeitung* in 1831. Here the work is discussed by the imaginary characters Florestan and Eusebius (the counterparts of Vult and Walt in Jean Paul's novel *Flegeljahre*), and Meister Raro (representing either the composer himself or Wieck) is called upon for his opinion. By the time, however, that Schumann had written *Papillons* (1831) he had gone a step farther. The scenes and characters of his favourite novelist had now passed definitely and consciously into the written music, and in a letter from Leipzig (April 1832) he bids his brothers "read the last scene in Jean Paul's *Flegeljahre* as soon as possible, because the *Papillons* are intended as a musical representation of that masquerade." In the winter of 1832 Schumann visited his relations at Zwickau and Schneeberg, in both of which places was performed the first movement of his symphony in G minor, which remains unpublished. In Zwickau the music was played at a concert given by Wieck's daughter Clara, who was then only thirteen. The death of his brother Julius as well as that of his sister-in-law Rosalie in 1833 seems to have affected Schumann with a profound melancholy. By the spring of 1834, however, he had sufficiently recovered to be able to start *Die neue Zeitschrift für Musik*, the paper in which appeared the greater part of his critical writings. The first number was published on the 3rd of April 1834. It effected a revolution in the taste of the time, when Mozart, Beethoven and Weber were being neglected for the shallow works of men whose names are now forgotten. To bestow praise on Chopin and Berlioz in those days was to court the charge of eccentricity in taste, yet the genius of both these masters was appreciated and openly proclaimed in the new journal.

Schumann's editorial duties, which kept him closely occupied during the summer of 1834, were interrupted by his relations with Ernestine von Fricken, a girl of sixteen, to whom he became engaged. She was the adopted daughter of a rich Bohemian, from whose variations on a theme in C♯ minor Schumann constructed his own *Études symphoniques*. The engagement was broken off by Schumann, for reasons which have always remained obscure. In the *Carnaval* (op. 9 = 1834), one of his most genial and most characteristic pianoforte works, Schumann commenced nearly all the sections of which it is composed with the musical notes signified in German by the letters that spell Asch, the town in which Ernestine was born, which also are the musical letters in Schumann's own name. By the sub-title "Estrella" to one of the sections in the *Carnaval*, Ernestine is meant, and by the sub-title "Chiarina" Clara Wieck. Eusebius and Florestan, the imaginary figures appearing so often in his critical writings, also occur, besides brilliant imitations of Chopin and Paganini, and the work comes to a close with a march of the men of David against the Philistines in which may be heard the clear accents of truth in contest with the dull clamour of falsehood. In the *Carnaval* Schumann went farther than in *Papillons*, for in it he himself conceived the story of which it was the musical illustration. On the 3rd of October 1835 Schumann met Mendelssohn at Wieck's house in Leipzig, and his appreciation of his great contemporary was shown with the same generous freedom that distinguished him in all his relations to other musicians, and which later enabled him to recognize the genius of Brahms when he was still obscure.

In 1836 Schumann's acquaintance with Clara Wieck, already famous as a pianist, ripened into love, and a year later he asked her father's consent to their marriage, but was met with a refusal. In the series *Phantasiestücke* for the piano (op. 12) he once more gives a sublime illustration of the fusion of literary and musical ideas as embodied conceptions in such pieces as "Warum" and "In der Nacht." After he had written the latter of these two he detected in the music the fanciful suggestion of a series of episodes from the story of Hero and Leander. The *Kreisleriana*, which he regarded as one of his most successful works, was written in 1838, and in this the composer's realism is again carried a step farther. Kreisler, the romantic poet brought into contact with the real world, was a character drawn from life by the poet E. T. A. Hoffmann (*q.v.*), and Schumann utilized him as an imaginary mouthpiece for the recital in music of his own personal experiences. The *Phantasie* (op. 17), written in the summer of 1836, is a work of the highest quality of passion. With the *Faschingsschwank aus Wien*, his most pictorial work for the piano, written in 1839, after a visit to Vienna, this period of his life comes to an end. As Wieck still withheld his consent to their marriage, Robert and Clara at last dispensed with it, and were married on the 12th of September at Schönefeld near Leipzig.

The year 1840 may be said to have yielded the most extraordinary results in Schumann's career. Until now he had written almost solely for the pianoforte, but in this one year he wrote about a hundred and fifty songs. Schumann's biographers represent him as caught in a tempest of song, the sweetness, the doubt and the despair of which are all to be attributed to varying emotions aroused by his love for Clara. Yet it would be idle to ascribe to this influence alone the lyrical perfection of such songs as "Frühlingsnacht," "Im wunderschönen Monat Mai" and "Schöne Wiege meiner Leiden." His chief song-cycles of this period were his settings of the *Liederkreis* of J. von Eichendorff (op. 39), the *Frauenliebe und Leben* of Chamisso (op. 42), the *Dichterliebe* of Heine (op. 48) and *Myrthen*, a collection of songs, including poems by Goethe, Rückert, Heine, Byron, Burns and Moore. The songs "Belsatzar" (op. 57) and "Die beiden Grenadiere" (op. 49), each to Heine's words, show Schumann at his best as a ballad writer, though the dramatic ballad is less congenial to him than the introspective lyric. As Grillparzer said, "He has made himself a new ideal world in which he moves almost as he wills." Yet it was not until long afterwards that he met with adequate recognition. In his lifetime the sole tokens of honour bestowed upon Schumann were the degree of Doctor by the University of Jena in 1840, and in 1843 a professorship in the Conservatorium of Leipzig. Probably no composer ever rivalled Schumann in concentrating his energies on one form of music at a time. At first all his creative impulses were translated into pianoforte music, then followed the miraculous year of the songs. In 1841 he wrote two of his four symphonies. The year 1842 was devoted to the composition of chamber music, and includes the pianoforte quintet (op. 44), now one of his best known and most admired works. In 1843 he wrote *Paradise and the Peri*, his first essay at concerted vocal music. He had now mastered the separate forms, and from this time forward his compositions are not confined during any particular period to any one of them. In Schumann, above all musicians, the acquisition of technical knowledge was closely bound up with the growth of his own experience and the impulse to express it. The stage in his life when he was deeply engaged in his music to Goethe's *Faust* (1844–1853) was a critical one for his health. The first half of the year 1844 had been spent with his wife in Russia. On returning to Germany he had abandoned his editorial work, and left Leipzig for Dresden, where he suffered from persistent nervous prostration. As soon as he began to work he was seized with fits of shivering, and an apprehension of death which was exhibited in an abhorrence for high places, for all metal instruments (even keys) and for drugs. He suffered perpetually also from imagining that he had the note A sounding in his ears. In 1846 he had recovered and in the winter revisited Vienna, travelling to Prague and Berlin in the spring of 1847 and in the summer to Zwickau, where he was received with enthusiasm, gratifying because Dresden and Leipzig were the only large cities in which his fame was at this time appreciated.

To 1848 belongs his only opera, *Genoveva*, a work containing much beautiful music, but lacking dramatic force. It is

interesting for its attempt to abolish the recitative, which Schumann regarded as an interruption to the musical flow. The subject of *Genoveva*, based on Tieck and Hebbel, was in itself not a particularly happy choice; but it is worth remembering that as early as 1842 the possibilities of German opera had been keenly realized by Schumann, who wrote, "Do you know my prayer as an artist, night and morning? It is called 'German Opera.' Here is a real field for enterprise . . . something simple, profound, German." And in his notebook of suggestions for the text of operas are found amongst others: *Nibelungen*, *Lohengrin* and *Till Eulenspiegel*. The music to Byron's *Manfred* is pre-eminent in a year (1849) in which he wrote more than in any other. The insurrection of Dresden caused Schumann to move to Kreischa, a little village a few miles outside the city. In the August of this year, on the occasion of the hundredth anniversary of Goethe's birth, such scenes of Schumann's *Faust* as were already completed were performed in Dresden, Leipzig and Weimar, Liszt as always giving unwearied assistance and encouragement. The rest of the work was written in the latter part of the year, and the overture in 1853. From 1850 to 1854 the text of Schumann's works is extremely varied. In 1850 he succeeded Ferdinand Hiller as musical director at Düsseldorf; in 1851–1853 he visited Switzerland and Belgium as well as Leipzig. In January 1854 Schumann went to Hanover, where he heard a performance of his *Paradise and the Peri*. Soon after his return to Düsseldorf, where he was engaged in editing his complete works and making an anthology on the subject of music, a renewal of the symptoms that had threatened him before showed itself. Besides the single note he now imagined that voices sounded in his ear. One night he suddenly left his bed, saying that Schubert and Mendelssohn had sent him a theme which he must write down, and on this theme he wrote five variations for the pianoforte, his last work. On the 27th of February he threw himself into the Rhine. He was rescued by some boatmen, but when brought to land was found to be quite insane. He was taken to a private asylum in Endenich near Bonn, and remained there until his death on the 29th of July 1856. He was buried at Bonn and in 1880 a statue by A. Donndorf was erected on his tomb.

His wife, CLARA SCHUMANN (1819–1896), trained from an early age by Wieck, had a brilliant career as a pianist from the age of thirteen up to her marriage. In the various tours on which she accompanied her husband, she extended her own reputation beyond the borders of Germany, and it was thanks to her efforts that his compositions became generally known in Europe. From the time of her husband's death she devoted herself principally to the interpretation of her husband's works, but when in 1856 she first visited England the critics received Schumann's music with a chorus of disapprobation. She returned to London in 1865 and continued her visits annually, with the exception of four seasons, until 1882; and from 1885 to 1888 she appeared each year. In 1878 she was appointed teacher of the piano at the Hoch Conservatorium at Frankfurt, a post which she held until 1892, and in which she contributed greatly to the modern improvement in technique. As an artist she will be remembered, together with Joseph Joachim, as one of the first executants who really played like composers. Besides being remembered for her eminence as a performer of nearly all kinds of pianoforte music, at a time when such technical ability was considerably rarer than in the present day, she was herself the composer of a few songs and of some charming music, mainly for the piano, and the authoritative editor of her husband's works for Breitkopf and Härtel.

The following are the chief compositions of Robert Schumann.

Pianoforte Works.

Papillons (op. 2)	1829–1831
Études symphoniques (op. 13)	1834
Carnaval (op. 9)	1834–1835
Sonata in F sharp minor (op. 11)	1835
Sonata in G minor (op. 22)	1833–1835
Kinderszenen (op. 15)	1836
Fantasia in C (op. 17)	1836
Fantasiestücke (op. 12)	1837
Kreisleriana (op. 16)	1838
Novelletten (op. 21)	1838
Faschingschwank aus Wien (op. 26)	1839

Songs and Choral Works.

Songs:—"Liederkreis" (Heine), nine songs (op. 24); "Myrthen," twenty-six songs (4 books) (op. 25); "Liederkreis" (Eichendorff), twelve songs (op. 39); "Frauenliebe und Leben" (Chamisso), eight songs (op. 42); "Dichterliebe," sixteen songs from Heine's *Buch der Lieder* (op. 48); "Belsatzar," ballad (Heine) (op. 57)	1840
Song, "Tragödie" (Heine) from op. 64	1841
Ballad, "Der Handschuh" (Schiller)	probably 1851
Songs from Wilhelm Meister and Requiem for Mignon for chorus (op. 98)	1849
Spanische Liebeslieder (op. 138)	1849
Choral and Dramatic Works:—"Paradise and the Peri," for solos, chorus and orchestra (op. 50)	1843
Faust music	1844–1853
"Genoveva," opera	1848
Manfred music	1849
"Der Rose Pilgerfahrt" (Moritz Horn), for solos, chorus and orchestra (op. 112); "Der Königssohn" (Uhland), for solos, chorus and orchestra (op. 103); "Des Sängers Fluch" (Uhland) for solos, chorus and orchestra (op. 139)	1851
Mass for four part chorus and orchestra (op. 148); "Vom Pagen und der Königstochter," four ballads (Geibel) for solos, chorus and orchestra (op. 135); "Das Gluck von Edenhall," ballad (Uhland), for solos, chorus and orchestra (op. 143)	1852
Festival overture on the *Rheinweinlied* for orchestra and chorus (op. 123)	1853

Chamber Music.

Three quartets for strings in A minor, F and A (op. 41); Quintet for pianoforte and strings in E flat (op. 44); Quartet for pianoforte and strings in E flat (op. 47); Fantasiestücke for pianoforte, violin and violoncello (op. 88)	1842
Andante and variations for two pianofortes (op. 46)[1]	1843
Trio for pianoforte and strings in D minor (op. 63); Trio for pianoforte and strings in F (op. 80)	1847
Fantasiestücke for clarinet and pianoforte (op. 73); Five "Stücke im Volkston" for piano and violoncello (op. 102); Three Romances for oboe and piano (op. 94)	1849
"Märchenbilder" for pianoforte and viola (op. 113); Sonata for pianoforte and violin in A minor (op. 105); Trio for pianoforte and strings in G minor (op. 110); Sonata for pianoforte and violin in D minor (op. 121)	1851
"Märchenerzählungen," four pieces for clarinet, viola and pianoforte, probably written in	1853

Orchestral Works.

B flat Symphony (op. 38); Fourth Symphony in D minor (op. 120)[2]; Overture, Scherzo and Finale	1841
Second Symphony in C (op. 61)	1846
Third or "Rhenish" Symphony in E flat (op. 97)	1850

Concertos and Concert-Stücke.

For Pianoforte in A minor (op. 54)	1841–1845
Concert-stück for four horns (op. 86); Introduction and Allegro-appassionato for Pianoforte (op. 92)	1849
Concerto for Violoncello (op. 120)	1852

BIBLIOGRAPHY.—Wasielewski, *Robert Schumann*; A. Reismann, *Robert Schumanns Leben und Werke*; J. A. Fuller Maitland, *Schumann* ("Great Musicians" series); *The Life of Robert Schumann told in his Letters* (with a preface by J. G. Jansen), translated from the German by May Herbert; *Letters of R. Schumann*, edited by Karl Storck (Eng. trans. by Hannah Bryant); V. Joss, *Der Musikpädagoge Friedrich Wieck und seine Familie*; Litzmann, *Clara Schumann* (1902); Moser's *Joseph Joachim* and the first volume of Kalbeck's *Brahms* contain much that is important as to Schumann's later years. See also W. H. Hadow, *Studies in Modern Music*, first series (1894).

[1] Originally for two pianofortes, two violoncellos and horn. The original version (which contains four additional variations) was published in 1893.

[2] Revised 1851; original version published 1891.

SCHÜRER, EMIL (1844–1910), German Protestant theologian, was born at Augsburg on the 2nd of May 1844. After studying at Erlangen, Berlin and Heidelberg from 1862 to 1866, he became in 1873 professor extraordinarius at Leipzig and eventually (1895) professor ordinarius at Göttingen. In 1876 he founded and edited the *Theologische Literaturzeitung*, and from 1881 to 1910 he edited it with Adolf Harnack. His elaborate work on the history of the Jews in the time of Christ (*Geschichte des judischen Volks im Zeitalter Jesu Christi*, 2 vols., 1886–1890; new ed. in 3 vols., 1901–1902; Eng. trans., 1890 ff.) made him in Great Britain and America one of the best known of modern German scholars. He died after a long illness on the 30th of April 1910.

His other works include: *Schleiermacher's Religionsbegriff* (1868); *Lehrbuch der neutestamentlichen Zeitgeschichte* (1874; an earlier form of *Gesch. des jud. Volks*), and *Die Gemeindeverfassung der Juden in Rom* (1879). See A. Harnack in the *Theologische Literaturzeitung* for May 14, 1910.

SCHURMAN, JACOB GOULD (1854–), American educationist, was born at Freetown, Prince Edward Island, on the 22nd of May 1854, of Dutch descent, his Loyalist ancestors having left New York in 1784. While a student at Acadia College, Wolfville, Nova Scotia, in 1875, he won the Canadian Gilchrist scholarship in the University of London, from which he received the degree of B.A. in 1877 and that of M.A. in 1878, and in 1877–1880 studied in Paris, Edinburgh and (as Hibbert Fellow) in Heidelberg, Berlin and Göttingen. He was professor of English literature, political economy and psychology at Acadia College in 1880–1882, of metaphysics and English literature at Dalhousie College, Halifax, N.S., in 1882–1886, and of philosophy (Sage professor) at Cornell University in 1886–1892, being Dean of the Sage School of Philosophy in 1891–1892. In 1892 he became president of Cornell University. He was chairman of the First United States Philippine Commission in 1899, and wrote (besides a part of the official report to Congress) *Philippine Affairs—A Retrospect and an Outlook* (1902). With J. E. Creighton and James Seth he founded in 1892 *The Philosophical Review*. He also wrote *Kantian Ethics and the Ethics of Evolution* (1881); *The Ethical Import of Darwinism* (1888); *Belief in God* (1890), and *Agnosticism and Religion* (1896).

SCHURZ, CARL (1829–1906), German American statesman and reformer, was born in Liblar, near Cologne, on the 2nd of March 1829, the son of a school-teacher. He studied in the Jesuit Gynasium of Cologne in 1840–1846, and then entered the University of Bonn, where he became a revolutionary, partly through his friendship with Gottfried Kinkel, professor of literature and art-history. He assisted Kinkel in editing the *Bonner Zeitung*, and on the outbreak of the Revolution of 1848 took the field, but when Rastatt surrendered he escaped to Zurich. In 1850 he returned secretly to Germany, rescued Kinkel from the prison at Spandau and helped him to escape to Scotland. Schurz went to Paris, but the police forced him to leave France on the eve of the *coup d'état*, and until August 1852 he lived in London, making his living by teaching German. He married in July 1852 and removed to America, living for a time in Philadelphia.

In 1856 after a year in Europe he settled in Watertown, Wisconsin, and immediately became prominent in the Republican party of that state. In 1857 he was an unsuccessful candidate for lieutenant-governor on the Republican ticket. In the Illinois campaign of the next year between Abraham Lincoln and Stephen A. Douglas he took part as a speaker; and later in 1858 he was admitted to the Wisconsin bar and began to practise law in Milwaukee. In the state campaign of 1859 he made a speech attacking the Fugitive Slave Law and arguing for state's rights and thus injured his political standing in Wisconsin; and in April he delivered in Faneuil Hall, Boston, an oration on "True Americanism," which coming from an alien was intended to clear the Republican party of the charge of "nativism." The Germans of Wisconsin unsuccessfully urged his nomination for governor by the Republican party in 1859. In the Republican National Convention of 1860 Schurz was chairman of the delegation from Wisconsin, which voted for W. H. Seward; he was on the committee which drew up the platform and served on the committee which announced his nomination to Abraham Lincoln. In spite of Secretary Seward's objection, grounded on Schurz's European record as a revolutionary, Lincoln sent him in 1861 as minister to Spain. He returned to America in January 1862, resigned his post, was commissioned brigadier-general of volunteers in April, and in June took command of a division under Frémont, and then in Sigel's corps, with which he took part in the second battle of Bull Run. He was promoted major-general of volunteers on the 14th of March and was a division commander at Chancellorsville of the Eleventh Corps, under General O. O. Howard, with whom he later had a bitter controversy over this battle. He was at Gettysburg and at Chattanooga. After the Eleventh and Twelfth Corps were united as the Twentieth he was put in command of a Corps of Instruction at Nashville, and saw no more active service except in the last months of the war when he was with Sherman's army in North Carolina. He resigned from the army immediately after the close of hostilities. In the summer of 1865 President Johnson sent him through the South to study conditions; the President quarrelled with Schurz because the latter approved General H. W. Slocum's order forbidding the organization of militia in Mississippi, and Schurz's valuable report (afterwards published as an executive document), suggesting the readmission of the states with complete rights and the investigation of the need of further legislation by a Congressional committee, was not heeded by the President. In 1866–1867 he was chief editor of the Detroit *Post* and then became editor and joint proprietor with Emil Praetorius (1827–1905) of the *Westliche Post* of St Louis. In the winter of 1867–1868 he travelled in Germany—the account of his interview with Bismarck is one of the most interesting chapters of his *Reminiscences*. He spoke against "repudiation" and for "honest money" during the Presidential campaign of 1868.

In 1869–1875 he was United States Senator from Missouri, and made a great reputation (especially in 1873–1874) by his speeches on financial subjects. During this period he broke with the administration: he started the Liberal Republican movement in Missouri in 1870 which elected B. Gratz Brown governor; and in 1872 he presided over the Liberal Republican convention which nominated Horace Greeley for the presidency (Schurz's own choice was Charles Francis Adams or Lyman Trumbull) and which did not in its platform represent Schurz's views on the tariff, but Greeley's. He opposed Grant's Santo Domingo policy—after Fessenden's death Schurz was a member of the Committee on Foreign Affairs,—his southern policy, and the government's selling arms and making cartridges for the French army in the Franco-Prussian War. But in 1875 he campaigned for Hayes, as the representative of sound money, in the Ohio gubernatorial campaign. In 1876 he supported Hayes in the contest for the presidency, and Hayes made him in 1877 his secretary of the interior, and followed much of his advice in other cabinet appointments and in his inaugural address. In this department Schurz put in force his theories in regard to merit in the Civil Service, permitting no removals except for cause, and requiring competitive examinations for candidates for clerkships; he reformed the Indian Bureau and successfully opposed a bill transferring it to the War Department; and he prosecuted land thieves and attracted public attention to the necessity of forest preservation. Upon his retirement in 1881 he removed to New York City, and from the summer of 1881 to the autumn of 1883 was editor-in-chief and one of the proprietors of the New York *Evening Post*. In 1884 he was a leader in the Independent (or Mugwump) movement against the nomination of James G. Blaine for the presidency and for the election of Grover Cleveland. From 1888 to 1892 he was general American representative of the Hamburg American Steamship Company. In 1892 he succeeded George William Curtis as president of the National Civil Service Reform League and held this office until 1901. He succeeded Curtis as editorial writer for *Harper's Weekly* in 1892–1898, in which he did much for civil service reform and for Cleveland's nomination and election

in 1892. In 1895 he spoke for the Fusion anti-Tammany ticket in New York City. He opposed W. J. Bryan for the presidency in 1896, speaking for sound money and not under the auspices of the Republican party; in 1900 on the anti-imperialism issue he supported Bryan; and in 1904 he supported A. B. Parker, the Democratic candidate. He died in New York City on the 14th of May 1906.

Schurz published a volume of *Speeches* (1885); *Henry Clay* (1887) in the "American Statesmen" series, a standard biography; *Abraham Lincoln* (1889), a remarkable essay; and *Reminiscences* (New York, 3 vols., 1907-1908), in the third volume of which is a sketch of his life and public services from 1869 to 1906 by Frederic Bancroft and William A. Dunning. During the last twenty years of his life Schurz was perhaps the most prominent Independent in American politics, and even more notable than his great abilities was his devotion to his high principles. He was the first German-born American to enter the United States Senate, and was an able debater; and his command of the English language, written and spoken, was remarkable. A sense of humour added much to his campaign speeches.

SCHÜTZENBERGER, PAUL (1829–1897), French chemist, was born on the 23rd of December 1829 at Strassburg, where his father Georges Frédéric Schützenberger (1779-1859) was professor of law, and his uncle Charles Schützenberger (1809–1881) professor of chemical medicine. He was intended for a medical career and graduated M.D. at Strassburg in 1855, but his interests lay in physical and chemical science. In 1853 he went to Paris as *préparateur* to J. F. Persoz (1805–1868), professor of chemistry at the Conservatoire des Arts et Métiers. A year later he was entrusted with a course of chemical instruction at Mülhausen, and he remained in that town till 1865 as professor at the École Supérieure des Sciences. He then returned to Paris as assistant to A. V. Balard at the Collège de France, in 1876 he succeeded that chemist in the chair of chemistry, and in 1882 he became directing professor at the municipal École de Physique et de Chimie. The two latter chairs he held together until his death, which happened on the 26th of June 1897 at Mézy, Seine et Oise. During the period he spent at Mülhausen, Schützenberger paid special attention to industrial chemistry, particularly in connexion with colouring matters, but he also worked at general and biological chemistry which subsequently occupied the greater part of his time. He is known for a long series of researches on the constitution of alkaloids and of the albuminoid bodies, and for the preparation of several new series of platinum compounds and of hyposulphurous acid, $H_2S_2O_4$. Towards the end of his life he adopted the view that the elements have been formed by some process of condensation from one primordial substance of extremely small atomic weight, and he expressed the conviction that atomic weights within narrow limits are variable and modified according to the physical conditions in which a compound is formed.

His publications include *Chimie appliquée à la physiologie et à la pathologie animale* (1863); *Traité des matières colorantes* (1867); *Les Fermentations* (1875), which was translated into German, Italian and English; and an excellent *Traité de chimie générale* in seven volumes (1880–1894).

SCHUYLER, PHILIP JOHN (1733–1804), American soldier, was born at Albany, New York, on the 11th of November 1733. The Schuyler family was established in the New World by Philip Pieterse Schuyler (d. 1683), who migrated from Amsterdam in 1650, and whose son, Peter (1657–1724), was the first mayor of Albany and chairman of the board of Indian commissioners of the province. The family was one of the wealthiest and most influential in the colony and was closely related by marriage to the Van Rensselaers, Van Cortlandts and other representatives of the old Dutch aristocracy. Philip Schuyler served in the Provincial Army during the Seven Years' War, first as captain and later as deputy-commissary with the rank of major, taking part in the battles of Lake George (1755), Oswego River (1756), Ticonderoga (1758) and Fort Frontenac (1758). From 1768 to 1775 he represented Albany in the New York Assembly, and he was closely associated with the Livingston family in the leadership of the Presbyterian or Whig party. He was a delegate to the second Continental Congress in May 1775, and on the 19th of June was chosen one of the four major-generals in the Continental service. Placed in command of the northern department of New York, he established headquarters at Albany, and made preparations for an invasion of Canada. Soon after the expedition started he was prostrated by rheumatic gout, and the actual command devolved upon General Richard Montgomery. Schuyler returned to Ticonderoga and later to Albany, where he spent the winter of 1775–1776 in collecting and forwarding supplies to Canada and in suppressing the Loyalists and their Indian allies in the Mohawk Valley. On the death of Montgomery and the failure to take Quebec the army retreated to Crown Point, and its commander, General John Sullivan, was superseded by General Horatio Gates. Gates claimed precedence over Schuyler and, on failing to secure recognition, intrigued to bring about Schuyler's dismissal. The controversy was taken into Congress. The necessary withdrawal of the army from Crown Point in 1776 and the evacuation of Ticonderoga in 1777 were magnified by Schuyler's enemies into a retrograde movement, and, on the 19th of August 1777, he was superseded. A court martial appointed in 1778 acquitted him on every charge. He resigned from the army in April 1779. He was a delegate from New York to the Continental Congress in 1779-1781, and state senator in 1781–1784, 1786–1790 and 1792–1797. In 1788 he joined his son-in-law Alexander Hamilton, John Jay and others in leading the movement for the ratification by New York of the Federal constitution. He served in the United States Senate as a Federalist from 1790 to 1791 and was again elected in 1797, but resigned in January 1798 on account of ill-health. He was also active for many years as Indian commissioner and surveyor-general and helped to settle the New York boundary disputes with Massachusetts and Pennsylvania. He prepared plans for the construction of a canal between the Hudson river and Lake Champlain before 1776, and, in 1792–1796, carried to a successful conclusion a more pretentious scheme for connecting the Hudson with Lake Ontario by way of the Mohawk, Oneida Lake and the Onondaga river. He died in Albany on the 18th of November 1804.

See Bayard Tuckerman, *Life of General Philip Schuyler* (New York, 1903).

Other prominent members of the family were: Montgomery Schuyler (1814–1896) and his cousin Anthony (1816–1896), Protestant Episcopal clergymen; George Washington (1810–1888), treasurer of New York State in 1863–1865 and of Cornell University in 1868–1874 and author of *Colonial New York: Philip Schuyler and his Family* (2 vols., 1885); his son Eugene (1840–1890), who was long in the consular and diplomatic service of the United States, and who translated some of the novels of Tourgeniev and Tolstoi and wrote *Peter the Great* (1884) and *American Diplomacy and the Furtherance of Commerce* (1886); and Montgomery (b. 1843), a son of Anthony, and a journalist and writer on architecture.

SCHWABACH, a town of Germany, in the kingdom of Bavaria, 9 m. by rail S. of Nuremberg. Pop. (1905) 10,342. It has the interesting Evangelical church of St John, built in the 15th century, with carvings by Veit Stoss, paintings by Wohlgemut, Martin Schön and others, and a ciborium by Adam Krafft; a fountain, the Schöne Brunnen, and several schools. Schwabach is the chief seat of the needle manufacture in Bavaria; its other industries include gold and silver wire work, brewing and the making of soap and earthenware. Schwabach was purchased in 1364 by the burgrave of Nuremberg.

See Petzoldt, *Chronik der Stadt Schwabach* (Schwabach, 1854).

SCHWABE, SAMUEL HEINRICH (1789–1875), German astronomer, was born on the 25th of October 1789 at Dessau, where he died on the 11th of April 1875. At first an apothecary, he turned his attention to astronomy, and in 1826 commenced his observations on sun-spots. In 1843 he made the suggestion of a probable ten year period (*i.e.* that at every tenth year the number of spots reached a maximum), but it met with scant approval, and he continued his observations, which were

afterwards utilized in 1851 by Humboldt in the third volume of his *Kosmos*. The periodicity of sun-spots is now fully recognized (see SUN); and to Schwabe is thus due the credit of one of the most important discoveries in astronomy.

See H. H. Turner, *Astronomical Discovery* (1904).

SCHWALBACH, or LANGENSCHWALBACH, a favourite German health resort, in the Prussian province of Hesse-Nassau, pleasantly situated in a deep valley, near the junction of the Schwalbach with the Aar, 12 m. N.W. from Wiesbaden, on the railway Dotzheim-Dietz. Permanent population (1905) 2836. Besides a large kursaal, the town has four churches, two Evangelical, a Roman Catholic and an English, a synagogue and several schools. There are eight springs, which are largely impregnated in varying proportions with iron and carbonic acid, and are used both for drinking and bathing. They are especially efficacious in feminine disorders, and the greater number of visitors (about 6000 annually) are ladies. The public grounds are prettily laid out and there are numerous fashionable hotels.

See Frickhöffer, *Die Eisenquellen zu Schwalbach* (2nd ed., Schwalbach, 1888), and A. Genth, *Geschichte des Kurortes Schwalbach* (3rd ed., Wiesbaden, 1884).

SCHWANN, THEODOR (1810–1882), German physiologist, was born at Neuss in Rhenish Prussia on the 7th of December 1810. His father was a man of great mechanical talent; at first a goldsmith, he afterwards founded an important printing establishment. Schwann inherited his father's tastes, and the leisure of his boyhood was largely spent in constructing little machines of all kinds. He studied at the Jesuits' college in Cologne and afterwards at Bonn, where he met Johannes Müller, in whose physiological experiments he soon came to assist. He next went to Würzburg to continue his medical studies, and thence to Berlin to graduate in 1834. Here he again met Müller, who had been meanwhile translated to Berlin, and who finally persuaded him to enter on a scientific career and appointed him assistant at the anatomical museum. Schwann in 1838 was called to the chair of anatomy at the Roman Catholic university of Louvain, where he remained nine years. In 1847 he went as professor to Liége, where he remained till his death on the 11th of January 1882. He was of a peculiarly gentle and amiable character, and remained a devout Catholic throughout his life. It was during the four years spent under the influence of Müller at Berlin that all Schwann's really valuable work was done. Müller was at this time preparing his great book on physiology, and Schwann assisted him in the experimental work required. His attention being thus directed to the nervous and muscular tissues, besides making such histological discoveries as that of the envelope of the nerve-fibres which now bears his name, he initiated those researches in muscular contractility since so elaborately worked out by Du Bois Reymond and others. He was thus the first of Müller's pupils who broke with the traditional vitalism and worked towards a physico-chemical explanation of life. Müller also directed his attention to the process of digestion, which Schwann showed to depend essentially on the presence of a ferment called by him pepsin. Schwann also examined the question of spontaneous generation, which he greatly aided to disprove, and in the course of his experiments discovered the organic nature of yeast. In fact the whole germ theory of Pasteur, as well as its antiseptic applications by Lister, is traceable to his influence. Once when he was dining with Schleiden in 1837, the conversation turned on the nuclei of vegetable cells. Schwann remembered having seen similar structures in the cells of the notochord (as had been shown by Müller) and instantly realized the importance of connecting the two phenomena. The resemblance was confirmed without delay by both observers, and the results soon appeared in his famous *Microscopic Investigations on the Accordance in the Structure and Growth of Plants and Animals* (Berlin, 1839; trans. Sydenham Society, 1847). The cell theory was thus definitely constituted. In the course of his verifications of the cell theory, in which he traversed the whole field of histology, he proved the cellular origin and development of the most highly differentiated tissues, nails, feathers, enamels, &c. His generalization became the foundation of modern histology, and in the hands of Rudolf Virchow (whose cellular pathology was an inevitable deduction from Schwann) afforded the means of placing modern pathology on a truly scientific basis.

An excellent account of Schwann's life and work is that by Léon Frédéricq (Liége, 1884).

SCHWANTHALER, LUDWIG MICHAEL (1802–1848), German sculptor, was born in Munich on the 26th of August 1802. His family had been sculptors in Tirol for three centuries; young Ludwig received his earliest lessons from his father, and the father had been instructed by the grandfather. The last to bear the name was Xaver, who worked in his cousin Ludwig's studio and survived till 1854. For successive generations the family lived by the carving of busts and sepulchral monuments, and from the condition of mechanics rose to that of artists. From the Munich gymnasium Schwanthaler passed as a student to the Munich academy; at first he purposed to be a painter, but afterwards reverted to the plastic arts of his ancestors. His talents received timely encouragement by a commission for an elaborate silver service for the king's table. Cornelius also befriended him; the great painter was occupied on designs for the decoration in fresco of the newly erected Glyptothek, and at his suggestion Schwanthaler was employed on the sculpture within the halls: Thus arose between painting, sculpture, and architecture that union and mutual support which characterized the revival of the arts in Bavaria. Schwanthaler in 1826 went to Italy as a pensioner of the king, and on a second visit in 1832 Thorwaldsen gave him kindly help. His skill was so developed that on his return he was able to meet the extraordinary demand for sculpture consequent on King Ludwig's passion for building new palaces, churches, galleries and museums, and he became the fellow-worker of the architects Klenze, Gärtner and Ohlmüller, and of the painters Cornelius, Schnorr and Hess. Owing to the magnitude and multitude of the plastic products they turned out, over-pressure and haste in design and workmanship brought down the quality of the art. The works of Schwanthaler in Munich are so many and miscellaneous that they can only be briefly indicated. The new palace is peopled with his statues: the throne-room has twelve imposing gilt bronze figures 10 ft. high; the same palace is also enriched with a frieze and with sundry other decorations modelled and painted from his drawings. The sculptor, like his contemporary painters, received help from trained pupils. The same prolific artist also furnished the old Pinakothek with twenty-five marbles, commemorative of as many great painters; likewise he supplied a composition for the pediment of the exhibition building facing the Glyptothek, and executed sundry figures for the public library and the hall of the marshals. Sacred art lay outside his ordinary routine, yet in the churches of St Ludwig and St Mariahilf he gave proof of the widest versatility. The Ruhmeshalle afforded further gauge of unexampled power of production; here alone is work which, if adequately studied, might have occupied a lifetime; ninety-two metopes, and, conspicuously, the colossal but feeble figure of Bavaria, 60 ft. high, rank among the boldest experiments. A short life of forty-six years did not permit serious undertakings beyond the Bavarian capital, yet time was found for the groups within the north pediment of the Walhalla, Ratisbon, and also for numerous portrait statues, including those of Mozart, Jean Paul Richter, Goethe and Shakespeare. Schwanthaler died at Munich in 1848, and left by will to the Munich academy all his models and studies, which now form the Schwanthaler Museum.

SCHWARTZE, TERESA (1852–), Dutch portrait painter, was born at Amsterdam, the daughter of Johan Georg Schwartze (1814–1874), from whom she received her first training, before studying for a year under Gabriel Max and Franz von Lenbach in Munich. In 1879 she went to Paris to continue her studies under Jean Jacques Henner. Her portraits are remarkable for excellent character drawing, breadth and vigour of handling and rich quality of pigment. She is one of the few women painters

who have been honoured by an invitation to contribute their own portraits to the hall of the painters at the Uffizi Gallery in Florence. Some of her best pictures, notably a portrait of Piet J. Joubert, and "Three Inmates of the Orphanage at Amsterdam," are at the Ryks Museum, and one entitled "The Orphan" at the Boyman Museum in Rotterdam.

SCHWARZ (or SCHWARTZ), **CHRISTIAN FRIEDRICH** (1726–1798), German Protestant missionary to India, was born on the 8th of October 1726 at Sonnenburg, in the electorate of Brandenburg, Prussia. Having learned Tamil to assist in a translation of the Bible into that language, he was led to form the intention of becoming a missionary to India. He received ordination at Copenhagen on the 8th of August 1749, and, after spending some time in England to acquire the English language, embarked early in 1750 for India, and arrived at Trichinopoly on the 30th of July. Tranquebar was for some time his headquarters, but he paid frequent visits to Tanjore and Trichinopoly, and in 1766 removed to the latter place. Here he acted as chaplain to the garrison, who erected a church for his general use. In 1769 he secured the friendship of the raja of Tanjore, who, although he never embraced Christianity, afforded him every countenance in his missionary labours. Shortly before his death he committed to Schwarz the education of his adopted son and successor. In 1779 Schwarz undertook, at the request of the Madras government, a private embassy to Hyder Ali, the ruler of Mysore. When Hyder invaded the Carnatic, Schwarz was allowed to pass through the enemy's camp without molestation. After twelve years in Trichinopoly he removed to Tanjore, where he spent the remainder of his life. He died on the 13th of February 1798. Schwarz's direct success in making converts exceeded that of any other Protestant missionary in India, in addition to which he succeeded in winning the esteem of Mahommedans and Hindus. The raja of Tanjore erected a monument, executed by Flaxman, in the mission church, in which he is represented as grasping the hand of the dying missionary and receiving his benediction. A splendid monument to Schwarz by Bacon was placed by the East India Company in St Mary's church at Madras.

See *Remains* of Schwarz, with a sketch of his life (1826); *Memoirs of Life and Correspondence*, by H. N. Pearson (1834, 3rd ed. 1839), *Life*, by H. N. Pearson (1855).

SCHWARZ, KARL (1812–1885), German Protestant theologian, was born at Wiek on the Isle of Rügen on the 19th of November 1812. His father, Theodor Schwarz, pastor at Wiek, was well known as a preacher, and as the writer of a number of popular works (parables, romances, &c.) under the pseudonym "Theodor Melas." Karl Schwarz pursued the study of theology and philosophy at Halle, and afterwards at Bonn (1831) and Berlin (1832–1834). At Berlin he came under the influence of Schleiermacher and Hegel, whose influences are seen in his work *Das Wesen der Religion* (1847). In 1837 he was imprisoned for six months on account of his advanced political opinions. After his release he helped (from 1838) with the *Hallische Jahrbücher*. From 1843–1845 he lectured at Halle, and was then suspended by the government. In 1849, however, he was appointed professor extraordinarius, and later received a number of distinctions (in 1858 chief court preacher, &c.). Schwarz took an important part in the founding and directing of the German Protestantenverein, and became an eminent exponent of liberal theology. His work *Zur Geschichte der neuesten Theologie* (1856, 4th ed. 1869) is a valuable source for the history of theology in Germany. His other works include *Lessing als Theologe* (1854) and *Grundriss der christl. Lehre* (1873, 5th ed. 1876). He died on the 25th of March 1885. In his memory a *Karl-Schwarz-stiftung* was founded in connexion with the theological faculty at Jena.

See G. Rudloff, *Karl Schwarz* (1887); F. Hummel, *Die Bedeutung der Schrift von Karl Schwarz: Über das Wesen der Religion* (1890); and Herzog-Hauck, *Realencyklopädie*.

SCHWARZBURG-RUDOLSTADT, a principality of Germany, an independent member of the German empire, and one of the Thuringian states (see THURINGIA). It shares with Schwarzburg-Sondershausen the possessions of the old house of Schwarzburg, consisting of the upper barony (*Oberherrschaft*) in Thuringia, on the Gera, Ilm and Saale, and the lower barony (*Unterherrschaft*), an isolated district on the Wipper and Helbe, about 25 m. to the north, surrounded by the Prussian province of Saxony. As the dignity of prince is held in virtue of the Oberherrschaft alone, a share of both baronies was given to each sub-line of the main house. The total area of Schwarzburg-Rudolstadt is 363 sq. m., of which 283 are in the upper and 80 in the lower barony; the chief towns in the former district are Rudolstadt (pop. 12,500 in 1905), the capital, and Blankenburg (2000), and in the latter Frankenhausen (6374). Both baronies are hilly, the highest elevation being attained in the Grossfarmdenkopf, 2900 ft. The scenery of the Thuringian portion of Schwarzburg-Rudolstadt attracts many visitors annually, the most beautiful spots being the gorge of the Schwarza and the lovely circular valley in which the village of Schwarzburg nestles at the foot of a curiously isolated hill, crowned by the ancient castle of the princely line. Cattle-rearing and fruit-growing flourish in the lower barony, while the upper barony is finely wooded. Of the whole country 44 % is under forest (mainly coniferous trees), and 50 % is devoted to agriculture and pasture. The chief grain crops are rye, oats, barley and potatoes. Great attention is paid to poultry farming and bee-keeping, and the exports from these sources are considerable. About 14 % of the population are engaged in agriculture and forestry, 21 % in mining and cognate industries. Trade and manufactures are insignificant; iron, lignite, cobalt, alum and vitriol are among the mineral productions. In 1905 the population was 96,835 or about 265 to the square mile. Nearly all these were Protestants.

Schwarzburg-Rudolstadt is a limited hereditary monarchy, its constitution resting on laws of 1854 and 1870. A diet has met at intervals since 1816, and is now entitled to be summoned every three years. The present diet consists of sixteen members elected for three years, four chosen by the highest assessed taxpayers, the others by general election. The troops of Schwarzburg-Rudolstadt have been incorporated with the Prussian army since the convention of 1867. The principality has one vote in the Reichstag and one in the federal council.

Schwarzburg-Rudolstadt is the cadet branch of the house of Schwarzburg, descended from Albrecht VII. (1605). In 1710 the count was made a prince, in spite of the remonstrances of the elector of Saxony, although he was prevented from taking his seat in the imperial college at Regensburg until 1754. The principality entered the Confederation of the Rhine in 1807 and the German League in 1815. In 1819 it redeemed the Prussian claims of superiority by surrendering portions of its territory.

See Sigismund, *Landeskunde des Fürstentums Schwarzburg-Rudolstadt* (2 vols., Rudolstadt, 1862–1863).

SCHWARZBURG-SONDERSHAUSEN, a principality of Germany, and constituent state of the German empire. It shares the old Schwarzburg lands with Schwarzburg-Rudolstadt. In general it may be said that while Schwarzburg-Rudolstadt forms the southern, Schwarzburg-Sondershausen occupies the northern portion of the lands once divided between them. The total area of the principality is 333 sq. m., of which 133 are in the upper and 200 in the lower barony. The chief towns are Arnstadt (pop. 16,275 in 1905), which at one time gave name to a line of counts, in the southern, and Sondershausen (7425), the capital, in the northern (or upper) barony. The general description of the nature and resources of Schwarzburg-Rudolstadt applies also to this principality, except that 62 % of the whole is devoted to agriculture and pasture and 30 % to forests, only about two-fifths of which are coniferous trees. The chief crops are oats, barley, wheat and rye, but by far the most land is planted with potatoes. About 15 % of the population are supported by agriculture and forestry, and about 18 % by mining and cognate industries. The industries are varied, and in some branches, notably gloves (at Arnstadt), glass, sausages and sugar-refining, considerable. In 1905 the population was 85,152, or about 245 to the square mile. Almost all of these were Protestants.

Schwarzburg-Sondershausen is a limited hereditary monarchy, its constitution resting on a law of 1857. The diet consists of five representatives elected by the highest taxpayers, five by general election, and five nominated for life by the prince. The first ten members are elected for four years, which is also the financial period. There is a ministry with five departments—for the prince's household, domestic affairs, finance, churches and schools, and justice. The budget for the years 1908–1911 estimates the income at £164,440 and the expenditure at the same. The state debt in 1909 was £167,970. The troops of Schwarzburg-Sondershausen have been incorporated with the Prussian army by convention since 1867. The principality has one vote in the Reichstag and one in the federal council.

The house of Schwarzburg is one of the oldest and noblest in Germany; and tradition traces its descent from Widukind and the kings of the Franks. Its historical ancestors were the counts of Käfernburg, from whom the counts of Schwarzburg sprang about the beginning of the 13th century. The name Günther became the distinctive name for the members of this house (corresponding to Heinrich in the Reuss family), the various Günthers being at first distinguished by numbers and afterwards by prefixed names. Various subdivisions and collateral lines were formed, but by 1599 all were extinct but the present two. Count Günther XL., who died in 1552, was the last common ancestor of both lines. Schwarzburg-Sondershausen is the senior line, although its possessions are the smaller. In 1697 the count was raised to the dignity of imperial prince by the emperor Leopold I. The prince had to pay 7000 thalers to the elector of Saxony and 3500 to the duke of Saxe-Weimar, and numerous disputes arose in connexion with the superiorities thus indicated. In 1807 Schwarzburg-Sondershausen entered the Confederation of the Rhine and became a sovereign state. In 1816 it joined the German League, and redeemed with portions of its territory all rights of superiority claimed by Prussia. Its domestic government has gradually, though not very quickly, improved since that time—the oppressive game-laws in particular having been abolished. A treaty of mutual succession was made between the two families in 1713. Prince Charles Günther succeeded on the 17th of July 1880, his father having on account of eye disease renounced the throne in favour of his son. By a law, promulgated in 1896, Sizzo, prince of Leutenberg, was recognized as the heir-presumptive to this principality and, by treaty with Schwarzburg-Rudolstadt, to that principality also.

See Apfelstedt, *Heimatskunde des Fürstentums Schwarzburg-Sondershausen* (Sondersh., 1854–1857); Irmisch, *Beitrage zur schwarzburgischen Heimatskunde* (Sondersh., 1905–1906).

SCHWARZENBERG, a princely family of Franconian origin, established in Bavaria and Austria, and carrying its present name since 1437. It was raised to princely rank in 1670. Besides Karl Philipp (see below) and Johann (1463–1528), a moralist and reformer who, as judge of the episcopal court at Bamberg, introduced a new code of evidence which amended the procedure then prevalent in Europe by securing for the accused a more impartial hearing, its best-known representative is Felix (1800–1852), Karl Philipp's nephew, an important Austrian statesman.

After six years' service in the Austrian army Felix espoused a diplomatic career at the instance of Metternich, and underwent a period of probation (1824–1848) at various European courts, in the course of which he confirmed his aristocratic aversion to popular government, but was led to acknowledge that absolutism needs to be justified by efficiency of administration. In 1848 he took an active part in the war against Piedmont and the insurgents in Vienna. On Nov. 21st of the same year he was appointed head of a reactionary ministry. Himself a soldier, he aimed at the ultimate restoration of the absolute monarchy by means of the army. At first he temporized, and on the 27th of November a proclamation was issued stating the intention of the government to uphold constitutional principles, but at the same time maintaining its intention to keep the empire intact even at the cost of a separation from Germany. The removal of the Austrian parliament to Kremsier followed the abdication of the emperor Ferdinand, and on March 7th 1849 the proclamation of a centralized constitution for the whole Austro-Hungarian monarchy, after the Austrian victory at Kopolna had seemed to Schwarzenberg to have crushed the Magyar power of resistance. This was followed by the declaration of Hungarian independence; and Schwarzenberg did not hesitate ultimately to call in the aid of Russia to put an end to the insurrection (November). This done, he was free to turn his whole attention to Germany. His refusal to incorporate only the German provinces of the monarchy in the proposed new German Empire had thrown the German parliament into the arms of Prussia. His object now was to restore the *status quo ante* of the Confederation, with the old predominance of Austria. His success in this respect was partly due to exterior circumstances, notably the mistimed exaggerations of the German revolutionists, but largely to his diplomatic skill, unscrupulousness and iron tenacity of purpose with which the weakness of Frederick William IV. and his ministers was unable to cope. His triumph came with the restoration of the old federal diet in May 1850 and the signature of the convention of Olmütz on the 29th of November of the same year (see GERMANY: *History*).

See Berger, *Felix, Furst zu Schwarzenberg* (Leipzig, 1853); A. Beer, *Furst Schwarzenberg's Deutsche Politik bis zu den Dresdener Konferenzen* (Historisches Taschenbuch, Leipzig, 1891). For Johann see W. Scheel, *Johann, Freiherr von S.* (Berlin, 1905).

SCHWARZENBERG, KARL PHILIPP, PRINCE ZU (1771–1820), Austrian field marshal, was born on the 15th of April 1771 at Vienna.[1] He entered the imperial cavalry in 1788, fought in 1789 under Lacy and Loudon against the Turks, distinguished himself by his bravery, and became major in 1792. In the French campaign of 1793 he served in the advanced guard of the army commanded by Prince Josias of Coburg, and at Cateau Cambresis in 1794 his impetuous charge at the head of his regiment, vigorously supported by twelve British squadrons, broke a whole corps of the French, killed and wounded 3000 men, and brought off 32 of the enemy's guns. He was immediately decorated with the cross of the Maria Theresa order. After taking part in the battles of Amberg and Wurzburg in 1796 he was raised to the rank of major-general, and in 1799 he was promoted lieutenant field marshal. At the defeat of Hohenlinden in 1800 his promptitude and courage saved the right wing of the Austrian army from destruction, and he was afterwards entrusted by the archduke Charles with the command of the rearguard. In the war of 1805 he held command of a division under Mack, and when Ulm was surrounded by Napoleon in October he was one of the brave band of cavalry, under the archduke Ferdinand, which cut its way through the hostile lines. In the same year he was made a commander of the order of Maria Theresa and in 1809 he received the Golden Fleece. When in 1808, in view of a new war with France, Austria decided to send a special envoy to Russia, Schwarzenberg, who was *persona grata* at the court of St Petersburg, was selected. He returned, however, in time to take part in the battle of Wagram, and was soon afterwards promoted general of cavalry. After the peace of Vienna he was sent to Paris to negotiate the marriage between Napoleon and the archduchess Maria Louisa. The prince gave a ball in honour of the bride on the 1st of July 1810, which ended in the tragic death of many of the guests, including his own sister-in-law, in a fire. Napoleon held Schwarzenberg in great esteem, and it was at his request that the prince took command of the Austrian auxiliary corps in the Russian campaign of 1812. The part of the Austrians was well understood to be politically rather than

[1] The family of Schwarzenberg, of which many members are known to history, was derived from Erkinger von Seinsheim (b. 1362), a distinguished soldier under the emperor Sigismund, who bought the lordship of Schwarzenberg in Franconia in 1420. Count Adolf von Schwarzenberg (1547–1600) was a renowned general of the empire, whose sword, along with that of his descendant Prince Karl Philipp, is preserved in the arsenal of Vienna. He fought in the wars of religion, but was chiefly distinguished in the wars on the Eastern frontier against the Turks. He was killed in a mutiny of the soldiers at Papa in Hungary in 1600. GEORG LUDWIG, COUNT VON SCHWARZENBERG (1586–1646), was an Austrian statesman in the Thirty Years' War. JOHANN, FREIHERR VON SCHWARZENBERG UND HOHENLANDSBERG (1463–1528), was a celebrated jurist and a friend of Luther.

morally hostile, and Schwarzenberg gained some minor successes by skilful manœuvres without a great battle; afterwards, under instructions from Napoleon, he remained for some months inactive at Pultusk. In 1813, when Austria, after many hesitations, took the side of the allies against Napoleon, Schwarzenberg, recently promoted to be field marshal, was appointed commander-in-chief of the allied Grand Army of Bohemia. As such he was the senior of the allied generals who conducted the campaign of 1813–1814 to the final victory before Paris and the overthrow of Napoleon. It is the fashion to accuse Schwarzenberg of timidity and over-caution, and his operations can easily be made to appear in that colour when contrasted with those of his principal subordinate, the fiery Blücher, but critics often forget that Schwarzenberg was an Austrian general first of all, that his army was practically the whole force that Austria could put into the field in Central Europe, and was therefore not lightly to be risked, and that the motives of his pusillanimity should be sought in the political archives of Vienna rather than in the text-books of strategical theory. In any case his victory, however achieved, was as complete as Austria desired, and his rewards were many, the grand crosses of the Maria Theresa and of many foreign orders, an estate, the position of president of the Hofkriegsrath, and, as a specially remarkable honour, the right to bear the arms of Austria as an escutcheon of pretence. But shortly afterwards, having lost his sister Caroline, to whom he was deeply attached, he fell ill. A stroke of paralysis disabled him in 1817, and in 1820, when revisiting Leipzig, the scene of the *Volkerschlacht* that he had directed seven years before, he was attacked by a second stroke. He died there on the 15th of October.

His eldest son, FRIEDRICH, PRINCE ZU SCHWARZENBERG (1800–1870), had an adventurous career as a soldier, and described his wanderings and campaigns in several interesting works, of which the best known is his *Wanderungen eines Lanzknechtes* (1844–1845). He took part as an Austrian officer in the campaigns of Galicia 1846, Italy 1848 and Hungary 1848, and as an amateur in the French conquest of Algeria, the Carlist wars in Spain and the Swiss civil war of the Sonderbund. He became a major-general in the Austrian army in 1849, and died after many years of well-filled leisure in 1870. The second son, KARL PHILIPP (d. 1858), was a Feldzeugmeister; the third, EDMUND LEOPOLD FRIEDRICH (1803–1873), a field marshal in the Austrian army. Of Schwarzenberg's nephews, Felix, the statesman, is separately noticed, and FRIEDRICH JOHANN JOSEF COELESTIN (1809–1885) was a cardinal and a prominent figure in papal and Austrian history.

See Prokesch-Osten, *Denkwürdigkeiten aus dem Leben des Feldmarschall's Fursten Schwarzenberg* (Vienna, 1823); Berger, *Das Fürstenhaus Schwarzenberg* (Vienna, 1866), and a memoir by the same hand in *Streffleur's Öst. Militärzeitschrift, 1863*.

SCHWARZENBERG, a town of Germany, in the kingdom of Saxony, situated on the Schwarzwasser, 16 m. W. from Annaberg by rail. Pop. (1905) 4629. It has a handsome parish church, an old palace and some schools. It has some small industries and there are large iron-works in the vicinity.

SCHWECHAT, a market-town of Austria, in Lower Austria, 5 m. S.E. of Vienna by rail. Pop. (1900) 8241. Here is situated the Dreher brewery, the largest in the monarchy; and there are also important smelting and iron works, cotton-spinning, factories of electrical plant, &c. The meeting at Schwechat of the emperor Leopold I. with Sobieski in 1683, after the liberation of Vienna, is commemorated by an obelisk. The imperial troops defeated the Hungarian insurgents in a battle fought here in October 1848.

SCHWEDT, a town of Germany, in the Prussian province of Brandenburg, on the left bank of the Oder, 13 m. N.E. from Angermünde by rail. Pop. (1905) 9530. It is a pleasant, well-built town, with broad streets and shady avenues. There are three Evangelical churches, a Roman Catholic church, a palace, built in 1580, and a gymnasium. The royal riding school was removed hence to Hanover in 1867. The industries include the manufacture of tobacco, cigars, machinery, vinegar, soap and bricks, and there is a considerable trade by water in agricultural produce.

Schwedt is mentioned in chronicles as early as 1138, and became a town in 1265. Towards the end of the 15th century it passed to Brandenburg, and, in 1684, after a great conflagration which laid it in ruins, was handsomely rebuilt by the electress Dorothea. The lordship of Schwedt was in the possession of the counts of Hohenstein from 1481 to 1609, when it passed to Brandenburg. In 1689 it was given to Philip William, a younger son of the elector of Brandenburg, Frederick William, and he and his successors called themselves margrave of Brandenburg-Schwedt. When this line became extinct in 1784 the lordship reverted to Prussia, being claimed both by the king as personal property and by the state. The matter was not settled until 1872, when it was assigned to the state.

See Thomä, *Geschichte der Stadt und Herrschaft Schwedt* (Berlin, 1873).

SCHWEGLER, ALBERT (1819–1857), German philosopher and theologian, was born at Michelbach in Württemberg on the 10th of February 1819, the son of a country pastor. He entered the university of Tübingen in 1836, and was one of the earliest pupils of F. C. Baur, under whose influence he devoted himself to church history. His first work was *Der Montanismus u. die christliche Kirche des 2ten Jahrhunderts* (1841), in which he pointed out for the first time that Montanism was much more than an isolated outbreak of eccentric fanaticism in the early church, though he himself introduced fresh misconceptions by connecting it with Ebionitism as he conceived the latter. This work, with other essays, brought him into conflict with the authorities of the church, in consequence of which he gave up theology as his professional study and chose that of philosophy. In 1843 he founded the *Jahrbücher der Gegenwart*, and became *Privatdozent* of philosophy and classical philology in Tübingen university. In 1848 he was made professor extraordinarius of Roman literature and archaeology, and soon afterwards professor ordinarius of history. He died on the 5th of January 1857.

His principal theological work was *Das nachapostolische Zeitalter* (2 vols., 1846). It was this book which first put before the world, with Schwegler's characteristic boldness and clearness, the results of the critical labours of the earlier representatives of the new Tübingen school in relation to the first development of Christianity. Schwegler published also an edition of the *Clementine Homilies* (1847), and of Eusebius's *Ecclesiastical History* (1852); in philosophy *Übersetzung und Erlduterung der aristot. Metaphysik* (4 vols., 1847–1848), his excellent *Geschichte der Philosophie im Umriss* (1848, 14th ed. 1887; 10th edition of Eng. trans. by J. Hutchison Stirling, 1888), and a posthumous *Geschichte der Griech. Philosophie* (1859). In history he began a *Römische Geschichte* (vols. i.-iii., 1853–1858, 2nd ed. 1867–1872), which he brought down only to the laws of Licinius.

See Edward Zeller, *Vorträge*, vol. ii. (1878), pp. 329-363; and the *Allgemeine deutsche Biographie*.

SCHWEIDNITZ, a town of Germany, in the Prussian province of Silesia, picturesquely situated on the left bank of the Weistritz, 28 m. S.W. of Breslau by rail. Pop. (1905) 30,540. The town has wide streets and contains several old churches, one of which, a Roman Catholic church, built in the 14th century, has a tower 330 ft. high. It has an old town hall, a theatre and several statues of eminent men. The surrounding country is fertile and highly cultivated, and the large quantities of flax and hemp there raised encourage an active weaving industry in the town. Beetroot for sugar, grain and fruit are also grown. The manufacture of woollens, linens, hosiery, furniture, gloves, paper, machinery and tools, carriages, nuts and screws, needles and other hardware goods is carried on. The beer of Schweidnitz has long been famous under the name of "Schwarze Schöps," and in the 16th century it was exported as far as Italy. Schweidnitz is the chief grain market of the district.

Schweidnitz, dating from about the 11th century, received civic rights in 1250. About 1278 it became the capital of a principality, with an area of about 1000 sq. m., which belonged to Bohemia from 1353 till 1741, when it passed into the possession of Prussia. The "Pölerei of Schweidnitz" is the name given to the riotous revolt of the town, in 1520–1522, against a royal edict depriving it of the right of coining its own money. One of

the strongest towns in Silesia it was besieged several times during the 17th and 18th centuries. In 1807 it was captured by the French, who demolished the fortifications. Restored to Prussia in 1816 it was again fortified, but in 1862 the fortifications were converted into a public park.

See F. J. Schmidt, *Geschichte der Stadt Schweidnitz* (2 vols., Schweidnitz, 1846–1848).

SCHWEIGHÄUSER, JOHANN (1742–1830), German classical scholar, was born at Strassburg on the 25th of June 1742. From an early age his favourite subjects were philosophy (especially Scottish moral philosophy as represented by Hutchinson and Ferguson) and Oriental languages; Greek and Latin he took up later, and although he owes his reputation to his editions of Greek authors, he was always diffident as to his classical attainments. After visiting Paris, London and the principal cities of Germany, he became assistant professor of philosophy (1770) at Strassburg. When the French Revolution broke out, he was banished; in 1794 he returned, and after the reorganization of the Academy in 1809 was appointed professor of Greek. He resigned his post in 1824, and died on the 19th of January 1830.

His son, JOHANN GOTTFRIED (1776–1844), was also a distinguished scholar and archaeologist, joint-author with M. Golbéry of *Antiquités de l'Alsace* (1828).

Schweighäuser's first important work was his edition of Appian (1785), with Latin translation and commentary, and an account of the MSS. On Brunck's recommendation, he had collated an Augsburg MS. of Appian for Samuel Musgrave, who was preparing an edition of that author, and after Musgrave's death he felt it a duty to complete it. His Polybius, with translation, notes and special lexicon, appeared in 1789–1795. But his chief work is his edition of Athenaeus (1801–1807), in fourteen volumes, one of the Bipont editions. His Herodotus (1816; lexicon, 1824) is less successful; he depends too much on earlier editions and inferior MSS.; and lacks the finer scholarship necessary in dealing with such an author. Mention may also be made of his *Encheiridion* of Epictetus and *Tabula* of Cebes (1798), which appeared at the time when the doctrines of the Stoics were fashionable; the letters of Seneca to Lucilius (1809); corrections and notes to Suïdas (1789); some moral philosophy essays. His minor works are collected in his *Opuscula academica* (1806).

See monographs by J. G. Dahler, C. L. Cuvier, F. J. Stiévenart (all 1830), L. Spach (1868), Ch. Rabany (1884), the two last containing an account of both father and son.

SCHWEINFURT, a town of Germany, in the kingdom of Bavaria, situated on the right bank of the Main, which is here spanned by several bridges, 27 m. N.E. of Würzburg by rail, and at the junction of lines to Kissingen, Bamberg and Gemünden. Pop. (1905) 18,416. The Renaissance town-hall in the spacious market-place dates from 1570; it contains a library and a collection of antiquities. St John's church is a Gothic edifice with a lofty tower; St Salvator's was built about 1720. Schweinfurt is well furnished with benevolent and educational institutions, including a gymnasium originally founded by Gustavus Adolphus in 1631, and rebuilt in 1881. The chief manufacture is paint ("Schweinfurt green" is a well-known brand in Germany), introduced in 1809; but beer, sugar, machinery, soap and other dry salteries, straw-paper and vinegar are also produced. Cotton-spinning and bell-founding are carried on, and the Main supplies water-power for numerous saw, flour and other mills. Schweinfurt carries on an active trade in the grain, fruit and wine produced in its neighbourhood, and it is the seat of an important sheep and cattle market. A monument was erected in 1900 to Friedrich Rückert the poet (1788–1866).

Schweinfurt is mentioned in 790, and in the 10th century was the seat of a margrave. It fell later to the counts of Henneberg; but, receiving civic rights in the 13th century, it maintained its independence as a free imperial city with few interruptions until 1803, when it passed to Bavaria. Assigned to the grand duke of Würzburg in 1810, it was restored to Bavaria in 1814. In the Thirty Years' War it was occupied by Gustavus Adolphus, who erected fortifications, remains of which are still extant.

See Beck, *Chronik der Stadt Schweinfurt* (2 vols., Schweinfurt, 1836–1841); and Stein, *Geschichte der Reichstadt Schweinfurt* (2 vols., Schweinfurt, 1900).

SCHWEINFURTH, GEORG AUGUST (1836–), German traveller in East Central Africa and ethnologist, was born at Riga on the 29th of December 1836. He was educated at the universities of Heidelberg, Munich and Berlin (1856–1862), where he particularly devoted himself to botany and palaeontology. Commissioned to arrange the collections brought from the Sudan by Freiherr von Barnim and Dr Hartmann, his attention was directed to that region; and in 1863 he travelled round the shores of the Red Sea, repeatedly traversed the district between that sea and the Nile, passed on to Khartum, and returned to Europe in 1866. His researches attracted so much attention that in 1868 the Humboldt-Stiftung of Berlin entrusted him with an important scientific mission to the interior of East Africa. Starting from Khartum in January 1869, he went up the White Nile to Bahr-el-Ghazal, and then, with a party of ivory dealers, through the regions inhabited by the Diur (Dyoor), Dinka, Bongo and Niam-Niam; crossing the Nile watershed he entered the country of the Mangbettu (Monbuttu) and discovered the river Welle (19th of March 1870), which by its westward flow he knew was independent of the Nile. Schweinfurth formed the conclusion that it belonged to the Chad system, and it was several years before its connexion with the Congo was demonstrated. The discovery of the Welle was Schweinfurth's greatest geographical achievement, though he did much to elucidate the hydrography of the Bahr-el-Ghazal system. Of greater importance were the very considerable additions he made to the knowledge of the inhabitants and of the flora and fauna of Central Africa. He described in detail the cannibalistic practices of the Mangbettu, and his discovery of the pygmy Akka settled conclusively the question as to the existence of dwarf races in tropical Africa. Unfortunately nearly all his collections made up to that date were destroyed by a fire in his camp in December 1870. He returned to Khartum in July 1871 and published an account of the expedition, under the title of *Im Herzen von Afrika* (Leipzig, 1874; English edition, *The Heart of Africa*, 1873, new ed. 1878). In 1873–1874 he accompanied Gerhard Rohlfs in his expedition into the Libyan Desert. Settling at Cairo in 1875, he founded a geographical society, under the auspices of the khedive Ismail, and devoted himself almost exclusively to African studies, historical and ethnographical. In 1876 he penetrated into the Arabian Desert with Paul Güssfeldt, and continued his explorations therein at intervals until 1888, and during the same period made geological and botanical investigations in the Fayum, in the valley of the Nile, &c. In 1889 he removed to Berlin; but he visited the Italian colony of Eritrea in 1891, 1892 and 1894.

The accounts of all his travels and researches have appeared either in book or pamphlet form or in periodicals, such as *Petermanns Mitteilungen*, the *Zeitschrift für Erdkunde*, &c. Among his works may be mentioned *Artes Africanae*; *Illustrations and Descriptions of Productions of the Industrial Arts of Central African Tribes* (1875).

SCHWEITZER, JEAN BAPTISTA VON (1833–1875), German politician and dramatic poet, was born at Frankfort-on-the-Main on the 12th of July 1833, of an old aristocratic Catholic family. He studied law at Berlin and Heidelberg, and afterwards practised in his native city. He was, however, from the first more interested in politics and literature than in law. He was attracted by the social democratic labour movement, and after the death of Ferdinand Lassalle in 1864, he became president of the "General Working-men's Union of Germany," and in this capacity edited the *Sozialdemokrat*, which brought him into frequent trouble with the Prussian government. In 1867 he was elected to the parliament of the North German Federation, and on his failure to secure election to the German Reichstag in 1871, he resigned the presidency of the Labour Union, and retired from political life. Schweitzer composed a number of dramas and comedies, of which several for a while had considerable success. Among them may be mentioned *Alcibiades* (Frankfort, 1858); *Friedrich Barbarossa* (Frankfort, 1858); *Canossa* (Berlin, 1872); *Die Darwinianer* (Frankfort, 1875); *Die Eidechse* (Frankfort, 1876); and *Epidemisch* (Frankfort, 1876). He also wrote one political novel, *Lucinde oder Kapital und Arbeit* (Frankfort, 1864).

SCHWELM, a town of Germany, in the Prussian province of Westphalia, situated on the river of the same name, 4 m. E. of Barmen, with which it is connected by an electric tramway, and on the main line of railway, Düsseldorf-Hagen. Pop. (1905) 18,469. It has three churches and various schools and public institutions. Lying close to the Harkort iron and sulphur mines, and within the populous and rich mineral district on the lower Rhine, it carries on iron-founding, wire-drawing and the manufacture of machinery of various kinds, besides an active trade in iron, steel and brass goods. Scarcely less important are its manufactures of ribbons, damask, cord, pianos and paper. In the neighbourhood is a hydropathic establishment. Schwelm is said to have existed as early as 1085, though it did not receive civic rights until 1590.

See Tobien, *Bilder aus der Geschichte von Schwelm* (Schwelm, 1890).

SCHWENKFELD, KASPAR (1490–1561), of Ossing, German theologian, was born in 1490, and after studying at Cologne and other universities served in various minor courts of Silesia, finally entering the service of the duke of Liegnitz, over whom he had great influence. The writings of Tauler and Luther so impressed him, that in 1522 he visited Wittenberg, where he made the acquaintance of Andreas Carlstadt and Thomas Münzer. On his return to Liegnitz he helped to spread the principles of the Reformation in the principality and in Silesia, while warning his colleagues against the abuse of the doctrine of justification by faith. The Protestant controversy on the Eucharist (1524) revealed his disagreement with Luther on that critical point. He sought to establish a *via media* between the doctrines of Luther and Zwingli, and vainly hoped to obtain for it Luther's acceptance. He as vainly sought to secure Luther's adoption of a strict rule of church discipline, after the manner of the Moravian Brethren. Meanwhile the Anabaptists obtained a footing in Silesia, and suspicions of Schwenkfeld's sympathy with them were aroused. Letters and writings of his own (1527–1528) proved him to hold strongly anti-Lutheran heresies, and both Catholics and Lutherans urged the duke of Liegnitz to dismiss him. He voluntarily left Liegnitz in 1529, and lived at Strasburg for five years amongst the Reformed clergy there. In 1533, in an important synod, he defended against Martin Bucer the principles of religious freedom as well as his own doctrine and life. But the heads of the church carried the day, and, more stringent measures being adopted against dissenters, Schwenkfeld left Strasburg for a time, residing in various cities of south Germany and corresponding with many nobles. In 1535 a sort of compromise was brought about between himself and the Reformers, he promising not to disturb the peace of the church and they not to treat him as a disturber. The compromise was of only short duration. His theology took a more distinctly heterodox form, and the publication (1539) of a book in proof of his most characteristic doctrine—the deification of the humanity of Christ—led to his active persecution by the Lutherans and his expulsion from the city of Ulm. The next year (1540) he published a refutation of the attacks upon his doctrine with a more elaborate exposition of it, under the title *Grosse Confession.* The book was very inconvenient to the Protestants, as it served to emphasize the Eucharistic differences between the Lutherans and Zwinglians at a moment when efforts were being made to reconcile them. An anathema was accordingly issued from Schmalkald against Schwenkfeld (together with Sebastian Franck); his books were placed on the Protestant "index"; and he himself was made a religious outlaw. From that time he was hunted from place to place, though his wide connexions with the nobility and the friendship of his numerous followers provided for him secure hiding-places and for his books a large circulation. An attempt in 1543 to approach Luther only increased the Reformer's hostility and rendered Schwenkfeld's situation still more precarious. He and his followers withdrew from the Lutheran Church, declined its sacraments, and formed small societies of kindred views. He and they were frequently condemned by Protestant ecclesiastical and political authorities, especially by the government of Württemberg. His personal safety was more and more imperilled, and he was unable to stay in any place for more than a short time. At last, in his seventy-second year, he died at Ulm, on the 10th of December 1561, surrounded by attached friends and declaring undiminished faith in his views.

Schwenkfeld, whose gentle birth and courtly manners won him many friends in high circles, left behind him a sect (who were called subsequently by others Schwenkfeldians, but who called themselves "Confessors of the Glory of Christ") and numerous writings to perpetuate his ideas. His writings were partially collected in four folio volumes, the first of which was published in the year 1564, containing his principal theological works. Erbkam states that his unprinted writings would make more than another four folios. His adherents were to be found at his death scattered throughout Germany. In Silesia they formed a distinct sect, which has lasted until the present time. In the 17th century they were associated with the followers of Jacob Böhme, and were undisturbed until 1708, when an inquiry was made as to their doctrines. In 1720 a commission of Jesuits was despatched to Silesia to convert them by force. Most of them fled from Silesia into Saxony, and thence to Holland, England and North America. Frederick the Great of Prussia, when he seized Silesia, extended his protection to those who remained in that province. Those who had fled to Philadelphia in Pennsylvania (1734) formed a small community under the name of Schwenkfelders; and Zinzendorf and Spangenberg, when they visited the United States, endeavoured, but with little success, to convert them to their views. This community still exists in Pennsylvania, and their views appear to be substantially those of the Quakers.

Schwenkfeld's mysticism was the cause of his divergence from Protestant orthodoxy and the root of his peculiar religious and theological position. It led him to oppose the Lutheran view of the value of the outward means of grace, such as the ministry of the word and the sacraments. He regarded as essential a direct and immediate participation in the grace of the glorified Christ, and looked on religious ordinances as immaterial. He distinguished between an outward word of God and an inward, the former being the Scriptures and perishable, the latter the divine spirit and eternal. In his Christology he departed from the Lutheran and Zwinglian doctrine of the two natures by insisting on what he called the *Vergötterung des Fleisches Christi*, the deification or the glorification of the flesh of Christ. The doctrine was his protest against a separation of the human and the divine in Christ, and was intimately connected with his mystical view of the work of Christ. He held that, though Christ was God and man from his birth from the Virgin, he only attained his complete deification and glorification by his ascension, and that it is in the estate of his celestial *Vergötterung* or glorification that he is the dispenser of his divine life to those who by faith become one with him. This fellowship with the glorified Christ rather than a less spiritual trust in his death and atonement is with him the essential thing. His peculiar Christology was based upon profound theological and anthropological ideas, which contain the germs of some recent theological and Christological speculations.

See Arnoldt, *Kirchen- und Ketzer-Historie* (Frankfort, ed. 1700); Salig, *Historie der Augsburg. Confession*; W. H. Erbkam, *Gesch. der prot. Sekten* (1848); Dorner, *Gesch. d. prot. Theol.* (1867); also R. H. Grützmacher's article in Hauck-Herzog's *Realencyklopädie*; Robert Barclay's *Inner Life of the Religious Societies of the Commonwealth* (1876), and C. Beard's *Hibbert Lectures* (1883), ch. vi.

SCHWERIN, KURT CHRISTOPH, COUNT VON (1684–1757), Prussian general field marshal, was born at Löwitz in Pomerania, and at an early age entered the Dutch army, with which he served at the Schellenberg and at Blenheim. In 1707 he became a lieutenant-colonel in the army of the duke of Mecklenburg-Schwerin, and was present at Ramillies and Malplaquet, and with the Swedish commander Stenbock at Gadebusch. In 1713 he was with Charles XII. of Sweden in his captivity at Bender, and in 1718 was made major-general. In 1719 he opposed the Hanoverian army which invaded Mecklenburg (in the course of which he fought a brilliant action at Walsmühlen on the 6th of March 1719), and in the following year entered the service of the king of Prussia. At first he was employed in diplomatic missions, but in January 1722/3 he received the command of an infantry regiment. In 1730, as a major-general, he was a member of the court martial which tried the crown prince of Prussia (afterwards Frederick the Great) for desertion, and in 1733, at the head of a Prussian army, conducted with great skill the delicate and difficult task of settling the Mecklenburg question. In the following year he became lieutenant-general and in 1739 general of infantry. During the life-time of King Frederick William, Schwerin was also employed in much administrative work. Frederick the Great, on his accession, promoted Schwerin to the rank of general field marshal and made him a

count. At the battle of Mollwitz (April 10th, 1741) he justified his sovereign's choice by his brilliant leading, which, when the king had disappeared from the field, converted a doubtful battle into a victory which decided for the time being the fate of Silesia. After the conclusion of the war he was governor of the important fortresses of Brieg and Neisse. In the Second Silesian War (1744–1745) Schwerin commanded the army which, marching from Glatz, met the king's army under the walls of Prague, and in the siege and capture of that place he played a distinguished part (September 10th, 1644). Some time afterwards, the king being compelled to retreat from Bohemia, Schwerin again distinguished himself, but, resenting a real or fancied slight, retired to his estate, to which, and its inhabitants, he devoted his energies during the years of peace. He reappeared on the field at the outbreak of the Seven Years' War (1756), and during the first campaign conducted the war on the Silesian side of Bohemia; and in 1757, following the same route as in 1744, again joined Frederick at Prague. On the 6th of May followed the battle of Prague. Leading on a regiment of the left wing to the attack with its colour in his hand, the old field marshal was shot dead. Frederick erected a statue on the Wilhelmsplatz to his foremost soldier, and a monument on the field of Prague commemorates the place where he fell. Since 1889 the 14th (3rd Pomeranians) Infantry of the German army has borne his name.

See Varnhagen von Ense, *Biographische Denkmale*, vol. vi. (3rd ed., Leipzig, 1873), and *Leben Schwerins* (Berlin, 1841); Wöllner, *Ein Christ und ein Held, oder Nachrichten von Schwerin* (Frankfurt a. O., 1758); Pauli, *Leben Grosser Helden*, i. (Halle, 1759); Gollmert, *Gesch. des Geschlechts von Schwerin* (Berlin, 1878); Schwebel, *Die Herren und Grafen von Schwerin* (Berlin, 1885).

SCHWERIN, a town of Germany, in the Prussian province of Posen, at the confluence of the Obra and the Warthe, 28 m. by rail E. of Cüstrin. Pop. (1905) 6768. Its principal manufactures are cigars, furniture, bricks and starch. By river a brisk trade is carried on in agricultural produce.

SCHWERIN, a town of Germany, the capital of the grand duchy of Mecklenburg-Schwerin, prettily situated at the S.W. corner of the lake of Schwerin (14 m. long and 3½ m. broad), 129 m. by rail N.W. of Berlin, and 20 m. S. of the Baltic. Pop. (1905) 41,638. The town is closely surrounded and hemmed in by a number of lakelets, with high and well-wooded banks, and the hilly environs are occupied by meadows, woods and pretty villas. The old and new towns of Schwerin were only united as one city in 1832; and since that date the suburb of St Paul and another outer suburb, known as the Vorstadt, have grown up. Though Schwerin is the oldest town in Mecklenburg, its aspect is comparatively modern, a fact due to destructive fires, which have swept away most of the ancient houses. The most conspicuous of the many fine buildings is the ducal palace, a huge irregularly pentagonal structure with numerous towers, built in 1844–1857 in the French Renaissance style. It stands on a small round island between Castle Lake and the lake of Schwerin, formerly the site of a Wendish fortress and of a later medieval castle, portions of which have been skilfully incorporated with the present building. The older and much simpler palace; the opera house, rebuilt after a fire in 1882; the government buildings, erected in 1825–1834 and restored in 1865 after a fire; and the museum, in the Greek style, finished in 1882, comprising a fine collection of paintings of the 17th century Dutch school; all stand in the "old garden," an open space at the end of the bridge leading to the new palace. Among the other secular buildings are the palace of the heir-apparent, built in 1779 and restored in 1878, the large arsenal, the ducal mews, the ducal library containing 180,000 volumes, the town hall, the artillery barracks and the military hospital. The cathedral was originally consecrated in 1248, though the present building—a brick structure in the Baltic Gothic style, with an unfinished tower—dates for the most part from the 15th century. Among other religious edifices are St Paul's church, a Roman Catholic church and a synagogue. Schwerin is rich in educational institutions, which include a classical school, a veterinary college and a technical school. Since 1837 Schwerin has been once more the residence of the grand duke, and the seat of government, a fact which has had considerable influence on the character of the town and the tone of its society. The chief industry is the making of furniture, and there are also some manufactures of dyes and soap.

Schwerin is mentioned as a Wendish stronghold in 1018, its name (Zwarin or Swarin) being a Slavonic word equivalent to "game-preserve." The Obotrite prince Niclot, whose statue is placed above the portal of the palace as the ancestor of the present reigning family, had his residence here. The town, founded in 1161 by Henry the Lion in opposition to this pagan fortress, received civic rights in 1166. From 1170 to 1624 it gave name to a bishopric; and it was also the capital of the duchy of Schwerin, which forms the western part of the grand-duchy of Mecklenburg-Schwerin. Destructive fires, the hardships of the Thirty Years' War, and the removal of the court to Ludwigslust in 1756 seriously depressed the town. It owes its revival and many of its chief buildings to the grand-duke Paul Frederick, to whom a statue by Rauch was erected in 1859.

See Fromm, *Chronik der Haupt- und Residenzstadt Schwerin* (Schwerin, 1863, revised and continued by G. Quade, 1892); G. Quade, *Vaterlandskunde* (Wismar, 1894); and Wörl, *Führer durch Schwerin* (1905).

SCHWERTE, a town of Germany, in the Prussian province of Westphalia, 9 m. by rail N.E. of Hagen, at the junction of the lines Aix-la-Chapelle-Holzminden and Schwerte-Cassel. Pop. (1905) 13,015. It has a Romanesque church, with a carved altar of 1523, and stained glass of the 14th and 15th centuries; and there is a 16th century town hall. The industries are practically confined to the manufacture of iron and steel goods. Schwerte received civic rights in the 12th century.

SCHWETZ, a town of Germany, in the Prussian province of West Prussia, on the left bank of the Vistula, 29 m. by rail N.E. of Bromberg. Pop. (1905) 7747. It has an Evangelical church, two Roman Catholic churches, a synagogue and an old convent, now used as a lunatic asylum, and also the remains of a castle built in the 14th century by the Teutonic Order. The chief industries are the making of sugar and shoes, and there are also electrical works and saw-mills.

See Kötz, *Geschichte der Stadt Schwetz seit 1772* (Märienwerder, 1904).

SCHWETZINGEN, a town of Germany, in the grand duchy of Baden, situated in a plain 9 m. by rail S.E. of Mannheim at the junction of lines to Carlsruhe, Heidelberg and Spires. Pop. (1905) 6858. It has a castle, formerly the residence of the electors palatine of the Rhine, built in 1656, destroyed by the French in 1689, but afterwards rebuilt. Its gardens, which occupy 117 acres, were laid out in the middle of the 18th century in imitation of those of Versailles. Cigars, vinegar, beer, yeast and jam are manufactured, while tobacco and hops are cultivated. Schwetzingen became a town in 1833.

SCHWIEBUS, a town of Germany, in the Prussian province of Brandenburg, situated in a fertile plain, 47 m. E. of Frankfort-on-Oder by the railway to Posen. Pop. (1905) 9321. It is still in part surrounded by its medieval wall, and has an old market-place, a castle and many old houses. Velvet, cloth, machinery, bricks and candles are manufactured, and there are flour-mills, breweries, distilleries and lignite mines. The territory of Schwiebus originally belonged to the principality of Glogau, and in the 16th and 17th centuries was a bone of contention between the electors of Brandenburg and the emperors. A compromise was arrived at in 1686, by which the elector received the lordship of Schwiebus on renouncing his claims to the principalities of Liegnitz, Brieg and Wohlau. The electoral prince Frederick, afterwards the elector Frederick III., had, however, in a private compact pledged himself to restore Schwiebus to the emperor Leopold I. when he became elector, and he did so in 1695, receiving £40,000 in exchange. By the peace of 1742, Frederick the Great regained Schwiebus with the rest of Silesia, and it was incorporated with the department of Glogau.

SCHWIND, MORITZ VON (1804–1871), German painter, was born in Vienna in 1804. He received rudimentary training and led a joyous careless life in that gay capital; among his companions

was the composer Schubert, whose songs he illustrated. In 1828 he removed to Munich, and had the advantage of the friendship of the painter Schnorr and the guidance of Cornelius, then director of the academy. In 1834 he received the commission to decorate King Ludwig's new palace with wall paintings illustrative of the poet Tieck. He also found in the same place congenial sport for his fancy in a "Kinderfries"; his ready hand was likewise busy on almanacs, &c., and by his illustrations to Goethe and other writers he gained applause and much employment. In the revival of art in Germany Schwind held as his own the sphere of poetic fancy. To him was entrusted in 1839, in the new Carlsruhe academy, the embodiment in fresco of ideas thrown out by Goethe; he decorated a villa at Leipzig with the story of Cupid and Psyche, and further justified his title of poet-painter by designs from the *Niebelungenlied* and Tasso's *Gerusalemme* for the walls of the castle of Hohenschwangau in Bavarian Tirol. From the year 1844 dates his residence in Frankfort; to this period belong some of the best easel pictures, pre-eminently the Singers' Contest in the Wartburg (1846), also designs for the Goethe celebration, likewise numerous book illustrations. The conceptions for the most part are better than the execution. In 1847 Schwind returned to Munich on being appointed professor in the academy. Eight years later his fame was at its height on the completion in the castle of the Wartburg of wall pictures illustrative of the Singers' Contest and of the history of Elizabeth of Hungary. The compositions received universal praise, and at a grand musical festival in their honour Schwind himself played among the violins. In 1857 appeared his exceptionally mature "cyclus" of the Seven Ravens from Grimm's fairy stories. In the same year he visited England to report officially to King Ludwig on the Manchester art treasures. And so diversified were his gifts that he turned his hand to church windows and joined his old friend Schnorr in designs for the painted glass in Glasgow cathedral. Towards the close of his career, with broken health and powers on the wane, he revisited Vienna. To this time belong the "cyclus" from the legend of Melusine and the designs commemorative of chief musicians which decorate the foyer of the new opera house. Cornelius writes, "You have here translated the joyousness of music into pictorial art." Schwind's genius was lyrical; he drew inspiration from chivalry, folk-lore, and the songs of the people; his art was decorative, but lacked scholastic training and technical skill. Schwind died at Munich in 1871, and was buried in the old Friedhof of the same town.

SCHWYZ (modern spelling *Schwiz*), one of the forest cantons of central Switzerland. Its total area is 350·5 sq. m., of which 293·6 sq. m. are reckoned as "productive" (forests covering 64·9 sq. m. and vineyards ·17 sq. m.), while of the rest 21¼ sq. m. are occupied by lakes (nearly 9 sq. m. of that of Zürich, 8¾ sq. m. of that of Lucerne, 3¾ sq. m. of that of Zug, and the whole of the lake of Lowerz), and ·5 sq. m. is covered by glaciers. Its loftiest point is the Böser Faulen (9200 ft.), while the two highest summits of the Rigi (the Kulm, 5906 ft., and the Scheidegg, 5463 ft.) rise within its borders. The canton extends from the upper end of the lake of Zürich on the north to the middle reach of the lake of Lucerne on the south; on the west it touches at Küssnacht, the northern arm of the same lake, and in the same direction the lake of Zug at Arth, mountain ridges dividing it from Glarus on the east and from Uri on the south. It is made up of two main valleys, those of the Muota, flowing through the older portion of the canton to the lake of Lucerne, and of the Sihl that passes near Einsiedeln on its way to Zürich. Less important are the Aa, that waters the Wäggi glen before joining the lake of Zürich, and the Biber, which receives the Alpbach that flows past Einsiedeln. It is thus a hilly rather than a mountainous region, and is all but wholly devoted to pastoral pursuits. It has not many railways, the principal being that portion of the main St Gotthard line between Küssnacht and Sisikon (about 20 m.), while from Arth-Goldau a line runs past Biberbrücke (where falls in the branch from Einsiedeln, 3 m.) towards Wädenswil. From Arth-Goldau a mountain line runs up to the Rigi Kulm, with a branch to the Rigi Scheidegg, while from Arth-Goldau the line towards Zug runs for 5½ m. within the canton. There is also a mountain line from Brunnen to Axenstein. In 1900 the population was 55,385, of whom 53,834 were German-speaking, 1108 Italian-speaking, and 296 French-speaking, while 53,537 were Romanists, 1836 Protestants and 9 Jews. The most populous town is Einsiedeln, with its famous Benedictine monastery, but Schwyz (the port of which is Brunnen) is the political capital.

There is a certain amount of industrial activity in the canton, particularly in the portion bordering on the lake of Zürich, while silk-weaving at home is widespread. There are many fruit trees, particularly cherry trees. But on the whole the region is essentially a pastoral one, and the local brown race of cattle is much esteemed and largely exported, mainly to north Italy. There are 417 mountain pastures or "alps" in the canton, capable of supporting 17,492 cows, and of an estimated capital value of 1,128,000 frs. Till 1814 the canton was included in the diocese of Constance, but it is now nominally part of that of Coire. There are six administrative districts in the canton, which comprise thirty communes. The cantonal constitution dates mainly from 1876, but was revised in 1898. The legislature (*Kantonsrat*) is composed of members elected in the proportion of one for every six hundred (or fraction over two hundred) inhabitants and holds office for four years—the elections in twelve (the larger) of the thirty electoral circles take place according to the principles of proportional representation. The executive (*Regierungsrat*) of seven members is elected by a popular vote, and holds office for four years. The two members of the federal *Ständerat* and the three of the federal *Nationalrat* are also chosen by a popular vote. The "obligatory referendum" prevails in the case of all laws approved by the legislature and important financial measures, while two thousand citizens may claim a popular vote as to any decrees or resolutions of the legislature, and have also the right of "initiative" as to the revision of the cantonal constitution or as to legislative projects.

The valley of Schwyz is first mentioned in 972 under the form of "Suittes." Later, a community of freemen is found settled at the foot of the Mythen, possessing common lands, and subject only to the count of the Zürichgau, as representing the German king. Its early history consists mainly of disputes with the great monastery of Einsiedeln about rights of pasture. In 1240 the community obtained from the Emperor Frederick II. the privilege of being subject immediately to the empire. Its territory then included only the district round the village of Schwyz and the valley of the Muota. But in 1269 it bought from Count Eberhard of Habsburg-Laufenburg (who in 1273 sold all his other rights to the head of the elder line of the Habsburgs), Steinen and Rothenthurm. Schwyz took the lead in making the famous everlasting league of the 1st of August 1291, with the neighbouring districts of Uri and of Unterwalden, its position and political independence specially fitting it for this prominence. An attack by Schwyz on Einsiedeln was the excuse for the Austrian invasion that was gloriously beaten back in the battle of Morgarten (November 15th, 1315). In the history of the league Schwyz was always to the front, so that its name in a dialectal form (Schweiz) was from the early 14th century onwards applied by foreigners to the league as a whole, though it formed part of its formal style only from 1803 onwards. Between 1319 and 1354 Schwyz secured possession of Arth. But it was only after the victory of Sempach (1386) that it greatly extended its borders. An "alliance" with Einsiedeln in 1397 ended in 1434 with the assumption of the position of "protector" of that great house, between 1386 and 1436 the whole of the "March" (the region near the upper lake of Zürich) was acquired, in 1402 Küssnacht was bought, and in 1440 the "Höfe," the parishes of Wollerau, Feusisberg and Freienbach, situated on the main lake of Zürich. All these districts were governed by Schwyz as "subject lands," the supreme power resting with the *Landsgemeinde* (or assembly of all male citizens of full age), which is first distinctly mentioned in 1294, though it seems to have already existed in 1281, when mention is also made of a common seal. Schwyz joined the

other forest cantons in opposing the Reformation and took part in the battle of Kappel (1531), in which Zwingli fell. In 1586 it became a member of the Golden or Borromean League, formed to continue the work of St Charles Borromeo in carrying out the counter reformation in Switzerland. In 1798 Schwyz, including Gersau (free from 1390), formed part of the République Telliane (or Tellgau) set up by the French, which a week later gave way to the Helvetic republic. The men of Schwyz, under Aloys Reding, offered a valiant resistance to the French, but they were forced to yield. Their land formed part of the vast canton of the Waldstätten, though the March and the Höfe were lost to that of the Linth. In 1799 a French occupation was successfully resisted, while later in the same year part of the canton was the scene of the disastrous retreat from Altdorf to Glarus over the Kinzigkulm and Pragel passes by the Russians under Suvarov in face of the French army. In 1803 the separate canton of Schwyz was again set up, the March and the Höfe being recovered, while Gersau now became part of it. In 1806 the great landslip from the Rossberg buried Goldau, causing great loss of life and of property. Later, Schwyz resisted steadily all proposals for the revision of the pact of 1815, joined in 1832 the league of Sarnen, and in 1845 the Sonderbund, which was put down by a short war in 1847. In 1832 the outer districts (Einsiedeln, the March, Küssnacht and Pfäffikon) formed themselves into a separate canton, an act which brought about a federal occupation of the old canton in 1833, this ending in the dissolution of the new canton, the constituent parts of which were put on an equal political footing with the rest. In 1838 a strife broke out in the older portion of the canton between the richer peasant proprietors (nicknamed the "Horns," as they owned so many cows) and the poorer men (dubbed the "Hoofs," as they possessed only goats and sheep) as to the use of the common pastures, which the "Horn" party utilized far more than the others. The "Horn" party finally carried the day at the Landsgemeinde held at Rothenthurm. The cantonal constitution of 1848 put an end to the ancient Landsgemeinde; it was revised in 1876 (when membership of one of the 29 communes became the political qualification), and in 1898.

AUTHORITIES.—J. J. Blumer, *Staats- und Rechtsgeschichte d. schweiz. Demokratien* (3 vols., St Gall, 1850–1859); J. C. Benziger, *Die Ratsprotokolle des Kant. Schwyz, 1548–1798* (Schwyz, 1900); T. Fassbind, *Geschichte d. Kant. Schwyz* (5 vols., Schwyz, 1832–1838); *Geschichtsfreund*, from 1843; M. Kothing, *Das Landbuch von Schwyz* (Zürich and Frauenfeld, 1850); A. Lütolf, *Sagen, Bräuche, Legenden aus den fünf Orte* (Lucerne, 1852); G. Meyer von Knonau, *Der Kanton Schwyz* (St Gall, 1835); *Mitteil. d. hist. Vereins d. Kant. Schwyz* (from 1882); W. Oechsli, *Die Anfänge d. schweiz. Eidgenossenschaft* (Zürich, 1891); R. von Reding-Biberegg, *Der Zug Suworoffs durch die Schweiz in 1799* (Stans, 1895); H. Ryffel, *Die schweiz. Landsgemeinden* (Zürich, 1903); J. Sowerby, *The Forest Cantons of Switzerland* (London, 1892); D. Steinauer, *Geschichte d. Freistaates Schwyz* (1798–1861) (2 vols., Einsiedeln, 1861); A. Strüby and H. Schneebeli, *Die Alpwirtschaft im Kant. Schwyz* (Soleure, 1899); W. H. Vormann, *Aus den Fremdenbüchern von Rigi-Kulm* (Bern, 1883); K. Zay, *Goldau und seine Gegend* (Zürich, 1807). (W. A. B. C.)

SCHWYZ, the capital of the Swiss canton of that name, a picturesque little town, admirably situated, amid fruit trees, on a mountain terrace (at a height of 1706 ft.), commanding a glorious view, at the north-west foot of the conical peak of the Gross Mythen (6240 ft.), and at a considerable height above the valley of the Muota. Besides a stately 18th century parish church and several convents, it contains a 16th century town hall (housing various precious MSS. and banners captured in various wars), as well as several curious old patrician houses, such as that of the Reding family, a member of which, Aloys (1765–1818), headed the patriotic resistance to the French in 1798–1799. Including the neighbouring hamlets of Ibach, Rickenbach, &c., the parish had 7398 inhabitants in 1900, practically all German-speaking and Romanists. The town is connected by an electric tramway with the Schwyz-Seewen station on the St Gotthard railway, about 3 m. from Brunnen, the port of Schwyz on the lake of Lucerne.

SCIACCA, a town and episcopal see of Sicily, on the S. coast, in the province of Girgenti, 45 m. N.W. of Girgenti by road, and about 30 m. direct. Pop. (1906) 24,645. It is surrounded by walls erected in 1400, and has two ruined castles, belonging to the Luna and Perollo families, whose hereditary feuds lasted from 1410 to 1529, some fine medieval palaces, and several interesting churches. The cathedral, founded in 1090, was largely reconstructed in 1686. The convent of Sta. Maria delle Giummare, with its battlemented walls, occupies the former palace of the Saracen governors, and contains a painting of the foundation of the convent by Count Roger. The town has only an open roadstead. It has an important trade in coral.

Three miles E. of the town is the Monte San Calogero (the ancient Mons Cronius) with sulphurous and saline springs and vapour baths, which are still frequented and were known in Roman times as Aquae Larodes or Thermae Selinuntiae (Sciacca is about 15 m. direct S.E. of Selinus). The name Sciacca is Arabic, but of uncertain meaning. The town is the birthplace of Tommaso Fazello (1498–1570), the father of Sicilian history.

SCIATICA (from a late Lat. corruption, *sciaticus*, of Gr. *ἰσχιαδιακός*, from *ἰσχίον*, the hip-joint), a form of neuralgia localized in the sciatic nerve, or its cords of origin; see NEURALGIA.

SCIENCE (Lat. *scientia*, from *scire*, to learn, know), a word which, in its broadest sense, is synonymous with learning and knowledge. Accordingly it can be used in connexion with any qualifying adjective, which shows what branch of learning is meant. But in general usage a more restricted meaning has been adopted, which differentiates "science" from other branches of accurate knowledge. For our purpose, science may be defined as ordered knowledge of natural phenomena and of the relations between them; thus it is a short term for "natural science," and as such is used here technically in conformity with a general modern convention.

The origin of science.

The beginnings of physical science are to be sought in the slow and unconscious observation by primitive races of men of natural occurrences, such as the apparent movements of the heavenly bodies, and in the gradually acquired mastery over the rude implements by the aid of which such men strove to increase the security and comfort of their lives. Biological science similarly must have begun with observation of the plants and animals useful to man, and with empirical medicine and surgery. It was only when a considerable progress had been made with ordered knowledge that men began to ask questions about the meaning and causes of the phenomena, and to discern the connexions between them.

In the earliest stage of development it seems that an anthropomorphic or mythological explanation is always assigned to the phenomena of nature. With no clue to trace the regularity of sequence and connexion between those phenomena, an untutored mind inevitably refers the apparently capricious events which succeed each other to the direct and immediate intervention of some unseen being of a nature essentially similar to his own. The sun is the flaming chariot of the sun-god, driven day by day across the heavens; the clouds are cows from which milk descends as nourishing rain on the fruitful earth. We may regard such myths as childlike fancies, but they were doubtless an advance on the want of all explanation which preceded them; they supplied hypotheses which, besides giving rise to themes of beauty and suggestiveness for poetry and art, played the first and chief part of a scientific hypothesis in pointing the way for further inquiry. Much useful knowledge was acquired and much skill gained in logical analysis before these primitive explanations were proved insufficient. A false theory which can be compared with facts may be more useful at a given stage of development than a true one beyond the comprehension of the time, and incapable of examination by observation or experiment by any means then known. The Newtonian theory of gravitation might be useless to a savage, to whose mind the animistic view of nature brought conviction and helpful ideas, which he could test by experience.

The phenomena of the heavens are at once the most striking, the most easily observed and the most regular of those which

are impressed inevitably on the minds of thinking men. Thus it is to astronomy we must look for the first development of scientific ideas. The orientation of many prehistoric monuments shows that a certain amount of astronomical observation had been acquired at a very early age, and the Chaldeans seem to have gone so far as to recognize a law of periodicity even in eclipses. From the land of Asia the Greeks took their earliest ideas of science, and it is to the Ionian philosophers, of whom Thales of Miletus (580 B.C.) is regarded as the first, that we must turn for the earliest known example of an advance on the mythological view of nature. Anaximenes recognized the rotation of the heavens round the pole star, and saw that the dome overhead was but the half of a complete sphere. The earth was thus deprived of the base stretching to unfathomed depths imagined by the mythologists, and left free to float as a flattened cylinder at the centre of the celestial sphere. Anaximenes, too, seems to have grasped the doctrine of the uniformity of nature, teaching that all material transformations must have a true cause.

Early astronomy.

Next came the Pythagoreans, who simplified these conceptions by the suggestion that instead of a rotation of the vast sphere of the heavens the earth itself might be a sphere and revolve about a central fixed point, like a stone at the end of a string. The uninhabited side of the earth always faced the fixed point, and its inhabited side faced successively the different parts of the heavens. At the central fixed point they placed a "universal fire," which, like the fire on an altar, served as a centre for the circling of the worshipping earth. Mythology was losing its hold of science, but mystical symbolism still held sway. When, however, in the 4th century B.C. the growth of geographical discovery failed to disclose any trace of this central fire, the idea of its existence faded away, and was replaced by the conception of the revolution of the earth on its own axis. Finally, Aristarchus (280 B.C.), believing that the sun was larger than the earth, thought it unlikely that it should revolve round the earth, and developed a heliocentric theory. But the time was not ripe; no indisputable evidence could be adduced, no general conviction followed, and to mankind the earth remained the centre of creation till many centuries later. Even to Lucretius, the visible universe consisted of the central earth with its attendant water, air and aether founded by the sphere of the heavens, which formed the flaming walls of the world—*flammantia moenia mundi.*

Simultaneously with the birth of astronomy the problem of matter came into being. The old Ionian nature philosophers, observing the sequence of changes from earth and water into the structure of plants and the bodies of animals, and through them again into the original constituents, began to grasp the conception of the indestructibility of matter, and to put forward the idea that all forms of matter might ultimately consist of a single "element." But the conception of a single ultimate basis of matter was far in advance of the age. It is only now becoming a fertile working hypothesis in the light of all the gigantic increase in knowledge of the intervening two thousand years. At the time when it was put forward, the conception was of little use, and the immediate path of advance was found in the idea of Empedocles (450 B.C.) that the primary elements were four: earth, water, air and fire—a solid, a liquid, a gas and the flame which seemed to the ancients a type of matter of still rarer structure. This hypothesis served to interpret the phenomena of nature for many centuries, till, in modern days, the growth of chemistry disclosed the seventy or eighty elements of our text-books. Signs are not wanting that they too have served their turn as a conception of the ultimate nature of matter, while still maintaining their place as the proximate units of chemical action.

The problem of matter.

In the four elements of Empedocles we trace the germ of the ideas of the Atomists. Empedocles saw that, by combining his separate elements in different proportions, he could explain all the endless differences in matter as known to the senses. Leucippus and Democritus developed the conception and gave to the world the theory of atoms, described at a later date by the Roman poet Lucretius. As matter is subdivided does it keep its characteristic properties throughout? Is iron always iron, however finely we divide it; is water always water? Are the properties of any kind of matter ultimate facts of which no explanation—no description in simpler terms—is possible? To avoid answering this last question in the affirmative, and resigning all hope of an advance in knowledge, the atomic theory of the Greeks was framed.

The theory of atoms.

To recognize the significance of the doctrines of the Greek Atomists, we must remove from our minds all sense of comparison with the atomic theory of to-day. The Greeks had none of the detailed physical and chemical knowledge on which that theory is founded, and which it was framed to explain. The object of Leucippus and Democritus was quite different from that of Dalton and Avogadro. To the latter, the conception of atoms and molecules served as a means of explaining certain definite and detailed facts of chemical combination and gaseous volume in a more definite and exact way than any other hypothesis available at the time. To the Greek philosophers, the atomic theory was an attempt to make the universe intelligible. The particular explanation offered was not of so much importance as the idea that an explanation of some kind was possible. When we see the beliefs that held sway before their day, we realize the advance their ideas produced. The qualities of substances were thought to be of their essence—the sweetness of sugar was as much a reality as sugar itself, the black colour of water must survive all changes in its form, so that, to one who knew this doctrine, snow could never look white again. It was such confusion as this—such denial of facts if they failed to support a theory—that Democritus assailed:—"According to convention there is a sweet and a bitter, a hot and a cold, and according to convention there is colour. In truth there are atoms and a void." Atoms were many in size and shape, but identical in substance. All qualitative differences in substances were to be assigned to differences in size, shape, situation and movement of particles of the same ultimate nature. No attempt was made to examine into the nature of this ultimate substance; but one set of phenomena was expressed in terms of something simpler, and no "explanation" even of the most recondite observation by the most modern physicist can do more.

The atomic theory of the Greeks as transmitted to us by the poem of Lucretius presented a wonderfully consistent picture of nature within the limits of the knowledge of their day. It is easy to show where it fails in the light of the knowledge of phenomena we now possess; it is easy to point to places where, as in its application to psychological problems, its authors passed in imagination over logical chasms without even seeing that a difficulty existed. But the attempt to frame an intelligible picture was a great step in advance, and a study of the flaws which we can now detect may serve to suggest the provisional nature of some of the theories by the aid of which knowledge is advancing so fast in our own day.

But the great difference between the position of the Greeks and that of ourselves in regard to natural knowledge consists in the small number of phenomena known to them contrasted with the enormous wealth of accumulated observation which is available for us, as the result of years of experiment with the aid of apparatus unknown to the ancients. When a new theory is put forward, it is now almost always possible to test its concordance with facts by the use of material already accumulated, or to suggest, in the light of such material, experiments which will serve to refute it, or to lend it greater probability. Thus a theory which survives the trials that follow its birth has nowadays a fairly long expectation of life—probably the theory will serve to interpret phenomena discovered either by its means or in other ways for some time to come. But in the ancient world this was not so. To test a new theory, other phenomena were very rarely available than those which suggested it, or to explain which it was put forward. Thus thought was much more speculative, and, as is still the case with metaphysics, no general consensus of opinion was reached. Each philosopher had a system of his own in science, just as he still has in metaphysics—a system which, beginning from first

principles anew, raises on them a superstructure, which, even if it logically follows from them, can have no more validity than the premises on which it is based. When the premises are not accepted by other philosophers, the whole scheme becomes merely the doctrine of one man, and, if it lives at all, may oppress by the dead weight of authority the struggle of living thought beneath it.

The history of the atomic theory of Leucippus and Democritus illustrates the difficulties of a position where speculation has outstripped observation. The theory was nearer what is now accepted as truth than any other of the ancient schemes of physics. Yet the grounds on which it was based were so insecure that Aristotle (*c.* 340 B.C.), who started with other preconceptions, was able to bring to bear such destructive criticism that the theory ceased to occupy the foremost place in Greek thought. Although, with the knowledge then available, we can but admit that some of Aristotle's criticism was just, much of it consists of metaphysical arguments against the atomists, while in parts he rejects true conclusions owing to what he considers their impossibility. Democritus, for instance, had held that all things would fall with equal speed in a vacuum, and that the fact that heavy bodies were observed to fall faster than very light ones was due to the resistance of the air. Democritus's belief was true, though he was of course quite unconscious of the grounds on which it can alone be demonstrated—the universal attraction of gravity, and the remarkable and curious experimental fact that the weights of bodies are proportional to their masses. Aristotle agrees that in a vacuum all bodies would fall at an equal rate, but the conclusion appears to him so inconceivable that he rejects the idea of the existence of any empty space at all, and with the "void" rejects the rest of the allied concepts of the atomic theory. If all bodies were composed of the same ultimate matter, he argues, they must all be heavy, and nothing would be light in itself and disposed to rise. A large mass of air or fire would then necessarily be heavier than a small mass of earth or water. This result he thinks impossible, for certain bodies always tend upwards and rise faster as their bulk increases. It will be seen that Aristotle has no idea of the conceptions we now call density and specific gravity, though clear views about the question why some things rise through water or air might have been obtained without the aid of physical apparatus. Aristotle's doctrine that bodies are essentially heavy or light in themselves persisted all through the middle ages, and did much to delay the attainment of more exact knowledge. It was not till Galileo Galilei (1564–1642) discovered by actual experiment that, in cases where the resistance of the air is negligible, heavy things fall at the same speed as light ones, that the Aristotelian dogma was overthrown.

Aristotle.

Turning to the biological sciences, we may trace a somewhat similar course of development. Owing to its practical importance, medicine has left many records by which its progress can be traced. Just as primitive man personified the sun and the moon, the wind and the sea, so he regarded disease as due to the action of some malignant demon or to the spells of some human enemy. Once more Greek literature enables us to trace the gradual decrease in the importance assigned to charms and magic, and the growth of more rational ideas among physicians. But here, as in the physical sciences, the philosophic range of the intellect of the Greeks led them astray. Assumptions as to the nature of man or the origin of organic life were too often made the starting point of a train of deductive reasoning, the consequences of which were not always compared with the results of observation and experiment, even where such comparison was possible. The Greek philosophers tried to make bricks without straw, usually in sublime unconsciousness that straw was necessary. Many centuries of humble observation and tentative fitting together of small parts of the great puzzle were needed before enough material was collected to make possible useful generalizations about the questions, answers to which the Greeks assumed as the very basis of their inquiries.

Early biology.

Among the multitude of their guesses, a few somewhat resembled the views that are now again rising into prominence from the basis of definite and exact experiment. A good example of the strength and weakness of ancient speculation is found in the cosmogony of the atomists, both on its physical and on its biological side. Lucretius describes how the world was formed by the conjunction of streams of atoms, which condensed into the earth, with its attendant water, air and aether, to form a self-contained whole. Unconscious of the mighty gap between inorganic matter and living beings, he proceeds to tell how, in the chances of infinite time, all possible forms of life appeared, while only those fittest to survive persisted and reared offspring. Here, surrounded by unsupported statements and false conclusions, we see dimly the germs of the ideas of the nebular hypothesis and the theory of natural selection, though Lucretius had the profoundest ignorance of the difficulties of the problem, and the vast stretches of time necessary for cosmical and biological development.

In those branches of biological science in which less ambitious theorizing and more detailed observation were forced on the Greeks, considerable progress was made. Aristotle compiled a laborious account of the animals known in his day, with many accurate details of their anatomical structure. Beginning from an earlier date, steady advance was made with geographical discovery. Maps of the known world, developed from the local maps invented by the Egyptians for the purposes of land-surveying, gave definiteness to the knowledge thus acquired, and showed its bearing on wider problems.

One of the most striking successes of Greek thought is seen in the development of geometry. Geometry has a twofold importance, as being itself the study of the properties of the space known to our senses, and as teaching us methods and means of studying nature by unfolding the full logical consequences of any hypothesis: geometry is the best type of deductive reasoning. Based on axioms, the result of simple experience, it traces from the ideas of solids, surfaces, lines and points the properties of other figures defined in terms of those ideas. As an example to other sciences, the deductive geometry of Euclid (*c.* 300 B.C.) had, perhaps, an unfortunate influence in emphasizing the deductive method, and teaching men to neglect the need of verifying by experiment the theories put forward to explain the more complex phenomena of nature at the conclusion, and at each possible step, of the deduction. But, in itself, the science of Euclidian geometry was brought to such a state of perfection that no advance was made till modern times: no change even in form attempted till quite recently. Unlike some other branches of inquiry we have mentioned, Euclid's geometry carried universal conviction, and represented a permanent step in advance which never had to be retraced.

Geometry.

Alongside the study of individual sciences, the Greeks paid even more attention to the laws of thought, and to the examination of the essence of the methods by which knowledge in general is acquired. In opposition to Plato's theory that all knowledge is but the unfolding and development of forgotten memories of a previous state of existence, Aristotle taught that we learn to reach the generalizations, which alone the Greeks regarded as knowledge, by remembering, comparing and co-ordinating numerous particular acts or judgments of sense, which are thus used as a means of gaining knowledge by the action of the innate and infallible nous or intellect. Neither Plato nor Aristotle could be satisfied without finding infallibility somewhere. Aristotle, it is true, investigated the logical processes by which we pass from particular instances to general propositions, and laid stress on the importance of observing the facts before generalizing about them, but he had little appreciation of the conditions in which observation and the induction based on it must be conducted in practice in order to obtain results where the probability of error is a minimum. Aristotle regarded induction merely as a necessary preliminary to true science of the deductive type best seen in geometry, and, in applying his principles, he never reached the "positive" stage, in which metaphysical problems are evaded, if not excluded,

Theories of knowledge.

and a scheme of natural knowledge built up in a consistent manner, so that metaphysical ideas, though they may underlie the foundation of the ultimate conceptions, do not intrude between the parts of the building. Hence Aristotle's explanations often turn directly on metaphysical ideas such as form, cause, substance, terms which do not occur (in the Aristotelian sense) in modern scientific terminology.

A century later than the time of Aristotle, Archimedes of Syracuse (287 to 212 B.C.) formulated the fundamental conceptions of hydrostatics and took what may be regarded as the first step in the exact science of mechanics. The use of the lever must have been discovered at a very early date, and Archimedes set to work to investigate its quantitative laws by the application of principles learnt from the geometers. He begins by laying down two axioms: (1) Equal weights placed at equal distances from the point of support of a bar will balance: (2) Equal weights placed at unequal distances do not balance, but that which hangs at the greater distance descends. The ancient philosophers based such axioms as the first of these two on the "principle of sufficient reason." No motion can take place, because, from the symmetry of the system, there is no reason why the balance should descend on one side more than the other. Even if we grant the theoretical validity of this principle, it is impossible to make sure without trial that the system in any given case is really symmetrical. Electrification of the bar, for instance, though imperceptible to our senses, would cause one end to descend if an oppositely electrified body were placed near that end; we cannot assume without trial that the position of the sun, or the colour of the arms, will not affect the result. Archimedes based the second axiom on the sounder ground of direct experience. On these two axioms he proceeded to construct an elaborate deductive proof of the numerical law of the lever, but, in the course of it, he assumed as known the principle of the centre of gravity. In reality, this principle is identical with that of the lever, and assuming one, implicitly we assume the other. Nevertheless, Archimedes' proof is of use and interest. On the assumptions made, it shows the connexion between the general case of the lever with unequal arms, and the special and more familiar case when the arms are equal. Indeed, if we also treat the principle of the centre of gravity as an axiom known by experience, Archimedes' proof is a true type of all scientific "explanations"; it reduces an unfamiliar phenomenon to others already well known to our minds, which, creatures of habit as they are, regard the familiar cases as in no need of explanation. Nowadays we should treat the law of the lever of unequal arms as one that is verified by direct and familiar experiment, and use it, in its turn, as the starting point for further deduction.

The origin of mechanics.

Thus before the intellectual activity of Greece was absorbed by the utilitarianism of Rome, which, in its turn, was lost in the dark ages following the barbarian conquests, the seeds were sown which, germinating after the lapse of centuries, developed in the more fruitful soil of the age of experiment. But for a time they were buried, and only remembered by compendiums written just before the ancient light was wholly lost. During the dark ages, the contents of secular learning, based on those compendiums, settled down into the elementary "trivium," consisting of grammar, rhetoric and dialectic, and the more advanced "quadrivium" music, arithmetic, geometry and astronomy. Music included a half-mystical doctrine of numbers and the rules of plainsong; geometry consisted of a selection of the propositions of Euclid without the demonstrations; while arithmetic and astronomy were cultivated chiefly because they taught the means of finding Easter. Meanwhile, the early alchemists of Alexandria, by the aid of mystical analogies with the conceptions of astrology, were making primitive experiments on the transformations of various substances. It was probably from them that the "sacred science" passed to the Arabs, among whom Geber (*c.* A.D. 750) discovered many new chemical reactions and compounds.

The dark ages.

With the intellectual revival which began in the 11th century, and the gradual recovery of some of the lost works of the ancient writers, we turn a new page. The controversy between Plato and Aristotle upon the doctrine of ideas fascinated the minds of the middle ages, saturated as they were with the logical subtleties of dialectic. This controversy originated the long debate on the reality of universals, which absorbed the intellectual energies of many generations of men. Did reality belong only to the idea or universal—to the class rather than to the individual—to the common humanity of mankind, for instance, rather than to each isolated being? Or were the individuals the reality, and the universals mere names? In this question, trivial, almost meaningless, as it seems at first sight, logical analysis disclosed to the medieval mind the whole theory of the universe. Either answer contained danger to theological orthodoxy as then understood; hence the fervour with which it was debated. But, as communication with the East was reopened early in the 13th century, Latin translations of Aristotle's works gradually were recovered; the whole of Aristotle's philosophy was reimported into the schools of Europe, and reconciled and adopted by Christian theology. For three hundred years Aristotle reigned supreme in European thought, and exponents of the scholastic philosophy, ignoring their master's teaching on the need of experiment, settled questions of fact as well as those of opinion by an appeal to his books. But outside the academic schools of the newly founded universities, experiment was kept alive by the labours of the alchemists, who, early in the 13th century, caught their ideas from the Arabs, and began to search for an *elixir vitae* and for a means of transmuting baser metals into gold. But alchemy never quite squared its account with orthodox theology, and the "sacred science" of the Alexandrians became associated in the medieval mind with the "black art" of witchcraft. Even a man like Roger Bacon, who, with some astrological mysticism, had a more modern idea of experiment both in chemical and physical problems, did not escape condemnation.

Medieval learning.

We now reach the period in the history of the world known as the Renaissance, when many converging streams of thought were given room to join by the increased material prosperity and improved political stability of the 15th and 16th centuries. The Renaissance was not, as it is sometimes represented, a sudden break with medievalism and a birth of the modern world. But a number of conditions favourable to rapid development happened to coincide, and, in the course of a century, men's outlook on themselves and on nature became profoundly modified. The recovery of the Greek language, the voyages of Columbus, the decay of the Western and the passing of the Eastern empire, the temporary diminution in power of the papacy, the invention of printing, all tended to produce new ideas and to prepare men's minds to accept the more human and naturalistic view of the universe which had been current among the Greeks, in place of the mystical aspect which it wore to the medieval schoolmen and ecclesiastics. At first the tendency was to substitute the authority of the ancients for the authority of the schoolmen, but gradually more independence of thought was secured; men like Leonardo da Vinci (1452–1519) began to experiment and to record their results; Nicolaus Copernicus (1473–1543) revived the heliocentric theory, and showed how the accumulated mass of astronomical observations could be interpreted by its means; and anatomy began again to be studied in the schools of medicine, gradually making its way in face of the prejudice against mutilating the human body.

The Renaissance.

The philosophy of the new experimental methods was first studied deeply by Francis Bacon (1561–1626). Sensible of the confused and disjointed information which then constituted the only scientific knowledge, Bacon set himself to describe a new method by which definite knowledge might be acquired with certainty. Warned by the failure of the scholastic methods, Bacon laid exclusive stress on experimental research, and it was perhaps natural that he should incline to the other extreme and ignore almost entirely the use of hypothesis and the deductive method. To arrive at the underlying causes, said Bacon, we must study the

Francis Bacon.

natural history of the phenomena, collect and tabulate all observations which bear on them, notice which phenomena are related in such a way as to vary together, and then, by a merely mechanical process of exclusion, we discover the cause of any given phenomenon. As a corrective of the medieval philosophy Bacon's work was of the greatest value in the history of thought, and, from this point of view, it is perhaps but a small drawback that scientific discovery is seldom or never made by the pure Baconian method. The multitude of phenomena are too great for any subject to be attacked with success without the aid of hypothesis framed by the use of the scientific imagination. Facts are collected to prove or disprove the consequences deduced from the hypothesis, and thus the number of facts to be examined becomes manageable.

Even while Bacon was philosophizing, the true method was being used by Galileo Galilei (1564–1642) to found the science of dynamics. We have seen how the Aristotelians held the belief that every body sought its natural place, the place of heavy bodies being below and that of light ones above. Innate qualities of heaviness and lightness were thus invoked to explain why some things fell, and others, in similar circumstances, rose. Galileo, rightly rejecting the whole current point of view, set himself to examine not why, but how, things fell. This change of attitude was in itself one of his great achievements. Now a falling body starts from rest and falls with a speed which is increasing constantly. Galileo sought to find the law of increase. To isolate the real law out of all possible laws he made a guess at a simple law which seemed likely to be true. He assumed that the speed acquired is proportional to the distance fallen through. But, working out the consequences of this hypothesis, he soon convinced himself that it involved a contradiction. He abandoned the hypothesis and made another. He supposed that the speed was proportional to the time of fall. Again he deduced mathematically the consequences of this new hypothesis, and, finding no inconsistencies, put some of his deductions to the test of experiment, and verified their accuracy. Thus Galileo proved mathematically that, if the speed of fall is proportional to the time from the moment of starting, the space traversed by a falling body must be proportional to the square of the time of fall. To verify this result experimentally, Galileo convinced himself that a body falling down an inclined plane acquired a speed which is the same as that it would have attained in falling through the same vertical height. He was able therefore to use a slow fall down a plane for his experiments instead of the unmanageably rapid course of a body falling freely. Nor was this all. From this stage of the investigation another consequence of his results was found to spring. A ball after running down an inclined plane of a certain height will run up another plane of the same height irrespective of its inclination—that is, if friction be small. The second plane may be made very long, but still, if its final height be the same, the ball will reach its end. Hence it is the height that matters; none of the speed of the ball is destroyed unless it rises. If the second plane be made horizontal, the ball will thus run on for ever unless stopped by friction or some other applied force. This fundamental result, put into definite words by Newton, is known as the first law of motion, and is the foundation of the whole science of dynamics. In Galileo's day it was an entirely new conception. It has been assumed that every motion required some cause or force to maintain it. Hence arose the need of hypothetical vortices to maintain planetary movements, and similar complications in astronomy and mechanics. But it now became evident that it was not the continuous motion of the planets which needed explanation, but the constant deflection of that motion from the straight path it would hold if no applied force were in action. The way was open for Newton.

Galileo.

Sir Isaac Newton (1642–1727) proved mathematically that the observed motion of the planets about the sun could be explained, and explained only, by the supposition that the sun exerted a force on each planet proportional inversely to the square of its distance from the planet. But the earth, at any rate, does attract bodies on or near its surface, the phenomenon being the familiar but mysterious gravity. Is this force competent to account for the motion of the moon round the earth? On the assumption of the law of inverse squares, Newton calculated what the known force of gravity would become at the distance of the moon. Owing to faulty data, his first result indicated that the force would be too great, and Newton put aside his calculations. Six years later a new determination of the size of the earth gave him a new basis for calculation, and, in an excitement so great that he could hardly see his figures, Newton found that the fall of a stone to the earth and the sweep of the moon in her orbit were due to the same cause. The mechanism by means of which the force is exerted remained unrevealed to Newton, and has baffled all inquirers since his day, but the discovery that all the movements of the heavens could be described by one simple physical law, represents the greatest achievement in the history of science.

Newton.

Newton brought the existing state of the solar system within the cognizance of known dynamical principles, and the logical extension of such principles to explain the origin of that system was made by the speculations of Pierre Simon, marquis de Laplace (1749–1827), and developed by those who followed him. They imagined a primitive state of nebulosity from which, by the action of known dynamical processes, the sun and planets would be evolved.

Laplace.

These speculations, isolated at first, coalesced with the more detailed conclusions of geology during the 19th century. The earlier conceptions of the origin of the rocks of the earth imagined catastrophes of fire or water, processes alien to those of everyday experience. But the "uniformitarian" school, founded by James Hutton (1726–1797) and expounded by Sir Charles Lyell (1797–1875), produced evidence to show that much, at any rate, of the structure of the surface of the globe was produced by the action of causes and processes still going on under our eyes. The deposition of material by the action of seas and rivers and other natural agencies, *e.g.* volcanoes, &c., was seen to need only time enough to produce beds of rock like those which make up our mountains. Comparison of the fossil remains of plants and animals found in different kinds of rock then enabled geologists to classify the rocks, and place them in a chronological sequence. Moreover, it became evident that a series of animal and plant types was associated with the gradual formation of the rocks, and that the age both of the earth itself and of the organic life found on it was much greater than had been suspected. The few thousand years of received cosmogonies stretched out into untold millions, during which the same familiar laws described the phenomena of development. The remains and traces of man, found, it is true, only in the later sedimentary deposits of the earth, still were enough to prove his existence through ages beside which the dawn of history was but as yesterday. As Newton had extended known principles throughout the gigantic spaces of the heavens, so the later geologists pushed them back over enormous epochs of time. The extent of the kingdom of ordered knowledge expanded both in space and time to a degree truly marvellous.

Geology.

The discovery by Sir George G. Stokes (1819–1903), R. W. Bunsen (1811–1898) and G. R. Kirchhoff (1824–1887), that the spectroscope gave a means of investigating the chemical composition of the sun and the stars, brought another set of phenomena under the control of terrestrial experiment. Moreover, the differences in stellar spectra once more suggested the idea of cosmical development, familiar from the nebular hypothesis of Laplace.

The spectroscope.

Besides the direct extension of the dominion of science produced by geology and spectroscopy the new results emphasized the idea of development, and prepared the way for the biological work of Charles Darwin (1809–1882). The origin of living beings from a few ancestral types was an old conception, but Darwin first found an adequate intelligible cause in the slow action of sexual selection, joined to the pressure

Darwin.

of the struggle for life, which allowed only those individuals most suited by favourable variation to the environment to survive and rear their offspring. The advantage thus given to beings with useful variations may develop into permanent modifications in the course of ages, and, when the parent types have disappeared, their common posterity may exhibit the marked differences characteristic of the separate and distinct species now existent. From the point of view of scientific thought, the significance of Darwin's theory lies in the new and vast extension it gives to the field in which causes intelligible to the human mind can be sought as explanations of phenomena. Thus evolution is co-ordinated in the history of thought with the Newtonian theory of gravitation, and with the uniformitarian theory of geology.

Both before and after the appearance of Darwin's work, biologists devoted their attention to the study of how the useful variations arise. Three views have been held. (1) Jean Baptiste, chevalier de Lamarck (1744–1829), regarded variation as due to the accumulated and inherited effect of use. Thus the giraffe acquires his long neck by the successive efforts of countless generations to browse on leaves just beyond their reach. (2) Darwin, while accepting changes in accordance with Lamarck's ideas as exceptional aids to variation, revolutionized biology by showing the primary importance of the struggle for life, when extended over long periods of time, in selecting useful variations which arise accidentally or in other ways. (3) Darwin also recognized the possible occasional effect of discontinuous variations or "sports," when a plant or an animal diverges from its parents in a marked manner. But of late years the study by Hugo de Vries, William Bateson and others, of discontinuous variations which arise spontaneously has pointed to the conclusion that in nature such sudden leaps are the normal cause of development. If a "sport" has advantages over the parental type, it tends to survive, while, if it is not as fitted for its life struggle, it is destroyed by natural selection and never establishes itself. Such a theory avoids the difficulty of pure "Darwinism," that organs useful, when fully developed, to an animal or plant are of no advantage in incipient stages. Statistical methods, too, suggest that a definite limit may exist to the amount of a given variation which proceeds by small steps, each insignificant in itself.

Variation.

Closely connected with such problems is the question of inheritance. Lamarck's theory required the inheritance of characteristics acquired during the life of a parent. But difficulties, such as that of seeing how such a change could affect the simple germ cells, has led some more recent biologists to pass to the other extreme, and to deny the possibility of any acquired characteristic being transmitted to offspring.

Inheritance.

A new light has been thrown on the problem of inheritance by the recent re-discovery of the work of G. J. Mendel, abbot of Brunn (1822–1884). Certain characters in both plants and animals have been found to be separable, and some of these characters exist in pairs, so that the presence of one involves the absence of the other. To take a simple example. Blue Andalusian fowls do not breed "true." On the average, half the offspring of two blue parents are blue, while the remaining half are divided equally between black and white birds. Both black and white when mated with a consort of the same colour breed "true" and yield only offspring similar to the parents. A white bird mated with a black, however, produces invariably all blue chicks. White mated with blue gives half blue and half white, while black mated with blue gives half blue and half black. Such phenomena are explained if we suppose that of the germ cells of the blue birds half bear the black character and half the white. If, in reproduction, a "black" cell meets a "black" the resulting chick is black; if "white" meets "white" the chick is white; while if "white" meets "black" the chick possesses a mixture of the two characters which in this case yield blue colour. But the reproductive cells of this intermediate form are not intermediate in character; they possess the pure parental characters in equal numbers. Knowing these facts, it is evident that we can reproduce any of the results at will, and from the mixed blue type produce a pure true breed of either black or white birds. Experiments of this kind must lead to a power of breeding new varieties of plants and animals hitherto undreamed of, and already have changed altogether our views of the problems of heredity. Instead of a vague mixture of all our ancestors, we possess definite characteristics of some of them only, though, like the blue Andalusian fowl, we may transmit to our children ancestral characters we do not ourselves exhibit. The family or race is more important in heredity than the individual parent. Thus the aristocratic theory of politics receives support from the experience of biology.

Mendel.

Simultaneously with the growth of geology, and the birth of the Darwinian hypothesis, a new development took place in physical science—the development of the conception of energy as a quantity invariable in amount throughout a series of physical changes. The genesis of the idea in its modern form may be traced in the work of Newton and C. Huygens (1629–1695), who applied it to the problems of pure dynamics. But, in the middle of the 19th century, by the work of James Prescott Joule (1818–1889), Lord Kelvin (1824–1907), H. L. F. von Helmholtz (1821–1894), J. Willard Gibbs (1839–1903), R. J. E. Clausius (1822–1888) and others, it was extended to physical processes. The amount of heat produced by friction was found to bear a constant proportion to the work expended, and this experimental result led to the conception of an invariable quantity of something, to which the name of energy was given, manifesting itself in various forms such as heat or mechanical work. Energy thus took its place beside mass as a real quantity, conserved throughout a series of physical changes. Of late years, as we shall see below, evidence has appeared to show that mass is not absolutely constant, but may depend on the velocity when the velocity approaches that of light. Since the only essential quality of matter is its mass, this result seems to strike at the root of the metaphysical conception of matter as a real, invariable quantity. It remains to be seen whether the conception of energy as an invariable quantity will hold its place or give way to some similar modification as science develops. But, in the present state of knowledge, we may accept the principle of the conservation of energy as one of the most firmly established of physical laws.

The theory of energy.

The amount of energy in an isolated system remains invariable, but, if changes are going on in the system, the energy tends continually to become less and less available for the performance of useful work. All heat engines require a difference of temperature—a boiler and refrigerator, or their equivalents. We cannot continue to transform heat into mechanical work if all available objects are at a uniform temperature. But, if temperature differences exist, they tend to equalize themselves by irreversible processes of thermal conduction, and it becomes increasingly difficult to get useful work out of the supplies of heat. In an isolated system, then, equilibrium will be reached when this process of "dissipation of energy" is complete, and, from this single principle, the whole theory of the equilibrium of physical and chemical systems was worked out by Willard Gibbs. Such a method avoids altogether the use of atomic and molecular conceptions. In fact, some supporters of the theory of "energetics" expressly disclaim the conceptions of natural atoms and molecules as unnecessary and misleading, and prefer to found all science on the idea of energy. Matter, they argue, is known to us only as a vehicle for energy, and may itself be but a manifestation of that energy.

But the other great line of advance in recent physics, although it may lead us in the end to somewhat similar conclusions, has been traced by a method which used atomic and molecular conceptions in an extreme form. The passage of electricity through liquids had been explained by Michael Faraday (1791–1867) and others as a transference of a succession of electric charges carried by

The theory of electric ions.

moving particles of matter or ions. At the end of the 19th century these ideas were extended, chiefly by the labours of J. J. Thomson, to elucidate also the conduction of electricity through gases. In 1897 Thomson discovered that, in certain cases, the moving particles which carried the electric current were of much smaller mass than the smallest chemical atom, that of hydrogen, and that these minute particles, to which he gave the name of corpuscles, were identical from whatever substance they were obtained. They enter into the structure of all matter, and form a common constituent of all chemical atoms. The only known properties of these corpuscles are their mass and their electric charge. Now, a charged body when set in motion spreads electromagnetic energy into the surrounding medium. Thus, more force is needed to produce a given acceleration than if the body were uncharged. The body acts as though its mass were greater than when it is uncharged. Now there is reason to believe that the whole apparent mass of the minute corpuscles to which we have referred is an effect of their electric charge. The idea of a material particle thus disappears with that of material mass, and the corpuscle becomes an isolated unit of electricity—an electron. It is impossible to resist making the speculation that the whole of an atom is made up of electrons, and that mass is to be explained in terms of electricity, though it must be pointed out that there is no conclusive evidence in favour of this hypothesis.

Another train of reasoning, starting from a different point, reinforces this result. The phenomena of the interference of beams of light in certain circumstances, to produce darkness or colour, indicate that light is some form of wave motion, and, to carry these waves, a hypothetical luminiferous aether was invented. The theoretical work of J. Clerk Maxwell (1831–1879) and the experiments of H. R. Hertz (1857–1894) showed that the properties and velocity of propagation of light and of electromagnetic waves were identical and that their other properties differed only in degree. Thus light became an electromagnetic phenomenon. But light is started by some form of atomic vibration, and to start an electromagnetic wave requires a moving electric charge. Thus electric charges must exist within the atom, and we are led again to the theory of electrons by the road opened up by H. A. Lorentz and Joseph Larmor. Such a theory suggests the occasional instability of the atom, and the phenomena of radioactivity, shown in a remarkable form by the substance radium, discovered by M. and Mme. Curie, have been explained satisfactorily by the theory of E. Rutherford and F. Soddy, who regard the energy liberated as due to the disintegration of the atom. The evolutionary view of nature, established in the biological and sociological sciences, is thus extended to physical science, not only in the development of planets and suns, but even in the chemical atoms, hitherto believed indestructible and eternal.

The methods of science.

As we have seen, Francis Bacon described a new method of discovery in which exclusive attention was paid to the collection and tabulation of facts, with a view to the detection of relations between them, and the consequent reference of "effects" to their proper "causes." Impressed by the barrenness of the a priori methods of the Schoolmen, Bacon in his philosophy went to the other extreme. The use of the Baconian method in its purity would be too laborious for success. Some guide is necessary in the collection of facts at an early stage of our investigations. Here the scientific imagination is brought into play, and some hypothesis is framed to explain the phenomena under investigation. The hypothesis may be suggested by the theories which are accepted at the time in cognate branches of knowledge, or it may be suggested by the few isolated facts already known or just discovered in the phenomena to be considered. From this new hypothesis, consequences are deduced by processes of logical reasoning—consequences which may be put to the test by comparison with the results of observation or experiment. If agreement is found, the hypothesis is, so far, confirmed, and gains in authority with every fresh concordance discovered. If the deductions from the hypothesis do not agree with the accepted interpretation of facts, the hypothesis may need modification, it may have to be abandoned altogether, or the want of concordance may point to some error or inconsistency in the fundamental concepts on which the hypothesis is based—the whole framework of that branch of science may need revision, as the idea of heat as a caloric substance had to be abandoned under the pressure of the experiments of Joule on the equivalence between work done and heat developed. But the ultimate test of the validity of our knowledge can only be the consistency with each other of the parts of the whole scheme. If the received interpretation of one set of phenomena is not consistent with that of another, one or other or both of the interpretations must be wrong if we make the assumption necessary for all knowledge, namely, that the universe is intelligible to a mind capable of dealing with its complexity.

The classification of the sciences.

In early times, when the knowledge of nature was small, little attempt was made to divide science into parts, and men of science did not specialize. Aristotle was a master of all science known in his day, and wrote indifferently treatises on physics or animals. As increasing knowledge made it impossible for any one man to grasp all scientific subjects, lines of division were drawn for convenience of study and of teaching. Besides the broad distinction into physical and biological science, minute subdivisions arose, and, at a certain stage of development, much attention was given to methods of classification, and much emphasis laid on the results, which were thought to have a significance beyond that of the mere convenience of mankind.

But we have reached the stage when the different streams of knowledge, followed by the different sciences, are coalescing, and the artificial barriers raised by calling those sciences by different names are breaking down. Geology uses the methods and data of physics, chemistry and biology; no one can say whether the science of radioactivity is to be classed as chemistry or physics, or whether sociology is properly grouped with biology or economics. Indeed, it is often just where this coalescence of two subjects occurs, when some connecting channel between them is opened suddenly, that the most striking advances in knowledge take place. The accumulated experience of one department of science, and the special methods which have been developed to deal with its problems, become suddenly available in the domain of another department, and many questions insoluble before may find answers in the new light cast upon them. Such considerations show us that science is in reality one, though we may agree to look on it now from one side and now from another as we approach it from the standpoint of physics, physiology or psychology.

The philosophical basis of science.

Having traced the development of the most important of the fundamental conceptions of science, and followed the subdivision of natural knowledge into the various sections which for convenience mankind has made, let us now examine the meaning of the knowledge thus acquired, and its relation to other branches of learning.

By the slow and laborious methods of observation, hypothesis, deduction, and experimental verification, a scheme has been constructed which for the most part is consistent with itself, and bears the test of the comparison of one part with another. As a chart is drawn by the explorer of unknown seas to represent his discoveries in a conventional manner, so the scientific investigator constructs a mental model of the phenomena he observes, and tests its consistency with itself and its concordance with the results of further experiment. The chart does not give a lifelike picture of the coast as does a painting, but it represents one aspect of it conventionally in a manner best adapted for the immediate purpose. So the conceptions of one branch of science—mechanics let us say—represent the phenomena of nature in the conventional aspect best suited for one particular line of inquiry. It does not follow necessarily that "nature" in reality resembles the particular mental chart which mechanical science enables us to construct. It does not even follow that there is any "reality" underlying phenomena and corresponding with any of our conceptions. The whole problem which mankind has to face

undoubtedly includes an inquiry into the ultimate nature of reality. But that inquiry lies in the province of metaphysics, and is not necessarily involved in the pursuit of natural science. Metaphysics uses the results of natural science, as of all other branches of learning, as evidence bearing on her own deeper and more difficult questions. But it does not follow that natural science must solve metaphysical problems before being of use to man and enlarging the sphere of his knowledge. We need not ask whether the reality is represented accurately by our conventional model, whether indeed there be any reality at all, before using that model to introduce order into what would otherwise be mental confusion, and to enable us to make systematic and progressive use of natural resources. It is true that the possibility of constructing consistent schemes of scientific concepts is an argument in favour of the existence of a definite reality underlying phenomena resembling in some respects the pictures of it we draw. But metaphysicians are not agreed that it is a conclusive argument. The difficulty of making a scientific picture of the ultimate nature of reality may be illustrated by an example. Our first conception of a wooden stick involves the ideas of a certain long-shaped form, of smoothness, of hardness, of weight, of a certain brown colour, perhaps of some amount of elasticity. A microscope reveals a structure much more detailed than we imagined, and our mental model of the stick ceases to be smooth. It becomes co-ordinated with those of a number of other bodies which we know to be parts of trees, and study, as regards growth and structure, by the help of botany. From the results of observation and experiment, physics teaches us that the properties of the stick can only be represented satisfactorily by imagining that the substance of it is not infinitely divisible, that it consists of discontinuous particles or molecules. Again, chemistry assures us that the molecules of the stick are made up of still smaller parts or atoms, which separate from each other when, for instance, the stick is burned, and afterwards can arrange themselves into new molecules. When we pursue our inquiries into the nature of these atoms, we find that they can be resolved, partly at any rate, into much smaller particles or corpuscles in continual motion within the atom. These corpuscles themselves have been identified with isolated units of negative electricity or electrons, the vibrations of which within the atom sort out the electromagnetic radiation which falls on them and allow to reach our eyes those waves only which give us the sensation of brown colour. At present pioneers are attempting to explain electrons in terms of centres of elastic strain in a hypothetical aether. But we have travelled far from our original conception of the nature of the stick, and, should the problem last stated be solved, we should only find ourselves faced by the next one, the nature of the aether. But what constitutes reality? Where, in the endless chain of explanations discovered or to be discovered, can we stop and say: "Here is the true picture of what the stick *is*"? But this impossibility does not prevent us from getting the full use of each conception in turn when used for its particular purpose. To the schoolboy, the effective and deterrent conception of the stick is that of a hard, elastic, long-shaped solid. The botanist regards it as built up by the action of vegetable cells, which he refers to a particular kind of tree. To the chemist the stick is made up of atoms of carbon, hydrogen and oxygen, each with definite properties and arranged in certain combinations. The physicist sees these atoms composed of whirling electrons, each an ultimate electric unit not capable of further explanation, or possibly a centre of strain in an all-pervading aether of unknown nature. Each idea is useful in turn, and each corresponds truly with certain properties of the stick, corresponds with the stick itself in certain of its aspects.

Such considerations show us the meaning of the subdivisions into which science has been arranged for convenience of study and research. They represent different aspects of nature, different sections, as it were, cut through the solid model which stands for the sum of all our scientific knowledge of the universe.

A nerve-impulse may be regarded from a psychological aspect when we deal with the thought which accompanied it; from a physiological aspect when we examine its relation to other changes in the body. But modern methods have co-ordinated it also with definite chemical and electrical changes, and are said sometimes to have "explained" the nerve-impulse in physical terms.

But, as always, an "explanation" proves to be simply a restatement of a phenomenon in terms of other phenomena which previously are familiar to the mind, and therefore appear to be better understood. Nevertheless, from our present point of view, no one of these possible aspects of the phenomenon—of the nerve-impulse—is essentially more fundamental than any other. To the psychologist the nerve-impulse is expressed in terms of thought, to the physicist by physical changes. The fact that a thought is accompanied by movement of matter or electricity does not make the thought less a fundamental conception.

But perhaps the best illustration is to be sought in the relation between the physical concepts of matter and electricity. As we have seen, J. J. Thomson discovered corpuscles which were common constituents of all matter, with masses smaller than those of any known atoms. One of these corpuscles represents a unit of negative electricity. An atom with a corpuscle in excess is an atom negatively electrified, an atom with one corpuscle less than the normal number is an atom positively electrified. In this scheme electricity is described in terms of matter. But these corpuscles have been identified with the hypothetical electrons of Lorentz and Larmor, who consider matter to be composed of such isolated units of electricity. Such electrons, it has been shown, would possess mass by virtue of their electromagnetic properties. In this theory the idea of mechanical mass is eliminated altogether, and mass, and therefore matter, explained in terms of electricity. The view has been held by some that a mechanical explanation of a phenomenon is fundamental, and that a phenomenon so explained in terms of mechanical conceptions is fully understood. This idea may be traced to the familiarity with mechanical conceptions of our everyday experience. The mind obtains its concept of matter from the resistance which that matter manifests to forces tending to set it in motion when at rest, or to change its state of motion when travelling. This fundamental property of inertia is the measure of mass, and we reach the concept of mass by our muscular sense of the force needed to set mass in motion. Force seems to be a direct sense perception, though mathematically it is better to define force in terms of acceleration and mass—since mass is found normally to keep constant throughout a series of physical changes. The familiarity we feel, then, with the conception of matter is based on our familiarity with the conception of force. Our minds form this conception from their experience of a direct sense perception of muscular effort. This seems to be the basis of the whole feeling that mechanical conceptions are more fundamental than any others, and that, for instance, it is more intelligible to explain electricity in terms of mechanics than vice versa. But the fact that we have a special muscular sense is an accident of our bodies. It is possible that the electric fish, or torpedo, has a special electric sense, and that to such a fish-philosopher the perception of electromotive force is more real than that of mechanical force. Such a being might well argue that it is intelligible and satisfactory to explain the mysterious concept of mass, which he only reaches through the other equally mysterious concept of mechanical force, in terms of the familiar concept of electricity, well known to every torpedo from his direct sense perception of electromotive force. This instance may serve to show that it is quite as correct philosophically to explain matter in terms of electricity, as to explain electricity in terms of mass. The object of science is to find connexions between phenomena and thus to correlate them. At present a greater simplification may be reached by reducing all possible phenomena to mechanical conceptions than in any other way, but that only shows that the mechanical aspect of nature gives us a fuller view than any other at present known, not that mechanics is philosophically the most fundamental science.

BIBLIOGRAPHY.—T. Gomperz, *Greek Thinkers* (Eng. trans., L. Magnus, 1901); J. Burnet, *Early Greek Philosophy* (1892); J. Masson, *The Atomic Theory of Lucretius* (1884); H. Rashdall, *The*

Universities of Europe in the Middle Ages (Oxford, 1895); J. J. Fahie, *Galileo, his Life and Work* (1903); W. E. H. Lecky, *History of the Rise and Influence of Rationalism in Europe* (4th ed., 1870); Sir D. Brewster, *Memoirs of the Life, Writings and Discoveries of Sir Isaac Newton* (2nd ed., 1860); J. Spedding, *Life and Letters of Sir Francis Bacon* (1862–1874), Novum Organon, ed.; Francis Darwin, *Life and Letters of Charles Darwin*; W. C. D. Whetham, *The Recent Development of Physical Science* (3rd ed., 1905); R. H. Lock, *Recent Progress in the Study of Variations, Heredity and Evolution* (1907). (W. C. D. W.)

SCILLITAN MARTYRS, a company of early North African Christians who suffered under Marcus Aurelius in A.D. 180, and whose *Acta* are at once the earliest documents of the Church of Africa and the earliest specimen of Christian Latin. The martyrs take their name from Scilla (or Scillium), a town in Numidia. Their trial and execution took place in Carthage under the Pro-consul Vigellius Saturninus, whom Tertullian declares to have been the first persecutor of the Christians in Africa. The date of their martyrdom is the 17th of July A.D. 180. It is thus the concluding scene of the persecution under Marcus Aurelius, which is best known from the sufferings of the churches of Vienne and Lyons in South Gaul. Marcus Aurelius died on the 17th of March of the year in question, and persecution ceased almost immediately upon the accession of Commodus. A group of sufferers called the Madaurian martyrs seems to belong to the same period: for in the correspondence of St Augustine, Namphamo, one of their number, is spoken of as "archimartyr," which appears to mean protomartyr of Africa. We have in this martyrdom an excellent example of "Acts of Martyrs" properly so called. The document is in brief legal form, beginning with the date and the names of the accused, and giving the actual dialogue between them and their judge. It closes with the sentence, based on "obstinate" persistency in an illicit cult, and with the proclamation by the herald of the names of the offenders and the penalty. All this may quite well be a transcript of the *Acta*, or official report of the proceedings. A Christian appends the words: "And so they all together were crowned with martyrdom; and they reign with the Father and the Son and the Holy Ghost, for ever and ever. Amen."

The Scillitan sufferers were twelve in all—seven men and five women. Two of these bear Punic names (Nartzalus, Cintinus), but the rest Latin names. Six had already been tried: of the remainder, to whom these *Acta* primarily relate, Speratus is the principal spokesman. He claims for himself and his companions that they have lived a quiet and moral life, paying their dues and doing no wrong to their neighbours. But when called upon to swear by the genius of the emperor, he replies: "I recognize not the empire of this world; but rather do I serve that God whom no man hath seen, nor with these eyes can see." Here he uses the language of 1 Tim. vi. 16; and it is interesting also to note that in reply to the question, "What are the things in your satchel?" he says, "Books and letters of Paul, a just man." The martyrs are offered a delay of thirty days to reconsider their decision, but this they all alike refuse. These Acts have been long known in an expanded form, or rather in a variety of later recensions. The fame of the martyrs led to the building of a basilica in their honour at Carthage; and their annual commemoration required that the brevity and obscurity of their Acts should be supplemented and explained, to make them suitable for public recitation.

The historical questions connected with these martyrs are treated by Lightfoot, *Ignatius* (1889, 2nd ed.), i. 524 ff. The Latin text, together with later recensions and a Greek version, is published in *Texts and Studies*, i. 2 (Passion of Perpetua, 1890); see also *Analecta Bollandiana* (1889), viii. 5; H. M. Gwatkin, *Selections from Early Christian Writers*, where, as in *Ante-Nicene Fathers*, ix. 285, there is an English translation. (J. A. R.)

SCILLY ISLES, a group of small islands, belonging to Cornwall, England, 25 m. W. by S. of Land's End. (For map, see ENGLAND, Section VI.) They form an outlying portion of the granite highlands of Cornwall; and contain a few metalliferous veins or lodes, which could never have yielded much ore. An old theory that the Scilly Isles could be identified with the "Cassiterides" or "Tin Islands" of Herodotus is abandoned, and the origin of their name has never been authoritatively settled. The islands are wild and picturesque, with sheer cliffs and many large caves hollowed out by the Atlantic. Owing to the reefs and shoals by which these shores are surrounded, navigation becomes perilous in rough weather, and many disasters have occurred. In 1707 Sir Cloudesley Shovel perished in the shipwreck of his flagship and two other men-of-war, while two fireships of his squadron were driven aground, and the remainder only narrowly escaped. The graveyard of an old Puritan church on St Mary's contains the bodies of 311 persons, drowned in the wreck of the "Schiller" in 1875; and a local proverb tells that for every man who dies a natural death on the islands the sea takes nine. Much, however, has been done to minimise the danger, especially by lighting the coast. On St Agnes there is a lighthouse, and on an outlying rock to the south-west is the lonely Bishop Light, constructed with infinite difficulty in 1858, and rebuilt thirty years later.

The islands are composed wholly of granite—outliers of the granite highlands of Cornwall. Most of the granite is coarse and porphyritic, but towards the centre of the original igneous mass it is finer and non-porphyritic. The finer granite occurs on the north-west side of St Mary's, the southern part of Tresco, Bryher and Samson and the north-west side of Annet. Elvans of quartz-porphyry are found in the granite. On the north-east end of White Island a fragment of the altered killas, which once covered the whole area, is still visible. A gravel deposit with chalk flints and Greensand cherts which caps some of the higher ground on St Mary's may possibly be of Eocene age. Raised beach, blown sand, fragmental granitic waste or "head" and an iron-cemented glacial deposit are found resting upon the granite.

The climate of the islands is unusually mild, snow being rarely seen, and the temperature varying from about 46° F. in winter to 58° in summer. As a result, vegetation is luxuriant; fuchsias, geraniums and myrtles attain an immense size, and aloes, cactus and prickly pear flourish in the open. All these, together with palms, may be seen in the gardens of the governor on Tresco Island, which are quite subtropical in character, and, therefore, unique in the British Isles. Great flocks of sea-birds haunt the remoter parts, and on some of the islands there are deer. On Tean there is a warren of white rabbits; and some of the rarer land-birds occasionally visit the islands, such as the golden oriole, which has been known to breed here.

The islands are served by steamers from Penzance, and telephone and telegraph communication is established with the mainland. The raising of early asparagus and other spring vegetables, and of flowers, has taken the place of potato culture as the principal industry. In spring the fields of narcissus and other flowers add greatly to the beauty of the islands. There is also a small coasting trade; and fishing is carried on to some extent, its most important branch being the taking of lobsters for the London market.

The islands which may be distinguished from mere rocks number about 40, and the group has a total area of 4041 acres; but only five islands are inhabited—St Mary's, Tresco, St Martin's, St Agnes and Bryher. The total population in 1901 was 2092. Hugh Town in St Mary's is the capital, occupying a sandy peninsula crowned by the height known as the Garrison, with Star Castle, dating from the days of Elizabeth. The town possesses a harbour, which is used by the Penzance steamers, and a roadstead where large vessels can lie at anchor. The government of the islands is vested in a county council created in 1890, consisting of a chairman, vice-chairman, 4 aldermen, and 18 councillors. For parliamentary purposes the isles are included in the St Ives division of Cornwall.

On Tresco there are the ruins of an abbey, and of two fortifications called Oliver Cromwell's Tower and King Charles's Tower; and here also is a church built in 1882 and dedicated to St Nicholas. Numerous rude pillars and circles of stones, resembling those of Cornwall, are to be noticed; and barrows are common, the most remarkable of these prehistoric remains being a barrow on the Isle of Samson, 58 ft. in girth, and containing,

amongst other relics, the only perfect "kistvaen," or sepulchral chamber of stone, which has been disinterred from any Cornish tomb.

Although the Scilly Isles have been regarded as the remains of Lyonesse, as identical with the Cassiterides, and as the object of an expedition and of conquest on the part of Athelstan in pursuance of a vow made at the shrine of St Burian, it is not until the reign of Henry I. that we have indisputable evidence concerning them. The king gave all the churches of Scilly and the land, as the hermits held it in the days of the Confessor, to the abbot and church of Tavistock. A confirmation of this grant and a further grant to the monks of all wrecks except whole ships and whales was made by Reginald, earl of Cornwall. In 1180 the bishop of Exeter confirmed a grant by Richard de Wicha of tithes, hitherto withheld, and of rabbits. Secular priests were temporally substituted for regulars by the abbot of Tavistock in 1345. Sharing the dignity of lords of Scilly with the abbot, holding apparently the better half of St Mary's Island, which was already furnished with a castle and a prison, and like the abbot practically beyond the jurisdiction of the hundred courts, the family of Blanchminster (de Albo Monasterio), at the beginning of the 14th century, held of the earldom of Cornwall lands in Scilly at a yearly service of 6s. 8d. or 600 puffins. The Year Books tell us that in cases of felony the punishment under this family was for the convicted person to be taken to a certain rock in the sea with two barley loaves and one pitcher of water and to be left on the rock until drowned by the tide. The Blanchminsters resisted and imprisoned the coroner of Cornwall and in 1319 were granted a coroner of their own. In 1345 they are found petitioning the king for a remedy owing to an invasion by 600 of the king's Welsh troops, who, being becalmed at Scilly, had carried away everything, and so impoverished the tenants that they were unable to pay their yearly rent of £40. In 1547 Silvester Danvers, as representing the Blanchminsters, being one of the coheirs, sold his moiety of Scilly to Sir Thomas Seymour, by whose attainder in 1549 this and probably the other moiety fell to the crown. The suppression of the religious houses had already placed the church's land and revenues at the king's disposal. During the Civil Wars, Hugh Town stood for the king, and in 1645 afforded a temporary shelter to Prince Charles, until his escape to Jersey. In 1649 the islands were occupied by a royalist, Sir Richard Grenville, and formed the base from which he swept the surrounding seas for two years, before a fleet under Admiral Blake and Sir John Ayscue forced him to surrender. In ancient times a haunt of pirates, the islands were afterwards notorious for smuggling. In 1687 the whole of Scilly was granted to Sidney Godolphin for eighty-nine years from the expiration of the lease for fifty years granted to Francis Godolphin in 1636 by Charles I. In 1831 Augustus Smith succeeded the Godolphins as lessee or lord-proprietor, and under his and his nephew's wise autocracy the islands prospered.

SCIMITAR, the term generally used of all oriental single-edged curved or crescent-shaped swords (see SWORD). The word has appeared in a variety of forms in English, due to Fr. *cimetare*, It. *scimitarra* or Span. *cimitarra*; it has even been corrupted into "smyter," as if connected with "smite." Most probably it represents an early Western corruption of the Persian word for a sabre; *shamshir* or *shimshir*, which means literally "lion's claw" (*sher*, lion, in Hindustani "tiger," and *sham*, nail, claw).

SCIOLIST, one who, with only a superficial knowledge or a smattering of knowledge on any particular subject, claims or pretends to a complete or profound learning. The Lat. *sciolus*, a diminutive of *scius*, learned, from *scire*, to know, is only found in post-classical times, *e.g.* Hieronymus, A.D. 420, *Epist.* 48. 18. It first appears in English at the beginning of the 17th century.

SCIOMANCY (Gr. σκιά, shade, shadow, and μαντεία, soothsaying, divination), a form of divination by means of supposed communication with the shades or spirits of the dead. The calling up of the spirit of Samuel by the Witch at Endor when consulted by Saul is the classical example (1 Sam. xxviii.).

SCION, a slip or cutting of a tree or plant used for grafting, hence a young shoot or twig. In a transferred sense the word is used of the heir or any young member of a family, a descendant. The word in O. Fr. was *cion* or *syon*, mod. *scion*, and the early forms in English are *syon*, *cion* or *cyon*. These forms seem to disprove the usual etymology, which connects it with Fr. *scier*, to cut, Lat. *secare*.

SCIPIO[1] ("staff"), the name of a patrician branch of the Cornelian gens, of which the following are the principal historical representatives:—

1. PUBLIUS CORNELIUS SCIPIO, father of the elder Africanus. He was consul in 218 B.C., the first year of the Second Punic War, and sailed with an army from Pisa to Massilia, with the view of arresting Hannibal's advance on Italy. Failing, however, to meet his enemy, he hastened to return by sea to Cisalpine Gaul, having sent back his army to Spain under the command of his brother Gnaeus, with instructions to hold the Carthaginian forces there in check. On his return to Italy he at once advanced to meet Hannibal. In a sharp cavalry engagement in the upper valley of the Po, on the Ticinus, he was defeated and severely wounded. Again, in December of the same year, he witnessed the complete defeat of the Roman army on the Trebia, his colleague T. Sempronius Longus having insisted on fighting contrary to his advice. But he still retained the confidence of the Roman people; his term of command was extended, and we find him with his brother in Spain in the following year, winning victories over the Carthaginians and strengthening Rome's hold on that country, till 212 (or 211). The details of these campaigns are not accurately known, but it would seem that the ultimate defeat and death of the Scipios were due to the desertion of the Celtiberi, bribed by Hasdrubal, Hannibal's brother.

See Polybius iii. 40; Livy xxi.-xxv.; Appian, *Hannib.* 5-8, *Hisp.* 14-16.

2. PUBLIUS CORNELIUS SCIPIO AFRICANUS, the elder (237[2]–183 B.C.), son of the above. He was present at the disastrous battles of the Ticinus (where, according to one tradition, he saved his father's life), the Trebia and Cannae. Even after the last of these he resolutely protested against several Roman nobles who advocated giving up the struggle and quitting Italy in despair (see METELLUS, 2). The year after his father's death, he offered himself for the command of the new army which the Romans resolved to send to Spain. In spite of his youth, his noble demeanour and enthusiastic language had made so great an impression that he was unanimously elected. All Spain south of the Ebro in the year of his arrival (210 or 209) was under Carthaginian control, but fortunately for him the three Carthaginian generals, Hasdrubal and Mago (Hannibal's brothers), and Hasdrubal the son of Gisgo, were not disposed to act in concert and were preoccupied with revolts in Africa. Scipio, on landing at the mouth of the Ebro, was thus enabled to surprise and capture New Carthage, the headquarters of the Carthaginian power in Spain. He thus obtained a rich booty of war stores and supplies, and an excellent harbour. His kindly treatment of the Spanish hostages and prisoners brought many over to his side. In 209 he drove back Hasdrubal from his position at Baecula, on the upper Guadalquivir, but was unable to hinder his march to Italy. After winning over a number of Spanish chiefs he achieved in 206 a decisive victory over the full Carthaginian levy at Ilipa (near Corduba), which resulted in the evacuation of Spain by the Punic commanders. With the idea of striking a blow at Carthage in Africa, he paid a short visit to the Numidian princes, Syphax and Massinissa, but at the court of Syphax he was foiled by the presence of Hasdrubal, the son of Gisgo, whose daughter Sophonisba was married to the Numidian chief. On his return to Spain Scipio had to quell a mutiny which had broken out among his troops. Hannibal's brother Mago had meanwhile sailed for Italy, and in 206 Scipio himself, having secured the Roman occupation of Spain by the capture of Gades, gave up his command and returned to Rome. In the following year he was unanimously

[1] The first *i* is long—Scipio.
[2] So Polybius: 235 according to Livy.

elected to the consulship, the province of Sicily being assigned to him. By this time Hannibal's movements were restricted to the south-western extremity of Italy, and the war was now to be transferred to Africa. Scipio was himself intent on this, and his great name drew to him a number of volunteers from all parts of Italy, but the old-fashioned aristocracy of Rome, who disliked his luxurious tastes and his Greek culture, and still entertained a wholesome dread of Hannibal, opposed the idea; all Scipio could obtain was permission to cross over from Sicily to Africa, if it appeared to be in the interests of Rome. The introduction (205) of the Phrygian worship of Cybele and the transference of the image of the goddess herself from Pessinus to Rome (see GREAT MOTHER OF THE GODS) to bless the expedition no doubt had its effect on public opinion. A commission of inquiry was sent over to Sicily, and it found that Scipio was at the head of a well-equipped fleet and army. At the commissioners' bidding he sailed in 204 and landed near Utica. Carthage meanwhile had secured the friendship of the Numidian Syphax, whose advance compelled Scipio to raise the siege of Utica and to entrench himself on the shore between that place and Carthage. Next year he destroyed two combined armies of the Carthaginians and Numidians. After the failure of peace negotiations in which Scipio displayed great moderation, he defeated Hannibal in a decisive battle near Zama (Oct. 19, 202; see PUNIC WARS). In the subsequent settlement with Carthage he upheld with success his comparatively lenient terms against the immoderate demands of many Roman aristocrats. Scipio was welcomed back to Rome with the surname of Africanus, and had the good sense to refuse the many honours which the people would have thrust upon him. For some years he lived quietly and took no part in politics. In 193 he was one of the commissioners sent to Africa to settle a dispute between Massinissa and the Carthaginians. In 190, when the Romans declared war against Antiochus III. of Syria, Publius was attached as legate to his brother Lucius, to whom the chief command had been entrusted. The two brothers brought the war to a conclusion by a decisive victory at Magnesia in the same year. Meanwhile Scipio's political enemies had gained ground, and on their return to Rome a prosecution was started (187) by two tribunes against Lucius on the ground of misappropriation of moneys received from Antiochus. As Lucius was in the act of producing his account-books his brother wrested them from his hands, tore them in pieces, and flung them on the floor of the senate-house. This created a bad impression; Lucius was brought to trial, condemned and heavily fined. Africanus himself was subsequently (185) accused of having been bribed by Antiochus, but by reminding the people that it was the anniversary of his victory at Zama he caused an outburst of enthusiasm in his favour. The people crowded round him and followed him to the Capitol to offer thanks to the gods and beg them to give Rome more citizens like himself. He then retired to his native country seat at Liternum on the coast of Campania, where he died. By his wife Aemilia, daughter of the Aemilius Paullus who fell at Cannae, he had a daughter Cornelia, who became the mother of the two famous Gracchi.

Scipio was one of Rome's greatest generals. Skilful alike in strategy and in tactics, he had also the faculty of inspiring his soldiers with confidence. According to the story, Hannibal, who regarded Alexander as the first and Pyrrhus as the second among military commanders, confessed that had he beaten Scipio he should have put himself before either of them. He was a man of great intellectual culture and could speak and write Greek perfectly. He wrote his own memoirs in Greek. He also enjoyed the reputation of being a graceful orator. There was a belief that he was a special favourite of heaven and held actual communication with the gods. It is quite possible that he himself honestly shared this belief; to his political opponents he was often harsh and arrogant, but towards others singularly gracious and sympathetic. According to Gellius, his life was written by Oppius and Hyginus, and also, it was said, by Plutarch.

See Livy xxi.-xxxviii. and Polybius; Aulus Gellius iv. 18; Val. Max. iii. 7; biography by F. D. Gerlach (1868); E. Berwick (1817), with notes and illustrations; also PUNIC WARS.

3. PUBLIUS CORNELIUS SCIPIO AEMILIANUS AFRICANUS, the younger (185–129 B.C.), was the younger son of L. Aemilius Paullus, the conqueror of Macedonia. He fought when a youth of seventeen by his father's side at the battle of Pydna (168), which decided the fate of Macedonia and made northern Greece subject to Rome. He was adopted by P. Cornelius Scipio Africanus, the eldest son of Scipio Africanus the elder, and from him took the name Scipio with the surname Africanus. In 151, a time of defeat and disaster for the Romans in Spain, he voluntarily offered his services in that country and obtained an influence over the native tribes similar to that which the elder Scipio, his grandfather by adoption, had acquired nearly sixty years before. In the next year an appeal was made to him by the Carthaginians to act as arbiter between them and the Numidian prince Massinissa, who, backed up by a party at Rome, was incessantly encroaching on Carthaginian territory. In 149 war was declared by Rome, and a force sent to besiege Carthage. In the early operations of the war, which went altogether against the Romans, Scipio, though a subordinate officer, distinguished himself repeatedly, and in 147 he was elected consul, while yet under the legal age, in order that he might hold the supreme command. After a year of desperate fighting and splendid heroism on the part of the defenders he carried the fortress, and at the senate's bidding levelled it to the ground. On his return to Rome he celebrated a splendid triumph, having also established a personal claim to his adoptive surname of Africanus. In 142, during his censorship, he endeavoured to check the growing luxury and immorality of the period. In 139 he was unsuccessfully accused of high treason by Tiberius Claudius Asellus, whom he had degraded when censor. The speeches delivered by him on that occasion (now lost) were considered brilliant. In 134 he was again consul, with the province of Spain, where a demoralized Roman army was vainly attempting the conquest of Numantia on the Durius (Douro). After devoting several months to restoring the discipline of his troops, he reduced the city by blockade. The fall of Numantia in 133 established the Roman dominion in the province of Hither Spain. For his services Scipio received the additional surname of Numantinus.

Scipio himself, though not in sympathy with the extreme conservative party, was decidedly opposed to the schemes of the Gracchi (whose sister Sempronia was his wife). When he heard of the death of Tiberius Gracchus, he is said to have quoted the line from the *Odyssey* (i. 47), "So perish all who do the like again"; after his return to Rome he was publicly asked by the tribune C. Papirius Carbo what he thought of the fate of Gracchus, and replied that he was justly slain. This gave dire offence to the popular party, which was now led by his bitterest foes. Soon afterwards, in 129, on the morning of the day on which he had intended to make a speech in reference to the agrarian proposals of the Gracchi, he was found dead in bed. The mystery of his death was never cleared up, and there were political reasons for letting the matter drop, but there is little doubt that he was assassinated by one of the supporters of the Gracchi, probably Carbo, whose guilt is expressly stated by Cicero (see GRACCHUS).

The younger Scipio, great general and great man as he was, is for ever associated with the destruction of Carthage. The horror he expressed at its fate was a tardy repentance. Yet he was a man of culture and refinement; he gathered round him such men as the Greek historian Polybius, the philosopher Panaetius, and the poets Lucilius and Terence. At the same time he had all the virtues of an old-fashioned Roman, according to Polybius and Cicero, the latter of whom gives an appreciation of him in his *De republica*, in which Scipio is the chief speaker. As a speaker he seems to have been no less distinguished than as a soldier. He spoke remarkably good and pure Latin, and he particularly enjoyed serious and intellectual conversation. After the capture of Carthage he gave back to the Greek cities of Sicily the works of art of which Carthage had robbed them. He did not avail himself of the many opportunities he must

have had of amassing a fortune. Though politically opposed to the Gracchi, he cannot be said to have been a foe to the interests of the people. He was, in fact, a moderate man, in favour of conciliation, and he was felt by the best men to be a safe political adviser, while he unfortunately contrived to offend both parties.

See Polybius xxxv. 4, xxxix.; Vell. Pat. i. 12; Florus u. 15, 17, 18; Appian, *Punica*, 72, 98, 113-131, *Hisp.* 48-95, *Bell. Civ.* i. 19; Plutarch, *Aemilius Paullus*, 22, *Tib. Gracchus*, 21, *C. Gracchus*, 10; Gellius iv. 20, v. 19; Cicero, *De orat.* ii. 40; exhaustive life by E. Person (Paris, 1877); monograph by Lincke (Dresden, 1898).

4. PUBLIUS CORNELIUS SCIPIO NASICA SERAPIO, consul 138 B.C., took a prominent part in the murder of Tiberius Gracchus. To save him from the vengeance of the people, he was sent by the senate on a pretended mission to Asia, where he died. The nickname Serapio was given him by the tribune C. Curiatius from his likeness to one Serapio, a dealer in sacrificial victims.

See Appian, *Punica*, 80 B.C., i. 16, Val. Max. ix. 14; Plutarch, *Tib. Gracchus*, 21.

SCIRE FACIAS, in English law, a judicial writ founded upon some record directing the sheriff to make it known (*scire facias*) to the party against whom it is brought, and requiring the latter to show cause why the party bringing the writ should not have the advantage of such record, or why (in the case of letters patent and grants) the record should not be annulled and vacated. Proceedings in *scire facias* are regarded as an action, and the defendant may plead his defence as in an action. The writ is now of little practical importance; its principal uses are to compel the appearance of corporations aggregate in revenue suits, and to enforce judgments against shareholders in such companies as are regulated by the Companies Clauses Act 1845, or similar private acts, and against garnishees in proceedings in foreign attachment in the lord mayor's court. Proceedings by *scire facias* to repeal letters patent for inventions were abolished by the Patents, Designs and Trademarks Act 1883, and a petition to the court substituted. It is not used in Scottish procedure.

SCISSORS, a cutting instrument, consisting of two crossed blades with the inner edges sharpened, pivoted at the crossing, and terminating with two looped handles for the insertion of the fingers of the person using them. The term is usually confined to small cutting implements, the larger being known as "shears" (*q.v.*). The modern form of the word points to a derivation from Lat. *scindere*, to cleave or cut, and is no doubt due to Lat. *scissor*, a cutter, which was used only of a carver, a butcher and a class of gladiators, never of a cutting instrument; but the earlier forms, *cysowres*, *sisoures*, *cisors*, *cissers*, *sizars*, &c., show the origin to be found in O. Fr. *cisoires*, shears, mod. *ciseaux*, plural of *ciseau*, earlier *cisel*, a chisel, and therefore to be referred to Lat. *caedere*, to cut, *cisorium*, a cutting instrument.

SCLOPIS DI SALERANO, FEDERIGO (1798–1878), Italian statesman and jurist. While still comparatively young he was appointed attorney-general to the Sardinian senate, and took part in the compilation of the new codes. An advocate of liberal ideas and reform, he proclaimed the necessity for a constitution, and was himself one of the authors of the *Statuto*, or Sardinian charter of 1848, which is to this day the constitution of the Italian kingdom; the introduction is entirely his work. Sclopis also wrote the proclamation in which Charles Albert announced to the people of Lombardy and Venetia his war against Austria. He was minister in the first Sardinian constitutional ministry under the presidency of Count Balbo, and afterwards president of the senate. In 1871 he was sent to Geneva as Victor Emmanuel's representative on the "Alabama" arbitration, and was chosen president of that tribunal; on his return to Italy the king conferred on him the Order of the Annunziata. The last years of his life were mainly occupied with municipal affairs and charitable administration at Turin. Between 1819 and 1878 he published over seventy works on history, jurisprudence, politics and literature, in Italian, Latin and French. At the age of thirty he was elected member of the Turin Academy of Sciences, of which he became life president in 1864; he was also foreign member of the Institut de France. His most important work is his *Storia della legislaziona Italiana dalle origini fino al 1847* (Turin, 1840), issued as a sequel to his *Storia dell' antica legislazione del Piemonte*, published in 1833.

Among his other writings we may mention the following: *Ricerche sui Longobardi in Italia* (1827), *Delle relazioni politiche fra la dinastia di Savoia e il governo Britannico dal 1240 al 1815* (1853), *Rimembranze sul Conte di Cavour* (1876), and *Considerazioni storiche sulle antiche assemblee rappresentative del Piemonte e della Savoia* (1878).

See E. Ricotti, *Notizia biografica di F. Sclopis*; A. Manno, *Bibliografia degli scritti di F. Sclopis*; M. Ricci, *Necrologia di F. Sclopis* (in the *Archivio storico Italiano*, ser. iv. tom. ii. p. 331 seq.).

SCOLD, one who scolds, *i.e.* chides, finds fault with or rebukes with violence or persistence or vituperation. It is usually a term applied to women, and a "common scold" (in Low Lat. *communis rixatrix*) was indictable in England at common law as a public nuisance, special instruments of punishment being devised in the "branks" or "scold's bridle," and the "cucking stool." The word is apparently an adaptation of the Norse *skald*, skald or scald, a poet, and according to the *New English Dictionary* the intermediate meaning through which the sense develops is "libeller" or "lampooner." Skeat derives from Du. *schold*, *schellen*, and takes the word as originally meaning a loud talker, cf. Icel. *skjalla*, to clash, Ger. *schallen*. The Norse word is also to be connected in this case, the "skald" being one who talks loudly.

SCOLECITE, a mineral belonging to the zeolite group; a hydrated calcium silicate, $CaAl_2Si_3O_{10}+3H_2O$. It is a lime-zeolite, and like the soda-zeolite natrolite and the soda-lime-zeolite mesolite, usually occurs as acicular and fibrous aggregations. Although having nearly the same interfacial angles as the orthorhombic natrolite, it crystallizes in the monoclinic system, and, as shown by the etched figures and the pyro-electric character, in the hemihedral class of this system, there being a plane, but no axis, of symmetry. Scolecite can therefore be distinguished from natrolite by an optical examination, since the acicular crystals do not extinguish parallel to their length between crossed nicols. Twinning on the ortho-pinacoid is usually evident. The mineral is colourless or white, transparent, and vitreous in lustre: the hardness is 5½, and the specific gravity 2·2. It is a mineral of secondary origin, and occurs with other zeolites in the amygdaloidal cavities of weathered volcanic rocks of basic composition. Fine divergent groups of prismatic crystals are found in the basalt of Berufjord near Djupivogr in Iceland and in the Deccan traps near Poona in India; hence the synonym poonahlite for this species. The name scolecite is derived from Gr. σκώληξ, a worm, because the crystals sometimes curl up like worms when heated before the blowpipe. (L. J. S.)

SCONCE (Lat. *absconsus*, Fr. *esconce*), a word of many meanings, mostly signifying a covering or protection, or, by extension, that which is covered or protected. Its most familiar significance is that of a wall light, consisting of a metal bracket, with two or more socketed branches for candles. The word is also used for the orifice of a candlestick into which the candle is fixed, and for the rim of metal, glass or china, placed round a candle to intercept grease droppings. Among its obsolete meanings is that of head or skull. At the English universities "to sconce" is still used as the term for imposing a penalty at dinner in the shape of a quart-pot of beer or cider.

SCONE (pron. *Skoon*; Gaelic, *skene*, "a cutting"), a parish of Perthshire, Scotland, containing Old Scone, the site of an historic abbey and palace, and New Scone, a modern village (pop. 1585), 2 m. N. of Perth, near the left bank of the Tay. Pop. of parish (1901) 2362. It became the capital of Pictavia, the kingdom of northern Picts, in succession to Forteviot. Parliaments occasionally assembled on the Moot Hill, where the first national council of which we possess records was held (906). The Moot Hill was known also as the Hill of Belief from the fact that here the Pictish king promulgated the edict regulating the Christian church. The abbey was founded in 1115 by Alexander I., but long before this date Scone had been a centre of ecclesiastical activity and the seat of a monastery. Kenneth

is alleged to have brought the Stone of Destiny, on which the Celtic kings were crowned, from Dunstaffnage Castle on Loch Etive, and to have deposited it in Scone, whence it was conveyed to Westminster Abbey (where it lies beneath the Coronation Chair) by Edward I. in 1296. Most of the Scottish kings were crowned at Scone, the last function being held on the 1st of January 1651, when Charles II. received the crown. Apparently there was never any royal residence in the town, owing to the proximity of Perth. Probably the ancient House of Scone, which stood near the abbey, provided the kings with temporary accommodation. Both the abbey and the house were burned down by the Reformers in 1559, and next year the estates were granted to the Ruthvens. On the attainder of the family after the Gowrie conspiracy in 1600, the land passed to Sir David Murray of the Tullibardine line, who became 1st viscount Stormont (1621) and was the ancestor of the earl of Mansfield, to whom the existing house belongs. Sir David completed in 1606 the palace which the earl of Gowrie had begun. The 5th viscount—father of the 1st earl of Mansfield, the lord chief justice of England (b. at Scone 1705)—entertained the Old Pretender for three weeks in 1716, and his son received Prince Charles Edward in 1746. The present palace, which dates from 1803, stands in a beautiful park. It contains several historic relics, the most interesting being a bed adorned with embroidery worked by Mary Queen of Scots during her imprisonment in Lochleven Castle. The gallery in which Charles II. was crowned, a hall 160 ft. long, has been included in the palace. Two hundred yards east of the mansion is an ancient gateway, supposed to have led to the old House of Scone, and near it stands the cross of Scone, removed hither from its original site in the town.

SCONE, the Scots name of a species of cake made of wheat or barley meal and baked on a griddle. The cakes are round and are usually cut into four pieces, thus giving the familiar shape of a wedge with circular edge. The broad lowland bonnet was called a "scone" or "scone-cap" from its shape. The word appears to have been a shortened form of a Low Ger. *Schonbrot, i.e.* fine bread, explained in the Bremen Glossary (1771), quoted in the *New English Dictionary*, as a sort of white loaf with two acute and two obtuse angles. The Hamburg dialect word *schönroggen*, fine rye, was adopted into Swedish and Icelandic in the sense of biscuit.

SCOOP (from M. L. Ger. or M. Du. *schope*, cf. Du. *schoep*, a bailing vessel, Ger. *schöpfen*, and, from M. Du. *schoppe*, Ger. *Schuppe*, shovel), properly a utensil or implement for ladling or bailing out water or liquid from a vessel, and so used of the bucket of a water-wheel or of a dredger; in its most usual sense the word is applied to a small kind of shovel with a short handle and a sharply curved blade, often covered in towards the handle end, and used for the moving and lifting of loose materials or for cutting out a rounded piece from any substance. In journalistic slang, originally American, a "scoop" is an exclusive piece of information obtained by a newspaper.

SCOPAS, probably of Parian origin, the son of Aristander, a great Greek sculptor of the 4th century B.C. Although classed as an Athenian, and similar in tendency to Praxiteles, he was really a cosmopolitan artist, working largely in Asia and Peloponnesus. The extant works with which he is associated are the Mausoleum of Halicarnassus, and the temple of Athena Alea at Tegea. In the case of the Mausoleum, though no doubt the sculpture generally belongs to his school, we are unable to single out any special part of it as his own. But we have good reason to think that the pedimental figures from Tegea, some of which are at Athens, while some are kept in the local museum, are Scopas' own work. The subjects of the pedimental compositions were the hunting of the Calydonian boar and the battle between Achilles and Telephus. Four heads remain, that of Hercules, that of Atalanta and two of warriors: also part of the body of Atalanta and the head of the boar. Unfortunately all these are in very poor preservation; but it is allowed that they are our best evidence for the style of Scopas. The head of a helmeted warrior (see GREEK ART, Plate III. fig. 63) is especially valuable to us. It is very powerful, with massive bony framework; the forehead is projecting, the eyes deep-set and heavily shaded, the mouth slightly open and full of passion. It shows us that while in general style Scopas approached Praxiteles, he differed from him in preferring strong expression and vigorous action to repose and sentiment. The temple at Tegea was erected after 395 B.C.; and the advanced character of the sculpture seems to indicate a date at least twenty years later than this.

Attempts have been made, through comparison of these heads, to assign to Scopas many sculptures now in museums, heads of Heracles, Hermes, Aphrodite, Meleager and others. It is, however, very risky thus to attribute works executed in Roman times, and often thoroughly eclectic in character. Ancient writers give us a good deal of information as to works of Scopas. He made for the people of Elis a bronze Aphrodite, riding on a goat (copied on the coins of Elis); a Maenad at Athens, running with head thrown back, and a torn kid in her hands was ascribed to him; of this Dr. Treu has published a probable copy in the Albertinum at Dresden (*Mélanges Perrot*, p. 317). Another type of his was Apollo as leader of the Muses, singing to the lyre. The most elaborate of his works was a great group representing Achilles being conveyed over the sea to the island of Leuce by his mother Thetis, accompanied by Nereids riding on dolphins and sea-horses, Tritons and other beings of the sea, "a group," says Pliny (36. 25), "which would have been remarkable had it been the sole work of his life." He made also an Aphrodite which rivalled the creation of Praxiteles, a group of winged love-gods whom he distinguished by naming them Love, Longing and Desire, and many other works.

Jointly with his contemporaries Praxiteles and Lysippus, Scopas may be considered as having completely changed the character of Greek sculpture. It was they who initiated the lines of development which culminated in the schools of Pergamum, Rhodes and other great cities of later Greece. In most of the modern museums of ancient art their influence may be seen in three-fourths of the works exhibited. At the Renaissance it was especially their influence which dominated Italian painting and through it modern art. (P. G.)

SCOPE (through Ital. *scopo*, aim, purpose, intent, from Gr. σκοπός, mark to shoot at, aim, σκοπεῖν, to see, whence the termination in telescope, microscope, &c.), properly that which is aimed at, purpose, intention; hence outlook, view, range of observation or action; more generally, the sphere or field over which an activity extends, room or opportunity for play or action.

SCORDISCI, in ancient geography, a Celtic tribe inhabiting the southern part of lower Pannonia between the Savus, Dravus and Danuvius. Some Roman authorities consider them a Thracian stock, because of their admixture with an older Thraco-Illyrian population. As early as 175 B.C. they came into collision with the Romans by assisting Perseus, king of Macedonia; and after Macedonia became a Roman province they were for many years engaged in hostilities with them. In 135 they were defeated by M. Cosconius in Thrace (Livy, *epit.* 56); in 118, according to a memorial stone discovered near Thessalonica (W. Dittenberger, *Sylloge inscriptionum Graecarum*, i. No. 247, 1883 edition), Sextus Pompeius, probably the grandfather of the triumvir, was slain fighting against them near Stobi. In 114 they surprised and destroyed the army of Gaius Porcius Cato in the Servian mountains, but were defeated by Q. Minucius Rufus in 107. Nevertheless, they still from time to time gave trouble to the Roman governors of Macedonia, whose territory they invaded in combination with the Maedi and Dardani. They even advanced as far as Delphi and plundered the temple; but Lucius Cornelius Scipio Asiaticus finally overcame them in 88 and drove them across the Danube. In Strabo's time they had been expelled from the valley of the Danube by the Dacians (Strabo vii. pp. 293, 313).

See Mommsen, *Hist. of Rome* (Eng. trans.), bk. iv. ch. 5, who puts the final conquest of the Scordisci by the Romans not later than 91. Also H. Pomtow, "Die drei Brände des Tempels zu Delphi" in *Rheinisches Museum*, li. p. 369 (1896); A. Holder, *Altceltischer Sprachschatz*, ii. (1904).

SCORE (O.E. *scor*, from *sceran*, to cut, notch, cf. "shear"), properly a notch or groove cut in a piece of wood, called a "tally" (*q.v.*), as a method of counting: hence an account or reckoning made in this way. Either from a custom of keeping each series of twenty numbers or notches on a separate tally, or of marking the twentieth number by a longer or deeper mark, the word was early used to denote the number twenty; it is still used as a measure of weight, equivalent to 20 lb, computing the weight of animals sold for slaughtering for food. In music, a score is the written or printed copy of a composition on two or more staves, barred and braced together. For instrumental and vocal music a "full score" has the parts for each class of voice and instrument on a separate staff.

SCORESBY, WILLIAM (1789–1857), English Arctic explorer, scientist and divine, was born near Whitby, Yorkshire, on the 5th of October 1789. His father, William Scoresby (1760–1829), made a fortune in the Arctic whale fishery. The son made his first voyage with his father when he was eleven years of age, but on his return he was sent back to school, where he remained till 1803. After this he was his father's constant companion, and was with him on the 25th of May 1806, as chief officer of the whaler "Resolution," when he succeeded in reaching 81° 30′ N. lat. (19° E. long.), for twenty-one years the highest northern latitude attained in the eastern hemisphere. During the following winter, Scoresby attended the natural philosophy and chemistry classes at Edinburgh university, and again in 1809. In his voyage of 1807 he began the study of the meteorology and natural history of the polar regions, among the earlier results of which are his original observations on snow and crystals; and in 1809 Robert Jameson brought certain Arctic papers of his before the Wernerian Society of Edinburgh, of which he was at once elected a member. In 1811 his father resigned to him the command of the "Resolution," and in the same year he married the daughter of a Whitby shipbroker. In his voyage of 1813 he established for the first time the fact that the temperature of the polar ocean is warmer at considerable depths than it is on the surface, and each subsequent voyage in search of whales found him no less eager of fresh additions to scientific knowledge. His letters of this period to Sir Joseph Banks, whose acquaintance he had made a few years earlier, no doubt gave the first impulse to the search for the North-West Passage which followed. In 1819 he was elected a fellow of the Royal Society of Edinburgh, and about the same time communicated a paper to the Royal Society of London "On the Anomaly in the Variation of the Magnetic Needle." In 1820 he published *An Account of the Arctic Regions and Northern Whale Fishery*, in which he gathers up the results of his own observations, as well as those of previous navigators. In his voyage of 1822 to Greenland he surveyed and charted with remarkable accuracy 400 m. of the east coast, between 69° 30′ and 72° 30′, thus contributing to the first real and important geographic knowledge of East Greenland. This, however, was the last of his Arctic voyages. On his return he was met by the news of his wife's death, and this event, with other influences acting upon his naturally pious spirit, decided him to enter the church. After two years of residence in Cambridge he took his degree (1825) and was appointed to the curacy of Bassingby, Yorkshire. Meantime had appeared at Edinburgh his *Journal of a Voyage to the Northern Whale Fishery, including Researches and Discoveries on the Eastern Coast of Greenland* (1823). The discharge of his clerical duties at Bassingby, and later at Liverpool, at Exeter and at Bradford, did not prevent him from continuing his interest in science. In 1824 the Royal Society elected him a fellow, and in 1827 he was elected an honorary corresponding member of the Paris Academy of Sciences, while in 1839 he took the degree of D.D. From the first he was an active member and official of the British Association, and he contributed especially to the knowledge of terrestrial magnetism. Of his sixty papers in the Royal Society list many are more or less connected with this department of research. But his observations extended into many other departments, including certain branches of optics. In order to obtain additional data for his theories on magnetism he made a voyage to Australia in 1856, the results of which were published in a posthumous work—*Journal of a Voyage to Australia for Magnetical Research*, edited by Archibald Smith (1859). He made two visits to America, in 1844 and 1848; on his return home from the latter visit he made some valuable observations on the height of Atlantic waves, the results of which were given to the British Association. He interested himself much in social questions, especially the improvement of the condition of factory operatives. He also published numerous works and papers of a religious character. In 1850 he published a work urging the prosecution of the search for the Franklin expedition and giving the results of his own experience in Arctic navigation. He was twice married after the death of his first wife. After his third marriage (1849) he built a villa at Torquay, where he died on the 21st of March 1857.

See the *Life* by his nephew, Dr R. E. Scoresby-Jackson (1861).

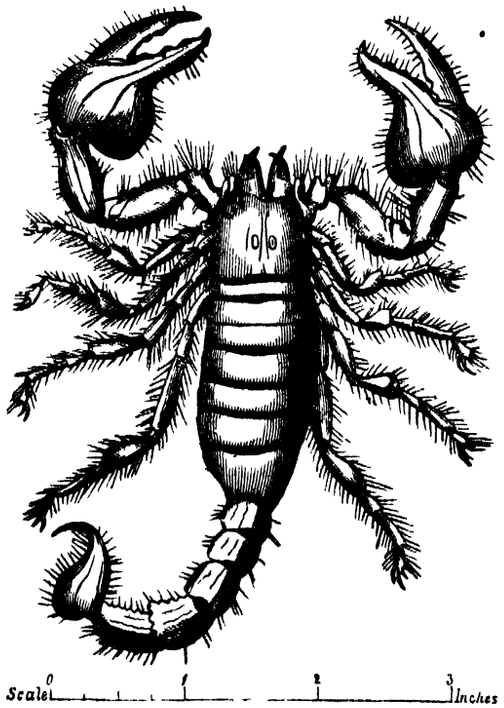
SCORIA (Lat. *scoria*, slag), in geology, a name applied to lava when moderately vesicular and having a structure like that of a clinker. Ejected masses of scoriaceous lava are often called "cinders," a term conveniently used for all lumps of vesicular lava (see VOLCANO).

SCORPIO ("THE SCORPION"), in astronomy, the 8th sign of the zodiac (*q.v.*), denoted by the symbol ♏. It is also a constellation, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.), and catalogued by Ptolemy (24 stars), Tycho Brahe (10), Hevelius (20). The Greeks fabled that Orion having boasted to Diana and Latona that he would kill every animal on the earth, these goddesses sent a poisonous reptile—a scorpion—which stung him so that he died. Jupiter raised the scorpion to heaven, and afterwards, at Diana's request, did the same for Orion. The chief star in this constellation is *α Scorpii* or Antares, a reddish star of the first magnitude, accompanied by a green companion of the seventh magnitude. *μ Scorpii* is a spectroscopic binary; T *Nova Scorpii* is a "new" star discovered in 1860 by G. F. Auwers in the cluster Messier 80.

SCORPION (Lat. *scorpio*), the common name for members of the class Arachnida (*q.v.*), distinguishable at a glance from all the other existing members by having the last five segments of the body modified to form a highly flexible tail, armed at the end with a sting consisting of a vesicle holding a pair of poison glands, and of a sharp spine behind the tip of which the ducts of the glands open. Like spiders they have four pairs of walking legs; but the limbs of the second pair form a couple of powerful pincers, and those of the first pair two much smaller nippers. They feed entirely upon animal food, principally upon insects such as beetles or other ground species, although the larger kinds have been known to kill small lizards and mice. The large pincers are studded with highly sensitive tactile hairs, and the moment an insect touches these he is promptly seized by the pincers and stung to death, the scorpion's tail being swiftly brought over his back and the sting thrust into the struggling prey. Paralysis rapidly follows, and, when dead, the insect is pulled to pieces by the small nippers and its soft tissues sucked into the scorpion's mouth. Scorpions vary in size from about 1 in. to 8 in.; and the amount of poison instilled into a wound depends principally upon the size of the animal. But the poison is more virulent in some of the smaller than in the larger species. Upon mankind the effects of the poison are seldom fatal, though death has been known to follow in the case of patients in a poor state of health at the time. In small scorpions, like those belonging to the genus *Euscorpius*, which occurs in Italy and other countries of South Europe, the sting is said to be as bad as that of a wasp; but in many tropical species acute pain, accompanied by inflammation and throbbing of the wounded part, follows. But unless molested, scorpions are perfectly harmless, and only make use of the sting for the purpose of killing prey.

The belief that scorpions commit suicide by stinging themselves to death when tortured by fire is of considerable antiquity and is prevalent wherever these animals occur. It is nevertheless quite without foundation in fact; for it has been proved

experimentally of late years that the venom has no effect upon the individual itself, nor yet upon a member of the same species. Scorpions, however, are extraordinarily susceptible to heat, and succumb very rapidly when exposed either to the warmth of a fire or to that of the tropical sun. Moreover, when they feel the heat beating upon them they brandish their tails and strike right and left as if to drive off or destroy the unseen enemy; and there can be no doubt that the belief above alluded to is traceable primarily to observation of the sequence of events just described, the final event being the death of the animal, not, however, from a self-inflicted wound but from the heat which provoked the behaviour suggestive of suicidal purpose. It may be that under such circumstances a random stroke has now and again wounded the animal itself; but a wound so inflicted would be accidental, not intentional, and at most would contribute in a small measure to the creature's death. Scorpions are very easily rendered innocuous by scraping off the sharp point of the sting; and specimens, which are handled with impunity by Arabs and Dervishes to impress the uninitiated with their superhuman attributes, have generally been treated in this way. At the same time it has been shown that insensibility to the pain of the sting and immunity to the ill effects can be acquired by any one who has the courage to permit himself to be repeatedly stung.



African Scorpion (*Pandinus heros*).

Like many poisonous animals, scorpions are for the most part rendered conspicuous by distinctive coloration of jet-black or black and yellow; and many of them are gifted with stridulating organs, developed in various parts of the body which are functionally comparable to the rattles of rattlesnakes, porcupines and other noxious animals. In habits scorpions are cryptozoic and nocturnal, spending the daytime concealed under stones or fallen tree trunks or in burrows, and only venturing out after sunset in search of food. Amongst the burrowing kinds are the large African species belonging to the genera *Pandinus* and *Opisthophthalmus* and to the eastern genus *Palamnaeus*. The yellow scorpions of the genus *Buthus*, which are common in Egypt and the Sahara, lurk on the watch for prey in shallow depressions which they excavate with their legs in the sand.

Unlike the majority of Arachnida, scorpions are viviparous. The young are born two at a time, and the brood, which consists of a dozen or more individuals, is carried about on its mother's back until the young are large and strong enough to shift for themselves. The young in a general way resemble their parents and undergo no metamorphosis with growth, which is accompanied by periodical casting of the entire integument. Moulting is effected by means of a split in the integument which takes place just below the edge of the carapace all round, exactly as in king-crabs, spiders and Pedipalpi. Through the split the young scorpion gradually makes its way, leaving the old integument behind.

Scorpions are of great antiquity. In coal deposits of the Carboniferous Period their remains are not uncommonly found, and no essential structural difference has been discovered between these fossils and existing forms—a fact proving that the group has existed without material structural modification for untold thousands of years. These Carboniferous scorpions, however, were preceded by others, now occurring in marine Silurian deposits, which evidently lived in the sea and exhibit some anatomical differences marking them off as a group distinct from their Carboniferous and recent descendants and attesting affinity with the still earlier marine Arachnida referred to the group Gigantostraca. Their legs were short, thick, tapering, and ended in a single strong claw, and were well adapted, it seems, like the legs of shore-crabs, for maintaining a secure hold upon rocks or seaweed against the wash of waves. The method of breathing of these ancient types is not certainly known; but probably respiration was effected by means of gills attached to the ventral plates of the body. At all events no trace of respiratory stigmata has been detected even in well-preserved material. These Silurian scorpions, of which the best-known genus is *Palaeophonus*, were of small size, only 1 in. or 2 in. in length.

At the present time scorpions are almost universally distributed south of about the 40th or 45th parallels of north latitude; and their geographical distribution shows in many particulars a close and interesting correspondence with that of the mammalia, their entire absence from New Zealand being not the least interesting point of agreement. The facts of their distribution are in keeping with the hypothesis that the order originated in the northern hemisphere and migrated southwards into the southern continent at various epochs, their absence from the countries to the north of the above-mentioned latitudes being due, no doubt, to the comparatively recent glaciation of those areas. When they reached Africa, Madagascar was part of that continent; but their arrival in Australia was subsequent to the separation of New Zealand from the Austro-Malayan area to the north of it. Moreover, the occurrence of closely related forms in Australia and South America on the one hand, and in tropical Africa and the northern parts of South America on the other, suggests very forcibly that South America was at an early date connected with Australia by a transpacific bridge and with Africa by a more northern transatlantic tract of land.

In conformity with their wide dispersal, scorpions have become adapted to diverse conditions of existence, some thriving in tropical forests, others on open plains, others in sandy deserts, and a few even at high altitudes where the ground is covered with snow throughout the winter. In the tropics they aestivate at times of drought; and in the Alps they pass the cold months of the year in a state of hibernation. (R. I. P.)

SCORPION-FLY, the popular name given to insects of the family *Panorpidae*, deriving the name from the fact that in the typical genus, *Panorpa*, the last two or three segments of the abdomen are narrow and can be flexed over the back like a scorpion's tail. The scorpion-flies are remarkable for the elongation of the oral region of the head into a prominent beak. The larva is grub-like, beset with spines and generally furnished with eight pairs of abdominal pro-legs in addition to the legs on the thorax, which are short. They live in the soil or in rotten wood and are carnivorous. The species of the genus *Bittacus* are superficially strikingly similar to the *Tipulidae* or "daddy-long-legs"; while those referred to, *Boreus*, are anomalous in being apterous and like small grasshoppers. They have usually been included in the order Neuroptera, but it is now generally considered that they should form a distinct order, which is termed Panorpata or Mecaptera.

SCORZONERA (*Scorzonera hispanica*), a hardy perennial, native to central and southern Europe, and cultivated in gardens as a vegetable for its fleshy cylindrical roots, which resemble those of salsafy except in being black outside. They should be treated in every respect like salsafy. The genus is a member of the natural order Compositae, and nearly allied to *Tragopogon*, to which salsafy belongs.

SCOT, MICHAEL (? 1175–1232), Scottish mathematician and astrologer. The dates of his birth and death are quite uncertain, the most probable being those here given. The efforts of Sir

Walter Scott and others to identify him with the Sir Michael Scot of Balwearie, who in 1290 was sent on a special embassy to Norway, must be considered unsuccessful, though he may have been a member of the family. Scot studied at Oxford and Paris, devoting himself to philosophy and mathematics. It appears that he had also studied theology, and was ordained a priest, as Pope Honorius III. wrote to Stephen Langton on the 16th of January 1223/4, urging him to confer an English benefice on Scot, and actually himself nominated him archbishop of Cashel in Ireland. This appointment Scot refused to take up, but he seems to have held benefices in Italy from time to time. From Paris he went to Bologna, and thence, after a stay at Palermo, to Toledo. There he acquired a knowledge of Arabic. This opened up to him the Arabic versions of Aristotle and the multitudinous commentaries of the Arabians upon them, and also brought him into contact with the original works of Avicenna and Averroes. His own first work was done as a translator. He was one of the savants whom Frederick II. attracted to his brilliant court, and at the instigation of the emperor he superintended (along with Hermannus Alemannus) a fresh translation of Aristotle and the Arabian commentaries from Arabic into Latin. There exist translations by Scot himself of the *Historia animalium*, the *De anima* and *De coelo*, along with the commentaries of Averroes upon them. This connexion with Frederick and Averroes—both of evil reputation in the middle ages—doubtless contributed to the formation of the legend which soon enveloped Michael Scot's name. His own books, however, dealing as they do almost exclusively with astrology, alchemy and the occult sciences generally, are mainly responsible for his popular reputation. Chief among these are *Super auctorem spherae*, printed at Bologna in 1495 and at Venice in 1631; *De sole et luna*, printed at Strassburg (1622), in the *Theatrum chimicum*, and containing more alchemy than astronomy, the sun and moon being taken as the images of gold and silver; *De chiromantia*, an opuscule often published in the 15th century; *De physiognomia et de hominis procreatione*, which saw no fewer than eighteen editions between 1477 and 1660. The *Physiognomia* (which also exists in an Italian translation) and the *Super auctorem spherae* expressly state that they were undertaken at the request of the emperor Frederick. Michael is said to have foretold (after the double-tongued manner of the ancient oracles) the place of Frederick's death, which took place in 1250. Around his own death many legends gathered. He was supposed to have foretold that he would end by a blow from a stone of not more than two ounces in weight, and that to protect himself he wore an iron helmet, and that, raising this in church at the elevation of the host, the fatal stone fell on him from the roof. Italian tradition says he died in that country, while another legend is that he returned to his native land to die, and according to one account was buried at Holme Cultram in Cumberland; according to another, which Sir Walter Scott has followed in the *Lay of the Last Minstrel*, in Melrose Abbey. In the notes to that poem, of which the opening of the wizard's tomb forms the most striking episode, Scott gives an interesting account of the various exploits attributed by popular belief to the great magician. "In the south of Scotland any work of great labour and antiquity is ascribed either to the agency of Auld Michael, of Sir William Wallace or the devil." He used to feast his friends with dishes brought by spirits from the royal kitchens of France and Spain and other lands. His embassy to France alone on the back of a coal-black demon steed is also celebrated, in which he brought the French monarch to his knees by the results of the stamping of his horse's hoof: the first ringing the bells of Notre Dame and the second causing the towers of the palace to fall. Other powers and exploits are narrated in Folengo's Macaronic poem of *Merlin Coccaius* (1595). But Michael's reputation as a magician was already fixed in the age immediately following his own. He appears in the *Inferno* of Dante (canto xx. 115-117) among the magicians and soothsayers. He is represented in the same character by Boccaccio, and is severely arraigned by Giovanni Pico della Mirandola in his work against astrology, while Gabriel Naudé finds it necessary to defend his good name in his *Apologie pour les grands personnages faussement accusés de magie.*

For full details and analysis of all the legends attaching to Scot, see Rev. J. Wood Brown, *Life and Legend of Michael Scot* (1897).

SCOT AND LOT (O. Fr. *escot*, A.S. *sceot*, a payment; *lot*, a portion or share), a phrase common in the records of English medieval boroughs, applied to those householders who were assessed to any payment (such as tallage, aid, &c.) made by the borough for local or national purposes. They were usually members of a gild merchant. Previous to the Reform Act 1832 those who paid scot and bore lot were entitled to the franchise in virtue of this payment, and the rights of those living in 1832 were preserved by the act. The phrase is preserved in the Disorderly Houses Act 1751, which empowers inhabitants of a parish or place paying scot and bearing lot therein (*i.e.* ratepayers) to require the constable of the parish to prosecute disorderly houses.

See D. P. Fry, "On the Phrase Scot and Lot," in *Trans. Philological Society* (1867), pp. 107-197; C. Gross, *Gild Merchant*, i. c. iv.; Pollock and Maitland, *Hist. Eng. Law*, p. 647.

SCOTER, a word of doubtful origin, perhaps a variant of "Scout," one of the many local names shared in common by the guillemot (*q.v.*) and the razorbill (*q.v.*), or perhaps primarily connected with coot (*q.v.*),[1] the English name of the *Anas nigra* of Linnaeus, a bird which with some allied species has been justifiably placed in a distinct genus, *Oedemia* (often misspelt *Oidemia*)—a name coined in reference to the swollen appearance of the base of the bill. The scoter is also very generally known around the British coasts as the "black duck" from the male being, with the exception of a stripe of orange that runs down the ridge of the bill, wholly of that colour. In the representative American form, *Oe. americana*, the protuberance at the base of the bill, black in the European bird, is orange as well. Of all ducks the scoter has the most marine habits, keeping the sea in all weathers, and rarely resorting to land except for the purpose of breeding. Even in summer small flocks of scoters may generally be seen in the tideway at the mouth of any of the larger British rivers or in mid-channel, while in autumn and winter these flocks are so increased as to number thousands of individuals, and the water often looks black with them. A second species, the velvet-duck, *Oe. fusca*, of much larger size, distinguished by a white spot under each eye and a white bar on each wing, is far less abundant than the former, but examples of it are occasionally to be seen in company with the commoner one, and it too has its American counterpart, *Oe. velvetina*; while a third, only known as a straggler to Europe, the surf-duck, *Oe. perspicillata*, with a white patch on the crown and another on the nape, and a curiously particoloured bill, is a not uncommon bird in North American waters. All the species of *Oedemia*, like most other sea-ducks, have their true home in arctic or subarctic countries, but the scoter itself is said to breed occasionally in Scotland (*Zoologist*, s.s. p. 1867). The females display little of the deep sable hue that characterizes their partners, but are attired in soot-colour, varied, especially beneath, with brownish white. The flesh of all these birds has an exceedingly strong taste, and, after much controversy, was allowed by the authorities to rank as fish in the ecclesiastical dietary (cf. Graindorge, *Traité de l'origine des macreuses*, Caen, 1680; and *Correspondence of John Ray*, Ray Soc. ed., p. 148). (A. N.)

SCOTIA (Gr. σκοτιά, shadow or darkness), in architecture, a concave moulding most commonly used in bases, which projects a deep shadow on itself, and is thereby a most effective moulding under the eye, as in a base. (See MOULDING.)

[1] In the former case the derivation seems to be from the O. Fr. *Escoute*, and that from the Latin *auscultare*, but in the latter from the Dutch *Koet*, which is said to be of Celtic extraction--*cwtiar*. The Fr. *macreuse*, possibly from Lat. *macer*, indicating a bird that may be eaten in Lent or on the fast days of the Roman Church, is of double signification, meaning in the south of France a coot and in the north a scoter. By the wild-fowlers of parts of North America scoters are commonly called coots.

SCOTLAND, the name given in modern times to that portion of Great Britain which lies north of the English boundary; it also comprises the Outer and Inner Hebrides and other islands off the west coast, and the Orkney and Shetland islands off the north coast. With England lying to the south, it is thus bounded on the N. and W. by the Atlantic Ocean, and on the E. by the North Sea. It is separated from England by the Solway Firth, the Sark, Scotsdyke (an old embankment in 55° 3′ N., connecting the Sark with the Esk), the Esk (for one mile), the Liddel, the Kershope, the Cheviot Hills, the Tweed and a small area known as the "liberties" of Berwick. The mainland lies between 58° 40′ 30″ (at Dunnet Head in Caithness) and 54° 38′ N. (Mull of Galloway in Wigtownshire), and 1° 45′ 32″ (Buchan Ness in Aberdeenshire) and 6° 14′ W. (Ardnamurchan Point in Argyllshire). Including the islands, however, the extreme latitude north is 60° 51′ 30″ (Out Stack in the Shetlands) and the extreme longitude west 8° 35′ 30″ (St Kilda). The greatest length from Cape Wrath in Sutherland to the Mull of Galloway is 274 m., and the greatest breadth from Buchan Ness to Applecross in the shire of Ross and Cromarty 154 m., but from Bonar Bridge at the head of Dornoch Firth to the head of Loch Broom it is only 26 m. wide, and 30 m. from Grangemouth on the Forth to Bowling on the Clyde. The coast-line is estimated at 2300 m., the arms of the sea being so numerous and in several cases penetrating so far inland that few places are beyond 40 m. from salt water. The total area is 19,069,500 acres or 29,796 sq. m., exclusive of inland waters (about 608 sq. m.), the foreshore (about 498 sq. m.) and tidal water (about 608 sq. m.).

The name Scotland for this geographical area of northern Britain (the *Caledonia* of the ancients—a name still poetically used for Scotland) originated in the 11th century, when (from the tribe of Scots) part of it was called Scotia (a name previously applied to what is now Ireland); and the name of Scotland became established in the 12th and 13th centuries. The name of Britain or North Britain is still firmly associated with Scotland; thus English letters are generally addressed, *e.g.* "Edinburgh, N.B.," *i.e.* North Britain; and Scottish people have long objected to the conventional use south of the Tweed of the word "English," when it really means (as they correctly, but sometimes rather pedantically, insist) "British."

I. Geography

Physically, Scotland is divided into three geographical regions —the "Highlands" (subdivided by Glen More into the North-Western and South-Eastern Highlands); the Central Plain or "Lowlands" (a tract of south-westerly to north-easterly trend, between a line drawn roughly from Girvan to Dunbar and a line drawn from Dumbarton to Stonehaven); and the Southern Uplands.

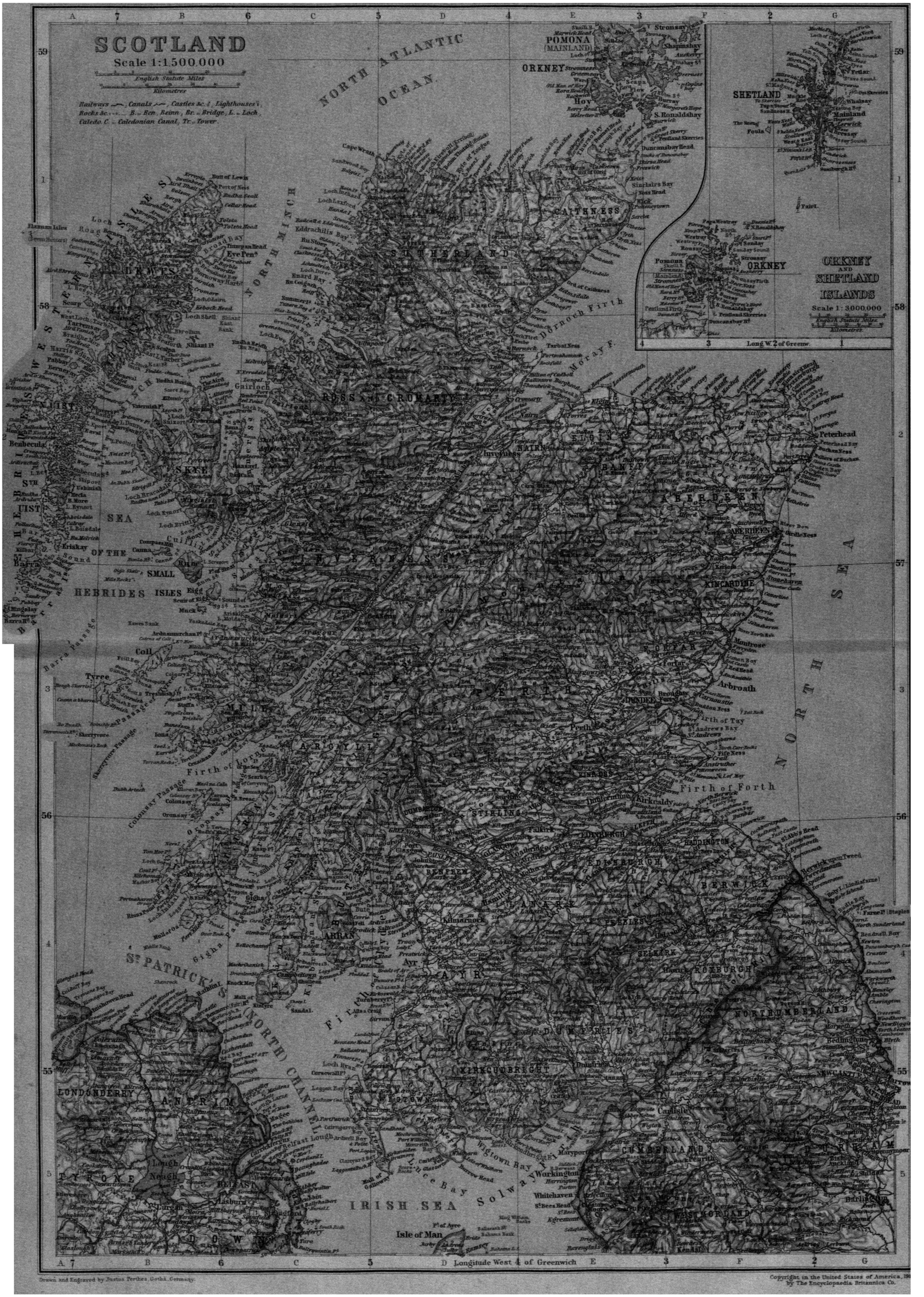
The Highlands.—Nearly all this region is lofty ground, deeply trenched with valleys and sea lochs. The only considerable low-lying area embraces the eastern part of Aberdeenshire and the northern parts of Banff, Elgin and Nairn—tracts which, ethnologically, do not fall within Highland territory. Along both sides of the Moray Firth a strip of level land lies between the foot of the hills and the sea, while the county of Caithness, occupying a wide plain, does not, strictly speaking, belong to the Highlands. Seen from Strathmore or the Firth of Clyde the Highlands present well-defined masses of hills abruptly rising from the Lowland plains, and from any of the western islands their sea front resembles a vast rampart indented by lochs and rising to a uniform level, which sinking here and there allows glimpses of still higher summits in the interior. The Highland hills differ from a mountain chain such as the Alps not merely in their inferior elevation but in configuration and structure. They are made up of a succession of more or less parallel confluent ridges, having in the main a trend from north-east to south-west. These ridges are separated by longitudinal and furrowed by transverse valleys. The portions of the ridge thus isolated rise into what are regarded as mountains, though they are really only loftier parts of the ridge, along which indeed the geological structure is continued. It is remarkable how the average level of the summits is maintained. Viewed from near at hand a mountain may seem to tower above the surrounding country, but from a distance it will be seen not to rise much above the general uniformity of elevation. There are no gigantic dominant masses obviously due to special terrestrial disturbance. A few apparent exceptions occur along the western seaboard of Sutherland, in Skye and elsewhere, but examination of their structure at once explains the reason of their prominence and confirms the rule. The surface of the Highlands is rugged. The rocks project in innumerable bosses and crags, which roughen the sides and crests of the ridges. The shape and colour of these roughnesses depend on the nature of the underlying rock. Where it is hard and jointed, weathering into large quadrangular blocks, the hills are more especially distinguished for the gnarled bossy character of their declivities, as may be seen in Ben Ledi and the heights to the north-east of it. Where, on the other hand, the rock decays with smaller debris, the hills assume smoother contours, as in the slate hills running from the Kyles of Bute to Loch Lomond. But, regarded broadly, the Highland mountains are monuments of erosion, the relic of an old tableland, the upper surface and former inclinations of which are shown approximately by the summits of the existing masses and the direction of the chief water-flows.

The Highlands are separated into two completely disconnected and in some respects contrasted regions by the depression of the Great Glen, extending from Loch Linnhe to Inverness, by which the ancient plateau was severed. In the north-western section the highest ground is found along the Atlantic coast, mounting steeply from the sea to an average height of 2000 to 3000 ft. The watershed consequently keeps close to the western seaboard, and indeed in some places is not above a mile and a half from the shore. From these hills which catch the first downpour of the rains from the ocean, the ground falls eastward. Numerous eminences, however, prolong the mountainous features to the North Sea and south-eastward to Glen More. The difference of the general level on the two sides of the water-parting is reflected in the length of their streams. On the west the drainage empties itself into the Atlantic after flowing only a very few miles, on the east it has to run 30 or 40 m. At the head of Loch Nevis the western stream is but 3 m. long, while the eastern has a course of some 18 m. to the Great Glen. Throughout the north-western region uniformity of features characterizes the scenery, betokening even at a distance the general monotony of structure. But the sameness is relieved along the western coast of the shires of Sutherland and Ross and Cromarty by groups of cones and stacks, and farther south by the terraced plateaus and abrupt conical hills of Skye, Rum and Mull.

The south-eastern region of the Highlands, having a more diversified geological structure, offers greater variety of scenery. Most of the valleys, lakes and sea lochs run in a south-westerly and north-easterly direction, a feature strikingly exhibited in west Argyllshire. But there are also several important transverse valleys, those of the Garry and Tay being the most conspicuous examples. The watershed, too, is somewhat different. It first strikes eastwards round the head of Loch Laggan and then swings southwards, pursuing a sinuous course till it leaves the Highlands on the east side of Loch Lomond. The streams flowing westward, however, are still short, while those running to the north-east, east and south-east have long courses and drain wide areas. There is a marked contrast between the configuration of the north-eastern district and the other parts of this region. In that area the Grampians rise into wide flat-topped heights or moors often more than 3000, and in a few places exceeding 4000 ft. in height, and bounded by steep declivities and sometimes by precipices. Seen from an eminence on their surface, the inference is irresistible that these plateaus are fragments of the original tableland, trenched into segments by the formation of the longitudinal and transverse valleys. Farther to the south-west, in the shires of Perth, Inverness and Argyll, they give place to the ordinary hummocky crested ridges of Highland scenery, which, however, in Ben Nevis and Aonach Beg reach a height of over 4000 ft.

Besides the principal tracts of low-lying ground in the Highlands already alluded to, there occur long narrow strips of flat land in the more important valleys. Most of the straths and glens have a floor of detritus which, spread out between the bases of the boundary hills, has been levelled into meadow land by the rivers and provides almost the sole arable ground in each district.

The Lowlands of Mid-Scotland, or the Central Plain, constitute a broad depression with south-westerly to north-easterly trend lying between the Highland line that runs from the head of the Firth of Clyde to Stonehaven and the pastoral uplands that stretch from Girvan to Dunbar. They may be regarded as a long trough of younger rocks let down by parallel dislocations between the older masses to the south and north. The lowest of these younger rocks are the various sedimentary and volcanic members of the Old Red Sandstone. These are covered by the successive formations of the Carboniferous system. The total thickness of both these groups of rock cannot be less than 30,000 ft., and, as most of them bear evidence of having been deposited in shallow water, they could only have been accumulated during a prolonged period of depression. The question arises whether this depression affected only the area of the midland valley, or extended also to the regions to the north and south; and so far as the evidence goes there is ground for the inference that, while the depression had its maximum along the line of the lowlands, it also involved some portion at least of the high grounds on either side. In other words, the Old Red Sandstone and Carboniferous rocks, though chiefly accumulated in the broad lowland valley, crept also over some part of the hills on either side, where a few outliers tell of their former extension. The central Lowlands are thus of great geological antiquity. During and since the deposition of the rocks that underlie them the tract has been the scene of repeated


SCOTLAND
Scale 1:1,500,000
English Statute Miles
Kilometres
Railways, Canals, Castles &c. & Lighthouses, Rocks &c. B. = Ben, Beinn, Br. = Bridge, L. = Loch, Caledo. C. = Caledonian Canal, Tr. = Tower.
NORTH ATLANTIC OCEAN
NORTH SEA
IRISH SEA
ORKNEY AND SHETLAND ISLANDS
Scale 1:3,000,000
English Statute Miles
Kilometres
Longitude West 4 of Greenwich
Drawn and Engraved by Justus Perthes, Gotha, Germany.
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terrestrial disturbances. Long dislocations have sharply defined its northern and southern margins. By other fractures and unequal movements of upheaval or depression portions of the older rocks have been brought up within the bounds of the younger, and areas of the younger have been enclosed by the older. On the whole, these disturbances have followed the prevalent north-easterly trend, and hence a general tendency may be observed among the main ridges and valleys to run in that direction. The chains of the Ochil, Sidlaw, Pentland, Renfrew, Campsie and Fintry Hills, and the valleys of the Strathmore, Firth of Tay, and the basin of Midlothian may be cited as examples. But the dominant cause in the determination of the topographical prominences and depressions of the district has been the relative hardness and softness of the rocks. Almost all the eminences in the Lowlands consist of hard igneous rocks, forming not only chains of hills such as those just mentioned and others in Ayrshire and Lanarkshire, but isolated crags and hills like those on which stand the castles of Edinburgh and Stirling, and others conspicuous in the scenery of Fife and the Lothians.

Of the three chief valleys in the central Lowlands two, those of the Tay and the Forth, descend from the Highlands, and one, that of the Clyde, from the Southern Uplands. Though on the whole transverse, these depressions furnish another notable example of that independence of geological structure already referred to.

The Southern Uplands extend from the North Channel in the south-west to St Abb's Head in the north-east and form a well-defined belt of hilly ground, and though much less elevated (their highest point is 2764 ft. above the sea) than the Highlands, rise with scarcely less abruptness above the lower tracts that bound them. Their north-western margin for the most part springs boldly above the fields and moorlands of the Central Plain, and its boundary for long distances continues remarkably straight. On the south and south-east their limits in general are less prominently defined, but are better seen west and south-west of the Nith from which they extend to the sea and Loch Ryan, terminating in the extreme south-west in a plateau of which the loftiest point is little over 1000 ft. above the sea. The Cheviots do not properly belong to the Uplands, from which they are separated by Liddesdale and other hollows and on which they abut abruptly. But though geologically the one set of mountains must be separated from the other, geographically it is convenient to include within the Southern Uplands the whole area between the Central Plain and the Border. A survey of the Uplands, therefore, presents in succession from south-west to north-east the Kirkcudbrightshire and Ayrshire mountain moors, the Lowthers, the Moffat hills, the Moorfoots and the Lammermuirs. Distinguished especially by the smoothness of their surface, they may be regarded as a rolling table-land or moorland, traversed by many valleys conducting the drainage to the sea. This character is well observed from the heights of Tweedsmuir. Wide, mossy moors, 2000 ft. or more above the sea, and sometimes level as a racecourse, spread out on all sides. Their continuity, however, is interrupted by numerous valleys separating them into detached flat-topped hills, which are comparatively seldom marked by precipices of naked rock. Where the rock projects it more usually appears in low crags and knolls, from which long trails of grey or purple debris descend till they are lost among the grass. Hence, besides being smooth, the uplands are remarkably verdant. They form indeed excellent pasture-land, while the alluvial flats in the valleys and even some of the lower slopes are fitted for grain and green crops.

This uniformity of aspect is doubtless traceable to the prevalence of the same kind of rocks and the same geological structure. The Silurian greywackes and shales that underlie almost the whole of the Uplands weather generally into small angular debris, and at a tolerably uniform rate of disintegration. But slight differences may readily be detected even where no feature interferes noticeably with the monotony. The bands of massive grit and coarse greywacke, for example, break up into larger blocks and from their greater hardness are apt to project above the general surface of the other softer rocks. Hence their line of trend, which like that of all the other strata is in a north-easterly direction, may be traced from hill to hill by their more craggy contours. Only in the higher tracts are there rugged features recalling the more savage character of Highland scenery. In the heights of Hartfell (2051 ft.) and Whitecoomb (2695), whence the Clyde, Tweed, Annan, and Moffat Water descend, the high moorlands have been scarped into gloomy corries, with crags and talus-slopes, which form a series of landscapes all the more striking from the abrupt and unexpected contrast which they offer to everything around them. In Galloway, also, the highest portions of the Uplands have acquired a ruggedness and wildness more like those of the Highlands than any other district in the south of Scotland. For this, however, there is an obvious geological reason. In that region the Silurian rocks have been invaded by large bosses of granite and have undergone a variable amount of metamorphism which has in some places altered them into hard crystalline schists. These various rocky masses, presenting great differences in their powers of resisting decay, have yielded unequally to disintegration: the harder portions project in rocky knolls, crags and cliffs, while the softer parts have been worn down into more flowing outlines. The highest summit in the south of Scotland—Merrick (2764 ft.)—consists of Silurian strata much altered by proximity to the granite, while the rest of the more prominent heights (all in Kirkcudbrightshire)—Rinns of Kells (2668 ft.), Cairnsmuir of Carsphairn (2612), and Cairnsmore of Fleet (2331)—are formed of granite.

The watershed of the Southern Uplands is of much interest in relation to their geological history. It runs from the mouth of Loch Ryan in a sinuous north-easterly direction, keeping near the northern limit of the region till it reaches the basin of the Nith, where it quits the Uplands altogether, descends into the lowlands of Ayrshire, and, after circling round the headwaters of the Nith, strikes south-eastwards across half the breadth of the Uplands, then sweeps north and eastwards between the basins of the Clyde, Tweed and Annan, and then through the moors that surround the sources of the Ettrick, Teviot and Jed, into the Cheviot Hills. Here again the longest slope is on the east side, where the Tweed bears the whole drainage of that side into the sea. Although the rocks throughout the Southern Uplands have a persistent north-easterly and south-westerly strike, and though this trend is apparent in the bands of more rugged hills that mark the outcrop of hard grits and greywackes, nevertheless geological structure has been much less effective in determining the lines of ridge and valley than in the Highlands. On the southern side of the watershed, in Dumfriesshire and Galloway, the valleys run generally transversely from north-west to south-east. But in the eastern half of the Uplands the valleys do not appear to have any relation to the geological structure of the ground underneath.

Characteristic Features.—Though Scotland is pre-eminently a "land of mountain and of flood," yet its leading physical features are not the lofty ridges carved out of the primeval plateau —apparently the dominant characteristic—but the valleys which have been opened through them by the agencies of water and weather, and which are therefore its fundamental topographical element. The longitudinal valleys, which run in the same general direction as the ridges—that is, north-east and south-west—have had their trend defined by geological structure, such as a line of dislocation (the Great Glen), or the plications of the rocks (Lochs Ericht, Tay and Awe, and most of the sea lochs of Argyllshire). The transverse valleys run north-west or south-east and are for the most part independent of geological structure. The valley of the Garry and Tay crosses the strike of all the Highland rocks, traverses the great fault on the Highland border, and finally breaks through the chain of the Sidlaw Hills at Perth. The valley of the Clyde crosses the strike of the Silurian folds in the Southern Uplands, the boundary fault, and the ridges of the Old Red Sandstone, and pursues its north-westerly course across the abundant and often powerful dislocations of the Carboniferous system. **Valleys.**

The crumpling of the earth's crust which folded the rocks of the Highlands and Southern Uplands probably upraised above the sea a series of longitudinal ridges having a general north-easterly direction. The earliest rain that fell upon these ridges would run off them, first in transverse watercourses down each short slope, and then in longitudinal depressions wherever such had been formed during the terrestrial disturbance. Afterwards the pathways of the streams would be gradually deepened and widened into valleys. Hence the valleys are of higher antiquity than the mountains that flank them. The mountains in fact have been hewn out of the original bulk of the land in proportion as the valleys have been excavated. The denudation would continue so long as the ground stood above the level of the sea; but there have been prolonged periods of depression, when the ground, instead of being eroded, lay below the sea-level and was buried sometimes under thousands of feet of accumulated sediment, which completely filled up and obliterated the previous drainage-lines. When the land reappeared a new series of valleys would at once begin to be eroded; and the subsequent degradation of these overlying sediments might reveal portions of the older topography, as in the case of the Great Glen, Lauderdale, and other ancient valleys. But the new drainage-lines have usually little or no reference to the old ones. Determined by the inequalities of surface of the overlying mantle of sedimentary material, they would be wholly independent of the geological structure of the rocks lying below that mantle. Slowly sinking deeper and deeper into the land, they might eventually reach the older rocks, but they would keep in these the lines of valley that they had followed in the overlying deposits. In process of time the whole of these deposits might be denuded from the area, and there might even remain no trace of the younger formations on which the valleys began and which guided their excavation. This is probably the explanation of the striking independence of geological structure exhibited by the Tweed and the Nith.

Among the valleys certain prevailing characteristics have been recognized in their popular names. *Straths* are broad expanses of low ground between bounding hills and are usually traversed by one main stream and its tributaries—*e.g.* Strath Tay, Strath Spey, Strath Conon. This name, however, has also been applied to wide tracts of lowland which embrace portions of several valleys, but are defined by lines of heights on each side; the best example is afforded by Strathmore—the "Great Strath"—between the southern margin of the Highlands and the line of the Sidlaw Hills. This long and wide depression, though it looks like one great valley, strictly speaking includes portions of the valleys of the Tay, Isla, North Esk and South Esk, all of which cross it. Elsewhere in central Scotland such a wide depression is known as a *howe*, as in the Howe of Fife between the Ochil and Lomond Hills. A *glen* is a narrower and steeper-sided

valley than a strath, though the names have not always been applied with discrimination. Most of the Highland valleys are true glens, Glencoe being the best-known example. The hills rise rapidly on each side, sometimes in grassy slopes, sometimes in rocky bosses and precipitous cliffs, while the bottom is occupied by a lake. In the south of Scotland the larger streams flow in wide open valleys called *dales*, as in Clydesdale, Tweeddale, Teviotdale, Liddesdale, Eskdale, Nithsdale. The strips of alluvial land bordering a river are known as *haughs*, and where in estuaries they expand into wide plains they are termed *carses*. The carses of the Forth extend seawards as far as Bo'ness and consist chiefly of raised beaches. The Carse of Gowrie is the strip of low ground intervening between the Firth of Tay and the Sidlaw Hills. *Brae* signifies the steep bank of a river, and so any slope or hill-side.

River-gorges are characteristic features in many of the valleys. In the Old Red Sandstone they are particularly prominent where that formation has lain in the pathway of the streams sweeping down from the Highlands. In the basin of the Moray Firth some fine examples may be seen on the Nairn and Findhorn, while on the west side of the Cromarty Firth some of the small streams descending from the high grounds of the east of the shire of Ross and Cromarty have cut out defiles in the Conglomerates, remarkable for their depth and narrowness. Towards the south margin of the Highlands notable instances of true *canyons* in the Old Red Sandstone are to be seen where the Isla and North Esk enter that formation. The well-known gorge in which the Falls of Clyde are situated is the best example in the Lowlands. (For the chief rivers see the separate articles on them, and also the section on the physical features in the article on the different shires of Scotland.)

River-gorges.

The topography of the country being the result of prolonged denudation, it is reasonable to infer that the oldest surfaces likely to be preserved are portions of some of the platforms of erosion successively established by the wearing down of the land to the sea-level. Relics of these platforms occur both in the Highlands and among the Southern Uplands. Allusion has already been made to the flat-topped moorlands which in the eastern Grampians reach heights of 3000 to 4000 ft. above the sea. The most familiar example perhaps is the top of Lochnagar, where, at the level of 3500 ft., the traveller finds himself on a broad undulating moor, more than a mile and a half long, sloping gently towards Glen Muick and terminating on the north in a range of granite precipices. The top of Ben Macdhui stands upon nearly a square mile of moor exceeding 4000 ft. in elevation. These mountains lie within granite areas; but not less striking examples may be found among the schists. The mountains at the head of Glen Clova and Glen Isla, for instance, sweep upwards into a broad moor some 3000 ft. above the sea, the more prominent parts of which have received special names—Driesh, Mayar, Tom Buidhe, Tolmount, Cairn na Glasha. It would hardly be an exaggeration to say that there is more level ground on the tops of these mountains than in areas of corresponding size in the valleys below. That these high plateaus are planes of erosion is shown by their independence of geological structure, the upturned edges of the vertical and contorted schists having been abruptly shorn off and the granite having been wasted and levelled along its exposed surface. Among the Southern Uplands exist traces of a similar tableland of erosion. The top of Broad Law on the confines of Peeblesshire and Selkirkshire, for example, is a level moor comprising between 300 and 400 acres above the contour line of 2500 ft. and lying upon the upturned edges of the greatly denuded Silurian grits and shales. An instructive example of the similar destruction of a much younger platform is to be found in the terraced plateaus of Skye, Eigg, Canna, Muck, Mull and Morven, which are portions of what was probably originally a continuous plain of basalt. Though dating back only to older Tertiary time, this plain has been so deeply trenched by the forces of denudation that it has been reduced to mere scattered fragments. Thousands of feet of basalt have been worn away from many parts of its surface; deep and wide valleys have been carved out of it; and so enormously has it been wasted, that it has been almost entirely stripped from wide tracts which it formerly covered and where only scattered outliers remain to prove that it once existed.

Types of mountain and hill.

It is curious that broad flat-topped mountains are chiefly to be found in the eastern parts of the country. Traced westwards, these forms gradually give place to narrow ridges and crests. No contrast, for instance, can be greater than that between the wide elevated moors of the eastern Grampians, and the crested ridges of western Inverness-shire and Argyllshire—Loch Hourn, Glen Nevis, Glencoe—or that between the broad uplands of Peeblesshire and the precipitous heights of Galloway. Geological structure alone will not account for these contrasts. Perhaps the cause is to be sought mainly in differences of rainfall. The western mountains, exposed to the fierce lash of the Atlantic rains, sustain the heaviest and most constant precipitation. Their sides are seamed with torrents which tear down the solid rock and sweep its detritus into the glens and sea lochs. The eastern heights, on the other hand, experience a smaller rainfall and consequently a diminished rate of erosion. No doubt, too, the preponderance of rainfall in the west has persisted for an enormous period.

Regarding the existing flat-topped heights among the eastern Grampians as remnants of what was once the general character of the surface, we can trace every step in the gradual obliteration of the tableland and in the formation of the most rugged and most individualized forms of isolated mountain. In fact, in journeying westwards across the tops of the Highland mountains we pass, as it were, over successive stages in the history of the origin of Highland scenery. The oldest types of form lie on the east side and the newest on the west. From the larger fragments of the denuded tableland we advance to ridges with narrow tops, which pass by degrees into sharp rugged crests. The ridges, too, are more and more trenched until they become groups of detached hills or mountains. In the progress of this erosion full scope has been afforded for the modification of form by variation in geological structure. Each ridge and mountain has been cut into its shape by denudation, but its outlines have been determined by the nature of the rocks and the manner in which they have yielded to decay. Every distinct variety of rock has impressed its own character upon the landscape. Hence, amid the monotonous succession of ridge beyond ridge and valley after valley, diversity of detail has resulted from the varying composition and grouping of the rocks.

The process by which the ancient tablelands have been trenched into valleys and confluent ridges is most instructively displayed among the higher mountains, where erosion proceeds at an accelerated pace. The long screes or talus-slopes at the foot of every crag and cliff bear witness to the continual waste. The headwaters of a river cut into the slopes of the parent hill. Each valley is consequently lengthened at the expense of the mountain from which it descends. Where a number of small torrents converge in a steep mountain recess, they cut out a crescent-shaped hollow or half-cauldron, which in the Scottish Highlands is known as a *corrie*. It is doubtful whether the convergent action of the streams has been the sole agency in the erosion of these striking cavities, or whether snow and glacier-ice have had a share in the work. No feature in Highland scenery is more characteristic than the corries, and in none can the influence of geological structure be better understood. Usually the upper part of a corrie is formed by a crescent of naked rock, from which long trails of debris descend to the bottom of the hollow. Every distinct variety of rock has its own type of corrie, the peculiarities being marked both in the details of the upper cliffs and crags, and in the amount, form and colour of the screes. The Scottish corries have been occupied by glaciers. Hence their bottoms are generally ice-worn or strewn over with moraine stuff. Sometimes a small tarn fills up the bottom, ponded back by a moraine. It is in such localities that we can best observe the last relics of the glaciers that once overspread the country. Among these high grounds also the gradual narrowing of ridges into sharp, narrow, knife-edged crests and the lowering of these into *cols* or passes can be admirably studied. Where two glens begin opposite to each other on the same ridge, their corries are gradually cut back until only a sharp crest separates them. This crest, attacked on each front and along the summit, is lowered with comparative rapidity, until merely a low col or pass may separate the heads of the two glens. The various stages in this kind of demolition are best seen where the underlying rock is of granite or similarly tough material, which at the same time is apt to be split and splintered by means of its numerous transverse joints. The granite mountains of Arran furnish excellent illustrations.

Where a rock yields to weather with considerable uniformity in all directions it is likely to assume *conical forms* in the progress of denudation. Sometimes this uniformity is attained by a general disintegration of the rock into fine debris, which rolls down the slopes in long screes. In other cases it is secured by the intersection of joints, whereby a rock, in itself hard and durable, is divided into small angular blocks, which are separated by the action of the elements and slide down the declivities. In many instances the beginning of the formation of a cone may be detected on ridges which have been deeply trenched by valleys. The smaller isolated portions, attacked on all sides, have broken up under weather. Layer after layer has been stripped from their sides, and the flat or rounded top has been narrowed until it has now become the apex of a cone. The mountain Schiehallion (3547 ft.) is an instance of a cone not yet freed from its parent ridge. Occasionally a ridge has been carved into a series of cones united at their bases, as in the chain of the Pentland Hills. A further stage in denudation brings us to isolated groups of cones completely separated from the rest of the rocks among which they once lay buried. Such groups may be carved out of a continuous band of rock extending into the regions beyond. The Paps of Jura, for instance, rise out of a long belt of quartzite which stretches through the islands of Islay, Jura and Scarba. In many cases, however, the groups point to the existence of some boss of rock of greater durability than those in the immediate neighbourhood, as in the Cuchullins and Red Hills of Skye and the group of granite cones of Ben Loyal, Sutherland. The most impressive form of solitary cone is that wherein after vast denudation a thick overlying formation has been reduced to a single outlier, such as Morven in Caithness, the two Bens Griam in Sutherland, and still more strikingly, the pyramids of red sandstone on the western margin of the shires of Sutherland and Ross and Cromarty. The horizontal stratification of some of these masses gives them a curiously architectural aspect, further increased by the effect of the numerous vertical joints by which the rock is cleft into buttresses and recesses along the fronts of the precipices and into pinnacles and finials along the summits. Solitary or grouped pyramids of red sandstone between 3000 and 4000 ft.

above the sea are mere remnants of a continuous sheet of red sandstone that once spread far and wide over the western Highlands.

Stratified rocks when they have not been much disturbed from their original approximate horizontality weather into escarpments. Such cliffs may run for many miles across a country, rising one above another into lofty terraced hills. In Scotland the rocks have been so dislocated and disturbed as to prevent the formation of continuous escarpments, and this form of rock-scenery is consequently almost entirely absent, except locally and for the most part on a comparatively small scale. The most extensive Scottish escarpments are found among the igneous rocks. Where lava has been piled up in successive nearly horizontal sheets, with occasional layers of tuff or other softer rock between them, it offers conditions peculiarly favourable for the formation of escarpments, as in the wide basalt plateaus of the Inner Hebrides. The Carboniferous lavas of the Campsie and Fintry Hills and of the south of Dumfriesshire and Roxburghshire likewise rise in lines of bold escarpment.

Lakes. The lakes and water-basins may be classified in four groups, each with its own peculiar scenery and distinct mode of origin—(1) glen lakes, (2) rock-tarns, (3) moraine-tarns, (4) lakes of the plains.

1. *Glen lakes* are those which occupy portions of glens. They are depressions in the valleys, not due to local heaping up of detritus, but true rock-basins, often of great depth. Much discussion has arisen as to their mode of origin, but it is probable they were caused by the erosive action of ice, since glaciers occupied the glens where they occur and wore down the rocks along the sides and bottom; but it is a point of difficulty in this theory whether ice could have eroded the deepest of the hollows. In any circumstances the lakes must be of recent geological date. Any such basins belonging to the time of the folding of the crystalline schists would have been filled up and effaced long ago. Indeed, so rapid is the infilling by the torrents which sweep down detritus from the surrounding heights that even the existing lakes are visibly diminishing. Glen lakes are almost wholly confined to the western half of the Highlands, where they form the largest sheets of fresh water. Hardly any lakes are to be seen east of a line drawn from Inverness to Perth. West of that line, however, they abound in both the longitudinal and the transverse valleys. The most remarkable line of them is that which fills up much of the Great Glen, Loch Ness being the largest. Other important longitudinal lakes are Lochs Tay, Awe, Ericht and Shiel. The most picturesque glen lakes, however, lie in transverse valleys, which being cut across the strike of the rocks present greater variety and, usually, abruptness of outline. Lochs Lomond, Katrine and Lubnaig in the southern Highlands, and Lochs Maree and More in the north, are conspicuous examples.

2. *Rock-tarns* are small lakes lying in rock-basins on the sides of mountains or the summits of ridges, and on rocky plateaus or plains. Unlike glen lakes, they have no necessary dependence upon lines of valley, but are scattered as it were broadcast, and are by far the most abundant of the Scottish lakes. Dispersed over all parts of the western Highlands, they are most numerous in the north-west, especially in the Outer Hebrides and in the west of the shires of Ross and Cromarty and Sutherland, where the surface of the Archean gneiss is so thickly sprinkled with them that many tracts consist nearly as much of water as of land. They almost invariably lie on strongly ice-worn platforms of rock, and are obviously hollows produced by the gouging action of the sheets of land-ice by which the general glaciation of the country was affected. In the Southern Uplands, owing to the greater softness and uniformity of texture of the rocks, rock-tarns are comparatively infrequent, except in Galloway, where the protrusion of granite and its associated metamorphism have reproduced Highland conditions of rock-structure. In the rocky hill-ranges of the Central Plain rock-tarns occasionally make their appearance.

3. *Moraine-tarns*—small sheets of water ponded back by some of the last moraines shed by the retreating glaciers—are confined to the more mountainous tracts. Among the Southern Uplands the best-known and one of the most picturesque is the wild and lonely Loch Skene, lying in a recess of Whitecoomb at the head of Moffat Water. Others are sprinkled over the higher parts of the valleys in Galloway. None occurs in the Central Plain. In the Highlands they may be counted by hundreds, nestling in the bottoms of the corries. In the north-western counties, where the glaciers continued longest to descend to the sea-level, lakes retained by moraine-barriers may be found very little above the sea.

4. The *Lakes of the Plains* lie in hollows of the glacial detritus which is strewn so thickly over the lower grounds. As these hollows were caused by original irregular deposition rather than by erosion, they have no intimate relation to the present drainage-lines. The lakes vary in size from mere pools to sheets of water several square miles in area. As a rule they are shallow in proportion to their extent and surface. They were once more numerous than they are now, but some have disappeared through natural causes and others have been drained. The largest sheets of fresh water in the Lowlands are lakes of the plains as Loch Leven and the Lake of Menteith.

The eastern and western seaboards present a singular contrast. The eastern is indented by a series of broad arms of the sea—the firths of Forth and Tay, Moray and Dornoch firths—but is otherwise relatively unbroken. The land slopes gently to the sea or to the edge of cliffs that have been cut back by the waves. The shores are for the most part low, with few islands in front of them, and cultivation comes down almost to the tide-line. The western side, on the contrary, is from end to end intersected with long narrow sea lochs or fjords. The land shelves down rapidly into the sea and is fronted by chains and groups of islands. The explanation of this contrast must be sought in geological structure. The west side, as we have seen, has been more deeply eroded than the eastern. The glens are more numerous there and on the whole deeper and narrower. Many of them are prolonged under the sea; in other words, the narrow deep fjords are seaward continuations of the glens. The presence of the sea in these fjords is an accident. If they could be raised out of the sea they would become glens, with lakes filling their deeper portions. That this has been their history hardly admits of question. They are submerged land-valleys, and as they run down the whole western coast they show that this side has subsided to a considerable depth beneath its former level. The Scottish sea lochs must be considered in connexion with those of western Ireland and Norway. The whole of this north-western coast-line of Europe bears witness to recent submergence. The bed of the North Sea, which at no distant date in geological history was a land surface across which plants and animals migrated freely into Great Britain, sank beneath the sea-level, while the Atlantic advanced upon the western margin of the continent and filled the seaward ends of what had previously been valleys open to the sun. In this view the Outer and Inner Hebrides were formerly one with themselves and the mainland, and the western isles therefore are truly grouped with the Highland province of Scotland. Nearly the whole coast-line is rocky. On the east indeed, the shores of the estuaries are generally low, but the land between the mouths of these inlets is more or less precipitous. On the west the coast is mostly either a steep rocky declivity or a sea-wall, though strips of lower ground are found in the bays. The cliffs vary in character according to the nature of the rock. At Cape Wrath, precipices 300 ft. high have been cut out of the Archean gneiss. The varying texture of this rock, its irregular foliation and jointing, and its ramifying veins of pegmatite give it very unequal powers of resistance. Here it projects in irregular bastions and buttresses, there retires into deep recesses and tunnels, but shows everywhere a ruggedness of aspect eminently characteristic. In striking contrast to these precipices are those of the Cambrian red sandstone a few miles to the east. Vast vertical walls of rock shoot up to a height of 600 ft., cut by their perpendicular joints into quadrangular piers and projections, some of which stand out alone as cathedral-like islets in front of the main cliff. The sombre colouring is relieved by vegetation along the edges of the nearly flat beds which project like great cornices and serve as nesting-places for sea-fowl. On the west the most notable cliffs south of those of Cape Wrath and the Cambrian sandstones of Sutherland are to be found among the basaltic islands, particularly in Skye, where a magnificent range of precipices rising to 1000 ft. bounds the western coast-line. However, the highest cliffs are found among the Shetland and Orkney Islands. The sea-wall of Foula, in Shetland, and the western front of Hoy, in Orkney, rise like walls to heights of 1100 or 1200 ft. Caithness is one wide moor, terminating almost everywhere seaward in a range of precipices of Old Red Sandstone. Along the eastern coast most of the cliffs are formed of rocks belonging to this formation. Beginning at Stonehaven, an almost unbroken line of precipice varying up to 200 ft. in height runs to the mouth of the estuary of the Tay. On the east the Southern Uplands plunge abruptly into the sea near St Abb's Head in a noble range of precipices 300 to 500 ft. in height, and on the west terminate in a long broken line of sea-wall, which begins at the mouth of Loch Ryan, extends to the Mull of Galloway, and reappears again in the southern headlands of Wigtown and Kirkcudbright. Among the most picturesque features of Scottish sea-cliffs are the numerous *stacks* or columns of rock which during the demolition and cutting-back of the precipices have been isolated and left standing amidst the waves. These remnants attain their most colossal size and height on the cliffs of Old Red Sandstone. Thus the Old Man of Hoy in Orkney is a huge column of yellow sandstone between 400 and 500 ft. high, forming a conspicuous landmark in the north. The coast of Caithness abounds in outstanding pillars and obelisks of flagstone.

Coast-line. The low shores on the west coast are frequently occupied by *sand-dunes*, as on the western margin of North and South Uist, and in many bays from the north of Sutherland to the coast of Ayrshire. They are more abundant on the east coast, however, especially on the shores of Aberdeenshire, between the mouths of the two Esks in Forfarshire, on both sides of the mouth of the Firth of Tay, and at various places on the Firth of Forth. Raised sea-beaches likewise play a part in the coast scenery. These alluvial terraces form a strip of low fertile land between the edge of the sea and the rising ground of the interior, and among the western fjords sometimes supply the only arable soil in their neighbourhood, their flat green surfaces presenting a strong contrast to the brown and barren moors that rise from them. Most of the seaport towns stand upon platforms of raised beach. Considerable deposits of mud, silt and sand are accumulating in many of the estuaries. In the Tay, Forth and Clyde, where important harbours are situated, great expense is involved in constantly dredging to remove the sediment continually brought down from the land and carried backwards and forwards by the tides.

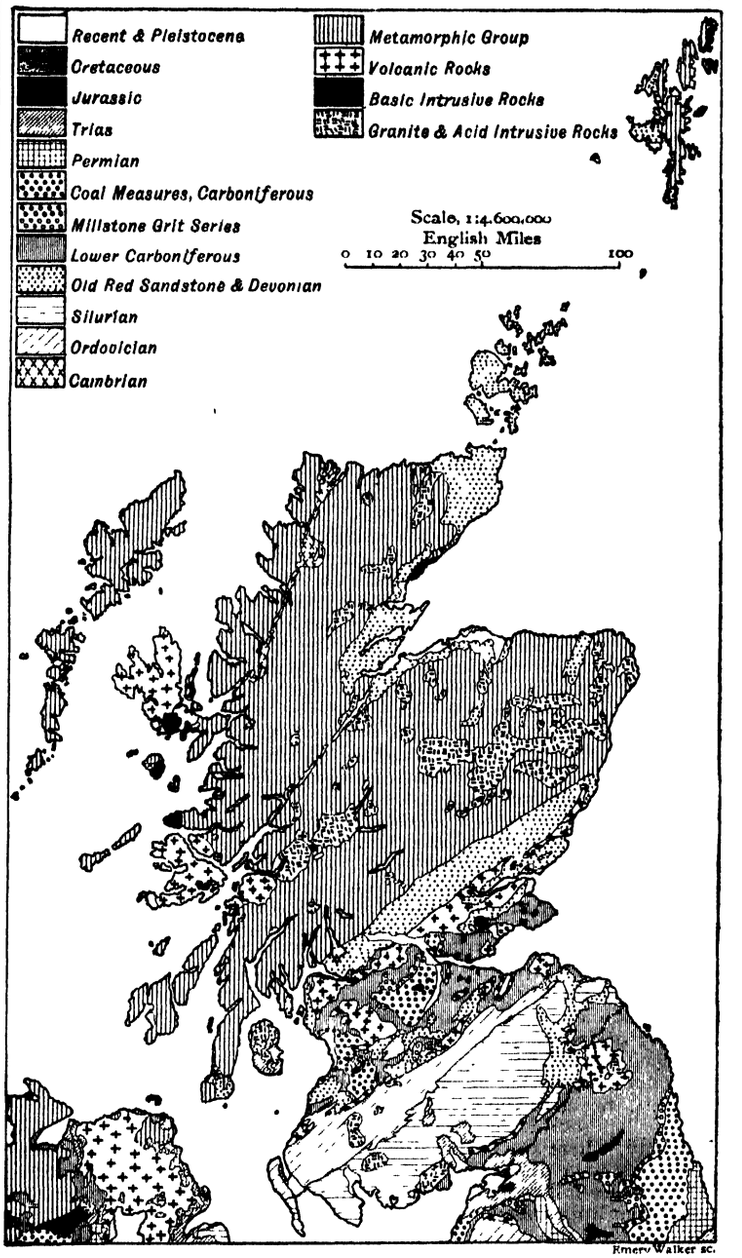
While no *islands* except mere solitary rocks like May Island, the Bass Rock and Inchkeith diversify the eastern seaboard, the western presents a vast number, varying from such extensive tracts as Skye to the smallest stack or skerry. Looked at in the broadest way, these numerous islands may be regarded as belonging to two groups or series, the Outer and the Inner Hebrides. In the Outer Hebrides most of the ground is low, rocky and plentifully dotted over with lakes; but it rises into mountainous heights in Harris, some of the summits attaining elevations of 2600 ft. The general trend of this long belt of islands is north-north-east. The Inner Hebrides form a much less definite group. They may be regarded as beginning with the Shiant Isles in the Minch and stretching to the southern headlands of Islay, and their irregularity has no doubt been chiefly brought about by the remarkable diversity of geological structure. Archean gneiss, Cambrian sandstone, Silurian quartzite, limestone and schist, Jurassic sandstone and limestone, Cretaceous sandstone, and Tertiary basalts, gabbros, and granitic rocks all enter into the composition of the islands.

Influence of Topography.—The influence of the topography of the country on the history of its inhabitants has been all-important. How powerfully the configuration affects the climate is shown in the remarkable difference between the rainfall of the mountainous west and of the lowland east. This difference has necessarily modified the character and employment of the people, leading to the cultivation of the soil on the one side and the raising of sheep and cattle on the other. The fertile low grounds on the east have offered facilities for the invasions of Romans, Norsemen and English, while the mountain fastnesses of the interior and the west have served as secure retreats for the older Celtic population. While, therefore, Teutonic people have spread over the one area, the earlier race has to this day maintained its ground in the other. Not only external configuration but geological structure also has profoundly influenced the progress of the inhabitants. In the Highlands no mineral wealth has been discovered to stimulate the industry of the natives or to attract labour and capital. These tracts remain still, as of old, sparsely inhabited and given over to the breeding of stock and the pursuit of game. In the Lowlands, on the other hand, rich stores of coal, iron, lime and other minerals have been found. The coal-fields have gradually drawn to them an ever-increasing share of the population. Villages and towns have suddenly developed and rapidly increased in size. Manufactures and shipbuilding have grown and commerce has advanced with accelerated pace. Other influences have of course contributed largely to the development of the country, but among them all the chief place must be assigned to that fortunate geological structure which, amid the revolutions of the past, has preserved in the centre of Scotland those fields of coal and ironstone which are the foundations of the national industry.

Geology.

Archean Rocks.—The oldest rocks of Scotland and of the British Isles are known, from their antiquity, as Archean, and consist chiefly of gneiss (called Fundamental, as lying at the foundation of the geological structure of the country, and Lewisian and Hebridean, because it is well developed in the island of Harris and the Outer Hebrides), which varies from a coarsely crystalline granitoid mass to fine schist. The coarse varieties are most abundant, intermingled with bands of hornblende-rock, hornblende-schist, pegmatite, eucrite, mica-schist, sericite-schist and other schistose accompaniments. In a few places limestone has been observed. No trace of any organism has ever been detected in any of these rocks. Over wide areas, particularly on the mainland, the bands of gneiss have a general north-west trend and undulate in frequent plications with variable inclination to north-east and south-west. The largest tract of Archean rock is that which forms almost the whole of the Outer Hebrides, from Barra Head to the Butt of Lewis. Other areas more or less widely separated from each other run down the western parts of the shires of Sutherland and Ross and Cromarty, and are probably continued at least as far as the island of Rum.

Eastern or Younger Schists.—The central, southern and eastern Highlands are occupied by metamorphosed sedimentary and igneous rocks, to which has been provisionally assigned the name of Dalradian, from the old Celtic kingdom of Dalriada. Their true stratigraphical position has not yet been ascertained, and it may appear that more than one group of rocks is included in the series. Eastward of the Archean gneiss in the west of Sutherland the effect of enormous underground pressure has been to upraise masses of the ancient gneiss and Torridonian sandstone and thrust them westward over the younger rocks. It is not possible to say what was the original character of many of the disrupted materials, for they have been rearranged and re-crystallized into granulitic, flaggy gneisses and schists (Moine schists). They extend from the north-east of Sutherland as far south as the Sound of Mull. To the east of the dislocation of the Great Glen these puzzling rocks may also be met with, though in that tract most of the surface comprises sedimentary and igneous rocks, the metamorphism of which has varied much. Immense sheets of dolerite, gabbro, or allied basic rocks indicate eruptive materials intruded as sills or poured out as lavas contemporaneously with the sedimentary formations among which they lie. On the other hand, there occur bands of conglomerate, pebbly grit, quartzite, graphitic shale and limestone in a certain ordered sequence and over a wide area. Traces of annelids have been detected in some of the quartzites, and some of the less changed parts of the limestones may be searched for fossils. This great series of metamorphic rocks, the geological age of which is still unsettled, has had a powerful effect on the scenery, especially along the Highland line. Where a thick group of coarse hard grits intercalated in the sedimentary rocks crops out it rises into a chain of lofty rugged hills, of which Ben Ledi and Ben Vorlich are examples. The slate hills, weathering more readily,



assume gentle slopes and rounded ridges, as in the high land from Holy Loch to the Kyles of Bute. The quartzites rise in conical hills, such as those of Jura and Islay. And to the soil created by the decay of the limestones is due a greener verdure than that of the surrounding moors.

Torridonian Sandstone.—Above the Archean gneiss lies a series of red and chocolate-coloured sandstone (Torridon sandstone), which form a number of detached areas from Cape Wrath down the seaboard of the shires of Sutherland and Ross and Cromarty, across Skye, and as far as the island of Rum. They rise into prominent pyramidal mountains, which, as the stratification is usually almost horizontal, present in their terraced sides a singular contrast to the neighbouring heights, composed of highly plicated crystalline schists. In the Torridon district they can be seen towering bed above bed to a height of about 4000 ft., but they must be at least 10,000 ft. thick. They are not met with anywhere else in Scotland. Traces of annelids and probably other organisms have been found in the bands of shale occurring in the south-west of the shire of Ross and Cromarty, in the isle of Raasay, and at Cailleach Head, and are the oldest relics of animal life yet found in Great Britain.

Cambrian.—In the north-western Highlands masses of white quartzite, resting unconformably in Torridonian sandstone, run from Loch Eriboll to Skye, forming in places great conical hills and some-

times capping isolated mountains of red Torridon sandstone. They constitute the lowest group of the most interesting series of strata in the Highlands, and yield a large number of fossils. In descending order they embrace the following subdivisions, whose thickness in the district of Durness is estimated at about 2000 ft.: (*e*) limestones, dolomites and cherts, with numerous organic remains; (*d*) grit and quartzite, with *Saltarella* and *Olenellus* (Serpulite Grit); (*c*) calcareous shales and dolomites, with many annelid casts and sometimes *Olenellus* (Fucoid Beds); (*b*) Upper Quartzite, often crowded with annelid pipes (Pipe Rock Quartzite); (*a*) Lower Quartzite—their original upper limit can nowhere be seen, for they have been overridden by the Eastern Schists in those gigantic underground disturbances already referred to, by which these rocks, the Archean gneiss and Torridonian sandstone, were crumpled, inverted, dislocated and thrust over each other. The quartzites themselves have also been subjected to extraordinary horizontal displacement, amounting in places to not less than 10 m. The rocks overlying them to the east of the line of disturbance in the shires of Sutherland and Ross and Cromarty are fine flaggy schists. The Cambrian system—including the Upper (Durness-Eriboll Limestone) and the Lower (Serpulite grit, Fucoid Beds, Quartzite)—forms a narrow band which can be traced for 100 m. from the north coast of Sutherland to Skye. Rocks of Cambrian age have not been identified elsewhere in Scotland, though it may ultimately be shown that the quartzites and limestones of the Central Highlands are equivalents of those of the north-west coast.

Ordovician and Silurian.—In the Southern Uplands a great development of Ordovician and Silurian rocks is found. In that belt they consist mostly of greywacke, grit, shale and other sedimentary rocks, but in the south-west of Ayrshire they include some thick lenticular bands of limestone. They have been thrown into many folds, the long axes of which run in a general north-easterly direction. It is this structure which has determined the trend of the southern Uplands. The plications of the Highlands and the chief dislocations of the country have followed the same general direction, and hence the parallelism and north-easterly trend of the main topographical features. Abundant fossils (graptolites principally) in certain parts of these rocks have shown that representatives of both the Ordovician and Upper divisions are present. By far the larger part of the Uplands belongs to the former. The Upper Silurian shales and sandstones appear only along the northern and southern margins. The coast on both sides of the country shows good sections of the rocks, the Berwickshire cliffs being particularly fine. Those of Ayrshire and Galloway are lower and more accessible, and permit of study of the plication of the strata. Among the best localities for fossils are Moffat Water, in Dumfriesshire, for graptolites, and the Pentlands, in Midlothian. Balmae, on the southern shore of Kirkcudbrightshire, the coast south of Girvan and the limestone quarries of the Stinchar and Girvan valleys, in Ayrshire, for shells, trilobites, corals, &c.

Old Red Sandstone.—Scotland is the typical European region for the deposits classed as Old Red Sandstone. These rocks are grouped in two divisions, Lower and Upper, both of which appear to have been deposited in lakes. The Lower, with its abundant intercalated lavas and tuffs, extends continuously as a broad belt along the northern margin of the Central Plain, reappears in detached tracts along the southern border, is found again on the south side of the Uplands in Berwickshire and the Cheviot Hills, occupies a tract of Lorne (Oban and the vicinity) in Argyllshire, and on the north side of the Highlands underlies most of the low ground on both sides of the Moray Firth, stretches across Caithness and through nearly the whole of the Orkney Islands, and is prolonged into Shetland. The Upper Old Red Sandstone covers a more restricted space in most of the areas just mentioned, its chief development being on the flanks of the north-eastern part of the Southern Uplands, where it spreads out over the Lammermuir Hills and the valleys of Berwickshire and Roxburghshire. The Lower Old Red Sandstone is rich in remains of plants and fishes, notably in the flagstones of Caithness, Orkney and Forfarshire. The volcanic rocks of this division form ranges of hills in the Lowlands, such as the Pentlands, Ochils and Sidlaws. They have in some places a thickness of 7000 ft. The lavas are usually porphyrites, which occur in sheets, with intercalated bands of volcanic tuff that are sometimes strongly felsitic. One of the vents by which such materials were ejected occurs in the Braid Hills on the south side of Edinburgh. Fossils are less common in the Upper Old Red Sandstone, though they are found—particularly fishes—in large numbers in certain spots, as at Dura Den, near Cupar-Fife. Traces of contemporaneous volcanic action exist in the Orcadian island of Hoy.

Carboniferous.—The areas occupied by Carboniferous rocks are almost entirely restricted to the Central Plain or Lowlands, but they are also found skirting the Southern Uplands from the mouth of the Tweed to that of the Nith. In the basins of the Forth and Clyde the following subdivisions are well marked: (5) Upper Red Sandstone series (red and grey sandstones, fireclays, shales, marls); (4) Coal Measures (white and grey sandstones, dark shales, fireclays, coal seams, ironstones); (3) Millstone Grit (massive sandstones and grits, with fireclays, thin limestones and coal); (2) Carboniferous Limestone series—(*c*) sandstones and shales, with three or more seams of limestone; (*b*) sandstones, shales, coals and ironstones, but with no limestone bands; (*a*) sandstones, shales, fireclays, coals and ironstones, with thin limestones towards the top and the Hurlet (Renfrewshire) limestone at the bottom; (1) Calciferous Sandstone series—(*b*) Upper or Cement Stone group, consisting of white and grey sandstones (of which the city of Edinburgh was built), black shales, thin limestones (Burdiehouse, near Edinburgh), and occasional coal seams; (*a*) Lower Red Sandstone group, with reddish and greenish marls and shales, passing down with the Upper Old Red Sandstone. The coal-fields contain two main groups of seams, the lower in the middle section of the Carboniferous Limestone, and the upper in the Coal Measures. The thin seams of the Calciferous Sandstone are not workable, but the bituminous shales in the Firth of Forth basin are largely worked for the manufacture of mineral oil. The plant-life of the Carboniferous was exceedingly luxuriant and varied, and the system is rich also in fossils of fishes, crustaceans, mollusca, insects and other forms of animal life. There was great volcanic activity during the deposition of the Calciferous Sandstone, Carboniferous Limestone and Millstone Grit series. The two leading types of volcanic areas are the *plateaus*, in which sheets of porphyrites, basalts and even trachytes were emitted, sometimes with wide discharge of volcanic ashes, and the *puys*, or isolated vents, or scattered groups of vents, which discharged comparatively a small amount of lava and ashes. The Campsie, Kilpatrick and Dumbarton hills, the high ground from Greenock to Ardrossan, and the Carleton Hills in East Lothian are examples of the plateaus, while Arthur's Seat in Edinburgh and the Binn of Burntisland illustrate the puys. Most of the hills and crags in the Carboniferous area are volcanic, and many of them—such as the castle rocks of Edinburgh and Stirling, Binny Craig in Linlithgowshire, North Berwick Law and the Bass Rock—mark the sites of actual events of eruption.

Permian.—Rocks assignable to the Permian system occupy only a few small areas in Scotland. They fill up the valley of the Nith for a few miles north of Dumfries, and, reappearing again in the same valley a little farther north, run up the narrow valley of the Carron to the Lowther Hills. Other detached tracts cover a considerable space in Annandale, one of them ascending the deep defile, known as the Devil's Beef Tub, at the head of that valley. Another isolated patch occurs among the Lead Hills; and lastly, a considerable space in the heart of the Ayrshire coal-field is occupied by Permian rocks. Throughout these separate basins the prevailing rock is a red sandstone, varied in the narrow valleys with intercalated masses of breccia. There can be no doubt that the valleys in which these patches of red rocks lie already existed in Permian time. They seem then to have been occupied by small lakes or inlets, not unlike fjords. Numerous amphibian tracks have been found in the red sandstone of Annandale and also near Dumfries, but no other traces of the life of the time. One of the most interesting features of the Scottish development of the Permian system is the occurrence of intercalated bands of contemporaneously erupted volcanic rocks in the Carron, Nithsdale and Ayrshire. The actual vents which were the sites of the small volcanoes still remain distinct, and the erupted lavas form high ground in the middle of Ayrshire.

Triassic.—The Triassic system is only feebly represented. The largest tract occurs in the south of Dumfriesshire between Annan and the head of the Solway Firth. To this division are assigned the yellow sandstones of Elgin, which have yielded crocodilian and other reptilian remains, the discovery of which led to the rocks being separated from the Upper Old Red Sandstone, to which they had previously been thought to belong. There occur also below the Lias on some parts of the west coast unfossiliferous red sandstones, conglomerates and breccias, presenting lithological resemblance to the Rhaetic group of England. Such strata are well seen in the isle of Raasay and near Heast in Skye. Red sandstones and conglomerates, probably of the same age, attain a thickness of several hundred feet at Gruinard Bay on the west coast of the county of Ross and Cromarty. On the east side of Scotland, where so many fragments of the Secondary rocks occur as boulders in the glacial deposits, a large mass of strata was formerly exposed at Linksfield to the north of Elgin, containing fossils which appear to show it to belong to the Rhaetic beds at the top of the Trias. But it was not in place, and was probably a mass transported by ice. Rhaetic strata no doubt exist *in situ* at no great distance under the North Sea.

Jurassic.—The Jurassic system—comprising, in descending order, the subdivisions of Upper Oolites (Portlandian Kimmeridge Clay), Middle Oolites (coal limestones; Oxford clay), Lower Oolites (Great Oolite series; Inferior Oolite series), Lias (Upper, Middle, Lower)—is well represented on both sides of the Highlands. Along the east coast of Sutherland good sections are exposed showing the succession of strata. Among these the Lower and Middle Lias can be identified by their fossils. The Lower Oolite is distinguished by the occurrence in it of some coal-seams, one of which, 3½ ft. in thickness, has been worked at Brora. The Middle Oolite consists mostly of sandstones with bands of shale and limestones, and includes fossils which indicate the English horizons from the Kellaways Rock up to the Coral Rag. The lower part of the Kimmeridge Clay is probably represented by sandstones and conglomerates, forming the highest beds of the series in Sutherland. On the west side of the Highlands Jurassic rocks are found in many detached areas from the Shiant Isles to the southern shores of Mull. Over much of this region they owe their preservation largely to the mass of lavas poured over them in Tertiary time. They have been uncovered, indeed, only at a comparatively recent

geological date. They comprise a consecutive series of deposits from the bottom of the Lias up to the Oxford Clay. The Lower, Middle and Upper Lias consist chiefly of shales and shelly limestones, with some sandstones, well seen along the shores of Broadford Bay in Skye and in some of the adjacent islands. The Lower Oolites are made up of sandstones and shales with some limestones, and are overlaid by several hundred feet of an estuarine series of deposits consisting chiefly of thick white sandstones, below and above which lie shales and shelly limestones. These rocks form a prominent feature underneath the basalt terraces of the east side of Skye, Raasay and Eigg. They form the highest members of the Jurassic series, representing probably some part of the Oxford Clay. The next Secondary rocks (Cretaceous) succeed them unconformably.

Cretaceous.—Rocks belonging to the Cretaceous system at one time covered considerable areas on both sides of the Highlands, but they have been entirely stripped off the eastern side, while on the western they have been reduced to a few fragmentary patches, which have survived because of the overlying sheets of basalt that have protected them. Some greenish sandstones containing recognizable and characteristic fossils are the equivalents of the Upper Greensand of the south of England. These rocks are found on the south and west coasts of Mull and on the west coast of Argyllshire. They are covered by white sandstones and these by white chalk and marly beds, which represent the Upper Chalk of England. Their existence under the basalt outlier of Ben Iadain in Morven, at a height of 1600 ft. above the sea, shows notably how extensively they have been denuded, but also over how large a portion of the Western Highland seaboard they may have spread. They are a prolongation of the Cretaceous deposits of Antrim (Ireland). Enormous numbers of flints and also less abundant fragments of chalk are found in glacial deposits bordering the Moray Firth. These transported relics show that the Chalk must once have been in place at no great distance, if indeed it did not actually occupy part of Aberdeenshire and the neighbouring counties.

Older Tertiary.—Above the highest Secondary rocks on the west coast come terraced plateaus of basalt, which spread out over wide areas in Skye, Eigg, Mull and Morven, and form most of the smaller islets of the chain of the Inner Hebrides. These plateaus are composed of nearly horizontal sheets of basalt—columnar, amorphous or amygdaloidal—which, in Ben More, in Mull, attain a thickness of more than 3000 ft. They are prolonged southwards into Antrim, where similar basalts overlying Secondary strata cover a large territory. Occasional beds of tuff are intercalated among these lavas, and likewise seams of fine clay or shale which have preserved the remains of numerous land-plants. The presence of these fossils indicates that the eruptions were subaërial, and a comparison of them with those elsewhere found among Older Tertiary strata shows that they probably belong to the Oligocene stage of the Tertiary series of formations, and therefore that the basalt eruptions took place in early Tertiary time. The volcanic episode to which these plateaus owe their origin was one of the most important in the geological history of Great Britain. It appears to have resembled in its main features those remarkable outpourings of basalt which have deluged so many thousand square miles of the western area of the United States. The eruptions were connected with innumerable fissures up which the basalt rose and from numerous points on which it flowed out at the surface. These fissures with the basalt that solidified in them now form the vast assemblage of dykes which cross Scotland, the north of England and the north of Ireland. That the volcanic period was a prolonged one is shown by the great denudation of the plateaus before the last eruptions took place. In the Isle of Eigg, for example, the basalts had already been deeply eroded by river-action and into the river-course a current of glassy lava (pitch-stone) flowed. Denudation has continued active ever since, and now, owing to greater hardness and consequent power of resistance, the glassy lava stands up as the prominent and picturesque ridge of the Scuir, while the basalts which formerly rose high above it have been worn down into terraced declivities that slope away from it to the sea. A remarkable feature in the volcanic phenomena was the disruption of the basaltic plateaus by large bosses of gabbro and of various granitoid rocks. These intrusive masses now tower into conspicuous groups of hills—the Cuillins in Skye, the mountains of Rum and Mull, and the rugged heights of Ardnamurchan.

Post-Tertiary.—Under the Post-Tertiary division come the records of the Ice Age, when Scotland was buried under sheets of ice which ground down, striated and polished the harder rocks over the whole country, and left behind them the widespread accumulation of clay, gravel and sand known as Glacial Deposits. The Till or Boulder Clay, the most universal kind of Drift —which covers much of the Lowlands to a depth sometimes of 100 ft., and along the flanks of hills reaches a height of 2000 ft. or more—was pushed along by ice radiating from different centres, evidence of which is to be seen in the direction of the striae on the rocky surface of the county as well as in the dispersion of boulders and stones from recognizable districts. Thus remains of Highland schists have been borne across the Central Plain and deposited on the northern margin of the Southern Uplands. Above the Boulder Clay are found sands and gravels, along with perched boulders which, by their source and position, indicate the direction and thickness of the ice that carried them. Moraines of the last of the glaciers are numerous throughout the Highlands.

Recent.—The youngest formations are the raised beaches—consisting sometimes of ledges cut in the rock, as on Lismore and other parts of Loch Linnhe, and sometimes of heaped up beds of sand and gravel—river terraces, lake deposits, peat-mosses, tracts of blown sand—notably seen in the dunes of Culbin, Rattray Head, Aberdeen, Montrose and Tents Muir on the east coast, and at Stevenston, Troon, Ayr, Glenluce and along North and South Uist on the west. These are related to the present configuration of the land and contain remains of plants and animals still living on its surface. (A. Ge.; J. A. M.)

Climate.

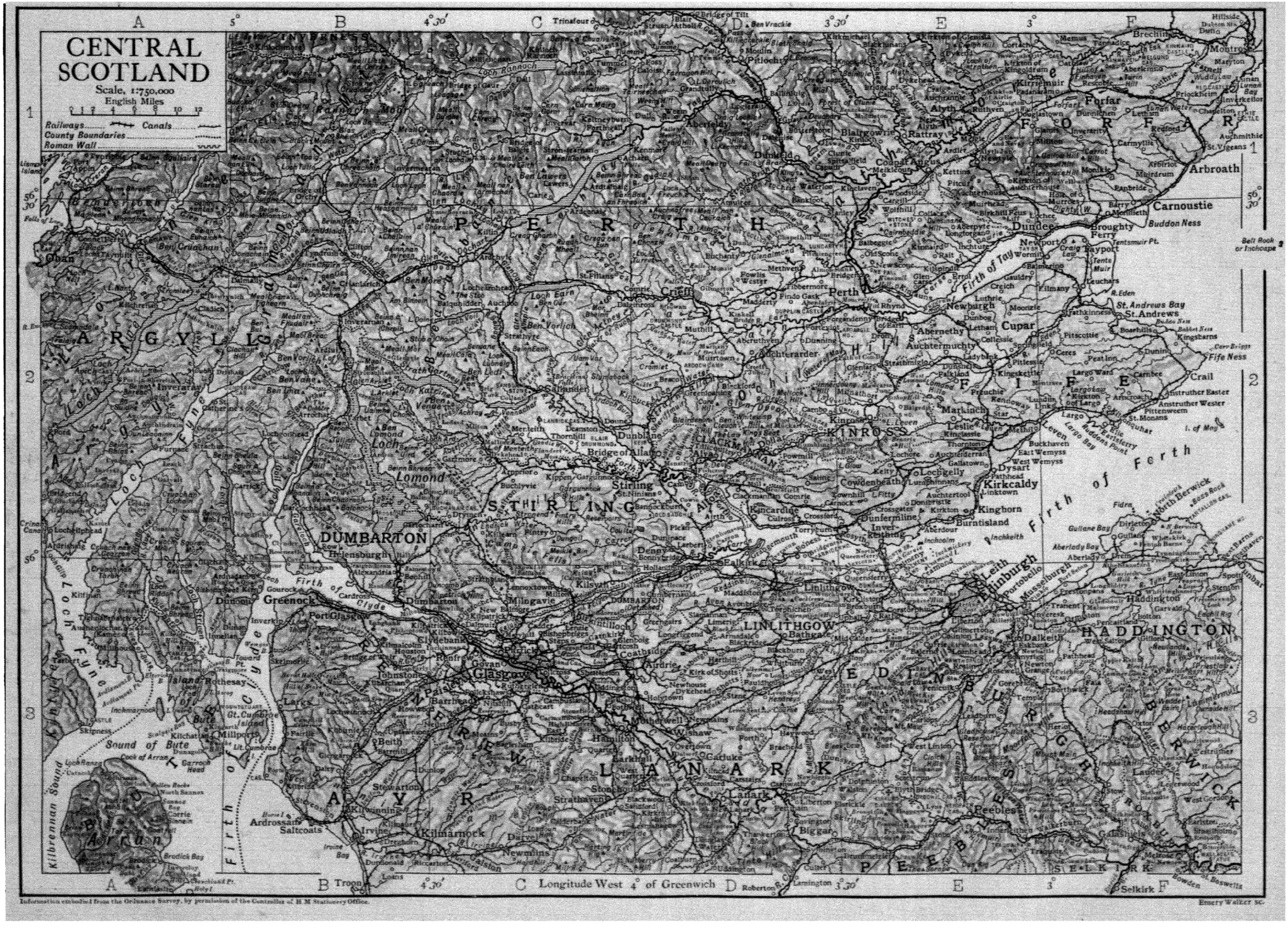
In considering the climate of Scotland the first place must be assigned to the temperature of various districts during the months of the year, since this, and not the mean temperature of the whole year, gives the chief characteristics of climate. Thus, while the annual temperatures of the west and east coasts are nearly equal, the summer and winter temperatures are very different. At Portree (on the east coast of Skye) the mean temperatures of January and July are 39° and 56·8° F., whereas at Perth they are 37·5° and 59·0°. The prominent feature of the isotherms of the winter months is their north and south direction, thus pointing not to the sun but to the warm waters of the Atlantic as the more powerful influence in determining the climate at this season through the agency of the prevailing westerly winds. In exceptionally cold seasons the ocean protects all places in its more immediate neighbourhood against the severe frosts which occur in inland situations. While this influence of the ocean is felt at all seasons, it is most strikingly seen in winter and is more decided in proportion as the locality is surrounded by the warm waters of the Atlantic. The influence of the North Sea is similarly apparent, but in a less degree. Along the whole of the eastern coast, from the Pentland Firth southwards, temperature is higher than what is found a little inland. In summer, everywhere, latitude for latitude, temperature is lower in the west than in the east and inland situations, but in winter the inland climates are the colder. The course of the isothermal lines in summer is very instructive. Thus the line of 59° passes from the Solway directly northwards to the north of Perthshire and thence curves round eastward to near Stonehaven. From Teviotdale to the Grampians temperature falls only one degree; but for the same distance farther northwards it falls three degrees. The isothermal of 56° marks off the districts where the finer cereals can be successfully raised. This distribution of the temperature shows that the influence of the Atlantic in moderating the heat of summer is very great and is felt a long way into the interior of the country. On the other hand, the high lands of western districts by robbing the westerly winds of their moisture, and thus clearing the skies of eastern districts, exercise an equally striking effect in the opposite direction—in raising the temperature.

There is nearly twice as much wind from the south-west as from the north-east, but the proportions vary greatly in different months. The south-west prevails from July to October, and again from December to February; accordingly in these months the rainfall is heaviest. These are the summer and winter portions of the year, and an important result of the prevalence of these winds, with their accompanying rains, which are coincident with the annual extremes of temperature, is to imprint a more strictly insular character on the climate, by moderating the heat of summer and the cold of winter. The north-east winds acquire their greatest frequency from March to June and in November, which are accordingly the driest portions of the year.

The mountainous regions are mostly massed in the west and lie generally north and south, or approximately facing the rain-bringing winds from the Atlantic. Thus the climates of the west are essentially wet. On the other hand, the climates of the east are dry, because the surface is lower and more level; and the breezes borne thither from the west, being robbed of most of their superabundant moisture in crossing the western hills, are drier and precipitate a greatly diminished rainfall. It thus happens that the driest climates in the east are those which have to south-westwards the broadest extent of mountainous ground, and that the wettest eastern climates are those which are least protected by high lands on the west. The breakdown of the watershed between the Firths of Clyde and Forth exposes southern Perthshire, the counties of Clackmannan and Kinross, and nearly the whole of Fife to the clouds and rains of the west, and their climates are consequently wetter than those of any others of the eastern slopes of the country. The driest climates of the east are in Tweeddale about Kelso and Jedburgh, the low grounds of East Lothian, and those on the Moray Firth from Elgin round to Dornoch. In these districts the annual rainfall averages 26 in., whereas over extensive breadths in the west it exceeds 100 in., in Glencroe being nearly 130 in., and on the top of Ben Nevis it may reach 150 in.

II. Economic Conditions, &c.

Population.—At the end of the 15th century it is conjectured that the population of Scotland did not exceed 500,000—Edinburgh having about 20,000 inhabitants, Perth about 9000, and Aberdeen, Dundee and St Andrews about 4000 each. By the Union with England (1707) the population is supposed to


CENTRAL SCOTLAND
Scale, 1:750,000
English Miles
0 1 2 4 6 8 10 12
Railways
Canals
County Boundaries
Roman Wall
PERTH
ARGYLL
STIRLING
DUMBARTON
KINROSS
CLACKMANNAN
FIFE
LINLITHGOW
EDINBURGH
HADDINGTON
BERWICK
PEEBLES
SELKIRK
LANARK
AYR
ROXBURGH
Loch Lomond
Firth of Clyde
Firth of Forth
Firth of Tay
Sound of Bute
Kilbrennan Sound
Loch Fyne
Loch Awe
Loch Tay
Loch Earn
Loch Katrine
Loch Lubnaig
Loch Rannoch
Loch Tummel
Loch Leven
Glen Coe
Glen Orchy
Glen Lyon
Glen Dochart
Glen Falloch
Glen Lochay
Glen Almond
Glen Artney
Glen Ogle
Glen Devon
Glen Farg
Glen Quaich
Glen Lednock
Glen Turret
Glen Shee
Glen Isla
Glen Clova
Glen Prosen
Glen Esk
Glen Doll
Glen Tilt
Glen Garry
Glen Tarken
Glen Fruin
Glen Douglas
Glen Croe
Glen Kinglas
Glen Shira
Glen Aray
Glen Fyne
Glen Kinglass
Glen Etive
Glen Lyon
Glen Quoich
Glen Shiel
Glen Affric
Glen Cannich
Glen Strathfarrar
Glen Urquhart
Glen Moriston
Glen Garry
Glen Tilt
Glen Feshie
Glen Tromie
Glen Truim
Glen Banchor
Glen Markie
Glen Nairn
Glen Livet
Glen Avon
Glen Rinnes
Glen Fiddich
Glen Grant
Glen Spey
Glen Tanar
Glen Muick
Glen Clunie
Glen Shee
Glen Isla
Glen Prosen
Glen Esk
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Glen Markie
Glen Nairn
Glen Livet
Glen Avon
Glen Rinnes
Glen Fiddich
Glen Grant
Glen Spey
Glen Tanar
Glen Muick
Glen Clunie
Perth
Crieff
Dunkeld
Blairgowrie
Pitlochry
Aberfeldy
Callander
Dunblane
Bridge of Allan
Stirling
Alloa
Falkirk
Kirkcaldy
Cupar
St. Andrews
Leven
Largo
Anstruther
Crail
Fife Ness
Dundee
Arbroath
Carnoustie
Montrose
Forfar
Brechin
Kirriemuir
Alyth
Coupar Angus
Newport
Wormit
Broughty Ferry
Buddon Ness
Bell Rock or Inchcape
Dysart
Leslie
Markinch
Glenrothes
Kinglassie
Auchtermuchty
Abernethy
Newburgh
Auchtertool
Kinghorn
Burntisland
Inverkeithing
Dunfermline
Rosyth
Inchcolm
Inchkeith
Aberlady Bay
Gullane Bay
Dirleton
North Berwick
Bass Rock
Fidra
Tantallon Cas.
Musselburgh
Portobello
Leith
Edinburgh
Haddington
Dunbar
Eyemouth
Berwick-upon-Tweed
Coldstream
Kelso
Jedburgh
Hawick
Selkirk
Galashiels
Melrose
Peebles
Biggar
Lanark
Hamilton
Motherwell
Wishaw
Coatbridge
Airdrie
Glasgow
Paisley
Renfrew
Greenock
Gourock
Dunoon
Port Glasgow
Helensburgh
Dumbarton
Milngavie
Kilsyth
Cumbernauld
Falkirk
Grangemouth
Bo'ness
Linlithgow
Bathgate
Livingston
Dalkeith
Penicuik
Lauder
Gifford
Haddington
Dunbar
Ayr
Kilmarnock
Irvine
Troon
Prestwick
Ardrossan
Saltcoats
Largs
Millport
Rothesay
Isle of Bute
Great Cumbrae Island
Arran
Brodick
Lochranza
Cock of Arran
Garrison Head
Skipness
Kilchattan
Inchmarnock
Island Davaar
Campbeltown Loch
Kintyre
Mull of Kintyre
Oban
Connel
Ballachulish
Fort William
Ben Nevis
Ben Cruachan
Ben Lawers
Ben More
Ben Vorlich
Ben Venue
Ben Lomond
Ben Ledi
Ben Vane
Ben Chonzie
Schiehallion
Ben Alder
Ben Macdui
Cairngorm
Lochnagar
Mount Keen
Clachnaben
Mount Battock
Cheviot
Hart Fell
Broad Law
Dollar Law
Cross Fell
Tinto
Culter Fell
Lowther Hill
Queensberry
Wanlockhead
Leadhills
Sanquhar
Thornhill
Dumfries
Annan
Lockerbie
Moffat
Gretna
Carlisle
Longitude West 4° of Greenwich
Information embodied from the Ordnance Survey, by permission of the Controller of H.M. Stationery Office.
Emery Walker sc.

have grown to 1,000,000. In 1755, according to the returns furnished by the clergy to the Rev. Dr Alexander Webster (1707–1784), minister of the Tron Kirk, Edinburgh—who had been commissioned by Lord President Dundas to prepare a census for government,—it was 1,265,380. At the first government census (1801) it had reached 1,608,420. The increase at succeeding decades has been continuous though fluctuating in amount, and in 1901 the population amounted to 4,472,103 (females, 2,298,348). In 1902 the Registrar-General for Scotland calculated that if the rate of increase (11·09 %) manifest during 1891–1901 were uniformly maintained, the population would double itself in the course of about 66 years.

TABLE I.—*Area and Population of Civil Counties in 1891 and 1901.*

Civil Counties.	Area in Acres.	Population. 1891.	Population. 1901.	Pop. per sq. m. 1901.
I. *Northern.*				
1. Shetland	352,889	28,711	28,166	51
2. Orkney	240,476	30,453	28,699	76
3. Caithness	438,878	37,177	33,870	49
4. Sutherland	1,297,849	21,896	21,440	11
	2,330,092	118,237	112,175	31
II. *North-Western.*				
5. Ross and Cromarty	1,976,707	78,727	76,450	25
6. Inverness	2,695,037	90,121	90,104	21
	4,671,744	168,848	166,554	23
III. *North-Eastern.*				
7. Nairn	103,429	9,155	9,291	57
8. Elgin (or Moray)	305,119	43,471	44,800	94
9. Banff	403,364	61,684	61,488	98
10. Aberdeen	,261,887	284,036	304,439	154
11. Kincardine	243,974	35,492	40,923	107
	2,317,773	433,838	460,941	127
IV. *East Midland.*				
12. Forfar	559,171	277,735	284,082	325
13. Perth	1,595,774	122,185	123,283	49
14. Fife	322,844	190,365	218,840	434
15. Kinross	52,410	6,673	6,981	85
16. Clackmannan	34,927	33,140	32,029	587
	2,565,126	630,098	665,215	166
V. *West Midland.*				
17. Stirling	288,842	118,021	142,291	315
18. Dumbarton	157,433	98,014	113,865	463
19. Argyll	1,990,471	74,085	73,642	24
20. Bute	139,658	18,404	18,787	86
	2,576,404	308,524	348,585	87
VI. *South-Western.*				
21. Renfrew	153,332	230,812	268,980	1123
22. Ayr	724,523	226,386	254,468	225
23. Lanark	562,821	1,105,899	1,339,327	1523
	1,440,676	1,563,097	1,862,775	827
VII. *South-Eastern.*				
24. Linlithgow	76,861	52,808	65,708	547
25. Edinburgh	234,339	434,276	488,796	1335
26. Haddington	171,011	37,377	38,665	145
27. Berwick	292,577	32,290	30,824	67
28. Peebles	222,599	14,750	15,066	43
29. Selkirk	170,762	27,712	23,356	88
	1,168,149	599,213	662,415	363
VIII. *Southern.*				
30. Roxburgh	426,060	53,500	48,804	73
31. Dumfries	686,302	74,245	72,571	68
32. Kirkcudbright	575,565	39,985	39,383	44
33. Wigtown	311,609	36,062	32,685	67
Grand Total	1,999,536	203,792	193,443	62
SCOTLAND	19,069,500	4,025,647	4,472,103	150

In 1901 there were 150 persons to each square mile, and 4·3 acres (excluding inland waters, tidal rivers and foreshore) to each person. The distribution of population is illustrated in the preceding table, which gives the names and areas of the counties and other particulars.

In the northern, north-western and southern divisions the population declined during the decade, the fifteen counties thus affected being, in the order of decrease, beginning with the shire in which it was smallest, Inverness, Banff, Argyll, Kirkcudbright, Shetland, Sutherland, Dumfries, Ross and Cromarty, Clackmannan, Berwick, Orkney, Roxburgh, Caithness, Wigtown and Selkirk. It will thus be seen that the far north and far south alike decreased in population, the decline being largely due to physical conditions, though it need not be supposed that the limit of population was reached in either area. The most sparsely inhabited county was Sutherland, the most densely Lanark. The counties in which there was the largest increase in the decennial period—with Linlithgow first, followed by Lanark, Stirling, Renfrew, Dumbarton and thirteen others—principally belonged to the Central Plain, or Lowlands, in which, broadly stated, industries and manufactures, trade, commerce and agriculture and educational facilities have attained their highest development. In every county the population increased between 1801 and 1841, the increase being more than 10 % in each county with the exception of Argyll, Perth and Sutherland. After 1841, however, the population in several Highland shires—in which the clearance of crofters to make way for deer was one of the most strongly-felt grievances among the Celtic part of the people—in the islands, and in some of the southern counties, diminished. The next table affords a comparison of the numbers of the population as grouped in towns, villages and rural districts, and in the mainland and islands.

TABLE II. – *Population in Towns, Villages and Rural Districts, Mainland and Islands, 1891 and 1901.*

Groups.	Population. 1891.	Population. 1901.	Percentage of Pop. in each to total Pop. 1891.	Percentage of Pop. in each to total Pop. 1901.
Towns[1]	2,631,298	3,120,241	65·37	69·77
Villages[1]	465,836	466,053	11·57	10·42
Rural districts	928,513	885,809	23·06	19·81
Total	4,025,647	4,472,103	100·00	100·00
Mainland	3,865,748	4,316,551	96·03	96·52
Islands	159,899	155,552	3·97	3·48
Total	4,025,647	4,472,103	100·00	100·00

[1] Villages have populations of from 300 to 2000; towns from 2000 upwards.

Table III. gives the population of towns with more than 30,000 inhabitants.

TABLE III.—*Population in chief Towns in 1881, 1891 and 1901.*

Town.	1881.	1891.	1901.
Glasgow	551,415	565,839 (of enlarged area, 658,198)	760,408
Edinburgh	228,357	261,225 (of enlarged area)	316,523
Dundee	140,239	153,330	160,878
Aberdeen	105,189	121,623	153,503
Paisley	55,638	166,425	79,354
Leith	59,485	67,700	76,668
Govan	50,492	63,625	76,350
Greenock	66,704	63,423	67,672
Partick	27,410	36,538	54,281
Coatbridge	24,812	30,034	36,991
Kilmarnock	23,901	28,447	34,165
Kirkcaldy	23,632	27,151	34,063
Perth	28,980	29,899	32,886
Hamilton	18,517	24,859	32,775
Motherwell	12,904	18,726	30,418

The burghs in which the largest proportion of Scottish-born persons lived in 1901 were Kirkcaldy (with 95·997 in every 100 of its inhabitants), Aberdeen (with 94·997), Perth (with 94·442) and Kilmarnock (with 94·046). The largest proportion of English-born were found in Edinburgh (with 5·438 %) and Leith (with 4·481). Irish-born were most in evidence in Coatbridge (with 15·158 in every 100), Partick (with 12·05) and Govan (with 11·51). Welsh nationality was most marked in Motherwell (with 0·250 %). Those of British-Colonial birth were most numerous in Edinburgh (with 0·933 %), and foreigners in Glasgow (with 0·890), Leith (with 0·741) and Hamilton (with 0·720). In addition to the 17,654 resident foreigners there were 4973 foreigners casually in Scotland at the taking of the census in 1901 (1839 men and women on board foreign and British vessels), raising the total of foreigners actually enumerated

to 22,627 (males 14,448), of whom 10,373 were of Russian nationality, 4051 of Italian, and 3232 of German.

Table IV. shows the nationalities of the people in 1891 and 1901.

TABLE IV.—*Illustrating Nationalities in 1891 and 1901.*

Where Born.	Scotland, 1891.		Scotland, 1901.	
	Number.	Percentage of Pop.	Number.	Percentage of Pop.
Scotland	3,098,700	91·63	4,085,755	91·361
Ireland	184,807	4·84	205,064	4·585
England	108,736	2·70	131,350	2·937
Wales	2,309	0·06	2,673	0·060
Isle of Man and the Channel Islands	927	0·02	1,058	0·024
British Colonies	13,607	0·39	15,907	0·355
British born abroad, by naturalization and at sea	8,051	0·20	12,642	0·283
Foreigners	8,510	0·21	17,654	0·395
Total	4,025,647	100	4,472,103	100

Table V. gives the number of persons, exclusive of children under three years of age, who spoke Gaelic only, and Gaelic and English, with their percentages to the population in 1901. The counties in which the highest percentages obtained of persons speaking Gaelic only were Ross and Cromarty with 15·92 % (12,171 persons) and Inverness with 13·01 % (11,722 persons). But in no fewer than eighteen counties the proportion of Gaelic-speaking persons was under 1 %.

TABLE V.—*Showing Number of Persons aged three years and upwards speaking Gaelic only and Gaelic and English in 1901.*

Area.	Population.	Gaelic only.	Percentage.	Gaelic and English.	Percentage.
Scotland	4,472,103	28,106	0·63	202·700	4·53
Northern portion	1,753,470	27,854	1·59	160,915	9·18
Southern portion	2,718,633	252	0·01	41,785	1·54
Northern division	112,175	489	0·43	17,084	15·23
North-western ,,	166,554	23,893	14·34	82,573	49·58
North-eastern ,,	460,941	20	0·01	5,125	1·11
East-midland ,,	665,215	95	0·01	13,818	2·06
West-midland ,,	348,585	3,357	0·96	42,315	12·14
South-western ,,	1,862,775	162	0·01	34,289	1·84
South-eastern ,,	662,415	89	0·01	7,002	1·06
Southern ,,	193,443	1	0·00	494	0·26

Vital Statistics.—In Table VI. is shown the number of births, deaths, marriages and illegitimate births for the decades ending 1870, 1880, 1890 and 1900.

Table VII. gives the percentages to the population of the births, deaths and marriages in the four decades specified, along with the ratio of illegitimacy to the total number of births in the same periods.

TABLE VI.—*Births, Deaths, Marriages and Illegitimate Births, 1861–1900.*

	1861–1870 (inclusive).	1871–1880 (inclusive).	1881–1890 (inclusive).	1891–1900 (inclusive).
Births	1,120,791	1,232,311	1,251,930	1,280,044
Deaths	706,195	763,948	743,582	781,860
Marriages	224,222	253,550	259,388	298,064
Illegitimate births	110,061	108,260	102,128	90,981

The counties in which the highest percentages of illegitimate births were found were Wigtown, Dumfries, Kirkcudbright and Peebles in the south; Elgin, Banff and Aberdeen in the north-east, and Caithness in the north; the shires showing the lowest percentages were Clackmannan, Dumbarton and Shetland.

TABLE VII.—*Birth, Death and Marriage Ratio, 1861–1900, and Percentages of Illegitimacy to total Births.*

Rate.	1861–1870 (inclusive).	1871–1880 (inclusive).	1881–1890 (inclusive).	1891–1900 (inclusive).
Birth	3·48	3·47	3·22	3·01
Death	0·19	2·15	1·91	1·84
Marriage	0·09	0·71	0·66	0·70
Percentages of illegitimate births to total births	9·81	8·79	8·15	7·11

Occupations of the People.—Table VIII. divides the people according to occupations. The most noteworthy feature in this connexion is the great diminution that took place within the intercensal period (1891–1901) in the unproductive class, which to some extent accounts for the increase in the number of the industrial and commercial classes.

Poor Relief.—Before the Reformation, relief of the poor had been the duty of the Church, for early legislation aimed at suppressing rather than aiding poverty. Those, indeed, who were absolutely dependent on alms might receive a licence to beg within the bounds of their own parish, but the able-bodied poor were severely dealt with. The act of 1579 directed the magistrates in towns and the justices in rural parishes to propose a register of the aged and impotent poor and to levy a tax on the inhabitants of every parish for their support. One consequence of the denial of relief to the able-bodied was that the workhouse, so familiar in the English poor-law system, was not established in Scotland, though almshouses are found in many

TABLE VIII.—*Occupation of the People in 1891 and 1901.*

Occupations.	Number engaged in each Class of Occupation.						Percentage engaged in each Class of Occupation.			
	1891.			1901.			1891.		1901.	
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Males.	Females.
Total occupied and unoccupied (aged 10 years and upwards)	1,446,209	1,599,453	3,045,662	1,656,081	1,790,242	3,446,323	100·00	100·00	100·00	100·00
Engaged in occupations	1,203,909	543,828	1,747,737	1,391,188	591,624	1,982,812	83·25	34·00	84·00	33·05
Retired or unoccupied	242,300	1,055,625	1,297,925	264,893	1,198,618	1,463,511	16·75	66·00	16·00	66·95
Classes.										
1. Professional	59,053	23,051	82,104	67,827	33,234	101,061	4·08	1·44	4·10	1·86
2. Domestic	29,163	190,057	219,220	26,755	174,475	201,230	2·02	11·88	1·61	9·75
3. Commercial	174,558	10,276	184,834	221,579	24,136	245,715	12·07	0·64	13·38	1·35
4. Agriculture and Fishing	205,827	30,018	235,845	196,581	40,730	237,311	14·23	1·88	11·87	2·27
5. Industrial	735,308	290,426	1,025,734	878,446	319,049	1,197,495	50·85	18·16	53·04	17·82
6. Unoccupied and non-productive	242,300	1,055,625	1,297,925	264,893	1,198,618	1,463,511	16·75	66·00	16·00	66·95

towns, and poorhouses, where those indigent who are alone in the world without any one to care for them find food and shelter, began to be general in the 19th century. Hence arises the prevalence of out-relief, one of the distinctive features of the Scottish poor law. The act of 1579, however, proved largely inoperative. The provision of relief passed from the justices to the ministers and kirk-sessions, who by an edict of the Privy Council, in 1692, were required to draw up a list of the poor twice a year, and rates were levied only when collections in the church "plates" were insufficient. For 150 years nothing was done to systematize poor relief, and even in 1842 about half of the parishes were yet unassessed to the poor. The total inadequacy of the voluntary system to cope with genuine distress, in respect both of contributions and the dispensing of alms, led in 1845 to the passing of an act which made the parish the poor-relief area, substituted the parochial board for the kirk-session where recourse was had to a rate, made the appointment of inspectors of the poor and medical officers compulsory, and set up a system of central administrative control known as the Board of Supervision for the Relief of the Poor, with headquarters in Edinburgh. The act did not provide for compulsory assessment, but this was virtually accomplished by the vigilance of the Board, which demanded of local authorities increased care and more liberal relief, with the result that in 1894 only 46 out of 848 parishes remained unassessed. In this year a change in the governing body was affected, the Local Government Board for Scotland being constituted and replacing the Board of Supervision, while the parochial boards made way for parish councils. As the authorities cannot give relief to those able to work, there are no casual wards in Scotland, vagrants having to pay for their night's lodging, or find it in the police station or elsewhere. Every parish has to support its own poor, that is, natives or those who have acquired a settlement by living in it for five years, but relief is given in the parish in which it is applied for, the cost being recovered from the parish of birth or settlement afterwards. For the sick poor the larger towns provide hospitals and dispensaries, besides medical attendance at the homes of the poor, while in rural districts there are cottage hospitals, village sick-rooms, and sick wards in the poorhouses. The mentally afflicted are sent to the asylum if they are dangerous, or kept in the licensed wards of poorhouses, or, if they are harmless or imbecile, boarded out. The expense of pauper lunacy is only partially borne by the parish. The district lunacy board (practically a joint-committee of the county and burgh councils), aided by a parliamentary grant, is charged with the provision and upkeep of the asylums, the poor-law authorities only defraying the maintenance of their own patients. Orphan or deserted children, or the children of paupers, are boarded out and reared like ordinary children, attending the public schools and growing up without the "pauper taint."

Police.—It was not till the middle of the 19th century that a regular police force was established in Scotland. Till then dwellers in rural districts had practically to provide for their own safety as best they could, while some towns maintained a paid watch and others enrolled volunteer constables, every citizen being expected to take his turn in patrolling the streets to protect person and property. At first an adoptive act was introduced, under which the Commissioners of Supply, who then managed county business—resident landowners in possession of landed estate to the annual value of £100—were empowered to raise a police force in the counties; but the want of common policy and initiative led in 1857 to the compulsory institution of a police force throughout the country. Burghs having a population of more than 7000 might furnish their own police, and smaller burghs were policed as part of the county to which they belonged by the standing joint-committee (composed equally of Commissioners of Supply and members of the county council), but no new police burgh the population of which was under 20,000 was to be free to police itself. All the constabulary forces, excepting the Orkney and Shetland police, are annually inspected as to efficiency and reported on to the Secretary of State for Scotland.

Education. (*a*) *Elementary Schools.*—The system of schools which prevailed till the Education Act of 1872 dated from 1696, when the Act for Settling of Schools was passed—one of the last but not the least of the achievements of the Scots Parliament—providing for the maintenance of a school in every parish by the kirk-session and heritors, with power to the Commissioners of Supply to appoint a schoolmaster in case the primary authorities made default. The schoolmaster held his office for life, co-education was the rule from the first, and the school was undenominational. The various religious secessions in Scotland led to the founding of a large number of sectarian and subscription schools, and at the Disruption in 1843 the Free Church made provision for the secular as well as the religious instruction of the children of its members. The Education Act of 1872 abolished the old management of the parish schools and provided for the creation of districts (burgh, parish or group of parishes) under the control of school boards, of which there are 972 in Scotland, elected every three years by the ratepayers, male and female. Since that date the most important changes effected in the elementary education system were the abolition, in 1886, of individual inspection of the lower standards—afterwards extended to the whole of the standards, the inspectors applying a collective test, the "block-grant" system, to the efficiency of a school—and the abolition of school fees (1889) for the compulsory standards, the loss being made up principally by a parliamentary grant, and partly by a proportion, earmarked for the purpose, of the proceeds of the Local Taxation (Customs and Excise) Act 1890, and the Education and Local Taxation Account (Scotland) Act 1892. The capitation grant in relief of fees is at the rate of 12s., of which 10s is furnished by the parliamentary grant and 2s. by the other sources. King's Scholars, trained at one of the training colleges, and King's Students who attend one of the universities, form the chief source of supply of certificated teachers.

(*b*) *Secondary Schools.*—Records of the existence of schools in the chief towns occur as early as the 13th century. They were under the supervision of the chancellor of each diocese, and were mainly devoted to studies preparatory for the Church. Before the Reformation schools for general education were attached to many religious houses, and in 1496 the first Scottish act was passed requiring substantial householders to send their eldest sons to school from the time they were eight or nine years old until they were "competentlie founded and have perfite Latin." In 1560 John Knox propounded in his *First Book of Discipline* a comprehensive scheme of education from elementary to university, but neither this proposal nor an act passed by the privy council in 1616 for the establishment of a school in every parish was carried into effect. In several burghs grammar schools have existed from a very early date, and some of them, such as the Royal High School of Edinburgh and the High School of Glasgow, reached a high standard of proficiency. They were largely supported by the town councils, who erected the buildings, kept them in repair, and usually paid the rector's salary. By the act of 1872 their management was transferred to the school boards, and they may be conveniently classified into higher-class public schools, such as the old grammar schools and the liberally endowed schools of the Merchant Company in Edinburgh, and higher grade schools, with a few years' preparatory course for the universities, while some of the ordinary schools have earned the grant for higher education. In 1885 the Scottish Education Department, of which the secretary for Scotland is the virtual head, was reorganized. It was separated from the English Department, and undertook the inspection of higher class schools (public, endowed and voluntary), and two years later instituted a leaving certificate examination, the pass of which is accepted for most of the university and professional authorities in lieu of their preliminary examinations. In 1898 the functions of the Science and Art Department, as far as Scotland is concerned, were transferred to the Department, which makes substantial grants for instruction in those subjects for which science and art grants were formerly paid. A Technical Schools Act, passed in 1887, was applied by a few local authorities; but in 1890 funds

were by chance made available from an unexpected source, and devoted to the purposes of technical and secondary education. Parliament had introduced a measure of public-house reform along with a scheme for compensating such houses as lost their licence. This feature was so stoutly opposed that the bill did not pass, although the chancellor of the exchequer had provided the necessary funds. Government proposed to distribute this money among local authorities and expend the balance in relief rates, but a clause was inserted in this bill giving burgh and county councils the option of spending the balance on technical education as well as in relief of rates. Advantage was largely taken of this power, and the grant came to be succinctly described as the "Residue" grant (£97,000 a year). The Department established in each county a body known as the secondary education committee, chosen by the county council and the chairmen of the school boards, which is charged with the expenditure of its share of the grant. The committee exists also in a few of the largest burghs, the members being in this case appointed by the town council, school board, and sometimes the trustees of educational endowments. In virtue of a Continuation Class code, technical and specialized education is given in day and, chiefly, evening classes in various centres, the principal being the Heriot-Watt College, Edinburgh; the Edinburgh and East of Scotland College of Agriculture; the Glasgow and West of Scotland Technical College; the Glasgow School of Art; the Glasgow Athenaeum Commercial College; the West of Scotland Agricultural College; the Dundee Technical Institute; Gray's School of Art, Aberdeen; the Edinburgh Royal Institution School of Art, and the Edinburgh School of Applied Art; but well-equipped classes are held in most of the large towns, and several county councils maintain organizers of technical instruction. As regards agricultural education, the county is found to be in most cases too small an area for efficient organization, and consequently several counties combine to support, for instance, the East of Scotland Agricultural College—a corporation consisting of the agricultural department in the University, the Heriot-Watt College and the Veterinary College in Edinburgh, —the West of Scotland Agricultural College, Glasgow, and the agricultural department in Aberdeen University. The leading public schools on the English model are Trinity College, Glenalmond, Perthshire; Loretto School, Musselburgh, and Fettes College, Merchiston Castle and the Academy in Edinburgh.

(*c*) *Universities and Colleges.*—There are four universities in Scotland, namely (in the order of foundation), St Andrews (1411), Glasgow (1450), Aberdeen (1494) and Edinburgh (1582), in which are the customary faculties of arts, divinity, law, medicine and science. In 1901 Mr Andrew Carnegie gave £2,000,000 to the universities. The administration of the fund was handed over to a body of trustees, who devote the annual income (£100,000) partly to the payment of students' fees and partly to buildings, apparatus, professorships and research. The court of each university is the supreme authority in regard to finance, discipline, and the regulation of the duties of professors and lecturers. The universities are empowered to affiliate other academical institutions, and women students are admitted on an equal footing with men. Under the act of 1899 the University College of Dundee was incorporated with St Andrews University, and Queen Margaret College became a part of the university of Glasgow, the buildings and endowments, used for women students exclusively, being handed over to the University Court. St Mungo's College, Glasgow, incorporated in 1889 under a Board of Trade licence, has medicinal and law faculties, and Anderson's College Medical School, Glasgow, was instituted in 1887. These are on the same basis as the extra-mural medical schools in Edinburgh, their medical curricula qualifying for licence only and not for Scottish university degrees. The United Free Church maintains colleges at Aberdeen, Edinburgh and Glasgow, and there is a Roman Catholic college at Blairs near Aberdeen, besides a monastery and college at Fort Augustus. The Church of Scotland and the United Free Church each possess their training colleges for teachers, the Episcopal Church supports one and the Roman Catholic Church one. The Edinburgh Museum of Science and Art has been transferred to the Scottish Education Department.

Agriculture.—Though Scotland is a country of great estates, this circumstance possesses less significance from the agricultural than from the historical standpoint. The excessive size of the properties may to some extent be accounted for by the fact that most of the surface is so mountainous and unproductive as to be unsuitable for division into smaller estates, but two other causes have also co-operated, namely, first, the wide territorial authority of such Lowland families as the Scotts and Douglases, and such Highland clans as the Campbells of Argyll and Breadalbane, and the Murrays of Athol and the duke of Sutherland; and secondly, the stricter law of entail introduced in 1685. Thus the largest estates remain in the hands of the old hereditary families. The almost absolute power formerly wielded by the landlords, who within their own territories were lords of regality, hindered independent agricultural enterprise, and it was not till after the abolition of hereditable jurisdictions in 1748 that agriculture made real progress. The Society of Improvers in the Knowledge of Agriculture, founded in 1723, ceased to exist after the rebellion of 1745, and the introduction of new and improved methods, where not the result of private energy and sagacity, was chiefly due to the Highland and Agricultural Society, established in 1784. Further stimulus was also supplied by the high prices that obtained during the Napoleonic wars, and, in spite of periods of severe depression since then, the science of agriculture has continued to advance. The system of nineteen years' leases had proved distinctly superior to the system of yearly tenancy so general in England, although prejudicially affected by customs and conditions which, for a considerable time, seriously strained the relations between landlord and tenant. But the abolition of the law of hypothec in 1879—under which the landlord had a lien for rent upon the produce of the land, the cattle and sheep fed on it, and the live stock and implements used in husbandry—the Ground Game Act of 1880, the several Agricultural Holdings Acts, and the construction of light railways improved matters and established a better understanding. The period of general depression which set in before 1885 was surmounted in Scotland with comparatively little trouble. A large amount of capital was lost by tenants, and a few farms were thrown here and there upon the landlords' hands, but in no district was rent extinguished or were holdings abandoned. The sub-commissioners who reported to the Royal Commission on Agriculture in 1895 found nearly everywhere a demand, sometimes competition for farms, persisting throughout the crisis. In Banff, Nairn, Elgin and several southern counties rent reductions varied from 25 to 30 %. In Perth, Fife, Forfar and Aberdeen the average was 30 %; but in nearly all the counties, towards the end at least of the period of depression, the coexistent demand and competition for farms were observable. In some districts in the west rents fell very little; in others, especially sheep-farming districts, the fall was very severe. In Ayrshire the figure varied from 5 to 20 %; for Dumfriesshire 16 % was given as a fair average, but here too the distressed farmer was compelled to admit that if he gave up his holding there were others ready to take it. Afterwards, owing to the increased attention given to stock-fattening and dairying, and to a rise in prices, farming reached a condition of equilibrium, and the most noticeable residuum of the period of depression was the large intrusion of the butcher and grazier class into the farmer class proper. Caithness-shire was declared to be the greatest sufferer by the period of depression; rents fell in that county by 30 to 50 % on large farms, 20 to 30 % on medium, and 10 to 60 % on small farms. Nevertheless, the decline in the value of land was serious. According to the reports of the Inland Revenue Commissioners, the gross income derived from the ownership of lands in Scotland was returned in 1879–1880 at £7,769,303. After that year a continuous fall set in, and in 1901–1902 the amount returned was only £5,911,836, a drop in twenty-five years of £1,857,467. These figures refer to land, whether cultivated or not, including ornamental grounds, gardens attached to houses when exceeding one acre in extent,

teinds or tithe-rent charge commuted under the Lands Commutation Acts, farm-houses and farm-buildings.

The crofters of the Highlands and islands had their grievances also. During the first half of the 19th century wholesale clearances had been effected in many districts, and the crofters were compelled either to emigrate or to crowd into areas already congested, where, eking out a precarious living by following the fisheries, they led a hard and miserable existence. At last after agitation and discontent had become rife, government appointed a royal commission to inquire into the whole question in 1883. It reported next year, and in 1886 the Crofters' Holdings Act was passed. Amending statutes of succeeding years added to the commissioners' powers of fixing fair rents and cancelling arrears, the power of enlarging crofts and common grazings. Since then political agitation has practically died out, though the material condition of the class has not markedly improved, except where, with government aid, crofter fishermen have been enabled to buy better boats; but in some districts, even in the island of Lewis, substantial houses have been built. After the passing of the act (1886) the Crofters' Commission in 15 years considered applications for rent and revaluation of holdings which amounted to £82,790, and fixed the fair rent at £61,233, or an annual reduction of £21,557; of arrears of rent amounting to £184,962 they cancelled £124,180, and also assigned 48,949 acres in enlargement of holdings. Under the Congested Districts (Scotland) Act of 1897, £35,000 a year was devoted within certain districts of Argyll, Inverness, Ross and Cromarty, Sutherland, Caithness, Orkney and Shetland, to assisting migration, improving the breeds of live stock, building piers and boat-slips, making roads and bridges, developing home industries, &c.

TABLE IX.—*Classification of Holdings above 1 Acre.*

Years.	1 to 5 Acres.		5 to 50 Acres.		50 to 300 Acres.		Above 300 Acres.	
	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
1895	20,150	65,891	33,921	608,390	22,802	2,935,184	2766	1,284,461
1903	19,560	63,961	34,018	610,669	23,075	2,970,325	2730	1,268,843
1905	18,685	...	34,673	...	23,055	..	2718	..

In Table IX. will be found a classification of the holdings in 1895, 1903 and 1905. The figures show that the holdings under 50 acres constituted fully two-thirds of the total holdings and that, though no very decided alteration in the size of farms was in progress, the larger portion of the cultivated land was held in farms of between 50 and 300 acres. The average holding in 1905 was 61·7 acres.

Table X. shows the total area, the cultivated area and the area under grain crops, green crops, grasses and miscellaneous crops Comparison between 1905 and the average for 1871–1875 clearly demonstrates the change which Scottish agriculture had undergone. Though practically the same amount of land was brought under the

TABLE X.- *Acreage under Cultivation.*

Total Area, including Inland Water, but excluding Foreshore and Tidal Water, 19,458,728 Acres.

Crops.	Average 1871–1875.	1905.
	Acres.	Acres.
Total area under Crops and Grasses.*	4,560,825	4,880,985
Permanent Pasture—		
For Hay	..	148,342
Not for Hay	..	1,302,384
Total	1,084,983	1,450,726
Arable Land	3,475,842	3,430,259
Grain Crops—		
Wheat	122,513	48,641
Barley or Bere	252,105	212,134
Oats	1,007,339	962,972
Rye	10,480	5,598
Beans	26,746	10,346
Peas	2,332	910
Total	1,421,515	1,240,601

* Not including mountain and heath land.

TABLE X.—*Acreage under Cultivation—continued.*

Total Area, including Inland Water, but excluding Foreshore and Tidal Water, 19,458,728 Acres.

Crops.	Average 1871–1875	1905.
	Acres	Acres
Potatoes	167,880	144,265
Turnips and Swedes	503,709	445,306
Mangold	1,748	2,389
Cabbage, Kohl-Rabi and Rape	4,656	14,725
Vetches or Tares	15,828	8,557
Other Crops		2,699
Total	693,821	617,941
Clover, Sainfoin and Grasses under Rotation—		
For Hay	.	427,686
Not for Hay	..	1,130,591
Total	1,338,106	1,558,277
Flax	731	4
Small Fruit	†	6,493
Bare Fallow	21,669	6,943

† Not separately distinguished.

plough, there was a considerable fall in the acreage under grain and green crops, but this was rather more than balanced by the increased area under grass, showing that the tendency towards the raising of live stock has become more widespread and more pronounced. Only a little more than one-fourth of the area of Scotland is cultivated, while in England only one-fourth is left uncultivated; but it should be borne in mind that "permanent pasture" does not include the mountainous districts, which not only form so large a proportion of the surface but also, in their heaths and natural grasses, supply a scanty herbage for sheep and cattle, 9,104,388 acres being used for grazing in 1905. Oats remain the staple grain crop, and barley, though fluctuating from year to year, is steadied by the demands of the distillers. Wheat showed a marked decline in most years from 1893 to 1904. Table XI., however, shows that in most cases, even when the acreage occupied by crops is smaller, the estimated yield to the acre shows a distinct improvement, the result of enhanced skill and industry, and the

TABLE XI.—*Showing Yield of Chief Crops to the Acre.*

Crops.	Estimate Total Produce.		Average Yield to the Acre.	Average Yield to the Acre.
	1885.	1905.	1885.	1905.
Wheat—Bushels	1,893,501	2,065,381	34·33	42·46
Barley ,,	8,245,820	8,004,446	34·72	37·73
Oats ,,	33,407,127	35,277,807	31·93	36·63
Beans ,,	709,577	364,818	30·67	36·76
Peas ,,	37,464	17,108	21·41	27·16
Potatoes—Tons	803,523	979,541	5·39	6·97
Turnips and Swedes—Tons	6,496,189	7,162,794	15·39	16·08

adoption of more scientific methods. In 1905 the yield of hay from clover, sainfoin and rotation grasses amounted to 666,985 tons, or 31·19 cwts. to the acre, and from permanent pasture 209,908 tons, or 28·46 cwts. to the acre, or 876,893 tons of all kinds of hay from 575,220 acres.

Table XII. shows the number of live stock in 1905, with the average for the period 1871–1875, and illustrates the extent to which farmers have turned their attention to stock in preference to crops. The cattle stock has risen steadily, and a regular increase in the number under 2 years points to the healthy state of the breeding industry. The breeds include the Ayrshire, noted milkers and specially adapted for dairy farms (which prevail in the south-west), which in this respect have largely supplanted the Galloway in their native district; the polled Angus or Aberdeen, fair milkers, but valuable for their beef-making qualities, and on this account, as well as their hardihood, in great favour in the north-east, where cattle-feeding has been carried to perfection; and the West Highland or Kyloe breed, a picturesque breed with long horns, shaggy coats and decided colours—black, red, dun, cream and brindle—that thrives well on wild and healthy pasture. The special breeds of sheep are

the fine-woolled of Shetland, the blackfaced of the Highlands, the Cheviots, natives of the hills from which they are named, a favourite breed in the south, though Border Leicesters and other English

TABLE XII.—*Illustrating Increase of Live Stock.*

Stock.	Average 1871-1875.	1905.
Horses—		
Used for agricultural purposes, including mares kept for breeding	..	156,520
Unbroken	..	49,668
Total	178,652	206,188
Cattle—		
Cows and heifers in milk or in calf	392,252	437,138
Other cattle, 2 years and above	267,920	276,330
Other cattle, under 2 years	467,165	513,827
Total	1,127,337	1,227,295
Sheep—		
Ewes kept for breeding	..	2,918,544
Other sheep, 1 year and above	4,735,008	1,383,200
Other sheep, under 1 year	2,426,114	2,722,467
Total	7,161,122	7,024,211
Pigs	166,148	130,214

breeds, as well as a variety of crosses, are kept for winter feeding on lowland farms. The principal breeds of horses are the Shetland and Highland ponies, and the Clydesdale draught.

Orchards and Forests.—The acreage devoted to orchards rose from 1562 in 1880 to 2482 in 1905. The chief areas for tree and small fruit are Clydesdale and the Carse of Gowrie, but there are also productive orchards in the shires of Haddington, Stirling, Ayr and Roxburgh, while market-gardening has developed in the neighbourhood of the larger towns. In 1812 woods and plantations occupied 907,695 acres, of which 501,469 acres were natural woods and 406,226 planted. Within sixty years this area had declined to 734,490 acres, but with renewed attention to forestry and encouragement of planting the area had grown in 1895 to 878,675 acres; by 1905, however, the acreage was practically unchanged. Inverness, Aberdeen and Perth are naturally the best wooded shires. The modern plantations consist mostly of Scots fir with a sprinkling of larch.

Deer Forests and Game, &c.—Deer forests in 1900 covered 2,287,297 acres, an increase of 575,405 acres since 1883. The red deer is peculiar to the Highlands, but the fallow deer is not uncommon in the hill country of the south-western Lowlands. The grouse moors occupy an extensive area and are widely distributed. Ptarmigan and blackcock are found in many districts, partridges and pheasants are carefully preserved, and the capercailzie, once extirpated, has been restored to some of the Highland forests. Hares and rabbits, the latter especially, are abundant. Fox-hunting is fashionable in most of the southern shires, but otter-hunting is practically extinct. The bear, wolf and beaver, once common, have long ceased to be, the last wolf having been killed, it is said, in 1680 by Sir Ewen Cameron of Lochiel. The wild cat may yet be found in the Highlands, and the polecat, ermine and pine marten still exist, the golden eagle and the white-tailed eagle haunt the wilder and more remote mountainous districts, while the other large birds of prey, like the osprey and kite, are becoming scarce. The islands, rocks and cliffs and some inland lochs are frequented in multitudes by a great variety of water-fowl.

Fisheries.—The Scottish seaboard is divided for administrative purposes into twenty-seven fishery districts, namely, on the east coast, Eyemouth, Leith, Anstruther, Montrose, Stonehaven, Aberdeen, Peterhead, Fraserburgh, Banff, Buckie, Findhorn, Cromarty, Helmsdale, Lybster, Wick (15); on the north, Orkney, Shetland (2); on the west, Stornoway, Barra, Loch Broom, Loch Carron and Skye, Fort William, Campbeltown, Inverary, Rothesay, Greenock, Ballantrae (10). The whole of the fisheries are controlled by the Fishery Board for Scotland, which was established in 1882 in succession to the former Board of White Herring Fishery. In 1903 the number of fishermen directly employed in fishing was 36,162, there were 17,496 engaged in curing and preserving the fish landed, while 32,201 were employed in subsidiary industries on shore, making a total of 85,859 persons engaged in the fisheries and dependent industries. In 1905 the herring fishery yielded 5,342,777 cwts. (£1,343,080); in 1909, 4,541,297 cwts. The most prolific districts are Shetland in the north, Fraserburgh, Peterhead, Wick, Aberdeen and Anstruther in the east, and Stornoway in the west. The principal herring market is continental Europe, Germany and Russia being the largest consumers, and there has been a growing exportation to the United States. In 1905 the total catch of fish of all kinds (excepting shell-fish) amounted to 7,856,310 cwts., and in 1907 (the highest recorded to 1910), 9,018,154 cwts. (£3,149,127). The annual value of the shell-fish (lobsters, crabs, oysters, mussels, clams, periwinkles, cockles, shrimps) is about £73,000. The weight of salmon carried by Scottish railways and steamers in 1894 was 2437 tons, and in 1903 it was 2047 tons. In 1894 the number of boxes of Scottish salmon delivered at Billingsgate market in London was 15,489, and in 1903 it was 15,103, being more than half of the salmon received then from all parts of Europe, including Irish and English consignments. In 1903 the Tay rentals came to £22,902, the highest then recorded. The other considerable rentals were the Dee £18,392, Tweed £15,389 and Spey £8146.

Roads.—In the 12th century an act was passed providing that the highways between market-towns should be at least 20 ft. broad. Over the principal rivers at this early period there were bridges near the most populous places, as over the Dee near Aberdeen, the Esk at Brechin, the Tay at Perth and the Forth near Stirling. Until the 16th century, however, traffic between distant places was carried on chiefly by pack-horses. The first stage-coach in Scotland was that which ran between Edinburgh and Leith in 1610. In 1658 there was a fortnightly stage-coach between Edinburgh and London, but afterwards it would appear to have been discontinued for many years. Separate acts enjoining the justices of the peace, and afterwards along with them the commissioners of supply, to take measures for the maintenance of roads were passed in 1617, 1669, 1676 and 1686. These provisions had reference chiefly to what afterwards came to be known as "statute labour roads," intended primarily to supply a means of communication within the several parishes. They were kept in repair by the tenants and cotters, and, when their labour was not sufficient, by the landlords, who were required to "stent" (assess) themselves, customs also being sometimes levied at bridges, ferries and causeways. By separate local acts the "statute labour" was in many cases replaced by a payment called "conversion money," and the General Roads Act of 1845 made the alteration universal. The Roads and Bridges (Scotland) Act of 1878 entrusted the control of the roads to royal and police burghs and in the counties to road trustees, from whom it was transferred by the Local Government Act of 1889 to county councils, the management, however, being in the hands of district committees. The Highlands had good military roads earlier than the rest of the country. The project, begun in 1725 under the direction of General George Wade, took ten years to complete, and the roads were afterwards kept in repair by an annual parliamentary grant. In the Lowlands the main roads were constructed under the Turnpike Acts, the earliest of which was obtained in 1750. Originally they were maintained by tolls, but this method, after several counties had obtained separate acts for its abolition, was superseded in 1883 by the act of 1878.

Canals.—There are four canals in Scotland, the Caledonian, the Crinan, the Forth and Clyde and the Union, of which the Caledonian and Crinan are national property (see CALEDONIAN CANAL). The Forth and Clyde Navigation runs from Bowling on the Clyde, through the north-western part of Glasgow and through Kirkintilloch and Falkirk to Grangemouth on the Forth, a distance of 35 m. There is also a branch, 2¾ m. long, from Stockingfield to Port Dundas in the city of Glasgow, which is continued for the distance of 1 m. to form a junction with the Monkland canal. This last has a length of 12¼ m., and runs from the north-east of Glasgow through Coatbridge to Woodhall in the parish of Old Monkland. It was begun in 1761 and opened for traffic in 1792. The Forth and Clyde canal was authorized in 1767 and opened from sea to sea in 1790. In 1846 its proprietors bought the Monkland canal, and in 1867 the combined undertaking passed into the hands of the Caledonian Railway Company. The Union canal, 31½ m. long, starts from Port Downie, on the Forth and Clyde canal near Falkirk, and runs to Port Hopetoun in Edinburgh. Begun in 1818 it was completed in 1822, and in 1849 was vested in the Edinburgh and Glasgow Railway Company, which in turn was absorbed by the North British Railway Company in 1865. The Forth and Clyde canal has a revenue of about £120,000 a year, including receipts from the docks at Grangemouth, and the expenditure on management and maintenance is about £40,000. The Union canal earns between £2000 and £3000, and its expenditure is but little

less than its revenue. Three other canals formerly existed in Scotland. The Aberdeen canal, 18¼ m. long, running up the Don valley from Aberdeen to Inverurie was opened in 1807, but did not prove profitable and was ultimately sold to the Great North of Scotland Railway Company, by which it was abandoned. The Glasgow, Paisley and Johnstone canal, 11 m. long, was opened in 1811 and was bought in 1869 by the Glasgow and South-Western railway, which in 1881 obtained statutory powers to abandon it as a canal and use its site, so far as necessary, for a railway line. The Forth and Cart Junction canal was only half a mile long. It ran from the Forth and Clyde canal to the Clyde, opposite the river Cart, and was intended to allow vessels to pass direct from the east coast up that river to Paisley. The Caledonian railway, which acquired it together with the Forth and Clyde canal in 1867, obtained powers to abandon it in 1893.

Railways.—The first railway in Scotland for which an act of parliament was obtained was that between Kilmarnock and Troon (9¾ m.), opened in 1812, and worked by horses. A similar railway, of which the chief source of profit was the passenger traffic, was opened between Edinburgh and Dalkeith in 1831, branches being afterwards extended to Leith and Musselburgh. By 1840 the length of the railway lines for which bills were passed was 191¼ m., the capital being £3,122,133. The chief companies are the Caledonian, formed in 1845; the North British, of the same date; the Glasgow and South-Western, formed by amalgamation in 1850; the Highland, formed by amalgamation in 1865; and the Great North of Scotland, 1846.

Table XIII. shows the advance in mileage, goods and passenger traffic and receipts, from both sources, since 1857.

TABLE XIII.—*Illustrating Growth of Railway Business.*

Year.	Mileage.	Passengers.	Passenger Traffic Receipts.	Goods Traffic Receipts.	Total.
1857	1243	14,733,503	£916,097	£1,584,781	£2,501,478
1874	2700	38,220,892	2,350,593	3,884,424	6,235,017
1884	2999	54,305,074	2,931,737	4,426,023	7,357,760
1888	3097	68,413,349	3,163,195	4,564,627	7,727,822
1900	3485	122,201,102	4,715,592	6,431,693	11,147,285
1905	3804	115,580,000	5,014,452	6,803,286	11,817,738

The total capital of all the Scots companies in 1888 was £114,120,119; by 1910 it exceeded £185,000,000. Since the passing of the Light Railways Act 1896, the Board of Trade has sanctioned several light railways. By 1910 the total railway mileage was 3844.

Mining Industry.—Coal and iron, generally found in convenient proximity to each other, are the chief sources of the mineral wealth of Scotland. The principal coalfields are Lanarkshire, which yields nearly half of the total output, Fifeshire, Ayrshire, Stirlingshire and Midlothian, but coal is also mined in the counties (usually reckoned as forming part of one or other of the main fields) of Linlithgow, Haddington, Dumbarton, Clackmannan, Kinross, Dumfries, Renfrew, Argyll and Peebles, while a small quantity is obtained from the Oolite at Brora in Sutherlandshire. The earliest records concerning coalpits appear to be the charters granted, towards the end of the 12th century, to William Oldbridge of Carriden in Linlithgowshire, and in 1291 to the abbot and convent of Dunfermline conferring the privilege of digging coal in the lands of Pittencrieff. The monks of Newbattle Abbey also dug coal at an early date from surface pits on the banks of the Esk. Aeneas Sylvius (Pope Pius II.), who visited Scotland in the 15th century, refers to the fact that the poor received at church doors a species of stone which they burned instead of wood; and although the value of coal for smith's and artificer's work was early recognized it was not used for domestic purposes till about the close of the 16th century. In 1606 an act was passed binding colliers to perpetual service at the works where they were employed, and they were not fully emancipated till 1799. An act was passed in 1843 forbidding the employment of children of tender years and women in underground mines. In 1905 there were 492 coal and iron mines in operation, employing 109,939 hands (89,516 below ground and 20,423 above). The total output in that year amounted to 35,839,297 tons, valued at £10,369,433. The total quantity worked up to the end of 1898 was 1,514,062 tons, the quantity then remaining to work being estimated at 4,634,785,000 tons. The quantity of coal exported in 1905 from the principal Scottish ports was 7,863,511 tons, and the quantity shipped coastwise to ports of the United Kingdom amounts annually to about 2½ million tons in addition.

The rise of the iron industry dates from the establishment of the Carron ironworks near Falkirk in 1760, but it was the introduction of railways that gave the production of pig-iron its greatest impetus. In 1796 the quantity produced was 18,640 tons, which had only doubled in thirty-four years (37,500 tons in 1830). In 1840 this had grown to 241,000 tons, in 1845 to 475,000 tons and in 1865 to 1,164,000 tons, almost the height of its prosperity, for in 1905 the product of 101 blast furnaces only amounted to 1,375,125 tons, and in the interval there were years when the output was below one million tons. More than one-third of the iron ore (that chiefly worked being Black Band Ironstone) comes from mines which also yield coal. The iron-producing counties in the order of their output are Ayr, Lanark, Renfrew, Linlithgow, Dumbarton, Fife, Midlothian and Stirling, the first three being the most productive. In 1905 the quantity of ore raised was 832,388 tons, valued at £320,875 and yielding 249,716 tons of metal. The imports of ore in that year amounted to 1,862,444 tons of the value of £1,420,379.

The oil shale industry is wholly modern and has attained to considerable magnitude since it was established (in 1851 and following years). Linlithgowshire yields nearly three-fourths of the total output, Midlothian produces nearly one-fourth, a small quantity is obtained from Lanarkshire, and there is an infinitesimal supply from Sutherland. The mineral is chiefly obtained from seams in the Calciferous Sandstone at the base of the Carboniferous rocks.

Fire-clay is produced in Lanarkshire, which yields nearly half of the total output, and Ayrshire and, less extensively, in Stirlingshire, Fifeshire, Renfrewshire, Midlothian and a few other shires. With the exception of the counties of Orkney, Shetland, Caithness, Sutherland and Inverness, granite is quarried in every shire in Scotland, but the industry predominates in Aberdeenshire, and is of considerable importance in Kirkcudbrightshire; limestone is quarried in half of the counties, but especially in Midlothian and Fife; large quantities of paving-stones are exported from Caithness and Forfarshire, and there are extensive slate quarries at Ballachulish and other places in Argyllshire, which furnishes three-fourths of the total supply. Sandstone, of which the total production in 1905 was 1,142,135 tons valued at £320,761, is quarried in nearly every county, but the industry flourishes particularly in the shires of Lanark, Dumfries, Ayr and Forfar. Lead ore occurs at Wanlockhead in Dumfriesshire and Leadhills in Lanarkshire. In 1905 there were produced 2774 tons of dressed lead ore, of the value of £25,823, yielding 2167 tons of lead in smelting and 11,409 oz. of silver. Gold has been found in the county of Ross and Cromarty. A small quantity of zinc is mined in Dumfriesshire and of barytes at Lochwinnoch in Renfrewshire. The precious metals were once worked at Abington in Lanarkshire and in the Ochils, and lead was mined at Tyndrum in Perthshire. In 1905 there were 66 mines apart from coal and iron, employing altogether 5329 hands, and 1127 quarries employing 7390 persons inside the quarries and 4797 persons outside, or 12,187 in all. Alumina is treated at works near Foyers in the shire of Inverness, where abundant water power enables electricity to be generated cheaply. The Foyers installation is the largest water-power plant in the United Kingdom.

Iron and Steel.—In 1901 the number of persons engaged in working of the raw material was 23,263, of whom 8258 were employed in steel smelting and founding, 7781 at blast furnaces in the manufacture of pig-iron, and 7224 at puddling furnaces and rolling mills. All the great iron foundries and engineering works are situated in the Central Plain or Lowlands, in close proximity to the shipbuilding yards and coalfields, especially in the lower and part of the middle wards of Lanarkshire, in certain districts of Ayrshire and Renfrewshire, at and near Dumbarton, in south Stirlingshire and in some parts of East and Mid Lothian and Fife. In 1901 the number of persons employed in engineering and machine-making—including 24,122 ironfounders, 24,944 blacksmiths, 20,567 fitters, turners and erectors, 9767 boiler-makers and 18,018 undefined—amounted to 118,736. In miscellaneous metal trades, embracing tinplate goods, wire workers, makers of stoves, grates, ranges and fire-arms, makers of bolts, nuts, rivets, screws and staples, and those occupied in several subsidiary trades, the number of operatives in 1901 amounted to 13,209. In the same year there were 7279 persons employed in the

making of cycles, motor cars, railway coaches and waggons and carriages and other vehicles. In the whole group of industries connected with the working in metals and the manufacture of machinery, implements and conveyances the total number of persons employed amounted in 1901 to 205,830.

Manufactures. (*a*) *Wool and Worsted.*—Although a company of wool weavers was incorporated by the town council of Edinburgh in 1475, the cloth worn by the wealthier classes down to the beginning of the 17th century was of English or French manufacture, the lower classes wearing "coarse cloth made at home," a custom still prevalent in the remoter districts of the Highlands. In 1601 seven Flemings were brought to Edinburgh to teach the manufacture of serges and broadcloth, and eight years later a company of Flemings was established in the Canongate (Edinburgh) for the manufacture of cloth under the protection of the king; but, notwithstanding also the establishment in 1681 of an English company for the manufacture of woollen fabrics near Haddington, the industry for long made little progress. In fact its importance dates from the introduction of machinery in the 19th century. The most important branch of the trade, that of tweeds, first began to attract attention shortly after 1830; though still having its principal seat in the district from which it takes its name, including Galashiels, Hawick, Innerleithen and Selkirk, it has extended to other towns, especially Aberdeen, Elgin, Inverness, Stirling, Bannockburn, Dumfries and Paisley. Carpet manufacture has had its principal seat in Kilmarnock since 1817, but is also carried on in Aberdeen, Ayr, Bannockburn, Glasgow, Paisley and elsewhere. Tartans are largely manufactured in Tillicoultry, Bannockburn and Kilmarnock, and shawls and plaids in several towns. Fingering and many other kinds of woollen yarns are manufactured at Alloa, the headquarters of the industry. In 1901 the number of operatives in the woollen industry (including combers and sorters, spinners, weavers and workers in other processes) amounted to 24,906. In 1850 the employed numbered 10,210.

(*b*) *Flax, Hemp and Jute.*—The manufacture of cloth from flax is of very ancient date, and towards the close of the 16th century Scottish linen cloths were largely exported to foreign countries, as well as to England. Regulations in regard to the manufacture were passed in 1641 and 1661. In a petition presented to the privy council in 1684, complaining of the severe treatment of Scotsmen selling linen in England, it was stated that 12,000 persons were engaged in the manufacture. Through the intercession of the secretary of state with the king these restrictions were removed. Further to encourage the trade it was enacted in 1686 that the bodies of all persons, excepting poor tenants and cotters, should be buried in plain linen only, spun and made within the kingdom. The act was renewed in 1693 and 1695, and in the former year another act was passed prohibiting the export of lint and permitting its import free of duty. At the time of the Union the annual amount of linen cloth manufactured in Scotland is supposed to have been about 1,500,000 yards. The Union gave a considerable impetus to the manufacture, as did also the establishment of the Board of Manufactures in 1727, which applied an annual sum of £2650 to its encouragement, and in 1729 established a colony of French Protestants in Edinburgh, on the site of the present Picardy Place, to teach the spinning and weaving of cambric. From the 1st of November 1727 to the 1st of November 1728 the amount of linen cloth stamped was 2,183,978 yds., valued at £103,312, but for the year ending the 1st of November 1822, when the regulations as to the inspection and stamping of linen ceased, it had increased to 36,268,530 yds., valued at £1,396,296. The counties in which the manufacture is now most largely carried on are Forfar, Perth, Fife and Aberdeen, but Renfrew, Lanark, Edinburgh and Ayr are also extensively associated with it. Dundee is the principal seat of the coarser fabrics, Dunfermline of the table and other finer linens, while Paisley is widely known for its sewing threads. The allied industry of jute is the staple industry of Dundee. In 1890 the number employed in the linen industry was 34,222, which had declined in 1901 to 23,570. In 1890 the operatives in the jute and hemp industry numbered 39,885, and in 1901 they were (including workers in canvas, sacking, sailcloth, rope, twine, mats, cocoa fibre) 46,550.

(*c*) *Cotton.*—The first cotton mill was built at Rothesay by an English company in 1779, though Penicuik also lays claim to priority. The Rothesay mill was soon afterwards acquired by David Dale, who was the agent for Sir Richard Arkwright, and had the invaluable aid of his counsel and advice. Dale also established cotton factories in 1785 at New Lanark, afterwards so closely associated with the socialistic schemes of his son-in-law, Robert Owen. The counties of Lanark and Renfrew are now the principal seats of the industry. The great majority of the cotton factories are concentrated in Glasgow, Paisley and the neighbouring towns, but the industry extends in other districts of the west and is also represented in the counties of Aberdeen, Perth and Stirling. As compared with England, however, the manufacture has stagnated. The number of hands employed in 1850 was 34,325, in 1875 it was 35,652 and in 1901 (including bleachers, dyers, printers, calenderers, &c.) it was 34,057.

(*d*) *Silk and other Textiles.*—The principal seats of the silk manufacture are Paisley and Glasgow. In 1885 the number employed amounted to 600 and in 1901 to 2424. The weaving of lace curtains has made considerable progress, in 1878 only 45 hands being employed against 2875 in 1901. Hosiery manufactures, a characteristic Border industry, with its chief seat at Hawick, employed 11,957 hands in 1901. The total number of persons working in textile fabrics in 1901, exclusive of 21,849 drapers, mercers and other dealers, but including 43,040 employed in mixed or unspecified materials (hosiery, lace, carpets, rugs, fancy goods, &c., besides a large number of "undefined" factory hands and weavers), amounted to 174,547 persons.

(*e*) *Whisky and Beer.*—Scotland claims a distinctive manufacture in whisky. Though distillation was originally introduced from England, by 1771 large quantities of spirits were already being consigned to the English market. The legal manufacture of whisky was greatly checked in the earlier part of the 19th century by occasional advances in the duty, but after the reduction of 2s. 4¾d. per proof gallon in 1823—the duty amounted in 1904 to 11s. per proof gallon—the number of licensed distillers rapidly increased, to the discouragement of smuggling and illicit distillation. In 1824 the number of gallons made amounted to 5,108,373; by 1855 this had more than doubled; in 1884 it was 20,164,962; in 1900 it reached 31,798,465; and in 1904 it had receded to 27,110,977. More than four-fifths of the distilleries at work in the United Kingdom are situated in Scotland. The leading distilling counties are Argyll, Banff, Elgin, Inverness and Aberdeen, Perth and Ross and Cromarty, while the industry is found in seventeen other shires. In 1893–1894 the total net duty received for home-made spirits amounted to £5,461,198 and in 1903–1904 to £7,276,125. The production has attained to colossal dimensions. In 1893–1894 the quantity of proof gallons in bond was 61,275,754, and in 1903–1904 it amounted to 121,397,951, the production having practically doubled itself within ten years. Ale was a common beverage as early as the 12th century, one or more breweries being attached to every religious house and barony. So general was its use even in the beginning of the 18th century that the threatened imposition of a tax on malt in 1725 provoked serious riots in Glasgow and clamour for repeal of the Union; and sixty years afterwards Robert Burns in certain poems voiced the popular sentiment concerning the "curst restrictions" proposed by the Excise on beer and whisky. Though ale has been superseded by whisky as the national beverage, brewing is extensively carried on in Edinburgh, whose ales are in high repute, Leith, Alloa and elsewhere. In 1885 the number of barrels of beer, duty-paid, amounted to 1,237,323; in 1893–1894, to 1,733,407; and in 1903–1904 to 1,877,978. In 1893–1894 the duty (6s. 3d. the barrel) yielded £473,311 and in 1903–1904 (7s. 9d. the barrel) £649,080. After 1893–1894, when the number of brewers licensed to brew for sale numbered 149, there was a steady fall to 117

in 1903–1904, alleged by the Inland Revenue Commissioners to be due to the disappearance of the small brewer. The practice of private brewing exhibits a still greater decline—from 272 to 84 in the years named. Notwithstanding the enormous turnover and output and the large capital invested, neither distilling nor brewing gives employment to many hands, the figures for 1901 being 1330 maltsters, 2052 brewers and 1970 distillers.

(*f*) *Miscellaneous.*—Paper, stationery and printing are industries in which Scotland has always occupied a foremost position. A paper mill was erected in 1675 at Dalry on the Water of Leith in which French operatives were employed to give instruction, with the result, in the words of the proprietors, that "grey and blue paper was produced much finer than ever was done before in the kingdom." Midlothian has never lost the lead then secured. The paper mills at Penicuik and elsewhere in the vale of the Esk and around Edinburgh are flourishing concerns, and the industry is also vigorously conducted near Aberdeen. Stationery is largely manufactured at Glasgow, Aberdeen and Edinburgh. In 1901 the number of persons employed in the paper and stationery industries amounted to 19,602. Ever since it was established by Andrew Myllar and Walter Chepman, early in the 16th century, the Edinburgh press has been renowned for the beauty and excellence of its typography, a large proportion of the books issued by London publishers emanating from the printing works of the Scottish capital. Printing is also extensively carried on in Glasgow and Aberdeen, and Cupar once enjoyed considerable repute for its press. The number of persons engaged in the production of books and other printed matter (including lithographers, copper, steel plate and "process" printers, bookbinders, publishers, booksellers and distributors) amounted in 1901 to 24,139. The first sugar refinery was erected in 1765 at Greenock, which, despite periodical vicissitudes, has remained the principal seat of the industry, which is also carried on at Leith, Glasgow and Dundee. The making of preserves and confectionery flourishes in Dundee, Aberdeen, Paisley and Edinburgh. Kirkcaldy is the seat of the oil floor-cloth and linoleum industries, the latter introduced in 1877. The headquarters of the chemicals manufacture are situated in Glasgow and the vicinity, while explosives are chiefly manufactured at Stevenston and elsewhere in Ayrshire, and at certain places on the Argyll coast. Among occupations providing employment for large numbers were trades in connexion with building and works of construction (136,639 persons in 1901), and furniture and timber (39,000), while the conveyance of passengers, parcels and messages employed 163,102 (railway, 43,037; roads, 53,813; sea, rivers and canals, 20,451; docks, harbours and lighthouses, 10,659; and storage, porterage and messages, 35,142).

Commerce and Shipping.—That Scotland had a considerable trade with foreign countries at a very early period may be inferred from the importation of rich dresses by Malcolm III. (d. 1093), and the enjoyment of Oriental luxuries by Alexander I. (d. 1124). His successor, David I., receives the special praise of Fordun for enriching "the ports of his kingdom with foreign merchandise." In the 13th century the Scots had acquired a considerable celebrity in shipbuilding; and a powerful French baron had a ship specially built at Inverness in 1249 to convey him and his vassals to the Holy Land. The principal shipowners at this period were the clergy, who embarked the wealth of their religious houses in commercial enterprises. Definite statements regarding the number and tonnage of shipping are, however, lacking till the 18th century. From two reports printed by the Scottish Burgh Record Society in 1881, it appears that the number of vessels belonging to the principal ports—Leith, Dundee, Glasgow, Kirkcaldy and Montrose—in 1656 was 58, the tonnage being 3140, and that by 1692 they had increased to 97 of 5905 tons. These figures only represent a portion of the total shipping of the kingdom. At the time of the Union in 1707 the number of vessels was 215 of 14,485 tons.

Table XIV. gives the figures of the registered tonnage in port in 1850 and later specified years, which are interesting as showing how,

TABLE XIV.—*Showing Registered Tonnage in Port in Specified Years.*

	1850.		1860.		1870.		1884.		1900.		1905.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Sailing vessels	3432	491,395	3172	552,212	2715	727,942	2065	827,295	1104	709,430	918	578,340
Steam vessels .	169	30,827	314	71,579	582	209,142	1403	866,780	1980	1,528,032	2330	3,139,558
Total . .	3601	522,222	3486	623,791	3297	937,084	3468	1,694,075	3084	2,237,462	3248	3,717,898

while sailing vessels declined during the half century to one-third of their number in 1850, steam vessels increased thirteenfold. It is true that the tonnage of the 918 sailing vessels of 1905 was considerably in excess of that of the 3432 sailing vessels of 1850, but even so it was a declining figure from a higher tonnage of the middle of the period. On the other hand, during fifty-five years the tonnage of steamers had grown to be a hundred times as large as it was in 1850. Table XV. illustrates the development that took place in the shipping trade with foreign countries and British possessions, as well as the expansion of the coasting trade, in 1855-1905, certain years being taken as types.

TABLE XV.—*Foreign and Colonial and Coastwise Trade: Tonnage of Vessels.*

Year.	Coastwise.		Colonial and Foreign.		Total.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
1855	1,963,552	2,057,936	668,078	840,150	2,631,630	2,898,086
1880	6,628,853	5,691,136	2,700,915	3,001,897	9,329,768	8,693,033
1889	7,188,763	6,998,516	3,931,010	4,412,607	11,119,773	11,411,123
1898	9,256,233	8,937,481	5,510,927	6,296,555	14,767,160	15,234,036
1900	7,213,574	6,791,959	5,657,200	6,602,545	12,870,774	13,394,504
1905	9,928,674	9,500,160	6,268,745	7,478,579	16,197,419	16,978,739

Table XVI. exhibits the growth of the foreign and colonial trade at specified dates since 1755, showing how it advanced by leaps and bounds during the latter part of the 19th century. Though the value of imports into Scotland is less than one-eleventh of that into England, this does not represent the due proportion of foreign wares used and

TABLE XVI.—*Showing Growth of Foreign and Colonial Trade since 1755.*

Year.	Imports.	Exports.	Year.	Imports.	Exports
	£	£		£	£
1755	464,411	535,576	1874	31,012,750	17,912,932
1790	1,688,337	1,235,405	1880	34,997,652	18,243,078
1795	1,268,520	976,791	1884	30,600,258	20,322,355
1800	2,212,790	2,340,069	1889	36,771,016	22,310,006
1815	3,447,853	6,997,709	1898	36,224,982	23,643,143
1825	4,994,304	5,842,296	1900	38,691,245	32,166,561
1851	8,921,108	5,016,116	1903	40,396,280	32,301,198

consumed in Scotland, for the obvious reason that large quantities of goods are brought into the country by rail, nearly all the tea, for example, consumed in Great Britain being imported into London, while several ports have almost a monopoly of certain other imports. Foreign and colonial merchandise transhipped was valued at £989,289 in 1889 and at £746,246 in 1903. The customs revenue rose from £1,965,080 in 1894 to £3,399,141 in 1903. Judged by the combined value of their imports and exports the chief ports are as shown in the first section of Table XVII. Their status is modified by the movements of shipping, and for purposes of comparison the entrance and clearance tonnage of the trade with British colonies and foreign countries and of the coastwise traffic are exhibited in the second and third sections of the same table. The favourable position occupied by Greenock in the third section is due to its preponderating share of the traffic with the west coast and the islands. Its share of the Irish and coasting trade likewise accounts for the position of Ardrossan in the same section. It should be added that on the figures of import and export value in 1909, Aberdeen had changed places with Methil, and Burntisland with Granton. The figure for Glasgow in that year was £41,238,867.

TABLE XVII.—*Chief Ports (1905).*

Port.	Order.	Imports and Exports. £	Order.	Colonial and Foreign Tonnage In and Out.	Order.	Coastwise Tonnage In and Out.
Glasgow	1	38,291,762	1	4,472,071	1	4,257,957
Leith	2	17,975,978	2	2,210,015	4	1,410,160
Grangemouth	3	6,273,317	4	1,425,978	6	859,177
Dundee	4	5,657,583	7	320,103	7	807,159
Greenock	5	2,046,457	10	202,336	2	3,348,928
Methil	6	1,127,931	3	1,716,355	8	542,244
Aberdeen	7	1,035,233	8	217,410	3	1,613,966
Granton	8	933,480	9	202,901	10	230,458
Burntisland	9	846,741	5	1,305,945	9	294,261
Ardrossan	10	651,124	6	326,356	5	1,094,439

Shipbuilding.—Many of the most important improvements in the construction of ships, especially steam vessels, are due to the enterprise and skill of the Clyde shipbuilders, who, from the time of Robert Napier of Shandon (1791–1876), who built and engined the first steamers for the Cunard Company, formed in 1840, have enjoyed an unrivalled reputation for the construction of leviathan liners, both as regards mechanical appliances and the beauty and convenience of the internal arrangements. The principal Clyde yards are situated in the Glasgow district (Govan, Partick, Fairfield, Clydebank, Renfrew), Dumbarton, Port Glasgow and Greenock. At several of the ports on the lower firth, as at Ardrossan and Fairlie, famous for its yachts, the industry is also carried on. On the east coast the leading yards are at Leith, Kirkcaldy, Grangemouth, Dundee, Peterhead and Aberdeen, which, in the days of sailing ships, was renowned for its clippers built for the tea trade. There are yards also at Inverness.

Postal Service.—Towards the end of the 16th century the practice arose of regular communication by letter between the magistrates of the larger towns and the seat of government in Edinburgh. After the accession of James VI. to the throne of England the necessity for an ordered method of intercourse between the Scottish capital and London became urgent, but the plans adopted involved extraordinary delay, for it not infrequently happened that there was an interval of two months between the despatch of a letter and the receipt of a reply. Such a leisurely fashion of transacting business soon grew intolerable, and in 1635 a system of relays was instituted which enabled the journey between the two cities to be accomplished in three days, the charge for a letter being 8d. The service was reorganized in 1662, and in 1711 the postal establishments of the United Kingdom, hitherto conducted independently in each country, were consolidated into one. When this reform was effected the cost of a letter to London was reduced to 6d. Three years before this date a local penny post had been provided in Edinburgh by private enterprise, carried on by a staff of seven persons, and after the success of this effort had been demonstrated the concern was taken over by the post office. Subsequently postal business stagnated, mainly owing to the greatly increased charges (the postage of a letter from London to Edinburgh is stated to have cost 1s. 4½d.), until the system of uniform penny postage came into operation. The telephones are mainly conducted by the post office and the National Telephone Company, but the corporation of Glasgow has a municipal service.

Religion.—The bulk of the population is Presbyterian, this form of Church government having generally obtained, in spite of persecution and other vicissitudes, since the Reformation. It is accepted equally by the Established Church, the United Free, the Free and other smaller Presbyterian bodies, the principal point distinguishing the first-named from the rest being that it accepts the headship of the sovereign. The Episcopal Church of Scotland, which is in communion with the Church of England, claims to represent the ancient Catholic Church of the country.

See SCOTLAND, CHURCH OF; also FREE CHURCH OF SCOTLAND; UNITED PRESBYTERIAN CHURCH; PRESBYTERIANISM; and SCOTLAND, EPISCOPAL CHURCH OF.

Parliamentary Government.—By the Act of Union in 1707 Scotland ceased to have a separate parliament, and its government was assimilated to that of England. In the parliament of Great Britain its representation was fixed at sixteen peers elected in Holyrood Palace by the peers of Scotland at each new parliament in the House of Lords, and at forty-five members in the House of Commons, the counties returning thirty and the burghs fifteen. The power of the sovereign to create new Scottish peerages lapsed at the Union, and consequently their number is a diminishing quantity. By the Reform Act of 1832 the number of Scottish representatives in the Commons was raised to fifty-three, the counties under a slightly altered arrangement returning thirty members as before, and the burghs, reinforced by the erection of various towns into parliamentary burghs, twenty-three; the second Reform Act (1867) increased the number to sixty, the universities obtaining representation by two members, while two additional members were assigned to the counties and three to the burghs; by the Redistribution of Seats Act in 1885 an addition of seven members was made to the representation of the counties and five to that of the burghs, the total representation being raised to seventy-two. The management of Scottish business in parliament has since 1885 been under the charge of the secretary for Scotland.[1]

Law.—At the Union Scotland retained its old system of law and legal administration, a system modelled on that of France; but since the Union the laws of England and Scotland have been on many points assimilated, the criminal law of the two countries being now practically identical, although the methods of procedure are in many respects different. The Court of Session, as the supreme court in civil causes is called, which is held at Edinburgh, dates from 1532, and was formed on the model of the *parlement* of Paris. Since the Union it has undergone certain modifications. It consists of thirteen judges, acting in an Inner and an Outer House. The Inner House has two divisions, with four judges each, the first being presided over by the lord president of the whole court, and the second by the lord justice clerk. In the Outer House five judges, called lords ordinary, sit in separate courts. Appeals may be made from the lords ordinary to either of the divisions of the Inner House, and, if the occasion demands, the opinion of all the judges of the Court of Session may be called for; but whether this be done or not the decision is regarded as a decision of the Court of Session. Appeals may be made from the Court of Session to the House of Lords. The lord justice general (lord president), the lord justice clerk and the other judges of the Court of Session form the High Court of Justiciary, instituted in 1672, for criminal cases, which sits at Edinburgh for the trial of cases from the three Lothians and of cases referred from the circuit courts. The latter meet for the south at Jedburgh, Dumfries and Ayr; for the west at Glasgow, Inveraray and Stirling; and for the north at Perth, Aberdeen, Dundee and Inverness. The law agents who undertake cases to be decided before the supreme courts are either solicitors before the supreme courts (S.S.C.) or writers to the signet (W.S.), the latter of whom possess certain special privileges. The lawyer authorized to plead before the supreme courts is termed an advocate. The principal law officer of the crown is the lord advocate, who is assisted by the solicitor-general and by advocates-depute. The practical administration of the law in a county is under the control of the sheriff-depute, who combines with his judicial duties certain administrative functions. The office, which once implied a much less restricted authority than at present, is as old as the reign of Alexander I. (d. 1124), when the greater part of the kingdom was divided into twenty-five sheriffdoms. In the latter part of the 13th century they numbered thirty-four, but now there are only fifteen sheriffs in all, who, excepting the sheriff for Lanarkshire, need not reside in the counties to which they are appointed and are not prohibited from private practice. They are assisted by sheriffs-substitute upon whom the bulk of the work falls, who must be residential and are debarred from private practice. At one time the functions of the sheriff-principal were confined to one county, but by an act passed in 1855 it was arranged that as sheriffdoms fell vacant certain counties should be grouped under the control of one sheriff-principal. Thus Aberdeen, Kincardine and Banff form one group, and the three Lothians with Peebles another. The public prosecutor for counties is the procurator-fiscal, who takes the

[1] A separate secretary of state for Scotland was in existence after the Union, but this office was abolished in 1746. From 1782 to 1885 the secretary of state for the home department was responsible for the conduct of Scottish business, being advised in these matters by the lord advocate. The secretary for Scotland is not one of the principal secretaries of state.

initiative in regard to suspected cases of sudden death, although in this respect the law of Scotland is less strict than that of England. Justices of the peace, who are unpaid and require no special qualification, but as they are recommended by the lord-lieutenant, are generally persons of position in the county, once exercised a wider subordinate jurisdiction than now devolves upon them, their chief administrative function being to act along with certain members of the county councils, as the licensing authority for public-houses in the county and in police burghs, and as a court of appeal from the decisions of the bailies in royal and parliamentary burghs.

Local Government.—The largest administrative unit is that of the county, but the areas of counties may be adapted to meet various public or political requirements. They may be altered for the purposes of the registrar-general, and for police purposes part of the area of one county may be brought into the area of another. For parliamentary purposes some counties have been united, as Clackmannan and Kinross, Elgin and Nairn, Orkney and Shetland, and Peebles and Selkirk, and others divided, as Aberdeen, Ayr, Lanark, Perth and Renfrew, while others retain in certain respects their old subdivision, Lanarkshire for assessment purposes being still partitioned into the upper, middle and lower wards. Originally the counties were synonymous either with sheriffdoms or stewartries. Stewartries ceased with the abolition of hereditary jurisdictions in 1748, though Kirkcudbrightshire still bears the designation. The counties are thirty-three in number, Ross and Cromarty constituting one, while Edinburgh, Glasgow, Aberdeen and Dundee are each a county of a city. The highest county dignitary is the lord-lieutenant, the office dating from 1782. Nominated by the crown, he holds office *aut vitam aut culpam*, represents the crown in military matters, recommends for commissions of the peace, holds the position of high sheriff, and is a member of the standing joint committee. The office, however, is little more than honorary. In olden times there were three classes of burgh. Those created by charter directly from the crown were styled royal burghs: they number seventy in all, of which no fewer than seventeen belong to Fifeshire. Those holding their charters from a feudal superior and not from the crown were called burghs of regality, their magistrates and council being usually appointed by the overlord or his representative. Being small and unimportant, these burghs were not affected by the act of 1833, but in 1892 were required to adopt the constitution of police burghs. Towns that received their charters from bishops were burghs of barony, their magistrates and council being appointed by the superior. When the bishop's jurisdiction was abolished, the burghs as a rule assumed the position of royal burghs. Police burghs are wholly modern, dating from the middle of the 19th century. They were called into existence by the rapid growth of certain districts caused by the development of the coal and iron fields. The principle on which they are established may be briefly stated thus: towns with a minimum population of 800 can, on a poll demanded by the ratepayers showing a majority in favour of it, acquire the status of a police burgh subject to representations from neighbouring burghs, a proviso devised to check the growth of "parasitic" burghs in the immediate vicinity of a great centre of population and industry, enjoying all the public improvements initiated by their powerful neighbour and yet contributing nothing towards the cost and upkeep of them. It should be noted that, according to Scottish usage, "police" includes drainage, the suppression of nuisances, paving, lighting and cleansing, in addition to the provision of a constabulary force, and that in point of fact, paradoxical as it appears, the bulk of the police burghs do not manage their police. Royal burghs derive part of their income from ancient corporate property known as "the Common Good" and consisting mostly of land and houses. It is devoted to objects for which the rates are not applicable. Glasgow, for example, might found a chair in the University from the Common Good but not from the rates, and Edinburgh maintains from the same source the city observatory and defrays part of the cost of the time-gun. Only Edinburgh, Glasgow, Dundee, Greenock, Aberdeen and Paisley have private and local acts, conferring powers exceeding the general law, to deal with, *e.g.* overcrowding, the obnoxious display of advertisements, the compulsory acquisition of land for gas, water or electric-power enterprises, all the other burghs being governed by Public General Acts. This is in marked contrast with the practice in England, where almost every large borough has its own private act. The corporation of the burghs consists of the provost (or lord provost, in the cases of Edinburgh, Glasgow, Aberdeen and Dundee), bailies and councillors, with certain permanent officials, of whom the town clerk is the most important. The course of reform may now be concisely summarized. In 1833 Scottish burghs were for the first time entitled to be governed by directly-elected bodies, and at various times since that date fuller powers of legal self-government were granted in different directions. In 1845 parochial boards were created for relief of the poor, their powers being afterwards extended to deal with the statutes concerning burial-grounds, the registration of births, deaths and marriages, vaccination, public health, public libraries and other matters. In 1872 school boards were set up throughout the country; county councils followed in 1889 and parish councils in 1894. These reforms profoundly modified and in some cases abolished older organizations which had grown inadequate to modern wants. The Commissioners of Supply, originally appointed to apportion and collect the national revenue and afterwards entrusted with the regulation of the land tax, the control of the county police, the raising of the militia, and the levying of rates for county expenditure, were practically superseded by the county councils, which are also the local authority under the Contagious Diseases (Animals) and the Public Health Acts in all parishes (burghs and police burghs excepted), perform the administrative duties formerly entrusted to the justices of the peace, and may also enforce the Rivers Pollution Act each within its own jurisdiction. The county councils are strengthened by certain special committees, such as the secondary education committee, whose duties have already been defined, and the standing joint committee—one half appointed by the county council, the other half by the Commissioners of Supply—which manages the county police and whose consent in writing must be obtained before the county council can undertake any work involving capital outlay. All but the smallest counties are subdivided into districts, and the Road Acts and Public Health Acts are administered in these areas by district committees, composed of members of the county council for the district and one representative of each parish council within the area. The act of 1894, as we have seen, not only established the Local Government Board, consisting of the secretary for Scotland, the solicitor-general, the under-secretary and three appointed members a vice-president, a lawyer and a medical officer of public health—but also replaced the parochial boards by parish councils, empowered to deal among other things with poor relief, lunacy, vaccination, libraries, baths, recreation grounds, disused churchyards, rights of way, parochial endowments, and the formation of special lighting and scavenging districts.

(J. A. M.)

III. Political History

Scotland, to political observers of the middle of the 16th century, seemed destined by nature to form one homogeneous kingdom with England. The outward frontiers of both were the sea; no difficult physical barriers divided the two territories; the majority of Scots spoke an intelligible form of English, differing from northern English more in spelling and pronunciation than in idiom and vocabulary; and after the Reformation the State religion in both countries was Protestant. Yet, in spite of these causes making for union, and in spite of the manifest advantages of union, it was by a mere dynastic accident that, in the defect of nearer heirs to the English throne, the crowns of both kingdoms were worn by James VI. (1603), while more than a century of unrest and war had to elapse before the union of England and Scotland into one kingdom in 1707. Even later there broke forth civil wars that, apart from dynastic sentiment, had no political aim except "to break the Union." Thus for seven hundred years the division of the isle of Britain was a constant cause of weakness and public distress. Nothing did more to bring the two peoples together than religion, after the Reformation, yet, by an unhappy turn of affairs, and mainly thanks to one man, John Knox, few causes were more potent than religious differences in delaying that complete union which nature herself seemed to desire.

Early conditions.

The historical causes which kept the nations separate were mainly racial, though, from a very early period, the majority of the people of Scotland were, if not purely English by blood, anglicized in language and, to a great extent, in institutions. All questions of race are dim, for such a thing as a European people of pure unmixed blood is probably unknown in experience. In A.D. 78–82 Agricola, carrying the Eagles of Rome beyond the line of the historical border, encountered tribes and confederations of tribes which, probably, spoke, some in Gaelic, some in Brythonic varieties of the Celtic language. That the language had been imposed, in a remote age, by Celtic-speaking invaders, on a prior non-Celtic-speaking population, is probable enough, but is not demonstrated. There exist in Scotland a few inscriptions on stones, in Ogam, which yield no sense in any known Indo-European language. There are also traces of the persistence of descent in the female line, especially in the case of the Pictish royal family, but such survivals of savage institutions, or such a modification of male descent for the purpose of ensuring the purity of the royal blood, yield no firm ground for a decision as to whether the Picts were "Aryans" or "non-Aryans."

It is unnecessary here to discuss the Pictish problem (see Celt). That their rivals, the Scots, were a Gaelic-speaking people is certain. That the Picts were Teutons (Pinkerton) is no longer believed. That they were non-Aryan, the theory of

Sir John Rhys, seems improbable; for the non-English place-names of Scotland are either Gaelic or Brythonic (more or less Welsh), and the names of Pictish kings are either common to Gaelic and Welsh (or Cymric, or Brythonic), or are Welsh in their phonetics. Mr Skene held that the Picts were a Gaelic-speaking people, but the weight of philological authority is with Mr Whitley Stokes, who says that Pictish phonetics, "so far as we can ascertain them, resemble those of Welsh rather than of Irish" (see Zimmer, *Das Mutterrecht der Pikten*; Rhys, *Royal Commission's Report on Land in Wales, Celtic Britain, Rhind Lectures*; Skene's *Celtic Scotland*; J. G. Frazer, *Lectures on the Early History of the Kingship*, p. 247; Macbain's edition, 1902, of Skene's *Highlanders of Scotland*).

The Roman occupation has left not many material relics in Scotland, and save for letting a glimmer of Christianity into the south-west, did nothing which permanently affected the institutions of the partially subjugated peoples. In A.D. 81–82 Agricola garrisoned the Roman frontier between Forth and Clyde, and in 84 he fought and won a great battle farther north, probably on the line of the Tay. His enemies were men of the early iron age, and used the chariot in war. They fought with courage, but were no match for Roman discipline; it was, however, impossible to follow them into their mountain fortresses, nor were the difficulties of pursuit thoroughly overcome till after the battle of Culloden in 1746. The most important Roman stations which have hitherto been excavated are those of Birrenswark, on the north side of Solway Firth; Ardoch, near the historical battlefield of Sheriffmuir (1715); and Newstead, a site first occupied by Agricola, under the Eildon hills. Roman roads extended, with camps, as far as the Moray Firth. It is not till A.D. 300 that we read of "the Caledonians and other Picts"; in the 4th century they frequently harried the Romans up to the wall of Hadrian, between Tyne and Solway. About the end of the century the southern Picts of Galloway, and tribes farther north, were partially converted by St Ninian, from the *candida casa* of Whithern. The Scots, from Ireland, also now come into view, the name of Scotland being derived from that of a people really Irish in origin, who spoke a Gaelic (see CELTIC) akin to that of the Caledonians, and were in a similar stage of higher barbarism. The Scots made raids, but, as yet, no national settlement.

The withdrawal of the Romans from Britain (410) left the northern part of the island as a prey to be fought for by warlike tribes, of whom the most notable were the Picts in the north, the Scots or Dalriads from Ireland in the west (Argyll), the Cymric or Welsh peoples in the south-west and between Forth and Tay, and the Teutonic invaders, Angles or English, in the south-east.

If the Picts had been able to win and hold Scotland as far south as the historic border, the fortunes of the country would probably have been more or less like those of Ireland. After the Norman Conquest, England would have subjugated the Celts and held Scotland by a tenure less precarious and disputed than they possessed in the western island. Scotland would have been, at most, a larger Wales. But in the struggle for existence it chanced that the early English invaders secured a kingdom, Bernicia, which stretched from the Humber into Lothian, or farther north, as the fortune of battle might at various times determine; and thus, from the centre to the south-east of what is now Scotland, the people had come to be anglicized in speech before the Norman Conquest, though Gaelic survived much later in Galloway. The English domain comprised, roughly speaking, the modern counties of Selkirkshire, Peeblesshire, Berwickshire, Roxburghshire and most of the Lothians, while south of Tweed it contained Northumberland, Durham and Yorkshire to the Humber. In later days the Celtic kings of northern and western Scotland succeeded in holding, on vague conditions of homage to the English crown, the English-speaking region of historic Scotland. That region was the most fertile, had the best husbandry, and possessed the most civilized population, a people essentially English in language and institutions, but indomitably attached to the Celtic dynasties of the western and northern part of the island. It was the English-speaking south-east part of Scotland, gradually extended so as to comprise Fife and the south-west (Lanarkshire, Dumfriesshire, Stirlingshire, Dumbartonshire, Ayrshire and Renfrewshire), which learned to adopt the ideas of western Europe in matters political, municipal and ecclesiastical, while it never would submit to the domination of the English crown. This English element, in a nation ruled by a Celtic dynasty, prevented Scotland from becoming, like Wales, a province of England.

On the west of the northern part of the English kingdom of Bernicia, severed from that by the Forest of Ettrick, and perhaps by the mysterious work of which traces remain in the "Catrail," was the Brython or Welsh kingdom of Strathclyde, which then included the territory and population, later anglicized, of Renfrewshire, Ayrshire, Lanarkshire, Dumfriesshire, and, south of the historic border, Cumberland and Westmoreland to the Derwent. Strathclyde was essentially Welsh, and it may be noted that this region, centuries later, was the centre of the recalcitrant Covenanters, a people enthusiastically religious in their own way. Later, this region was the hotbed of "revivals" and the cradle of Irvingism. Whether the influence of Cymric blood may be traced in these characteristics is a dubious question.

While southern Scotland was thus English and Cymric, the north, from Cape Wrath to Lochaber, in the west, and to the Firth of Tay, on the east, was Pictland; and the vernacular spoken there was the Gaelic. The west, south of Lochaber to the Mull of Kintyre, with the isles of Bute, Islay, Arran and Jura, was the realm of the Dalriadic kings, Scots from Ireland (503): here, too, Gaelic was spoken, as among the "Southern Picts" of the kingdom of Galloway. Such, roughly speaking, were the divisions of the country which arose as results of the obscure wars of the 5th, 6th and 7th centuries.

As regards Christianity in these regions, Protestantism, Presbyterianism and patriotism find here a battle-ground. The mission of St Ninian (397) was that of a native of the Roman province of Britain, and the church which he founded would bear the same relation to Rome as did the church in Britain. There are material relics of his church, bearing the Christian monogram, and there are stones with Latin epitaphs; these objects are wholly unlike the Irish crosses and inscriptions of the Gaelic church. If Bede is right in saying that Ninian was trained in Rome, then the early Christianity of Scotland was Roman. ***Christianity.***

In 431 the contemporary *Chronica* of Prosper of Aquitaine record that Palladius was ordained by Pope Celestine as the first bishop "to the believing Scots," that is, to the Irish. If there were "believing Scots" in Ireland before the first bishop was ordained, their ecclesiastical constitution cannot have been episcopal. Fordun, in the 14th century, supposed that the clergy, before Palladius, were presbyters or monks. As Hector Boece, "that pillar of falsehood," dubbed these presbyters "Culdees," "the pure Culdee," a blameless presbyterian, almost prehistoric, has been claimed as the ancestor of Scottish presbyterianism; and episcopacy has been regarded as a deplorable innovation. The Irish church has paid more reverence to St Patricius than to Palladius (373–463), and the church of St Patricius, himself a figure as important as obscure, certainly abounded in bishops; according to Angus the Culdee there were 1071, but these cannot have been bishops with territorial sees, and the heads of monasteries were more potent personages.

The Dalriadic settlers in Argyll and the Isles, the (Irish) Scots, were Christians in the Irish manner. Their defeat by the Picts, in 560, induced the Irish St Columba to endeavour to convert the conquering Picts. In 563–565 he founded his mission and monastery in the isle of Iona, and journeying to Inverness he converted the king of the Picts. About the same date (573), the king of Cymric Strathclyde summoned, from exile in Wales, St Kentigern, the patron saint of Glasgow, who restored a Christianity almost or quite submerged in paganism, Celtic and English. The pagan English of Deira (603) routed under Æthelfrith the Christian Scots of Argyll between Liddesdale and North Tyne; and pagan English for more than a century held unopposed the

region from Forth to Humber. In 617 Æthelfrith fell in battle with the English of East Anglia, and his sons, Eanfrid and Oswald, fled to the North. Eanfrid, by his marriage with a Pictish princess, became the father of the Pictish king Talorcan, while Oswald was baptized into the Columban church at Iona. In a season of war and turmoil Oswald won the crown of the north-east English kingdom, stretching to the Forth, with its capital at Eadwinsburgh (? Edinburgh, a dubious etymology), and in that kingdom St Aidan, from Iona, erected the Columban churches under the auspices of Oswald, whose brother Oswin dominated Strathclyde and Pictland up to the Grampians; the English element, for the time, extending itself and anglicizing more and more of the Scotland that was to be.

Thus the Dalriadic Scots had handed on the gift of Irish Christianity, with such literature as accompanied it in the shape of Latin, and reading and writing, to the northern English from Forth to Humber. The ecclesiastical constitution thus introduced was one of missionary monastic stations, settled in fortified villages. The Celtic church, unluckily, differed from the Roman on the question of the method of calculating the date of Easter, the form of the tonsure, and other usages, one of them apparently relating to a detail in the celebration of the Holy Communion. From a letter to Pope Boniface IV. of an Irish saint Columbanus, who led twelve Irish monks into Gaul and Burgundy, the Celtic church appears to have denied that the papal jurisdiction extended beyond the limits of the Roman empire. Consequently Rome would have no jurisdiction in the affairs of the Irish church established in Scotland and the north of England. The results would be the severance of these regions from the main current of western ecclesiastical ideas. Conceivably these sentiments of Columbanus never wholly died out in the Scottish kingdom of later history, whose kings were always apt to treat Rome in a cavalier manner, laughing at interdicts and excommunications. A papal legate, in Bruce's time, was no more safe, if his errand was undesirable, than under John Knox, when Mary Stuart wore the crown. "All the world errs, Rome and Jerusalem err, only the Scoti and the Britones are in the right" is quoted as the opinion of the Scoti and Britones in 634. It appears that Scotland was naturally Protestant against Rome as soon as she was Christian.

Meanwhile Rome was too strong, and in 604, in a synod held at Whitby, St Wilfrid procured the acceptance of Roman as against Celtic doctrine in the questions then at issue. The English Christians overcame the Celtic divines of Iona, and in 710 even in Pictland they came into the customs of western Christianity. The church of the Celtic tribe thus yielded to the church of the Roman empire.

There followed an age of war in which the northern English were routed at Nectan's mere, in Forfarshire, and driven south of Forth. In the quarrels of Picts and of Scots of Argyll, the Pictish king, Angus MacFergus (ob. 761), was victorious while in his prime, and then consolidated Pictland; but (802–839) the Scandinavian sea-rovers began to hold large territories in Scotland, weakened the Picts, and made easy their conquest by Kenneth MacAlpine of Kintyre, the king of the Dalriad Scots of Argyll. In 860 this Scot became king of the Picts. Old legends represent him as having exterminated the Picts to the last man; and the Picts become, in popular tradition, a mythical folk, hardly human, to whom great feats, including the building of Glasgow cathedral, are attributed, as the walls of Tiryns and Mycenae in Greece were traditionally assigned to the energy of the Cyclopes. In 1814 Sir Walter Scott met a dwarfish traveller in the Orkneys, whom the natives regarded as a "Pecht" or Pict.

Wars of Picts and Scots.

There was, of course, in fact, no extermination of the Picts, there was merely a change of dynasty, an alliance between Picts and Scots, and that change was probably made in accordance with Pictish customs of succession. Kenneth MacAlpine, though son of a Scottish father, was probably, though not certainly, a Pict on the mother's side, and in Pictland the crown was inherited in the female line. The consequence was that what had been Pictland came to be styled Scotland. The king of Alban was a Scot in the paternal line. His conquest was not achieved at a blow, but his language, Gaelic, prevailed. Henceforth, despite the incursions of the Scandinavians, and partly because of them, the ecclesiastical and royal centres of life are moved to the south and the east, though the king of Alban (*Ardrigh*) is not aways master of his *Ri*, or subordinate princes of the seven provinces (*Mortuath*). His position is rather that of an overlord, or Bretwalda, like Agamemnon's among the Achaean *anaktes*. He allies himself with Cymric Strathclyde, and by constant raids, and thanks to English weakness caused by Danish invasions, he extends his power over English Lothian. A marriage of the daughter of Kenneth MacAlpine with the Welsh prince of Strathclyde gives Scotland a footing in that region; in short, Scotland slowly advances towards and even across the historic border.

Through this contact with and actual tenure of English lands arose the various so-called "submissions" of kings of Scotland to the English crown. Thus (924) the *English Chronicle* asserts that Constantine, king of Scotland, "chose Edward King to father and lord." It is impossible here to analyse the disputes as to whether, in Freeman's words, "from this time to the 14th century" (he means, to Bannockburn) "the vassalage of Scotland was an essential part of the public law of the Isle of Britain." In fact this vassalage was claimed at intervals by the English kings, and was admitted by Scottish kings for their lands in England; but as regards Scotland, was resisted in arms whenever opportunity arose. Each submission "held not long," and the practical result was that (945) Malcolm acquired northern Strathclyde, "Cumberland, Galloway (?) and other districts," while another Malcolm (1018) took Lothian, the northern part of Northumbria, after winning a great battle at Carham on the Tweed.

Connexions with England.

The Celts, Scoto-Picts, of Alban, had thus annexed a great English-speaking region, which remained loyal to their dynasty, the more loyal from abhorrence of the Norman conquerors. The English or anglicized element in Scotland was never subjugated by England, save during the few years of the Cromwellian Commonwealth, and was supported (with occasional defections, and troubles caused by dynastic Celtic risings) by the Celtic element in the kingdom during the long struggle for national independence. Scotland, in short, was too English to be conquered by England. Poor, distracted, threatened on occasion by the Celts on her flank and rear, anglicized Scotland preferred her poverty with independence, to the prosperity and peace which England would have given, if unresisted, but never could impose by war. Her independence, her resistance, curbed the conquering ambitions of England abroad; and it went for something in securing the independence of France, and the success of Protestantism, where it succeeded.

A sturdy and stoical temper was developed in the nation, which later helped parliamentary England in the struggle against the crown (1643–1648). Habits of foreign adventure and of thrift were evolved, which were of advantage to the empire when, too long after the union of 1707, Scottish men were admitted to participate in its privileges and in its administration. Such were the consequences, in the sequel, of what seemed a disastrous event, the absorption, by a Celtic kingdom, of a large and fertile region of northern England.

The English element in the realm of Malcolm II. (1005–1034) was the conducting medium of western ideas which naturally appealed to the interests and the ambitions of that prince. On looking at the genealogical tree of the dynasty of Kenneth MacAlpine, we see that from the date of his death (859) to the accession of Duncan on the death of Malcolm II. (1034) no monarch is succeeded by his own son or grandson. The same peculiarity appears in the list of the ancient kings of Rome, but these are entangled in mythology. In the dynasty of Kenneth the succession to the crown alternated thus: he was succeeded by his brother Donald, who was followed by his nephew, Kenneth's son, Constantine; Constantine's brother, Aodh, followed; and henceforth till 957, the kings were alternately chosen from the houses of Constantine

Dynasty of Malcolm II.

and Aodh. It was the custom to appoint the successor to the king, his "Tanist," at the same time as the king himself. Malcolm II. succeeded his own cousin, and, in accordance with the native system of royal inheritance, should have been followed by the unnamed grandson of his own predecessor, Kenneth III. But Malcolm is accused of putting his legitimate successor out of the way, and thus securing the succession of his own grandson, Duncan, a son of his daughter, Bethoc, and her husband Crinan, protector of the abbey (or lay abbot) of Dunkeld. Malcolm thus set the example of advance to the western system of royal successions, while in Crinan's lay tenure of the abbacy of Dunkeld we see the habit of appropriating ecclesiastical revenues which again became so common about a century before the Reformation.

The innovation of Malcolm II. brought not peace but a sword. Boedhe, son of Kenneth III., left a daughter, Gruach, who inherited the claims of the unnamed son of Boedhe slain by order of Malcolm. Gruach married Gilcomgain, and had issue male, Lulach. After the death of Gilcomgain, Gruach wedded Macbeth, Mormaor (or earl in later style) of the province or subkingdom of Moray; Macbeth slew Duncan, and ruled as protector of the legitimate claims of Lulach. From Lulach descended a line of Celtic *prétendants*, and for a century the dynasty violently founded by Malcolm II. was opposed by claimants of the blood of Lulach, representing the Celtic customs adverse to the English and Norman ideas of the family in possession of the throne. Thus Celtic principles, as opposed to the western principles of chartered feudalism, did not perish in Scotland without a long and severe struggle.

Meanwhile the dynasty of Malcolm II. was brought into close connexion with the English crown, and relied on English support, both before and after the Norman Conquest. The genius of Shakespeare, in his *Macbeth*, based on legendary materials borrowed by Hollinshed from Hector Boece, and on the dynastic myth of the descent of the Stuart kings from Banquo, has clouded the actual facts of history. To the Celts of Scotland, or at least to those of the great subkingship or province of Moray, Duncan, not Macbeth, was the usurper. Duncan left sons, Malcolm, called Canmore (great head), and Donald Ban; and in 1054 Siward, earl of Northumbria, defeated Macbeth, whether acting under the order of Edward the Confessor in favour of the claims of Malcolm Canmore, or merely to punish Macbeth for sheltering Norman fugitives from the Confessor's court. The latter *casus belli* is the more probable, though the chronicler, Florence of Worcester, asserts the protection of the sons of Duncan by England. Siward did not dethrone Macbeth, who was defeated and slain by Malcolm in 1057; Lulach fell obscurely in 1058, leaving claimants to his rights, though these did not trouble much the crowned king, Malcolm Canmore. His long reign (1058–1093), and his second marriage (1068) with Margaret, sister of Edgar Ætheling, of the ancient English royal blood—dispossessed by the Norman Conqueror—intensified the sway of English ideas in Scotland, and increased the prepotency of the English element in political, social and ecclesiastical affairs. The anarchic state of Northumberland and Cumberland after the Norman Conquest, which did not soon assimilate them, was Malcolm's opportunity. He held Cumberland (1070), and supported the claims of his brother-in-law, the Ætheling, while his relationship with Gospatric, earl of Northumbria, who retired into Scotland, gave him pretexts for invading the north-east of England. William the Conqueror's earl of Northumberland, Robert de Comines, was slain at Durham in 1069, and the houses of Gospatric (earls of Dunbar and March) and of de Comines (the Comyns of Badenoch) were long puissant in Scottish history.

Malcolm Canmore.

In 1072 William marched north and took a disputed homage of Malcolm at Abernethy, receiving as hostage the king's eldest son (by his first wife, Ingebiorge), named Duncan. As to the nature of Malcolm's homage, whether for Scotland (Freeman), or for manors and a subsidy in England (Robertson), historians disagree. Malcolm subdued "the King of Moray," son of Lulach, who died in far Lochaber, though his family's claims to the crown of Scotland did not lapse. In 1091 William Rufus renewed the treaty of Abernethy with Malcolm and fortified Carlisle, thereby cutting Malcolm off from Cumberland; Malcolm was summoned to meet Rufus at Gloucester; he went, but declined to accept the jurisdiction of the Anglo-Norman peers, or to "do right" to Rufus, except on the frontier of the two realms, wherever he may have supposed that frontier to be. He was an independent king, no vassal of England; as such (1093) he invaded Northumberland, and was slain at Alnwick. His wife, St Margaret, did not survive her sorrow; she died in the castle of Edinburgh. Her reforms in church matters had apparently made her unpopular with the Celts, but under cover of a mist her body was conveyed to and buried at Dunfermline.

Margaret, in fact, completed the reduction of the Celtic church in Scotland to conformity with western Christendom, and some recent presbyterian writers have not forgiven her. Beautiful, charitable and pious, she mollified the fierce manners of her husband, who, according to her director and biographer, Turgot, acted as interpreter between her and the Gaelic-speaking ecclesiastics at their conferences. Certain obscure religious usages, as regards Lent, the Communion, the non-observance of Sunday, non-communicating at Easter, and the Forbidden Degrees in marriage, were brought into conformity with western Christendom. The last Celtic "bishop of Alban" died at this time; and when the dynasty of Malcolm Canmore was established after an interval of turmoil, English ecclesiastics began to oust the Celtic Culdees from St Andrews.

Malcolm would have been succeeded by his eldest son by Margaret, Edward, but he fell beside his father at Alnwick, and the succession was disputed between Duncan, son of Malcolm by his first wife; Edmund, eldest surviving son of Malcolm and Margaret; and Donald Ban, brother of Malcolm. The Celts (apart from the claimant of the blood of Lulach and the house of Moray) placed Donald Ban on the throne; England supported Duncan (by primogeniture Malcolm's heir, and a hostage in England); there was division of the kingdom till Duncan was slain, and Edgar, son of Malcolm and Margaret, was restored by Edgar Ætheling. He put out the eyes of his uncle, Donald Ban, and in unsaintly ways established the dynasty of the English St Margaret and of the Celtic Malcolm. In 1103 Edgar's sister, Eadgyth (Matilda), married Henry I.; the dynasty of Scotland now shows, by the names of its members, that the English element in it was predominant. After Donald Ban no Scottish sovereign bears a Gaelic Christian name save Malcolm the Maiden; and perhaps no later king knew Gaelic.

Edgar, before his death, established his brother, Alexander I., as king of Scotland, north of Forth and Clyde, with Edinburgh, which looks as if he considered Forth and Clyde the frontier of what was legally Scotland; while his younger brother, David, as earl, ruled Lothian and Cumbria. The reign of Alexander I. is marked by war with the northern Celts, and by the introduction of English bishops of St Andrews, while the claims of the see of York to superiority over the Scottish church were cleverly evaded at Glasgow (David's bishopric), as well as at St Andrews, where English Augustinian canons were now established, to the prejudice of the Celtic Culdees. We observe that the chief peers of Alexander, who signed the charter of his monastery at Scone, are Celts—Heth, earl of Moray (husband of the daughter of Lulach), Malise of Strathearn, Dufagan of Fife, and Rory. After the death of Alexander I. (1124) his successor, David I., is attended by men of Norman names, Moreville, Umfraville, Somerville, Bruce, FitzAlan (the ancestor of the Stewards of Scotland, and himself of an ancient Breton house), and so on.

Alexander I.

David, educated in England by Normans, was the maker of a Scotland whereof the anglicized part at least was now ruled by Anglo-Norman feudalism and Anglo-Norman municipal laws in the burghs. Marrying Matilda, widow of Simon de St Liz and heiress of Waltheof, David received the earldom of Huntingdon and supposed himself to have claims over Northumberland, a cause of war for three generations. With Anglo-Norman aid he repelled a Celtic rising—the right of

David I.

the claimants to represent the blood of Lulach is exquisitely complex and obscure in this case—but in the end David annexed to the crown the great old sub-kingdom or province of Moray, and made grants therein to English, Norman and Scottish followers.

Some of the most eminent of his southern allies could not stand by David when, in the reign of Stephen and in fidelity to the cause of his niece, the empress Matilda, daughter of Henry I., he invaded England. The towns of Northumberland and Cumberland opened their gates, but he and Stephen met in conference at Durham, and David's son Henry, prince of Scotland, received the Honour of Huntingdon, Carlisle, Doncaster "and all that pertains to them" (1135). Stephen's relations with Henry became unfriendly, and in January 1138, in pursuance of Henry's claim to Northumberland, David again invaded. A holy war against him was proclaimed by the archbishop of York, and on the 22nd of August 1138 Bruce, Baliol, and others of David's southern allies renounced fealty to him, and he was defeated at the battle of the Standard, near Northallerton. David regained the shelter of Carlisle, a legate from Rome made peace, and Prince Henry received the investiture of Northumberland, without the strong fortresses of Bamborough and Newcastle.

The anarchic weakness of the reign of Stephen enabled David to secure his hold of northern England to the Till, but the death of his gallant and gentle son Henry, in June 1152, left the succession to his son, Malcolm the Maiden, then a child of ten, and David's death (24th of May 1153) exposed Scotland to the dangers of a royal minority.

David was, if any man was, the maker of Scotland. The bishopries erected by him, and his many Lowland abbeys, Holyrood, Melrose, Dryburgh, Kelso, Jedburgh and others, confirmed the freedom of the Scottish church from the claims of the see of York, encouraged the improvement of agriculture and endowed the country with beautiful examples of architecture. His charters to landowners and burghs (charters not being novel in Scotland, but now more lavishly conferred) substituted written documents for the unwritten customs of Celtic tenure, and converted the under kings of provinces into earls of the king, while *vice-comites*, or sheriffs, administered local justice in the king's name, though Celtic custom still prevailed, under a thin veneer of law, in the Celtic regions, as in Galloway. Where Anglo-Normans obtained lands in Moray and Renfrewshire, there seems to have been no displacement of the population: though a FitzAlan was dominant in Renfrewshire, the "good men," or gentry, still bore Gaelic names, till territorial names—"of" this or that place—came into use. In Lothian the place-names recorded in charters were already, for the most part, English. Beneath the freeholders and *noblesse* were free tenants, farmers paying rents, mainly in kind, and in services of labour and of war. Below these were the *nativi*, attached to the land, and changing masters when the land changed hands. These *nativi* were gradually emancipated, partly through the influence of the church, partly for economic reasons, partly through the rule that any *vilein* became free after a year's residence in a burgh.

Social and political growth.

Thus Scotland never saw a *jacquerie* or servile rising. The burghs were not actually the creations of David and William the Lion, but the rights, duties and privileges which had gradually developed in the towns were in the time of these kings codified and confirmed by charters; the towns had magistrates of their own election, courts, and legalized open markets. The greater burghers had a union, and made laws and regulations for municipal affairs. In addition to royal burghs, there were burghs of nobles and of bishops, and the provostship was apt to become, by custom, almost hereditary in a local noble family, which protected the burgesses.

The germ of a parliament existed in the crown vassals and the royal officials—chancellor, steward, constable, marischal and the rest—with bishops, priors, earls, barons and other *probi homines*. The term *tota communitas*, "the whole community," appears to denote all freeholders of gentle birth, who might be present at any important assembly for the discussion of national affairs. Burgesses do not yet receive mention as present on such occasions.

Scotland was as yet, and in fact remained, destitute of constitutional history as it appears in England. There was, technically speaking, no taxation. The king "lived on his own," on rent of crown lands, feudal fines and aids, wardships, marriages, and the revenues of vacant bishoprics. Opposition used the mechanism of conspiracies; and changes of administration were effected by the seizure of the king's person, especially during the many royal minorities.

In the matter of justice, royal succeeded to tribal authority. Offences were no longer against the individual and his kin, but against the king's peace, or against the peace of subordinate holders of courts—earls, thanes, barons, bishops and abbots. Compurgation, the ordeal, and trial by battle began to yield to *Visnet, Jugement del Pais*, the "good men of the country," giving their verdict, while sentence was passed by the judge, sheriff, alderman or bailiff. "The Four Pleas of the Crown," murder, arson, rape and robbery, were relegated to the king's court, under Alexander II. ruled by four grand justiciaries. While Roman law became the foundation of justice, a learned clerk was needed as assessor and developed into the Lord Justice Clerk. The *vice-comes*, or sheriff, as the king's direct representative, was the centre of justice for shires, and his judicature tended to encroach on that of noble holders of courts. Royal authority, sheriffs, juries and witnesses gradually superseded ordeal, compurgation, and trial by battle, though even barons long retained the right of "pit and gallows."

In the matter of education, the monasteries had their schools, as had the parish churches, and there were high schools in the burghs, and "song-schools." From the time of David to the death of Alexander III. Scotland was relatively peaceful, prosperous, and, in the south, anglicized, and was now in the general movement of western civilization.

Malcolm the Maiden, before his early death in 1165, had put down the menacing power of Somerled, lord of the Isles, a chief apparently of mixed Celtic and Scandinavian blood, the founder of the great clan of Macdonald, whose chiefs, the lords of the Isles, were almost royal; Malcolm also subdued the Celts of Galloway, sometimes called Picts, but at this time Gaelic in speech.

Malcolm's brother, William the Lion (1165–1214), initiated the French alliance, fondly ascribed to the time of Charlemagne. William's desire was to seize Northumberland; in 1173 he was allied with Henry, the rebellious son of Henry II., himself in alliance with France. The capture of William at Alnwick, in July 1174, permitted a Celtic revolt in Galloway, and necessitated the Treaty of Falaise, by which for fifteen years Scotland was absolutely a fief of England, though the clergy maintained their independence of the see of York, which was recognized by Pope Clement III. in 1188. In a quarrel of church and state the legate had been authorized to lay an interdict on Scotland; William and the country merely disregarded it; and in 1191 a new pope absolved the Scottish king. The Celtic risings now were made in defence of the royal claims of a descendant of Duncan, son of Malcolm Canmore; there were also MacHeth claimants to the old rights of Lulach; Galloway and the Celtic north were ceaselessly agitated.

William the Lion.

After the death of Henry II. in 1189, Richard I. sold back to Scotland all that his father had gained by the Treaty of Falaise, and William only became Richard's man—for all the lands for which his predecessors had been liegemen to the English kings, a vague phrase but implying that the king of Scotland was not liegeman for Scotland. To John, William did homage (1200) *salvo jure suo*. In 1209 he promised to purchase John's goodwill with 15,000 merks, and gave hostages. Peace was preserved till William died in 1214.

In the reign of his successor, Alexander II., the risings of Celtic claimants died out; he converted Argyll into a sheriffdom, and (1237) resigned the claims to Northumberland, in exchange for lands in the northern English counties with a rental of £200 yearly. His death in 1249 left the crown to his son, Alexander III., a child of eight, in whose minority began the practice by which parties among the nobility seized the person of the sovereign. At the age of ten, Alexander,

Alexander III.

at York, wedded a child bride, Margaret, daughter of Henry III. His boyhood was distracted by vague party strifes, but Henry did not attempt to administer his country. In 1261 his queen bore, at Windsor, a daughter, Margaret, who later, marrying Eric, king of Norway, became the mother of "The Maid of Norway," heiress of Alexander III.; the girl whose early death left the succession disputed, and opened the flood-gates of strife. Alexander (1260) won the western isles and the Isle of Man from Norway, paying 4000 merks, and promising a yearly rent of 100 merks. In 1279 Alexander did homage to Edward I. at Westminster, *salvo jure suo*, and through the lips of Bruce, earl of Carrick. The homage was vague, "for the lands which he holds of the king of England," or according to the Scottish version, "saving my own kingdom." On the death of Alexander's daughter, Margaret of Norway (1283), and of his son, the prince of Scotland, without issue, the estates, at Scone, recognized Margaret's infant daughter as rightful successor. At this assembly were Bruce, earl of Annandale; Robert de Brus, earl of Carrick (later king), his son; Comyn, earl of Buchan; John Baliol; and James the Steward of Scotland, of the house of FitzAlan. On the 19th of March 1286 Alexander died, in consequence of a slip made by his horse on a cliff near Kinghorn during a night ride. His death was the great calamity of Scotland, and is lamented in a famous fragment of early Scottish verse. The golden age of "The Kings of Peace" was ended.

The first step of the Scottish noblesse (mainly men of Norman names), after Alexander's death, was to send a secret verbal message to Edward of England. Six custodians of the realm were then appointed, including the bishop of Glasgow (Wishart) and the bishop of St Andrews (Frazer). Presently the nobles formed two hostile parties, that of the Bruces and that of Baliol. The Bruce party took up arms, and from the terms of their "band," or agreement, obviously contemplated resistance to the rights of the Maid of Norway, while declaring their fealty to Edward. In 1286–1289 Scotland was on the verge of civil war. Edward procured a papal dispensation for the marriage of the Maid of Norway to his son Edward; the Scots were glad to consent, and preliminaries were adjusted by the Treaty of Birgham (18th of July 1290). All possible care was taken by the Scots to guard their national independence, but Edward succeeded in inserting his favourite clause, "saving always the rights of the King of England, which belonged, or ought to belong, to him." As the Bruce faction had asserted their fealty to Edward, the carefully patriotic attitude of the Scots may be ascribed to the two bishops, who did not consistently live on this level. In August Edward ventured a claim to the castles of Scotland, which was not admitted. By the 19th of August it was known that the child queen had arrived in the Orkneys. An assembly was being held at Scone; the Bruces did not appear, but, by the 7th of October, they arrived in arms, on a rumour of the queen's death. The bishop of St Andrews tells Edward of these events, and urges him to come to the border, to preserve peace. The bishop of St Andrews was for Baliol, he of Glasgow was for Bruce; and the Baliol party, the seven earls complain, was ravaging Moray. These seven earls appear to represent the old rulers of the seven provinces of Pictland, and asserted ancient claims to elect a king. The Bruces placed themselves under Edward's protection. In March 1291 he ordered search to be made for documents bearing on his claims in the English clerical libraries, and summoned his northern feudal levies to meet him at Norham on Tweed, fully armed, in June. Hither he called the representatives of Scotland for the 10th of May; on the 2nd of June the eight claimants of the crown acknowledged him as Lord Paramount, despite a written protest of the *communitas* of Scotland; obscurely mentioned, and not easily to be understood. Edward took homage from all, including burgesses even, at Perth; his decision on the claims was deferred to the 2nd of June 1292 at Berwick.

Bruce and Baliol parties.

The choice lay between descendants in the female line of David of Huntingdon, younger brother of William the Lion. John Baliol was great-grandson of this David, through his eldest daughter; Bruce the old was grandson of David through his second daughter, and pleaded that, by Scottish custom, he was David's heir. He also pleaded a selection of himself as successor by Alexander II., before the birth of Alexander III., but of this he had no documentary evidence. On the 17th of November 1292 Edward decided, against Scottish custom (if such custom really existed), in favour of Baliol, who did fealty, and, amidst cries of dissent, was crowned at Scone on the 26th of December.

John Baliol crowned.

Edward instantly began to summon John to his courts, even on such puny matters as a wine-merchant's disputed bill. He appeared to aim at driving Baliol into rebellion and annexing his kingdom. In 1293 Edward refused to obey a similar summons from the king of France, and in 1294 was fighting in Gascony. Baliol declined to follow his standard and negotiated for a French alliance. Edward ordered Baliol's English property to be confiscated; Baliol renounced his fealty, and English merchants were massacred at Berwick. The Comyns failed in an attack on Carlisle, and (30th of March 1296) Edward took Berwick, seized William Douglas (father of the Good Lord James), and massacred the male populace. A disorderly levy of Scots, appearing on the hills above Dunbar, left their strong position (like Leslie later) and were defeated with heavy loss. Robert Bruce was now of Edward's party; the nobles in a mass surrendered and Edward was unopposed. He seized the Black Rood, the coronation stone of Scone, St Margaret's fragment of the True Cross, and many documents; then he marched north as far as Elgin. The Ragman's Roll contains sworn submissions of all *probi homines* outside of the western thoroughly Celtic region; and, in October 1296, Edward returned to England, with Baliol his prisoner, leaving Scotland in the hands of the earl of Surrey as guardian, Cressingham as treasurer, and Ormsby as justiciary.

Intervention by England.

Agitation at once broke out, and, when Edward went abroad in June 1297, he left orders for suppression of assemblies (*conventiculae*). Now Sir William Wallace came to the front, a younger son of Sir Malcolm Wallace of Elderslie, near Paisley. The family probably came from England with the FitzAlans, the hereditary Stewards of Scotland. The English chroniclers call Wallace *latro*, "a brigand," and he probably was a leader of broken men, discontented with English rule. Sir Thomas Gray, son of an English gentleman wounded in a rising at Lanark in May 1297, says that Wallace was chosen leader "by the *commune* of Scotland," and began operations by slaying Heselrig, sheriff of Clydesdale, at Lanark. The Lanercost contemporary chronicler writes that the bishop of Glasgow and the Steward began the broil, and called in Wallace as the leading brigand in the country-side. Wallace, in fact, was a gentleman of good education. Percy and Clifford led the English forces to suppress him, and (7th July) made terms with the bishop, the Steward and Robert Bruce, who submitted; but Wallace held out in Ettrick Forest. Sir William Douglas was kept a prisoner for life, but Andrew Murray was out in Moray, with a large following. The nobles who had submitted made delays in providing hostages, and Warenne marched from Berwick against Wallace, who, by September 1297, was north of Tay.

Wallace.

On hearing of Warenne's advance, Wallace occupied the Abbey Craig at Stirling, commanding the narrow bridge over the Forth; the Steward and Lennox attempted pacific negotiations; a brawl occurred; and next day (11th of September) the English crossed Stirling bridge, marched back again, recrossed, and were attacked in deploying from the bridge. The general, Warenne, was old and feeble. Cressingham was hasty and confident; counsels were confused, the manner of attack was rash, and the rout was sanguinary. Cressingham was slain, and Warenne fled to Berwick. Pursuing his victory, Wallace ravaged Cumberland, most English writers say with savage ferocity; but Hemingburgh represents Wallace as courteous on one occasion, and as confessing that his men were out of hand.

By the 29th of March 1298 Wallace appears, in a charter granted by himself, as guardian of the kingdom, and, with

Andrew Murray, as army leader in the name of King John—that is, the captive Baliol. By June 1298 Robert Bruce is active in the service of Edward, in Galloway. Edward was moving on Scotland, and on the 22nd of July he found Wallace in force, and in a strong position, guarded by a morass, at Falkirk. The Scottish horsemen fled from the English cavalry, but the archers of Ettrick fought and died round Sir John Stewart of Bonhill, brother of the Steward. The *schiltrons*, or squares of Scottish spearmen, were unbroken by Edward's cavalry, till their ranks were thinned by the English bowmen and could no longer keep out the charging horse. Wallace had made the error of risking a general engagement in place of retiring into the hills; to do this had, it is said, been his purpose, but Edward surprised him, and Wallace disappears from the leadership, while the wavering Robert Bruce appears in command, with the new bishop of St Andrews, Lamberton; Lord Soulis; and the younger Comyn, "the Red Comyn" of Badenoch. For want of supplies, Edward returned to England through Annandale, burning Bruce's castle of Lochmaben. Stirling still held out for England. There is certain evidence of fierce dissensions in some way connected with Wallace, among the Scottish leaders (August 1299). Wallace was going to France; the Scottish leaders were reconciled to each other, and took the castle of Stirling, which they entrusted to Sir William Oliphant. The Scottish cause seemed stronger than ever, under Bruce, the Steward, the Red Comyn and Lamberton, but in June 1300 Edward mustered a splendid array, and took Carlaverock castle, but, on the arrival of the archbishop of Canterbury with a letter from the pope approving of the Scottish cause, he granted a truce till Whitsuntide 1301. The barons of England angrily refused to submit to the papal interference, but nothing decisive was attempted by Edward, though Bruce had again entered his service. By 1303 France (which doubtless had moved the pope to his action) deserted the Scots in the Treaty of Amiens, and Edward, with little opposition, overran Scotland in 1303.

On the 9th of February 1304 Comyn with his companions submitted; they hunted Wallace, who had returned from the continent, and on the 24th of July the brave Oliphant surrendered Stirling on terms of a degrading nature. Among his officers we see the names of Napier, Ramsay, Haliburton and Polwarth.

The noblest names of Scotland now took part in the pursuit of Wallace, who, as great in diplomacy as in war, had visited Rome (he had a safe-conduct of Philip of France to that end), and had at least secured a respite for his country. It seems probable that Wallace remained consistently loyal to Baliol, and hostile to the party of the wavering Bruce. He was taken near Glasgow, in his own country, and handed over to England by Sir John Menteith, sheriff of Dumbartonshire. Menteith certainly received the blood-money, £100 yearly in land, and Wallace, like Montrose, was hanged, disembowelled and quartered (at London, August 1305). Tradition attributes to Wallace strength equal to his courage. His diplomacy in France proves him to have been a man of education, and his honour is unimpeached; he never wavered, he never was liegeman of Edward, while bishops, nobles, and, above all, Bruce, perjured themselves and turned their coats again and again. The martyr of an impossible loyalty, Wallace shares the illustrious immortality of the great Montrose, and is by far the most popular hero of his country's history. His victory at Stirling lit a fire which was never quenched, and began the long and cruel wars of independence on which Scotland now entered.

For an hour there seemed as if there might be no raising of the fallen standard of St Andrew. Edward had not yet alienated the country by cruelty, save in the case of Wallace and the massacre of Berwick. He aimed at a union of the two countries, and Scottish representatives were chosen to sit in the English parliament. The laws of David I. were to be revised. Eight justices were appointed, the sheriffs were mainly Scots of the kingdom; the bishop of St Andrews was one of the Scottish representatives. The country was being reorganized, ruined churches and bridges were being rebuilt. The "commons," the populace, were eager for peace; nobles like Bruce were Edward's men. Bruce had been actively engaged in the siege of Stirling, and had succeeded his father as earl of Annandale. Yet, during the siege of Stirling (11th of June 1304), Bruce had entered into a secret band with Lamberton, bishop of St Andrews, for mutual aid. Early in February 1306 he stabbed the Red Comyn before the high altar, in the church of the Franciscans at Dumfries: Comyn's uncle was also slain, and Bruce, from his castle of Lochmaben, summoned his party to arms; he was supported by the bishops of St Andrews and Glasgow, and by Sir James of Douglas, and was promptly crowned by the countess of Buchan, representing the clan MacDuff, at Scone.

Bruce.

The cause of the slaying of Comyn is unknown; the two men had long been at odds, but the evidence does not confirm the story that Comyn had betrayed Bruce to Edward. It is more probable that Comyn merely refused to be drawn by Bruce into a rising, and that the deed was unpremeditated. Be that as it may, Bruce had now no place of repentance for a sacrilegious homicide; he could not turn his tabard again; he was outlawed, forfeited and excommunicated. He had against him, not merely England, but the kith and kin of Comyn, including the potent clan of MacDowall or MacDougall in Galloway and Lorne, on his own side he had his kinship, broken men, and the clergy of Scotland. Heedless of the excommunication they backed him, and the preaching friars proclaimed his to be a holy war.

Bruce was warring in Galloway when, in May 1306, Aymer de Valence led an English force to Perth. Bruce followed, and was defeated in Methven wood; the prisoners of rank, his brother Nigel, and Atholl, with others, were hanged, and his two bishops were presently secured. "All the Commons went him fra," says Barbour, the poet chronicler. His queen, with Lady Buchan and his sister, were imprisoned; and his castles were held against him. He took to the heather, making for the western seas, hewing his way through the MacDougals at Tyndrum and marching over the mountains to Loch Lomond, which he crossed in a canoe. Sir Nial Campbell of Lochow, founder of the house of Argyll, secured shipping for him, and he reached a castle of Macdonald of Islay (Angus Og), his ally, at Dunaverty in Kintyre. He was driven to an isle off the Irish coast; he thence joined Douglas in Arran, and by a sudden camisade he butchered the English cantoned under his own castle of Turnberry in Carrick. Two of his brothers were taken in Galloway and hanged at Carlisle, while King Edward, a dying man, lay with a great army at Carlisle, or at the neighbouring abbey of Lanercost. Aymer de Valence, Butetourte, Clifford, and Mowbray were sent to net and "drive" the inner wilds of Galloway, where Bruce lurked in the forests and caves of Loch Trool and Loch Dungeon. Now he evaded them, now he and his valiant brother Edward surprised and cut them up in detail, doing *miracula*, says a contemporary English chronicler. Douglas, an excellent guerilla leader, captured his own castle and butchered the English garrison. By the 15th of May 1307 a writer of a letter from Forfar says that if Edward dies his cause in Scotland is lost. Bruce slipped into Ayrshire and defeated de Valence at Loudon Hill; so Edward, a dying man, began to move against him with his whole force. He died (7th of July 1307) at Burgh-on-Sands, leaving his incompetent son to ruin himself by his own follies, while ferocious hangings and dragging of men to death at horses' heels roused the Scottish Commons, and the men of Ettrick and Tweeddale, renouncing their new lord, de Valence, came over to the wandering knight who stood for Scotland.

In the winter of 1307 and in 1308 Bruce ruined Buchan, a Comyn territory, and won the castles of Aberdeen and Forfar, while Edward Bruce cleared the English out of Galloway. In the summer of 1309 Bruce fell on the MacDougals, on the right side of the Awe, where it rushes from Loch Awe at the pass of Brander, and, aided by a rear attack led by Douglas, seized the bridge and massacred the enemy. He then took the old royal castle of Dunstaffnage and drove the chief, John of Lorne, into England; Menteith, the captor of Wallace, changed sides, and

Edward, after a feeble invasion in 1310, retreated from a land laid desolate by the Scots.

In 1311 Bruce carried the war into England, seconded by the most audacious if the least skilled of his captains, his daring brother Edward. For two years the north of England, as far south as Durham and Chester, was the prey of the Scots, and some English counties secured themselves by paying an indemnity. The castles of Carlisle and Berwick, however, repelled the assailants, but Perth was surprised, in January 1313, Bruce himself leading the advance. Randolph, earl of Murray, took the chief hold in the country, Edinburgh castle, by scaling the precipitous rock to the north, while a feigned attack was being made on the accessible southern front. In short almost every castle held by the English was captured, and the fortifications were destroyed.

In the spring of 1313 Edward Bruce invested Stirling castle, the key of Scotland; on midsummer day he accepted a pact for the surrender of the place if not relieved within a year. This was a heedless piece of chivalry on Edward's part. It gave the English king, less opposed by his nobles since his favourite, Gaveston, was slain, time to muster a large army, which Bruce must meet, if at all, in the open field. Edward II. not only summoned English but Irish levies, and knights of Hainault, Bretagne, Gascony and Aquitaine crowded to his standard. The estimates of numbers by the old writers are usually much exaggerated; modern authorities reckon King Edward's army at 50,000, of whom 10,000 were cavalry. Old accounts put the infantry at 100,000, the horsemen at 40,000. Bruce had but five hundred horse, under Keith the Marischal; Douglas led the levies of his own district and Ettrick Forest; Randolph commanded the men of Moray; Walter Steward, those of the south-western shires; and Angus Og brought to the Scottish standard the light-footed men of the Isles, and, probably, of Lochaber, Moidart, and the western coast in general. Bruce commanded the people of Carrick and probably of his old earldom, Annandale.

Moving out from the Torwood forest, Bruce arrayed his force so as to guard either the Roman road through St Ninians, or the way through the Carse, which was then studded with marshes and small lakes. The former route appeared to be chosen by the English, and Bruce stationed his army in a position where it was defended by a cleugh, or ravine of the Bannockburn, and by two morasses between which was a practicable but narrow neck of firm land. Randolph, on Bruce's left, was to guard against a rush of English cavalry to relieve Stirling castle. The Macdonald tradition is that their clan was on the right wing, under Angus Og; the old accounts place them with Bruce's reserves. Three hundred English horsemen appear to have stolen round Randolph's flank unseen by him, and Bruce is said to have warned him that "a rose had fallen from his chaplet." Randolph advanced with his footmen against the English horse, who unwarily accepted his challenge and were defeated by his spearmen. While Edward's army paused, Bruce, mounted on a palfrey, was attacked by Sir Henry Bohun. Bruce evaded his spear and slew him with an axe stroke; the axe shaft broke in his hand. The omens were evil for England; and her forces bivouacked, reserving the general attack for the following day. Bruce is said to have proposed retreat and a guerilla war, but his council were for fighting.

Bannockburn.

In the general engagement, next day, the English cavalry could not break the "impenetrable wood" of the Scottish spearmen, who, however, were galled by the arrows of the English bowmen, which had broken their formation at Falkirk. Bruce bade Keith, with his five hundred horse, charge the archers in flank: apparently they were unprotected by pikes; they were broken, and the great peril passed away. The Scottish archers charged with axe in hand, and the Scottish right front was protected by a mass of fallen English horses and fighting men; the rear ranks of the English, clogged and crowded, could not reach the foe, and the line of Scottish spears pressed steadily and slowly forward. Now a panic was caused by a rush of camp followers from the "gillie's hill": the English wavered; Bruce commanded an advance of his whole line: the English rout was general, and, had Bruce possessed cavalry, few would have escaped. The Bannockburn was choked with the fallen, and it was only by hard spurring that Edward and his guards reached Dunbar, whence he sailed to Berwick. An immense booty and many ransoms rewarded the Scots, whose victory was one of the decisive battles of the world. It was won by the generalship of Bruce and his captains; by the excellence of his position, by the steadiness of his men, and, obviously, by the reckless fury of the English cavalry, and by the folly which left their archers open to defeat by the Marischal's handful of horse (24th of June 1314).

Bruce now swept the country, but Carlisle he could not take. He married his daughter, Marjory, to the Steward, and from this union came the Stewart (Stuart) dynasty. The invasion of Ireland by Edward Bruce failed (1315–1318), and Edward fell in battle: after which (1318) parliament settled the crown in the Steward's line, failing male descendants of Robert Bruce. He disdained the pope's efforts to make peace with England, except on terms of absolute independence for his country. He took and held Berwick, and (14th of October 1322) defeated Edward with heavy loss near Byland Abbey in Yorkshire, where the highlanders scaled a cliff and drove the English from a formidable position. A thirteen years' truce was arranged in 1323: the pope removed his excommunication from Bruce, and acknowledged him as king: a son, David, was born to him in 1324.

The murder of Edward II. (1327) was followed by successful Scottish raids in the north, and in May 1328 the Treaty of Northampton sealed the triumph of Scotland. David Bruce was to marry Joanna of England: Bruce was recognized as king: former owners of forfeited lands, with three exceptions, were not to be restored. This led, after Bruce's death, to an invasion by the disinherited English ci-devant lords of lands in Scotland, and to a long war from which Scotland was only "saved as by fire." Bruce died, outworn by war and hardships, on the 7th of June 1329: his body was buried in Dunfermline abbey; his heart, which Douglas was bearing to the Holy Land, was brought home again, after Douglas's chivalrous death in battle with the Moors in Spain.

Bruce's death and work.

Bruce, previously so shifty, had never wavered or turned back since he smote the Red Comyn at Dumfries. In face of obstacles apparently insurmountable he had made a nation, consolidating all the forces which Wallace had stirred into life. There is, perhaps, nothing in the history of medieval Europe which so closely resembles a voice from ancient Greece as the reply of the nobles and the whole *communitas* of Scotland to the pope (parliament of Aberbrothock, 6th of April 1320). They will be liegemen of Bruce only so long as he resists England. As long as a hundred Scots are left alive, they will continue the war for freedom, "which no good man loses save with his life." They show that the barbarities of Edward I. (which *he* regarded as reprisals) have made it eternally impossible for Scotland to yield to an English king. Their excommunication by Rome does not trouble them at all. They are free from Rome, from England, from all alien powers. Henceforth, through good and evil fortune, this was the spirit of the nation.

The most important point in constitutional history was the action of a parliament at Cambuskenneth, near Stirling, in 1326. The representatives of the burghs were present: they made a grant of all tenths to the king during his life; while they covenanted with him that he should collect no other taxes and should exercise the privileges of *prisiae et cariagia* with moderation. The long wars had been adverse to commerce, for which ransoms and the booty of Bannockburn made inadequate compensation, But the great abbey church of St Andrews was, none the less, completed, to stand for some two hundred and forty years, and was dedicated in the presence of Bruce.

The brilliant and sustained effort which made Scotland independent was almost paralysed by the deaths of Bruce and

the good Sir James of Douglas, during the minority of David II. (crowned, 24th of November 1331). The disinherited lords, deprived of their lands by Bruce, were headed by Edward Baliol, claiming the crown of Scotland as heir of John Baliol, and secretly backed by England. Randolph died in July 1332, and in August Edward Baliol, with the disinherited lord of Liddesdale, and Beaumont, the disinherited earl of Buchan, and the English claimant of the earldom of Atholl, landed a filibustering force in Forfarshire. They were opposed by the new regent of Scotland, the earl of Mar, who was routed with heavy loss and was slain, at Dupplin, on the 12th of August 1332. The English owed the victory to their archers, whose shafts rolled up a courageous charge by the Scots. Edward Baliol was enabled to seize and fortify Perth and was crowned at Scone, as Edward I. of Scotland (24th of September). On the 23rd of November, at Roxburgh, Baliol acknowledged Edward III. as his liege lord and promised to surrender Berwick and large lands in southern Scotland. The hands on the clock were then put back to the time of the reign of John Baliol. But the earl of Murray, son of Randolph, and Archibald, youngest brother of the Good Lord James of Douglas, surprised Baliol at Annan and drove him, half clad, into England.

David II. Struggle with Edward Baliol.

The struggle was now (1333) for Berwick, which was besieged by Edward III. Archibald Douglas tried to relieve it, just as Edward II. strove to relieve Stirling, and found his Bannockburn on Halidon hill (19th of July 1333), where he was routed and slain, with many of the leaders of the Scots. Scotland was never again to hold Berwick for any length of time: meanwhile a few castles stood out, but the child king was sent over to France for safe keeping. A parliament held by Baliol at Edinburgh (February 1334) ratified the promises made by him to England at Roxburgh: the disinherited lords were in power and many patriots turned their coats. At Newcastle on the 12th of July Baliol surrendered to Edward III. the southern shires of Scotland with their castles: he had already done homage for the whole of Scotland; and Edward III. would have succeeded where Edward I. failed, had not the partisans of Baliol come to deadly feud over matters of their private interests and ambitions. Some took part with Sir Andrew Murray, son of a companion of Wallace, and with the Steward, who contrived to occupy the castle of Dumbarton, the key of western Scotland. These two men, with Campbell of Loch Awe, and Randolph's son, the earl of Moray, held up the national standard and were joined by the English claimant of the earldom of Atholl.

Relations with Edward III.

Randolph's daughter, too, the famous Black Agnes of Dunbar, brought over her wavering husband, the earl of March, to the side of the patriots, and there was a war of partisans, while Edward III. again and again invaded and desolated southern Scotland. In 1335–1336 the English party prevailed, and patriots began to come into the English peace: Atholl again changed his side, but the sister of Bruce held out in Kildrummie castle. Andrew Murray, March and a Douglas, the Black Knight of Liddesdale, went to her relief and slew Atholl: Edward III. (1336) again waged a victorious summer campaign, from Perth as his base, and again found Scottish resistance revive in winter. His rupture with France in October 1337, caused by his claims to the French crown, tended to withdraw his attention from Scotland, where, though the staunch Sir Andrew Murray died, Black Agnes drove the English besiegers from Dunbar (1338), while the Knight of Liddesdale recovered Perth. By 1342 Roxburgh, Stirling and Edinburgh castles were again in Scottish hands, though the Knight of Liddesdale captured and starved to death, in Hermitage castle, his gallant companion in arms, Sir Alexander Ramsay, who had relieved the garrison of Dunbar. With this Douglas, Knight of Liddesdale, a ruffian and a traitor, may be said to begin the long struggle between his too powerful house and the crown.

King David, a lad of eighteen, had returned from France and had removed this Douglas from the sheriffdom of Teviotdale, superseding him by Alexander Ramsay. Douglas revenged himself on Ramsay, as we have seen, and though David was obliged to overlook the crime, the Knight of Liddesdale henceforth was not to be trusted as loyal against England. It is probable that he was intriguing for Baliol's restoration, and he certainly was securing the favour of Edward III. An ill-kept truce of three years ended in October 1346, when David attempted to lead the whole force of his realm, including the levies of John, Lord of the Isles, and of the western Celts in general, against England. As the Celts marched south the earl of Ross slew Ronald Macdonald, whose inheritance was claimed by John of the Isles. As a result, the Islesmen went home: David, however, crossed the border, plundering and burning the marches. Near Durham he came into touch with English levies under Henry Percy and the archbishop of York. David was a knight of the French school of late chivalry: he was not a general like Bruce or Randolph. In this affair of Neville's Cross (17th of October 1346) he copied the mistakes of Edward II. at Bannockburn; his crowded division was broken by the English archers, and the king himself was wounded and captured. Moray, the last male representative of Randolph, with the Constable and Earl Marischal of Scotland, was slain; the Steward made his escape: and, henceforth, the childless David regarded his heir, the Steward, with jealousy and suspicion. The Steward, during the king's captivity, was regent, and the Douglas of Liddesdale (the son of Archibald and nephew of the Good Lord James) drove the English out of Douglasdale, Teviotdale and the forest of Ettrick. A truce till 1354 was arranged between England, France and Scotland, while the country strove to raise the royal ransom, and David, who preferred English ways to those of his own kingdom, acknowledged Edward III. as his lord paramount. It became David's policy to secure his own life interest on Scotland, while the crown, on his decease, should go to one of the English royal family. The more loyal William Douglas, in 1353, slew his kinsman, the shifty Knight of Liddesdale, on the braes of Yarrow, and a fragment of one of the oldest Scottish ballads deplores his fall.

David's captivity.

In July 1354 an arrangement as to David's ransom was made: his price was 90,000 merks *sterling* (for the coinage of Scotland was already beginning to be debased). Negotiations were interrupted by the arrival of French reinforcements in men and gold: Berwick was recaptured, only to be recovered by England in 1356. In the same year Edward Baliol, after handing over his crown and the royalty of Scotland to Edward III., retired from active life, and Edward wasted the south in the raid of "The Burned Candlemas." In October 1357 David was permitted to return to Scotland, giving hostages and promising 100,000 merks in ten yearly payments. The country, crushed by inevitable taxation, was discontented, and not reconciled by Edward's grant of commercial privileges. In May 1363 David put down a rising headed by the Steward, and then, in October, went to London, where he and the earl of Douglas made arrangements by which the countries were to be united under Edward III. if David died childless. Scotland was to be forgiven the ransom, receive the Stone of Scone and retain its independent title as a kingdom: her parliaments were to be held within her own borders; her governors and magistrates were to be Scots, freedom of trade was guaranteed, and the earl of Douglas was to be restored to his English estates, or to an equivalent.

David's agreement with Edward.

This scheme would have saved Scotland from centuries of war and from a Stewart dynasty: there would have been a union of the crowns, as under James VI.; or (by an alternative plan of November, December 1363) a son of the king of England, not Edward III. himself, would succeed to David. In March 1364 David laid the projects before a parliament at Scone, which firmly refused its assent. Possibly David had, as one motive for his scheme, the very dubious legitimacy of the children of the Steward, a probable cause of civil war and a disputed succession. He had also private reasons for disliking the Steward, who was on bad terms with the widow, Margaret Logie (by birth a Drummond), whom David had married on the death of his first wife. The country,

The union rejected by Scotland.

resolved to stand by the Steward and the blood of Bruce, preferred the heavy taxation and the turbulence inevitable under such a king as David to union under an English prince. On the 20th of June 1365 Edward granted a four years' truce, with the ransom to be paid in yearly instalments of £4000. But the necessary taxation was resisted by various nobles, including John of the Isles (1368), who had married a daughter of the Steward. John was in arms, divisions and distress were everywhere, a famine prevailed, and Scotland had to face the prospect of yielding to Edward, when, in 1369, that prince proclaimed himself king of France, and, having his hands full of war, made a fourteen years' truce with his northern neighbour.

David was now free to subdue John of the Isles, to repudiate all his own debts contracted before 1368, and to make preparations for a crusade. From this crowning folly death delivered him on the 22nd of February 1371. The whole of his ransom was never paid, and his absurdities and misfortunes gave the Estates opportunity to strengthen their constitutional position. They established the rule that no official should put in execution any royal warrant "against the statutes and common form of law." The reign also saw the introduction of the committees, "elected by the Commons and the other Estates," which did the actual business of parliament, thus saving time and expense to the members. But these committees, later known as the Lords of the Articles, were to exercise almost the full powers of parliament in accordance with the desires of the crown, or of the dominant faction, and they were among the grievances abolished after the revolution of 1688–1689. The whole reign was a period of wasteful turmoil, of party strife, of treachery, of reaction. But the promise of peace and prosperity in exchange for absolute independence was rejected with all the old resolution; and the freedom which a Bruce desired to sell was retained by the first of the Stewart line, Robert II.; for Mr Froude erred in alleging that James I. was the first Stewart king of Scotland.

Robert II., the grandson of Robert Bruce, had lived hard, and when he came to the throne, was weary of fighting and of politics. Nothing proves more clearly the firm adherence of the nation to the blood of Bruce, and the parliamentary settlement of the crown in his female line, than the undisputed acceptance of the Steward's children as heirs to the throne. Several of them had been born to Robert's mistress, Elizabeth Mure of Rowallan, before a papal dispensation permitted, in 1349, a marriage which the canon law seemed to render impossible. The pope might have said, like a later pontiff on another day, "remittimus irremissibile." By a second marriage, undeniably legal, Robert had a family whose claims were not permitted to give trouble at his accession, though the earl of Douglas, the fellow conspirator of David II., would have caused difficulties if he had possessed the power. His eldest son, the earl who fell at Otterburn, was married to Robert's daughter, Isabella, but by her had no issue. The new prince of Scotland, John (an unlucky name, later changed to Robert), was a *fainéant*: the king's second son, Robert, earl of Fife (later first duke of Albany), was a man of energy and ambition, while the character of the third, Alexander, is expressed in his sobriquet, "The Wolf of Badenoch."

Stuart line. Robert II.

When the new reign opened, Edward III. made no secret of his claims to be king of Scotland, and the southern regions were still in English hands. From 1372 to 1383 Scotland was in truce with England; and Robert II. had no desire to aid France and accept from Rome a dispensation from the oaths of truce. The southern nobles, under the Douglases and March, kept up a semi-public feud with the Percy on the border, after the accession of Richard II., still a child, and piece by piece Scottish territory was recovered, mainly in Teviotdale and Liddesdale. In 1380 and 1381, Lancaster, uncle of Richard II., arranged truces, but difficulties were caused by the late proclamation, in Scotland, of a truce made with her ally, France, on the 26th of January 1384. With the tidings of this truce arrived, in April, a body of French knights who desired to enjoy fighting, and though dates are obscure they seem to have caused, by a raid in April, a retaliatory foray by the Percies in May or June. The king smoothed matters over, but in 1385 a great band of French knights landed in Scotland, forced the king's hand, and penetrated England as far as Morpeth. Here they might have had fighting enough, as Lancaster led a force against them, while Richard II. followed with a large army. But Douglas, to the disgust of the French, refused battle, and allowed the English to do what mischief could be done in a thrice stripped country. The French deemed the Scots shabby, poor and avaricious: their grooms were killed by the peasantry when they went foraging: the nobles were churlish and inhospitable.

In August 1388 Douglas led the famous raid as far as Alnwick castle, which culminated in the battle of Otterburn, fought by moonlight. Here Douglas fell in the thickest of the melée, but his death was concealed and Henry Percy, with many other English knights, were captured and held to heavy ransom (15th of August 1388). These battles were fought in the spirit of chivalry, and were followed, in 1389, by a three years' truce.

The second son of King Robert, Albany, was appointed governor, his father being in ill-health and dying in 1390. He was succeeded (14th of August 1390) by his son Robert III., whose own health was so bad that, in the previous year, his brother Albany had been preferred before him as governor. The reign of a weakling was full of anarchy, complicated by the feud between his eldest son, the wayward duke of Rothesay, and his ambitious brother, now duke of Albany. These two are the first dukes in Scotland. There was peace with England till the death of Richard II. in 1399, and till the parliament of January 1399 Albany still undertook the duties of the king.

Robert III.

Here commenced the tragedy of the Stuarts and of Scotland. For nearly two centuries each reign began with a long royal minority, increasing the power and multiplying the feuds of the nobles. The remainder of each reign was, therefore, a struggle to re-establish the central power, a struggle in which cruel deeds were done on all sides. Meanwhile, now England, now France, secured the alliance of the men in power, or out of power, and threatened the independence of the kingdom. The cause of the miseries of these two unhappy centuries was beyond human control: no Stuart sovereign, after Robert II., escaped from the inevitable evils of a long minority, while Robert II. himself was as weak as any child. Under his nominal rule, the Celts of the north and west, in 1385, became troublesome, while Robert's son, the Wolf of Badenoch, who was justiciary, with his own wild sons, rather fanned than extinguished the flames. They slew the sheriff of Angus (1391–1392) in a battle, and then two clan-confederacies, quarrelling among themselves, put their cause to the ordeal of fight, in the famous combat of thirty against thirty, on the Inch of Perth (see Scott's *Fair Maid of Perth*). Though we know the cost of fencing the lists, from entries in the treasury accounts, we are ignorant of the cause of the quarrel, and even of the clans engaged. The names are diversely given, but probably the combat was only one incident in the long wars of the Camerons with the great Clan Chattan confederacy. In 1397, at Stirling, the Estates denounced the anarchy "through all the kingdom," and, in 1398–1399, were full of grievances arising from universal misgovernment. By this parliament, David, prince of Scotland and duke of Rothesay, was made regent for three years; with his uncle, duke of Albany, as his coadjutor. Peace between Albany and the wayward Rothesay was impossible, and Rothesay, by breaking troth with the daughter of the earl of March, and marrying a daughter of the third earl of Douglas, added a fresh feud to the general confusion.

Regency rule.

Meanwhile Scotland, to vex Henry IV., adopted the cause of the "Mammet," the pretender to be Richard II. This enigmatic personage appeared in Islay, and rather had his pretences thrust on him than assumed them; he was half-witted. Meanwhile the insult to March caused him to seek alliance with Henry IV., who crossed the border,—the last English king to do so,—and appeared before Edinburgh castle. Rothesay held it in his contempt, and, as Albany declined a battle in the open, Henry returned with nothing gained.

In 1400 Albany, and the 4th earl of Douglas (brother-in-law of the duke of Rothesay), confessed before the Estates that they had arrested the prince, and were cleared of the guilt of his subsequent death. They kept him, first in the castle of St Andrews, and then at Falkland, where he perished; some said of dysentery, others, of starvation.

Restored to the regency, Albany permitted his son, Murdoch, with Douglas, to retort on a successful raid by Percy and the traitor March. They were defeated by English archery, as usual, at Homildon hill: Murdoch and Douglas were captured. Percy, dissatisfied with Henry's treatment of him in the matter of ransoms, led an army into Scotland which was to have trysted at Cocklaw with Albany and the whole forces of the realm, and invaded England. But Douglas and Percy left Cocklaw before Albany came up, and hurried to join hands with the Welsh rebel, Glendower. The hostile forces met at Shrewsbury, and Shakespeare has made the result immortal. Percy was slain; Douglas was the prisoner of England.

The young prince of Scotland, the first James, was on his way to seek safety in France, during an interval of truce, but was captured on the high seas by English cruisers. (The dates are obscure, but James was in the Tower by February-March 1405–1406.) His father's death followed (4th of April 1406). Albany sent, within a year, envoys to plead for his release; and again, in 1409, but vainly. An interval of peace occurred, among a series of border battles, and the heresy of Lollardy was attacked by the clergy; Resby, who had been a priest in England, was burned in 1407 at Perth. The embers of Lollardy, not extinguished by the new central fountain of learning, the university of St Andrews, smouldered in the west till the Reformation.

James I.

"The wicked blood of the Isles," the Macdonalds, descendants of island kings, now made alliance with England; Donald, eldest son of the Lord of the Isles, having an unsatisfied claim on the earldom of Ross, which Albany strove to keep in his own family. The greatest of highland hosts met at Ardtornish castle, now a ruin on the sound of Mull: they marched inland and north, defeated the Mackays of Sutherland and were promised the plunder of Aberdeen. The earl of Mar, with a small force of heavily-armoured lowland cavaliers, stopped and scattered the plaided Gael at Harlaw (1411). The knights lost heavily, but Donald did not plunder Aberdeen (see Elspeth's ballad of Harlaw, in *The Antiquary*). Next year Albany received the submission of Donald at Lochgilp in Knapdale, and the Celts were, for the moment, useless to their allies of England.

Time went on: Albany's son, Murdoch, was set free, but in 1410 the captive King James much resented Albany's neglect of himself. His letter is written in Scots. Albany died in 1420; his regency, with that of his son Murdoch, produced the anarchy which James, when free, combated at the cost of his life. Meanwhile France demanded and received auxiliaries from Scotland, who fought gloriously for French freedom. Their great victory, where the duke of Clarence fell, was at Baugé Bridge (1421), where the Stewarts and Kennedys, under Sir Hugh, were specially distinguished. In 1424 the Scots, with the earl of Buchan and the earl of Douglas, were almost exterminated at Verneuil, some five months after King James, already affianced to the Lady Jane Beaufort, was released. He never paid his ransom, and his noble hostages lived and died south of Tweed: one cause of his unpopularity.

Tradition tells that James vowed "to make the key keep the castle, and the bush keep the cow," even though he "lived a dog's life" in the endeavour. His reign was a struggle against anarchy and in the cause of the poor and weak. He instantly arrested Murdoch, son of Albany, and Fleming of Cumbernauld, met parliament, dismissed it, retaining a committee ("the Lords of the Articles"), and took measures with landlords, who must display their charters; appointed an inquest into lay and clerical property; and imposed taxes to defray his ransom. The money could not be collected, and the edicts against private wars and the maintenance of armed retainers were hard to enforce. James next arrested Lennox and that Sir Robert Graham whose feud proved fatal to the king. In March 1425 he met his second parliament, relying on a council of barons with no great earl but Mar. He next arrested Albany's secretary and the Lord Montgomery: the story, accepted by our historians, that he also seized twenty-six notables, has been finally disproved by Sir James Ramsay. No Scottish king ever embarked on such a *coup d'état* as the arrest of "the whole Scottish House of Lords," and Knox, who attributes a much larger design to James V., must have been deceived by rumour. Albany (Murdoch), his son, and Lennox, were tried and executed: Albany's son, James, in revenge burned Dumbarton. The king appears to have been avenging his private wrongs, or destroying the three nobles *pour encourager les autres*. Parliament now insisted on inquisition for heretics: an act was passed (which never took effect) against "bands" or private leagues among the nobles: the Covenant was called "the great band," by cavaliers in days to come. More important was the establishment of a new court of justice, the court of Session, to sit thrice in the year. Yeomen were bidden to practise archery, to which they much preferred football and golf.

The highlanders were next handled as the lowlanders had been; a parliament was held at Inverness and a number of chiefs who attended were seized, imprisoned or executed. The Lord of the Isles, when released, burned Inverness (1429), but, being pursued, he was deserted by Clan Chattan and Clan Cameron (probably the clans represented on the ordeal of battle on the Inch of Perth). The Lord of the Isles made submission, but Donald Balloch, his cousin, defeated Mar near Inverlochy, later fled to Ireland, and was reported dead, though he lived to give trouble. James was unjustly repressing highland anarchy: from the highlands came his bane.

James now granted his daughter, a child, to the Dauphin, later Louis XI.; but, as Jeanne d'Arc said, "the daughter of the king of Scotland could not save Orleans," then (1428–1429) besieged in a desultory manner by the English. In February 1429 the Scots under the oriflamme were cut to pieces in "The Battle of the Herrings" at Rouvray. The surviving Scots fought under Jeanne d'Arc till her last success, at Lagny, under Sir Hugh Kennedy of Ardstinchar in Ayrshire, but James (May, June 1429) made a treaty of peace with Cardinal Beaufort, which enabled Beaufort to send large reinforcements into Paris, where the Maid, deserted by Charles VII., failed a few months later.

In October 1430 was born the prince destined to be James II. The king and the Estates were curtailing the judicial privileges and jurisdiction of the clergy; and the anti-pope, Peter de Luna, quarrelled with the country on this ground. Scotland then deserted his cause for that of Martin V., but quarrels between church and state did not cease, and a legate arrived to settle the dispute a few days before the king's murder. James had already threatened the Benedictines and Augustines for "impudently abandoning religious conduct," and had founded the Carthusian monastery in Perth, that the Carthusians might offer a better example. A reformation by the state seemed at hand, but the religious orders fell deeper in odium and contempt during the next hundred and thirty years. Doctrine, too, was endangered by heretics, one of whom, a Hussite named Paul Crawar, was burned at Perth in 1433.

In 1427 James seized, as a male fee, the earldom of Strathearn, gave the earl by female descent the title of Menteith, and sent him to England as a hostage for his ransom. He was nephew of the Sir Robert Graham whom James had arrested at the beginning of his reign: Graham's anger was thus rekindled. The earls of Mar and March also lost their lands, on one pretext or another: James's policy was plainly to break the power of the nobles.

The English translation (1440) of a lost contemporary Latin history of the events avers that Sir Robert Graham rose in parliament, denounced James as a tyrant and called on the barons to seize their king: Graham was taken, was banished from court, was confiscated and fled to the Atholl hills. He thence intrigued with the old earl of Atholl (heir to the crown if the ancestors of James by Robert II.

Death of James I.

and Elizabeth Muir were illegitimate), and he drew into the conspiracy the king's chamberlain, Atholl's grandson. By his aid 300 highlanders were brought into the monastery of the Black Friars in Perth, where the king was keeping the Christmas of 1436, and there they slew James, who had fled into a vault. The conspirators were seized and tortured to death with unheard-of cruelties, but lawlessness had won the battle. James had failed, practically, even in his effort (1427–1428) to anglicize parliament, by introducing the representative system; two "wise men" were to be chosen by each sheriffdom, and two Houses were to take the place of the one House in which all Estates were wont to meet. But constituents were averse to paying their members, no Speaker was elected, the reform never came into being. Till the Union, all estates sat in one room during parliament. The court of session was the most valuable and permanent of James's innovations, and his poem "The King's Quhair" attests his real genius. He had attempted to reform the country too hurriedly; and treachery, by all accounts, was one of his methods. He left a child as king, and the old round of anarchy began again; oppression, murder, feud, faction and private war. History repeats itself, and the evil practices were checked, not by the Reformation, but by the increased resources and entire safety enjoyed by James VI. when he succeeded to the crown of England.

Space forbids a record of the faction fights in the reign of James II. Coming to the crown at the age of seven, he was used like the Great Seal, as a sanction of authority and passed from one party to another of the nobles, as each chanced to be the more dexterous or powerful (crowned 25th of March 1437). The Crichtons and Livingstones held the king till the earl of Douglas died, being succeeded by his son, a boy. The queen-mother married Sir James Stewart of Lorne, and their sons, Buchan and Atholl, mixed in the confused intrigues of the reign of James III., but the queen was treated with scant courtesy by the rival parties. From them the young earl Douglas and duc de Touraine, the most powerful man in Scotland, stood apart, sullenly watching an unprecedented state of anarchy. Livingstone and Crichton, previously foes, invited him and his brother to dine with the child king in Edinburgh castle, and there served to him "the black dinner" bewailed in a fragment of an early ballad. The two young nobles, after a mock trial, were decapitated (November 1440). *James II.*

Douglas was succeeded in his earldom by his grandfather, Sir James the Gross, an unwieldy veteran. On his death in 1443, his son, William, a lad of eighteen, became earl, and waged private war on Crichton, while he allied himself with Livingstone. Crichton lost the chancellorship: and the keys were given to Kennedy, bishop of St Andrews and founder of St Salvator's college in that university. Involved in secular feuds with Douglas, Livingstone and the earl of Crawford, Kennedy destroyed Crawford with a spiritual weapon, his Curse (23rd of January 1445–1446).

On the 3rd of July 1449 James married Marie of Gueldres, seized and imprisoned the Livingstones, and generally asserted royal power. He relied on Douglas, who (1450) was his constant companion, till the earl visited Rome (November 1450–April 1451). In June 1451 he resigned his lands, in which he was at once reinstated. It appears, however, that he was, or was suspected of being, in treasonable alliance with the new earl of Crawford and the ever-turbulent Celtic lord of the Isles. It is certain, from documents, that Douglas was always in the royal *entourage* from June 1451 to January 1452, so that stories of insults and crimes committed by him at this period seem legendary. Nevertheless, on the 22nd of February 1452, James, who had invited Douglas, under safe-conduct, to visit him at Stirling, there dirked his guest with his own hand. The king was exonerated by parliament, on the score of Douglas's contemptuous treatment of his safe-conduct, and because of his oppressions, conspiracies and refusal to aid the king against rebels, such as the new "Tiger Earl" of Crawford.

The brother of the slain Douglas defied his king, then made his submission, and visited London, where he probably intrigued with the English government against his sovereign and country. In 1455 James made serious war against the "Black Douglases" of the south; his army being led by the "Red Douglas," the earl of Angus. The royal cause was successful, and the Black Douglas was attainted (10th of June 1455). He fled south and became the pensioner and ally of Edward IV., who reasserted the traditional claim to sovereignty over Scotland—"his rebels of Scotland!"

From 1457 to 1459 a truce was made between Scotland and the Lancastrian party, then in power, but in July 1460, Henry VI. was defeated and taken, and his wife and son sought James's hospitality. Roxburgh castle was in English hands; James besieged it, and on the 3rd of August 1460 was slain by the bursting of one of his own huge siege guns. The castle was taken, but the second James died at the age of thirty, leaving a child to succeed him in his heritage of woe. James II. had overcome his nobles, but left a legacy of feuds to the coming reign.

The period of James III. is filled with the recurrent strife of the nobles among themselves and against law and order. Slowly and obscurely the Renaissance comes to Scotland; its presence is indicated by the artistic tastes of the king, and, later, by the sweet and mournful poetry of Henryson. But the Renaissance, like the religious revivals initiated in Italy, arrived in Scotland weak and weary; hence the church did not share in the new enthusiasms of the faith of St Francis, and art was trampled on by the magnates who hated poetry and painting. *James III.*

In politics, the queen-mother, who had the private guardianship of her boys, the king and the dukes of Albany and Ross, turned from the Lancastrian to the Yorkist side, while Kennedy and his party (Lancastrians) were accused of endangering Scotland to please France. This was the beginning of that movement away from the Ancient League to partisanship with England, which culminated in the success of the Protestant allies of England at the Reformation. This, then, is an important moment in the long and weary march to union with England.

In 1461 Henry VI. was driven to take sad shelter with Kennedy at St Andrews. In June 1461 Edward IV. was crowned, and at once made pact and alliance with the banished Douglas and the Celts of the west Highlands and the isles. From Ardtornish castle, John, lord of the Isles, sent ambassadors to Westminster, where (1462) a treaty was made for an English alliance and the partition of Scotland between Douglas and the Celts. A marriage between the mother of James III. and Edward IV. was spoken of, but Kennedy would not meet the English, and in March 1463 the English treaty with Douglas and the Celts was ratified. Douglas invaded Scotland, in advance of an English army, but was defeated by an army under Bishop Kennedy. When France went over to the Yorkists, Kennedy, accepting an English pension, made a long truce between Scotland and England (October 1464). Peace might have been assured, but Kennedy died in 1466. His tomb in his college chapel of St Salvator's at St Andrews, his college and his bridge over the river Eden, have survived as monuments of a good and great man; they passed unscathed through the ruin wrought by the reformers.

On his death the nobles, notably Fleming, Livingstone, Crawford, Hamilton and Boyd, made a band for securing power and place. Boyd, with some borderers, Hepburn and Ker of Cessford, seized the boy king, and Boyd had himself made governor, his son marrying the princess Mary, sister of James.

In July 1469 James, then about eighteen, married Margaret, daughter of King Christian of Norway, who pledged the Orkney and Shetland Isles for her dowry, which remains unpaid. The enemies of the Boyds instantly overthrew them, and the Hamiltons, a race of English origin, arose on their ruins to their perilous place of possible heirs to the crown. The princess Mary was divorced from her Boyd husband and married Lord Hamilton. Their descendants were again and again kept from the royal succession only by the existence of a Stuart child, Mary, queen of Scots, or James VI. This fact, with the consequent feud of the Stewarts of Lennox, themselves claimants, governs the

dynastic intrigues during more than two centuries and gave impetus to the Reformation. Never was marriage so fruitful in tragedies as the wedding of Lord Hamilton and the princess Mary.

There followed ecclesiastical feuds, centring round Patrick Graham, the new bishop of St Andrews. These, to the present day, have been misunderstood (see *The Archbishops of St Andrews*, by Herkless and Hannay, for details). It is not possible here to unravel the problem, but documents at St Andrews, now printed, demonstrate the error of the historians who regard Graham as a holy man, persecuted because he was half a premature Protestant. At Rome he procured, without royal or national assent, the archbishopric for St Andrews; he became insane and was succeeded by the learned Schevez. Glasgow also became an archbishopric.

James now followed a policy in which Louis XI. succeeded, but he himself failed utterly. He surrounded himself with men of low birth, such as Ireland, a scholar and diplomatist; Rogers, a great musician; and Cochrane, apparently an architect or sculptor—he is styled a mason or stone-cutter. This aroused the wrath of the nobles and the two princes of the blood, Albany and Mar. Mar was arrested on a charge of magic, and died, whether murdered or from natural causes is uncertain, while his accomplices are said to have been the protomartyrs of witchcraft, scarcely heard of in Scotland till the reformers began to burn old women. Albany was arrested for treason, escaped to France, and was under sentence of forfeiture.

Relations with England were now unfriendly, and parliament, in March 1482, denounced Edward IV. as "the reiver, Edward." By May the Douglases brought Albany from France to England, where he swore fealty to Edward, and was to be given the Scottish crown. The duke of Gloucester (later Richard III.) marched north and took Berwick, while the earl of Angus, with other nobles, hanged Cochrane and other favourites of James over Lauder bridge. The domestic mutiny and the English war ended in a compromise, Albany being restored to office and estates. He took Edinburgh castle, in which James was interned, and he was made lieutenant-general. Yet, aided by Angus, he continued to intrigue with Edward for the gift of the Scottish crown. By March 1483 he was reduced, we know not how; he laid down his office, and was forbidden to approach the court. On the death of Edward IV. he lost his chief supporter (9th of April 1483), and was forfeited while absent in England. He and Douglas entered Scotland with a small force (22nd of July 1484), and were defeated at Lochmaben: Albany escaped, went to France, and was slain in a tournament, leaving issue, but Douglas was captured and interned till his death in the monastery of Lindores.

Our information for this period is so scanty that we do not know how James reached his new position, how he overcame Albany and his other rebels. At peace with England, and allied with France, he quarrelled with the church, and it was decreed that the clergy who obtained benefices from Rome were guilty of treason. He planned a set of royal marriages with England, and this was the ground of his subjects' charge against him of servility to England. "James IV. and James V. are constantly upbraided for not doing the very things which James III. is execrated for having done," namely, securing peace and amity with their powerful neighbour. James III. "died in his enemies' day," and such accounts as we have of him are written by the partisans of his unruly nobles, Argyll, Lennox and Angus.

They secured the crown prince, James, now aged fifteen, their motive being that under James III. the guilt of their murders and rebellion still hung over their heads. The Estates refused to give them an amnesty for seven years; and the arch rebel, Angus Bell the Cat, with Argyll, the young prince, Lennox and other malcontents, declared that he was deposed, and proclaimed his son as his successor and Argyll as chancellor. Doing what they falsely accused James of having done, they sent, or obtained from England leave to send, members of their party to intrigue with Henry VII. (1st of May 1488). After a half reconciliation, James marched in force to Stirling, the key of the north, but the treacherous commander of the castle, Shaw of Sauchie, held the castle against him. James and his leaders, Atholl and Huntly, with their Stewarts and Gordons, and the levies of burgesses, and the mounted gentry of Fife, encountered the wild border spearmen of Hepburn and Home and the Galloway men, the whole being led by Angus and the rebel prince at Sauchie burn, near Bannockburn. How it chanced we know not; James's horse seems to have run away and thrown him (he was a bad horseman), and the story goes that he was taken into a cottage and stabbed by a priest. In fact, as his rebels put it, "he happinit to be slain" at Beaton's mill. He was accused of having accumulated great treasures. They were never found, or, if found, never accounted for by the finders.

His real history remains unknown; we have only Ferrerius, who is vague, and the late and slanderous gossip of the writers of the Reformation. We know that James was clement; that the middle and lower classes stood by him; that he was a great amateur in the arts; that he was betrayed again and again by those of his own house, finally by his own son. A hideous tale is told by Buchanan against his private morals, but it is certainly inaccurate in detail, and is uncorroborated, while it appears to turn on a confusion between an alleged royal mistress, "the Daisy," and Margaret (Daisy), the king's own sister. It is clear to any reader of Ferrerius, Lesley and Buchanan that they all drew from a common source, now unknown, and this source may well have been a chronicle inspired by James's enemies. James III. of Scotland has been almost as much the butt of slanderous charges as the Jacobite James III. of England and VIII. of Scotland, "The Old Pretender."

With James IV. we enter on the modern history of Scotland. The king escaped the evils of a long minority, was a "free king" and managed his own policy. He was tall, handsome, strong and recklessly brave. He inherited his father's love of art and of nascent science; but this fault was forgiven him, as his manners were popular, his horsemanship good, and his bearing frank and free. The early Tudor policy of Henry VII. was not to make open war on Scotland, but to intrigue secretly, especially with the treacherous Douglas, earl of Angus, and with Ramsay, earl of Bothwell under James III., but soon dispossessed. They schemed to kidnap the king as vainly as Henry VIII. later planned to kidnap many of his foreign opponents. Under James IV. the houses of Hepburn of Hailes, ancestor of Queen Mary's Bothwell; of the Huntly Gordons; and of the Kers of Fernihirst and Cessford, rose into new importance; while the Huntlys and Argylls were entrusted with the maintenance of order among the fighting clans of the west and north. They aggrandized themselves at the expense of the Macleans, Macdonalds, Camerons and Clan Chattan, but their sway was far from being peaceful and orderly. ***James IV.***

The king, reckless as he was, had more than his share of the Stuart melancholy. His parricidal rebellion lay heavy on his conscience; he practised asceticism at intervals, and dreamed of eastern pilgrimages. But he also fostered a navy, under Sir Andrew Wood, who swept the seas of the English pirates. James threw Scotland into the whirlpool of European politics, dealing with Spanish envoys and with the duchess of Burgundy, the patroness of the mysterious Perkin Warbeck, who claimed to be Richard, duke of York, son of Edward IV. Meanwhile, to balance the power of the primate, James purchased from Innocent VIII. an archbishopic for the bishop of Glasgow (1492), who laid information against the heretics of Kyle in Ayrshire. They had evolved or inherited anti-papal heresies much like those of the reformers of 1559, but James turned their trial into a jest. He made a secret treaty to defend France if she were attacked by England, but meanwhile a five years' truce was concluded (1491). In the following year James was in correspondence with Perkin, then in Ireland; in 1495 he received that *prétendant*, married him to a daughter of Huntly, and in 1496 raided northern England in his company,—all this in contempt of the offered hand of a Tudor princess. In the autumn of 1497 an attempted raid by James ended in a seven

years' truce fostered by the Spanish envoy, Ayala, who has left a flourishing description of the king and his country. Meanwhile Perkin had failed in Cornwall and been captured. Henry VII. kept offering the hand of his daughter Margaret, who was married to James at Holyrood in August 1503. From this wedding, disturbed by quarrels over the queen's jewels and dowry, was to result the union of the crowns on the head of Margaret's great-grandson, James VI., after a century of tragedies and turmoil.

In 1507 the pope failed to draw James into the league formed to check French aggression in Italy. A murder on the borders poisoned Scottish relations with England, and the death of Henry VII. (1509) left James face to face with his blustering brother-in-law, Henry VIII. The Holy League of 1511, against France, found James committed to the cause of the old French alliance. He strengthened his fleet, but his admiral, Sir Andrew Barton, fell in a fight with English privateers equipped by the earl of Surrey and commanded by his sons (1511). Border homicides added their element of international irritation, and James renewed the ancient league with France. In 1513 Dr West, an envoy of Henry VIII., found James in the state of "a fey man," doomed, distracted, agitated and boastful. In May came the letter and ring of the French queen ordering James, as her knight, to strike a blow on English ground. He wrote to Henry none the less (24th May) with peaceful proposals, but on the 30th of June Henry invaded France.

Strange portents and warning phantasms did not check James: he sent forth a fleet of thirteen ships and 3000 men, which faded into nothingness: he declared war on Henry; and on the 22nd of August he crossed the border with all his force, including the highlanders and islesmen. After securing his flank and rear by taking Norham, Wark and Eitel castles, he awaited the approach of Surrey's army at Ford castle, behind which lies Flodden Edge, a strong position, which he presently occupied. Surrey, who was ill-provisioned, challenged him to fight on the open field of Wooler Haugh. James declined to commit this chivalrous folly; but, for lack of scouts, permitted Surrey to out-manœuvre him and pass, concealed by a range of hills, across his front, to a position north of Flodden, on his lines of communication. ***Battle of Flodden.***

Next day, 9th of September, Surrey crossed the Till, unobserved, by Twizel bridge and Millford, and moved south against Branxton hill, the middle of three ridges on the Flodden slope. The ground was difficult from heavy rains, the English troops were weary and hungry, but James had lost touch of Surrey and knew nothing of his movements till his troops appeared on his rear towards evening. In place of remaining in his position, James burned his camp and hurried his men down hill to the plateau of Branxton ridge. Home and Huntly, on the Scottish left, charged Edmund Howard's force; the Tynemouth men, under Dacre, did not support Howard, at first, but Dacre checked Home (whose later conduct is obscure) and drove off the Gordons. The Percys broke Errol's force; Rothes and Crawford fell, and the king led the centre, through heavy artillery fire, against Surrey. With Herries and Maxwell he shook the English centre, but while Stanley and the men of Cheshire drove the highlanders of Lennox and Argyll in flight (their leaders had already fallen), the admiral and Dacre fell on the flank of James's command, which Surrey, too wise to pursue the fleet highlanders, surrounded with his whole force. The Scottish centre fought like Paladins, and James, breaking out in their front, hewed his way to within a lance's length of Surrey, as that leader himself avers. There fell the king, riddled with arrows, his left hand hanging helpless, his neck deeply gashed by a bill-stroke. His peers surrounded his body, and night fell on "the dark impenetrable wood" of the Scottish spears. At dawn the survivors had retreated, only the light Border horse of Home hung about the field. The bishop of Durham accuses them of plundering both sides. (That Home's Borderers had but slight loss is argued by Colonel the Hon. FitzWilliam Elliot, in *The Trustworthiness of Border Ballads*, pp. 136-138.) Among the dead were thirteen earls, and James's son, the archbishop of St Andrews. The king's death assured the victory, which Surrey had not the strength to pursue, though the townsmen of Edinburgh built their famous Flodden Wall to resist him if he approached.

England never won a victory more creditable to the fighting and marching powers of her sons than at the battle of Flodden. The headlong recklessness of James, remarked on by Ayala, gave the opportunity, but he nobly expiated his fault. The Scots had so handled their enemies that they could not or dared not pursue their advantage; on the other hand, it was long indeed before the memory of Flodden ceased to haunt the Scots and deter them from invading England in force.

Though Ayala's well-known letter certainly flatters the material progress of Scotland, the country had assuredly made great advances. While England was tuneless, with Dunbar and the other "Makers" Scotland was "a nest of singing birds." The good Bishop Elphinstone founded the university of Aberdeen in 1495; and in 1496 parliament decreed compulsory education, and Latin, for sons of barons and freeholders. Prior Hepburn founded a new college, that of St Leonard's, in the university of St Andrews, and Scotland owes only one university, that of Edinburgh, to the learned enthusiasm of her reformed sons. Printing was introduced in 1507, and the march of education among the laity increased the general contempt for the too common ignorance that prevailed among the clergy. The greater benefices were being conferred on young men of high birth but of little learning. The college of Surgeons was founded by the municipality of Edinburgh (1505), and in 1506 obtained the title of "Royal." The stimulus given to shipbuilding encouraged commerce, and freedom from war fostered the middle class, which was soon to make its influence felt in the Reformation. The burgesses, of course, had long been a relatively rich and powerful body: it is a fond delusion to suppose that they sprang into being under John Knox, though their attachment to his principles made them prominent among his disciples, while Flodden probably began to deter them from the ancient attachment to France. Protestantism, and the disasters of James V., with the regency of his widow, were to convert the majority of Scots to the English party. ***Social progress.***

The long minority of James V. was fatal to the Stuart dynasty. The intrigues of Henry VIII., the ambition of Angus, who married the king's mother (Margaret, sister of Henry VIII.); the counter intrigues of Albany, a resident in France, and son of the rebellious Albany, brother of James III.; the constantly veering policy and affections of the queen-mother; and the gold of England, filled fourteen years with distractions, murders, treasons and conspiracies. Already Henry VIII. was trying to kidnap the child king, who found, as he grew up, that his stepfather, Angus, was his master and was the paid servant of Henry. The nobles were now of the English, now of the French party; none could be trusted to be loyal except the clergy, and they were factious and warlike. The result was that James threw off the yoke of his stepfather, Angus; drove him and his astute and treacherous brother, Sir George Douglas, into England (thereby raising up, like Bruce, a fatal party of lords disinherited), and while he was alienated from Henry and his Reformation, threw himself into the arms of France, of the clergy and of Rome. ***James V.***

Meanwhile the many noble and dissatisfied pensioners of England adopted Protestantism, which also made its way among the barons, burgesses and clergy, so that, for political reasons, James at last could not but be hostile to the new creed; he bequeathed this anti-protestantism, with the French alliance, through his wife, Mary of Guise, and the influence of the house of Lorraine, to his unhappy daughter, Mary Stuart. The country, ever jealous of its independence, found at last that France threatened her freedom even more than did England, the apparent enemy; and thus, partly from Protestantism, partly from patriotism, the English party in Scotland proved victorious, and the Reformation was accomplished. Had Henry been honourable and gentle, had his sister not shared his vehement passions, James and Henry, nephew and uncle, might have been

united in peace; and the Scottish Reformation might have harmoniously blended with that of England.

It is impossible here fully to unfold the tortuous intrigues which darkened the minority of James. Who was to govern the young prince and the country? His wavering, intriguing mother, Margaret Tudor, or her sometimes friend, sometimes foe, Albany, arrived from France; or her discarded husband, Angus, the paid tool of Henry VIII.? By June 1528 the young king settled the question. He had complained to Henry of the captivity in which he was held by his hated stepfather, Angus. In June Angus had prepared forces to punish the Border raiders, and James, rightly or wrongly, seems to have suspected that he was to be handed over bodily to his royal uncle. On the 27th of May he was with Angus in the castle of Edinburgh; on the 30th of May, by a bold and dexterous ride, he was with his mother in the castle of Stirling, with Archbishop Beaton, Argyll and Maxwell. In July he mastered Edinburgh, and bade Angus and his brother, Sir George Douglas, place themselves in ward north of Tay. This he announced to Henry, the paymaster of the Douglases, and the breach between the two kings was never healed. A war broke out between the Douglases and James, but a five years' peace, not including the restoration of Angus, was concluded in December 1528. Angus prolonged his outrages on the Scottish border till 1529, when he entered England as a subsidized mischief-maker against Scotland. Not till James's death did the Douglases return to their own country. Meanwhile James visited the Border, hanged some brigand lairds, and reduced such English partisans as the Kers, Rutherfords, Stewarts of Traquair, Veitches and Turnbulls. Johnny Armstrong of Gilnockie, famed in ballad and legend, was hanged, with forty of his clan, at Carlanrigg, in Teviotdale. The tale of royal treachery in his capture is popular; the best authorities for it seem to be the synoptic versions of a ballad and of the fabulous chronicler, Pitscottie.

When James V. became "a free King" the main problems before him were his relations with Henry VIII. and with the nascent Reformation. From 1535 Henry was anxious that James should meet him in England. Henry was notoriously treacherous; to kidnap was his ideal in diplomacy. His pensioner Angus (1531) was to have aided Bothwell in crowning Henry in Edinburgh. In 1535 Henry sent Dr Barlowe to convert James to his own religious ideas, Erastian, anti-papal, the seizure of the wealth of the church. James (1536) was willing enough to meet Henry in England, but his council, especially the clerical members, were opposed to the tryst. James desired to wed none but his mistress, Margaret Erskine, the mother of the Regent Moray. As Henry had once declared that he could only meet a Scottish king, in England, as a vassal, James's council had good reason for their attitude. Had they consented, had James married Henry's daughter, Mary (called "The Bloody"), it is not plain that advantage would have come of the alliance.

In 1536 James sailed to France, and (1st of Jan. 1537) married Madeleine, daughter of Francis I. The die was cast; he was committed to France and to the ancient faith. This was the cardinal misfortune of the Stuarts, but who could trust Henry, and who could join in the fiery persecutions of the new pope-king? In James's absence, Scottish heretics fled to England, while Henry's heretics fled to Scotland. Madeleine died on the 7th of July 1537. "Lady Glamis," as she was called, a Douglas lady, widow of Lord Glamis, was burned for abetting her brother Angus and devising the king's death by poison. The truth of this matter is obscure; our early historians of this age, Protestants like Knox and Pitscottie, with Buchanan and the Catholic Lesley, are seldom to be trusted without documentary corroboration.

In 1538 James married a lady whom Henry desired to add to his list of wives, Mary of Guise, at this moment a young widow, Madame de Longueville. Mary shines like a good deed in a naughty world; but she was a Catholic, was of the house of Lorraine, and in diplomacy was almost as other diplomatists.

In 1539 David Beaton, the Cardinal, now aged forty-five, succeeded his uncle, James Beaton, as primate of Scotland. He had been educated in Scotland and Paris, held the rich abbey of Arbroath, and for some twenty years at least lived openly with Mariotte Ogilvy, of the house of Airlie. He was a practised diplomatist, and necessarily of the French and Catholic party. His wealth, astuteness, experience and tenacity of purpose, were to baffle Henry's attacks on Scottish independence, till the daggers of pietistic cut-throats closed the long debate. Beaton was cruel: he had no more scruples than Henry about burning men for their beliefs. But the martyrs were few, compared with the numbers of people whom the reformed kirk burned for witchcraft. Some twelve martyrs at least perished in 1539–1540, and George Buchanan, whose satires on the Franciscans delighted the king, escaped to France, in circumstances which he described diversely on different occasions, as was his habit.

In May 1540 James visited the highlands, and later reduced the Macdonalds and annexed the lordship of the Isles to the crown. In 1541 he lost two infant sons, and the mysterious affair of the death of that aesthetic ruffian, Sir James Hamilton of Finnart, was supposed to lie heavy on his mind. There were disputes with Henry, who demanded the extradition of fugitive friars, which James refused. In 1541 he disappointed Henry, not meeting him at York, and this course, advised by his council and Francis I., rankled deeply, while Angus was making a large English raid on the Border in time of peace. The English fared ill, and Henry horrified his council by his usual proposal to kidnap the king of Scotland. Henry's men marauded on the Border, but a force which James summoned to Fala Moor (31st of October 1542) contained but one lord who would march with him—Napier of Merchistoun. About this date occurs the legend of a list of hundreds of heretics, whom the clergy asked James to proscribe. No king of Scotland could dream of executing such a *coup d'état*; the authority for it is that mythopoeic earl of Arran who later became regent, and told the fable to Henry's agent, Sir Ralph Sadleyr.

Presently ensued the Scottish raid of Solway Moss and the capture of many of the Scottish nobles. The facts may be found in contemporary English despatches printed in the Hamilton papers. The fables are to be read in Knox's *History of the Reformation in Scotland*, and in Froude. The secret of the raid was sold by the brother of Angus, Sir George Douglas, and by other traitors. England was prepared, and on the 23rd of November routed and drove into Solway Moss a demoralized multitude of farm-burning Scots. The guns and some 1200 men were taken; many men were drowned. James retired heart-broken from the Border to Edinburgh, where he executed business. He then dwelt for a week at Linlithgow with the queen, who was about to give birth to a child. Next he bore "the pageant of his bleeding heart" to Falkland, where he heard of the birth (8th of December) of his daughter, Mary Stuart. Uncomforted, he died on the 14th (15th?) of December. Accounts differ as to the date. Sheer grief and shame, and, it is said, sorrow for the failure in war of his favourite, Oliver Sinclair, were the apparent causes of his death. Knox appears to insinuate that a rumour declared Mary of Guise and the cardinal guilty of poisoning James, but an attempt had been made to put another sense on the words of this historian, who frequently hints that Mary was the mistress of the cardinal (Knox, vol. i. p. 92).

Mary, queen of Scots.

Again Scotland had to endure a long royal minority. The distraction of Scotland promised to Henry VIII. a good chance of annexing the kingdom, whether by the marriage of Edward, prince of Wales, to the infant queen, Mary, or by acquiring, through treachery, her person and the castles of the country. Sir George Douglas at once crossed the border. Angus soon followed, with the lords captured at Solway Moss, all bound more or less to work Henry's will. In Scotland the cardinal; Arran, who was next heir to the throne; Huntly and Murray were proclaimed regents. Knox and others speak of a will of James V., forged by the cardinal, but the stories are inconsistent, and rest mainly on the untrustworthy evidence of Arran. His legitimacy was rather worse than dubious, and henceforth he sided with the party most

powerful at each crisis. Now the restored Douglases were most powerful; by the 28th of January 1543 they imprisoned the cardinal, but their party was already breaking up. In March a full parliament was held, the Bible in English was allowed to circulate, and envoys were sent to treat with Henry. But by the 22nd of March Beaton was a free man, liberated by Sir George Douglas. Arran's brother, later archbishop of St Andrews, arrived from France and worked on the wavering regent, while his rival, Lennox, came also from France, and failing to oust Arran, became Henry's pensioner in England. If Arran were illegitimate, Lennox was next heir to the throne, and the consequent Stewart-Hamilton feud was to ruin Mary Stuart. Sir George Douglas went to London and negotiated with Henry for the marriage of Mary and Prince Edward. But the people were still so averse to England that Beaton's was the more popular party: they carried Mary to Stirling: the treaty with Henry was ratified, indeed, but a quarrel was picked over the arrest by England of six Scottish ships; and Arran, who had just given orders for the sack of monasteries in Edinburgh, suddenly (3rd of September) fled to Beaton and was reconciled to the church, just after he had (28th of August) proclaimed Beaton an outlaw.

At once the sacking of religious houses in Dundee, Lindores and Arbroath had begun; the hour of religious revolution had struck; but the godly were put down when the regent and the cardinal were so suddenly reconciled. Arran must have perceived that Henry had infuriated the Scots and that the cardinal might adopt the claims of Lennox and proclaim Arran illegitimate. But Beaton could not keep both Arran, whom he had now secured, and Lennox, who betrayed him, and made for England. The cardinal, however, punished the church-sackers and imprisoned George Douglas, while Hertford in 1544 moved with a large army against Scotland, and Henry negotiated with a crew of discontented lairds and a man named Wishart for the murder or capture of Beaton. Hertford struck at Edinburgh in May, and in the leader's own words "made a jolly fire" and did much mischief. The suffering Commons now began to blame Beaton. Lennox presently married Margaret, Henry's niece, daughter of his sister, Margaret Tudor, by her husband, Angus. Their eldest son was the miserable Henry Darnley, second husband of Mary Stuart. In Scotland arose party divisions and reunions, the queen mother being in the hands of the Douglas faction, while Beaton's future murderers backed him and Arran. Then the Douglases allied themselves with the cardinal, and Henry VIII. tried to kidnap Angus and his brother, Sir George. For once true to their country, they helped Buccleuch to defeat a large English force at Ancram Moor in February 1545, and Henry, seeking help from Cassilis, revived the plot to murder Beaton. Cassilis was a Protestant and the patron of Knox's friend and teacher, George Wishart; Cassilis would not commit himself formally, and the threads of the plot are lost, owing to a great gap in the records.

The Douglases continued to play the part of double traitors; Hertford, in autumn, again devastated the border and burned religious houses (whether he always burned the abbey *churches* is disputed), but Beaton never lost heart and had some successes. We lose trace of the plot to slay him from the 20th of October 1545 till the end of May 1546, the documents being missing; but on the 29th of May 1546 Beaton was cruelly murdered in his castle of St Andrews. On the 1st of March he had caused George Wishart, a man of austere life and a Protestant propagandist, to be strangled and then burned. To what extent revenge for Wishart was the motive of the Kirkcaldys and Leslies and Melvilles who led the assassins, and how far they were paid agents of England, is unknown. These men had been alternately bitter enemies and allies of Beaton; in 1543 Kirkcaldy of Grange and the master of Rothes were offering their venal daggers to England, through a Scot named Wishart. The details of the final and successful plot are uncertain—the martyr Wishart cannot be identified with Wishart the would-be murderer—but with Beaton practically expired the chances of the French and Catholic party in Scotland.

The death of Beaton brought the Douglases into resistance to Henry VIII., who aided the murderers, now besieged in Beaton's castle of St Andrews. An armistice was arranged; the besieged begging for a remission from the pope, and also asking Henry to request the emperor to move the pope to refuse. The remission, however, arrived before the 2nd of April 1547, and was refused by the murderers.

Henry VIII. and Francis II. were now dead. In mid July French armed galleons approached St Andrews, and the castle surrendered as soon as artillery was brought to bear on it. With other captives, John Knox was put aboard a French galley. In September the Protector Somerset (Hertford) invaded and utterly routed the Scots at Pinkie near Musselburgh. No result ensued, except Scottish demands for French aid, and a resolve to send Mary to France. Ferocious fighting, aided by French auxiliaries, followed: in 1550 the English abandoned all castles occupied by them in Scotland. Mary was now in France, the destined bride of the Dauphin; while Knox, released from the galleys, preached his doctrines in Berwick and Newcastle, and was a chaplain of Edward VI., till the crowning of Mary Tudor drove him to France and Switzerland. Here he adopted, with political modifications of his own, the extremest form of Calvinism.

A visit of Mary of Guise to France (1550) ended in her acquiring the regency, which she administered mainly under French advice. The result was irritation, the nobles looking towards England as soon as Mary Tudor was succeeded by Elizabeth, while Protestantism daily gained ground, inflamed by a visit from Knox (1555–1556). Invited again, in 1557, he shrank from the scene of turmoil, but a "band" of a Protestant tendency was made by nobles, among them Mary's natural brother James Stewart, later the Regent Murray (3rd of Dec. 1557). On the 24th of April, Mary wedded the Dauphin, and about the same date Walter Milne, an aged ex-priest, was burned as a heretic, the last Protestant martyr in Scotland. There was image-burning by godly mobs in autumn; a threat of the social revolution, to begin at Whitsuntide, was issued on the 1st of January 1559,—"the Beggars' Warning." Mary of Guise issued proclamations against preachers and church-wreckers, backed by a statute of March 1559. The preachers, mainly ex-friars and tradesmen, persevered, and they were summoned to stand their trial in April, but Knox arrived in Perth, where an armed multitude supported their cause. On the 10th of May they were outlawed for non-appearance at Stirling. Knox accuses Mary of Guise of treachery: the charge rests mainly on his word.

Religious revolution.

On the 10th of May the brethren wrecked the monasteries of Perth, after a sermon by Knox, and the revolution was launched, the six or seven preachers already threatening the backward members of their party with excommunication. The movement spread to St Andrews, to Stirling, to Edinburgh, which the brethren entered, while Mary of Guise withdrew. She was still too strong for them, and on the 24th of July they signed a compact. They misrepresented its terms, broke them, and accused the regent of breaking them. Knox and William Kirkcaldy of Grange had been intriguing with England for aid, and for the marriage of the earl of Arran (son of the earl of Arran, now also duc de Chatelherault, ex-regent) with Queen Elizabeth. He escaped from threatened prison in France, by way of Switzerland, and though Elizabeth never intended to marry him, the Hamiltons now deserted Mary of Guise for the Anglo-Protestant party. Maitland of Lethington, the Achitophel of his day, also deserted the regent; but in November the reformers were driven by the regent and her small band of French soldiers from Edinburgh to Stirling. They were almost in despair, but, heartened by Knox and Lethington, they resumed negotiations with Elizabeth, who had already supplied them with money. An English fleet suddenly appeared, and drove the French to retreat into Leith from an expedition to the west. In February 1560 a league was made at Berwick between Elizabeth and "the Congregation." France was helpless, the tumult of Amboise alarmed the Guises for their own lives and power, and the regent, long in bad health, was dying in Edinburgh castle. On the 10th of June

she expired, and hunger forced her French garrison in Leith, after a gallant and sanguinary defence, to surrender.

After an armistice, treaties of peace were concluded on the 6th of July: the treaty, as far as it touched the rights of Mary Stuart, was not accepted by her, nor did she give her assent to the ensuing parliament or convention of Estates. Knox and the other preachers began to organize the new kirk, under "superintendents" (not bishops), whose rule was very brief. The Convention began business in August, crowded by persons not used to be present, and accepted a Knoxian "Confession of Faith." On the 24th of August three statutes abolished papal and prelatical authority and jurisdiction; repealed the old laws in favour of the church, and punished celebrants and attendants of the Mass—for the first offence by confiscation, for the second by exile, for the third by death. The preachers could get the statute passed, but the sense of the laity prevented the death penalty from being inflicted, except, as far as we know, in one or two instances. The *Book of Discipline* and the *Book of Common Order* express Knox's ideals, which, as far as they were noble, as in the matter of education and of provision for the poor, remained, in part or in whole, "devout imaginations." Not so the Knoxian claims for the power of ministers to excommunicate, with civil penalties, and generally to "rule the roast" in secular matters. The nobles and gentry clung to the wealth of the old church; the preachers, but for congregational offerings, must have starved.

Neglect as well as mob violence left the ecclesiastical buildings in a ruinous condition, but the authority of the preachers, with their power of boycotting (excommunication), became a theocracy. The supernatural claims of these pulpiteers to dominance in matters public or private were the main cause of a century of war and tumult. The preachers became, what the nobles had been, the opponents of authority; the Stuarts were to break them and be broken on them till 1688. In the hands of the ministers a Calvinism more Calvinistic than Calvin's was the bitter foe of freedom of life, of conscience, and of religious tolerance. On the other hand, unlike the corrupt clergy whom they dispossessed, they were almost invariably men of pure and holy life; stainless in honour; incorruptible by money; poor and self-sacrificing; and were not infrequently learned in the original languages of the scriptures. Many were thought to be possessed of powers of healing and of prediction; in fact a belief in their supernormal gifts, like those of Catholic saints, was part of the basis of their prestige. The lower classes, bullied by sabbatarianism and deprived of the old revels, were restive and hostile; but the educated middle class was with the preachers; so were many lesser country gentry; and the nobles, securing the spoils of the church, were acquiescent.

The religious revolution in Scotland, after the work of destruction had been done, was the most peaceful that occurred in any European country. On the Catholic side there was as yet no power of resistance. Huntly, the Catholic "Cock of the North," had himself been compromised in the actions of the Congregation. How the Catholics of the west highlands took the change of creed we do not know, but they were not fanatically devout and attempted no Pilgrimage of Grace. Life went on much as usual, and the country, with a merely provisional government, was peaceful enough under the guidance of Moray, Maitland of Lethington, and the other lay Protestant leaders. They wished, as we saw, to secure the hand of Elizabeth for the earl of Arran, a match which would practically have taken away the Scottish crown from Mary Stuart, unless she were backed by the whole force of France. But Elizabeth had seen Arran in London and had probably detected his hysterical folly. He actually became a suitor for Mary's hand, when the death of her husband the French king (5th of December 1560) left her a friendless exile. Her kinsmen, the Guises, fell from power, and were no longer to be feared by England, so that Elizabeth need not abandon her favourite, Lord Robert Dudley, in the hope of securing Scotland by her marriage with Arran. In the spring of 1561, Mary's brother, Lord James Stewart, lay prior of St Andrews, visited her in the interest of the Scottish Protestant party, while Lesley, later bishop of Ross, brought the promises of Huntly. He would restore the Mass in the North and welcome the queen at Aberdeen if she would land there, but Mary knew the worth of Huntly's word, and preferred such trust as might be ventured on the good faith of her brother. She foiled the attempts of the English ambassador to make her ratify the treaty of Edinburgh, and, while Lethington, no worse a prophet than Knox, predicted "strange tragedies," Mary came home.

Mary's return to Scotland.

Young as she was, she came as no innocent novice to a country seething with all the perfidious ambitions that a religious revolution brings to the surface. She was wise with the wisdom of the Guises, but sincere friends she had none, and with all her trained fascinations she made few, except in the circle of the Flemings, Beatons, Livingstones and Seatons. Lethington, who had deserted her mother, dreaded her arrival; she forgave him, and for a time, relying on him and her brother, contrived to secure a measure of tranquillity.

Scotland was, doubtless, in Mary's mind, a mere stepping-stone to England. There the Catholic party was strong but for its lack of a leader, and to the English Catholics Mary seemed their rightful queen. By one way or other—by a Spanish marriage, by the consent of Elizabeth to recognize Mary as her heir, by the ambitions of her own nobles and the wit of Lethington, ever anxious to unite the island under one sovereign—Mary hoped to wear the three crowns. Catholicism she would restore if she could, but that was not her first object. It was commonly thought that, though she would never turn Calvinist, she might adopt the Anglican doctrine as understood by Elizabeth, if only she could be recognized as Elizabeth's successor. Till she became Elizabeth's captive there was always the possible hope of her conversion, and despite her professions to the pope there was at least one moment when the pope perceived this possibility. Meanwhile she only asked freedom of conscience for herself, and her mass in her own chapel. The bitter fanaticism of Knox on this point encountered the wiser policy of Lord James and of Lethington.

Mary had her mass, but the constant and cowardly attacks on her faith and on her priests embittered her early years of queenhood in her own country. The politicians hoped that Elizabeth might convert Mary to her own invisible shade of Protestantism if the sister sovereigns could but meet, and for two years the promise of a meeting was held up before Mary.

Meanwhile the needy and reckless Bothwell, a partisan of Mary of Guise, a Protestant and the foe of England, was accused by Arran of proposing to him a conspiracy to seize the queen, but the ensuing madness of Arran left this plot a mystery, though Bothwell was imprisoned till he escaped in August 1562. Mary then undertook a journey to the north, which ended in a battle with the Gordons, the death of Huntly and the execution of one of his sons. This attack by a Catholic queen on the leader of the Catholic party has been explained in various ways. But Mary's heart was in the expedition and in the overthrow of Huntly; she was in the hands of her brother, to whom she had secretly given the earldom of Murray, coveted by Huntly, whose good faith she had never believed in, and whose power was apt to trouble the state and disturb her friendly relations with England. She was deliberately "running the English course," and she crushed a probable alliance between the great clans of the Gordons and Hamiltons.

The question of her marriage was all important, and her chances were not improved by the scandal of Chastelard, whether he acted as an emissary of the Huguenots, sent to smirch her character, or merely played the fatuous fool in his own conceit. He was executed on the 22nd of February 1563 at St Andrews. Lethington then went to London to watch over Mary's interests, and either to arrange her marriage with Don Carlos, or to put pressure on Elizabeth by the fear of that alliance. Now, in March 1563, Elizabeth first drew before the Scottish queen the lure of a marriage with her favourite, Lord Robert Dudley, Mary to be acknowledged as her successor if Elizabeth died without issue. Later in the year, and after Lethington's diplomatic

mission to France, Elizabeth announced that a marriage of Mary with a Spanish, Imperial or French prince would mean war, while she still hinted at the Leicester marriage, or perhaps at a union with young Henry Darnley, son of Lennox. Elizabeth's real intention was merely "to drive time," to distract Scotland and to leave her rival isolated. The idea of a Spanish marriage excited the wrath of Knox, whose interviews with Mary did nothing but irritate both parties and alienate the politicians from the more enthusiastic Protestants. The negotiations for the Leicester marriage were prolonged till March 1565, when Elizabeth had let slip on Mary Henry Darnley (the young son of Lennox, who himself had been allowed to return to Scotland), and at the same time made it clear that she had never been honest in offering Leicester.

Till the spring of 1565, Mary, despite the insults to her religion and the provocations to herself, had remained attached to "the English course" and to the counsels of Moray and Lethington. Her naturally high temper, wearied of treacheries and brow-beatings, now at last overcame her. Darnley was esteemed handsome, though his portraits give an opposite impression; his native qualities of cowardice, perfidy, profligacy and overweening arrogance were at first concealed, and in mid April 1565 Lethington was sent to London, not to renew the negotiations with Leicester (as had been designed till the 31st of March), but to announce Mary's intended wedding with her cousin. Thus the cunning of Elizabeth and Cecil had its reward. Darnley being a Catholic, as far as he was anything, the jealous fears of the Brethren under Knox reached a passionate height. The Hamiltons saw their Stuart enemies in power and favour. Murray knew that his day of influence was over, and encouraged by the promises of Elizabeth, who was remonstrating violently against the match into which she had partly beguiled and partly forced Mary, he assumed a hostile attitude and was outlawed (6th of August 1565). A week earlier Mary, without waiting for the necessary papal dispensation (Pollen, *Papal Negotiations with Mary Stuart*), had publicly married Darnley, who bore the title of king, but never received the crown matrimonial.

Marriage with Darnley.

Mary now promised restoration to Huntly's son, Lord George; she recalled Bothwell, who had a considerable military reputation, from exile in France; and she pursued Murray with his allies through the south of Scotland to Dumfries, whence she drove him over the English border in October. Here Elizabeth rebuked and disavowed him, and Mary's triumph seemed complete. Her valour, energy and victory over Elizabeth were undeniable, but she was now in the worst of hands, and her career took its fatal ply. Lethington had not left her, but he was overlooked; Lennox and the impracticable Darnley were neglected; and the dangerous earl of Morton, a Douglas, had to tremble for his lands and office as chancellor, while Mary rested on her foreign secretary, the upstart David Riccio; on Sir James Balfour, noted for falseness even in that age; and on Bothwell.

As early as September 1565 gossips were busy over the indiscretion of Riccio's favour: Darnley had forfeited the good opinion of his wife; was angry because the Hamiltons were not wholly sacrificed to the ancient feud of Lennox and his clan; and Knox's party looked forward with horror to the parliament of March 1566, when Mary certainly meant "to do something tending to some good anent restoring the ancient religion." She was also supposed to have signed a Catholic league, which only existed in devout imaginations, but in February 1560 she sent the bishop of Dunblane to crave a large subsidy from the pope. Quite ignorant as to the real state of affairs, he raised the money and sent a nuncio, who never risked himself in Scotland, but made the extraordinary proposal later, that Mary should execute or at least "discourt" her chief advisers.

Meanwhile the clouds of hatred gathered over the queen. Lethington (5th of February 1566), wrote to Cecil saying that "we must chop at the very root," and Randolph, Elizabeth's ambassador, heard that measures against Mary's own person were being taken. Randolph was dismissed for supplying Murray with English gold; from Berwick he and Bedford reported to Cecil the progress of the conspiracy. While Mary was arranging a marriage between Bothwell and the late Huntly's daughter, Lady Jane Gordon, Darnley intrigued with Lord Ruthven and George Douglas, a bastard kinsman of Morton, for the murder of Riccio, and for his own acquisition of the crown matrimonial. Morton and Lindsay were brought into the plot, while Murray, in England, also signed. He was to return to Edinburgh as soon as the deed of slaughter was done, and before parliament could proceed to his forfeiture.

Mary, according to Ruthven's published account, had herself unconstitutionally named the executive committee of parliament, the Lords of the Articles, who were usually elected in various ways by the Estates themselves. While Mary was at supper, on the 9th of March, Darnley, with Ruthven, George Douglas and others, entered the boudoir in Holyrood, by his private stair, while Morton and his accomplices, mainly Douglases, burst in by way of the great staircase. There had been an intention of holding some mock trial of Riccio, but the fury of the crowd overcame them: Riccio was dragged from Mary's table and fell under more than fifty dagger wounds. While Mary, Darnley and Ruthven exchanged threats and taunts, Bothwell and Huntly escaped from the palace, but next day, Mary contrived to send letters to them and Atholl. On the following evening Murray arrived, and now even Murray was welcome to his sister. Darnley had taken on him (his one act of kingly power) to dismiss the parliament, but he now found himself the mere tool of his accomplices. He denied—he never ceased to deny—his share in the guilt, and Mary worked on his vanity and his fears, and moulded his "heart of wax" to her will. On his assurances the lords, expecting an amnesty, withdrew their guards from the palace and next day found that the bird had flown to the strong castle of Dunbar. Hence Mary summoned the forces of the country, under Bothwell and Huntly; she forgave Murray; the murderers had no aid from the Protestants of Edinburgh, who as before failed them in their need. Knox himself fled to Kyle, though there is no evidence that he was privy to a deed which he calls "worthy of all praise," and Morton and Ruthven spurred to Berwick, while Lethington skulked in Atholl. His possessions were handed over to Bothwell. Darnley betrayed some obscure accomplices. He was now equally detested by Murray, by the new exiles and by the queen, while she reconciled Murray and Bothwell. She tried to assuage all feuds; in an inventory of her jewels she left many of them to Darnley, in case she and her child did not survive its birth. The infant, James, was born in the castle on the 19th of June.

Riccio's murder.

On Mary's recovery, her aversion to Darnley, and her confidence in Bothwell, were unconcealed; and, early in September, she admitted Lethington to her presence. She had learned that Darnley meant to leave the country: she met him before her Privy Council, who sided with her; he withdrew, and the lords, including Murray, early in October signed a "band" disclaiming all obedience to him. On the 7th or 9th of October, Mary went to Jedburgh on the affairs of Border justice, and a week later she rode with Murray to Hermitage castle, where for several days Bothwell had lain, wounded nearly to death by Eliot, a border reiver. On her return she fell into an almost fatal illness and prepared for her end with great courage and piety; Darnley now visited her, but was ill-received, while Bothwell was borne to Jedburgh from Hermitage in a litter. While Buchanan represents the pair as indulging in a guilty passion, the French ambassador, du Croc, avers that Mary was never in better repute with her subjects. On the 24th of November Mary was at Craigmillar castle, near Edinburgh, where undoubtedly she held a conference with her chief advisers that boded no good to Darnley; and there were rumours of Darnley's design to seize the infant prince and rule in his name. The evidence on these points is disputable, but now, or not long after, Huntly, Bothwell, Lethington and Argyll signed a "band" for Darnley's murder.

Meanwhile, in December, Mary held the feasts for the baptism of her son by catholic rites at Stirling (17th of December), while

Darnley stood aloof, in fear and anger. A week later, moved by Bedford, representing Elizabeth, and by Bothwell and her other advisers, Mary pardoned Morton and his accomplices. She also restored Archbishop Hamilton to his consistorial jurisdiction, but withdrew her act, in face of presbyterian opposition. Darnley had retired to his father's house at Glasgow, where he fell ill of small-pox, and, on the 14th of January 1567 Mary, from Holyrood, offered to visit him, though he had replied by a verbal insult to a former offer of a visit from Stirling. About this week must have occurred the interview in the garden at the Douglas's house of Whittingehame, between Morton, Bothwell and Lethington, when Morton refused to be active in Darnley's murder, unless he had a written warrant from the queen. This he did not obtain. On the 20th of January 1567 Mary left Edinburgh for Glasgow, her purpose being to bring Darnley back to Craigmillar. At this time (the 22nd–25th of January), she must have written the two first Casket Letters to Bothwell. Letter II. (really Letter I.) leaves no doubt, if we accept it, as to her murderous design (see CASKET LETTERS). What followed must be read in Mary's biography: the end was the murder of Darnley in the house at Kirk o' Field, after the midnight of Sunday, the 9th of February.

Darnley's murder.

Public and conspicuous as was the crime, the house being blown up with gunpowder, no secret has been better kept than the details. The facts of Mary's lawless marriage with Bothwell, her capture at Carberry Hill, her confinement in Loch Leven castle, her escape, her defeat at Langside, and her fatal flight to an English prison, with the proceedings of the English Commissions, which uttered no verdict, must be read in her biography (see MARY STUART).

Marriage with Bothwell.

Scotland was now ruled by her brother, the Regent Murray, in the name of her infant son, James VI. Murray arrested Lethington, as accused of Darnley's murder, and Lethington was now lodged under ward in Edinburgh, but Kirkcaldy of Grange released him and gave him shelter in Edinburgh castle, which he commanded (23rd of October). Lethington was to be tried, but his armed friends mustered in great numbers, and, secure in the castle, he and Kirkcaldy upheld the cause of Mary. Lethington's motive is obvious; in Mary's success lay his chance of safety: how he won over Kirkcaldy is unknown. The rebellion in the north of England failed, Northumberland was driven across the border, and it was Murray's idea to barter him for Mary, in the beginning of January 1570. But on the 23rd of January, Murray was shot dead, in the street of Linlithgow, by a Hamilton, with the approval and aid of Archbishop Hamilton and other heads of the house.

James VI.: Internal Contentions.

The contending parties, queen's men and king's men, now made approaches to each other; neither had a share in the Hamiltons' crime. But Randolph, sent to Edinburgh for the purpose, kept them apart; Elizabeth despatched Sussex to ravage the Scottish border, in revenge for a raid by Buccleuch, and in May Lennox entered Scotland with an English force and soon was appointed regent (17th of July). This meant a war of Stuarts against Hamiltons, and, generally, of "Queen's men" against "King's men." Truces and empty negotiations merely protracted disorder. On the 2nd of April 1571 Mary's party lost Dumbarton castle, which Crawford of Jordanhill took by a daring night surprise; and Archbishop Hamilton, a prisoner, was hanged without trial. In May the Hamiltons entered Edinburgh, and later Lennox, in a parliament held at Leith, secured the forfeiture of Lethington. As the year passed by, Argyll, Cassilis, Eglintoun and Boyd went over to Lennox's party, and in an otherwise futile raid of Kirkcaldy's men on Stirling, Lennox was captured and was shot by a man named Calder. In England the Ridolphi-Norfolk plot was discovered, and at the end of 1571 Buchanan's "Detection" of Mary, with translations of the Casket Letters, was published. Though Mar was now regent, Morton was the man of action. In February 1572 he forced on the kirk an order of bishops, "Tulchan bishops," filters through which the remaining wealth of the church trickled into the coffers of the state, or of the regent.

This was the beginning of the sorrows of more than a century. The kirk Presbyterian was founded on the Genevan model, and was intended to be a theocracy. She had claimed, since the riots at Perth in 1559, the Power of the Keys, with the power of excommunicating even the king, a sentence practically equivalent to outlawry. These pretensions were incompatible with the freedom of the state and of individuals. It became the policy of the crown to check the preachers by means of the order of bishops, first reintroduced by Morton, and worthy of their origin. The kirk was robbed afresh, benefices were given to such villainous cadets of great families as Archibald Douglas, an agent in Darnley's murder; and though, under the scholarly but fierce Andrew Melville, the kirk purified herself afresh and successfully opposed the bishops, James VI. dominated her again, when he came to the English crown, and the result was the long war between claims equally exorbitant and intolerable, those of the crown and the kirk.

Crown and Kirk.

The death of Mar (28th of October 1572) left power in the stronger hands of Morton, and the death of Knox (24th of November) put the kirk for a while at the mercy of the new regent. Meanwhile Mary's party dwindled away; at a meeting in Perth (23rd of February 1573) her thanes fled from her, and Elizabeth at last reinforced Mary's enemies with men and artillery. On the 28th of May Edinburgh castle surrendered at discretion. Lethington, the heart of the long resistance, died, a paralytic, in prison, and Morton resisted the generous efforts made to save the gallant Kirkcaldy. Knox had prophesied that he would be hanged, and hanged he was.

Despite the ferocity of partisans in "the Douglas wars," an English envoy reported that the power of the country gentry and the boroughs had increased, while that of the great wavering nobles, Hamilton, Huntly and others, was diminishing. The "navy was so augmented as it is a thing almost incredible," but none the less £100 sterling was worth as much, Drury wrote from Berwick, as £1000 Scots.

In 1575, at the General Assembly, Andrew Melville, now a man of thirty, and, with Buchanan, the foremost scholar of Scotland, especially in Greek, caused the lawfulness of bishops to be mooted. Thenceforward Scotland was engaged in a kind of "bishops' war." Meanwhile Morton found the old Marian party-feud reviving, and in 1577, knowing his own guilt in Darnley's murder, he attempted to win the alliance of Mary for his own security. In March 1578, a coalition of his public and private foes caused Morton to resign the regency, while the young earl of Mar became custodian of the boy king. On the 28th of May, Morton allied himself with Mar, who commanded Stirling castle, and after negotiations recovered power. Atholl was his chief opponent, but in April 1579 he died suddenly, after dining with Morton; poison was suspected. Morton, with Angus, attacked the Hamiltons, whose chiefs fled the country, accompanied by the worst of traitors, Sir James Balfour. Knowing all the secrets of Darnley's murder, Balfour revenged himself by raking up Morton's foreknowledge of the deed; and here he was helped by the influence exercised over the young king by his cousin Esmé Stuart d'Aubigny (a son of Darnley's paternal uncle, John), who came to Scotland from France in September 1579. D'Aubigny allied himself with Knox's brother-in-law, James Stewart of the house of Ochiltree, captain of the King's Guards, an able, handsome, learned, but rapacious man. The Hamiltons, now in English exile, were forfeited; d'Aubigny received the earldom of Lennox; and, as after Darnley's death, placards were posted urging the trial of Morton for that crime. As against the new Lennox, Morton was deemed a friend by the preachers, though Lennox professed to be reconciled to the kirk. Throughout 1580 Elizabeth encouraged Morton, with her wonted fickle treachery. In October she recalled her ambassador, and left Morton to his fate. Sir James Balfour secretly returned from France with his information, and Morton was accused and arrested on the last day of 1580. Elizabeth sent old Randolph to threaten and plead, but Lennox and James Stewart were too

powerful. Morton was tried on the 1st of June 1581, was found guilty, and, with one Binning, who had accompanied Archibald Douglas to the scene of Darnley's murder, was executed. His title went to the Douglases of Lochleven. James Stewart received the Hamilton earldom of Arran, and under him and Lennox the young king began his long strife with the kirk and his half-hearted dealings with the Catholics and his mother.

It is impossible here to follow the course of the strife, in which the godly were led by the earls of Gowrie and Angus. Gowrie seized James, and power, at Ruthven (August 1582), a step approved of by the preachers. In June 1583, James escaped to St Andrews and was surrounded by his party. In November he made the son of Lennox, who had died in France, a duke; Arran was again in power, and Melville with other preachers fled to England in 1584, after the execution of Gowrie for high treason. The king and council were proclaimed judges in all cases; preachers were to submit to their judicature when accused of political offences, a standing cause of strife.

No longer needing Catholic assistance, James threw over his mother, with whom he had been intriguing, and sent the beautiful Master of Gray to betray Mary's secrets to Elizabeth. At the end of 1585, all James's exiled foes, Douglases, Hamiltons and others, returned across the border in force, caught the king at Stirling, drove Arran into hiding, restored the Gowrie family, and became the new administration. In 1586, the Babington plot was arranged, and discovered by those who had allowed it to be arranged. James practically did nothing to rescue his mother: one of his representatives in England was that Archibald Douglas who helped to slay his father.

The execution of Mary on the 8th of February left James "a free king" as far as his mother's claim to the throne was concerned, and he had his pension of £3000 or £4000 from Elizabeth. Thus war between the two countries was avoided. Thenceforth, till James came to the throne of England, the history of Scotland was but a series of inchoate revolutions, intrigues that led to nothing definite and skirmishes in the war of kirk and state. The king had to do with preachers who practically held the doctrines of Becket as to priestly pretensions. James was "Christ's silly vassal," so Andrew Melville told him, and "Christ" in practice meant the preachers who possessed the power of the keys, the power to bind and loose on earth and in heaven. The strange thing is that while Elizabeth warned James against the pretensions of men who "would have no king but a presbytery," whenever he was at odds with the ministers and with the nobles who kept trying to seize his person with the approval of the ministers, Elizabeth secretly or openly backed the kirk.

Death of Mary.

The kirk was strong enough to compel James to march, more than once, against the Catholic earls, Huntly, Errol, Angus and others. They, again, constantly intrigued with Spain, and there were moments when James, driven desperate by the preachers, listened to their projects. He was anti-papal by conviction, yet hoped for help from Rome, and was so far implicated in the adventures of his Catholic subjects that, in the interest of his own character, he had to advance against them and drive them into exile. In 1590 he married Anne of Denmark: in 1592 his character suffered through the murder, by Huntly, of "the bonny earl o' Murray," suspected of favouring the madcap Francis Stewart, earl of Bothwell (nephew of Queen Mary's Bothwell), a man who made it his business to kidnap the king, and who presently, by the help of Gowrie's widow, seized him in Holyrood. In 1592 parliament "ratified the liberty of the true kirk," leaving little liberty for king and state, since, in the phrase of one preacher, "the king might be excommunicated in case of contumacy and disobedience to the will of God," as interpreted by the ministers. In the following year (23rd of July 1593) Bothwell, much favoured by the preachers, made his capture of James, but had not the power to hold him long, and a later revolutionary attempt in the same year, by Atholl and the young earl of Gowrie, was a failure.

Gowrie went abroad and passed some time at the university of Padua; to him the eyes of the preachers were hopefully turned after 1596. As Bothwell had become a Catholic, they excommunicated him in 1595: in 1596 James resolved to recall the exiled Catholic peers; the commissioners of the General Assembly, alarmed and infuriated, met in Edinburgh, ordered a day of humiliation, decided to excommunicate the Catholic earls and established a kind of revolutionary committee of public safety. James insisted on his own authority; insisted that a secular court had a right to try a virulent preacher who declined the secular jurisdiction when accused of having denounced Queen Elizabeth as an atheist. The quarrel waxed: the gatherings summoned by the preachers were declared to be seditious; a meeting in a church ended in a threatening riot that raged round the Tolbooth, where James was sitting, and on the following day he with his Court withdrew to Linlithgow (18th of December 1596). The Court of Session was also to be removed, and the burgesses, fearing loss of trade, laid down their arms. The leader of the clerical agitation, Mr Bruce, with a wild preacher named Balcanquhal, fled to England, and James returned in triumph to his capital on the 1st of January 1597. He followed up his victory; a General Assembly at Perth was obedient to his will: the preachers were forbidden to criticize, from the pulpit, acts of parliament or of the privy council; they were forbidden to call conventions without the royal person or authority and to attack individuals in their sermons.

In the great towns, moreover, ministers might not be appointed to charges without the king's consent, and in this course James advanced, with but slight opposition, till he put the preachers under his feet. In a long series of crafty movements James managed to reintroduce episcopacy (1598–1600) by the aid of packed General Assemblies, later declared void by the Covenanters (1638). He increased Presbyterian emotion by the suspicion that he was intriguing with Catholic powers, and by his book on the rights and duties of a king (*Basilicon Doron*), which fell into the hands of Andrew Melville. Some cryptic correspondence with the pope, whether actually by James or by Elphinstone, one of his ministers, came apparently to the knowledge of the English court; his secret relations with the earl of Essex were, if not known, suspected; the young earl of Gowrie, returned from a residence on the continent, was too effusively welcomed by Elizabeth in May 1600; and James made a tactless speech when asking parliament for money towards his "honourable entering to the crown of England after the death of the queen." He was in deep poverty, the Estates were chary of supplies, plotters in Scotland had been offering to Cecil to kidnap the king (1598), and his relations both with the English government and with his own subdued but struggling preachers were bitterly unfriendly.

Gowrie conspiracy.

It is not known whether the mysterious events that culminated in the slaying of the earl of Gowrie and his brother, by John Ramsay, in their own house in Perth, on the 5th of August 1600, had any connexion with James's attitude to England and the kirk. The most probable explanation is that Gowrie laid, with the utmost secrecy, a plot to lure James to Perth, kidnap him there, transport him to Fastcastle, a fortress of the profligate and intriguing Logan of Restalrig, on the Berwickshire coast, and then raise the presbyterian party. If we could accept the evidence of a letter attributed to Logan and produced in 1608, this theory would be valid. But the letter has been proved beyond question to be a forgery, though it may very well be a forged copy of a genuine original (see *The Gowrie Conspiracy Confessions of George Sprot*, by A. Lang, Roxburghe Club, London, 1902). Certainly no plot was laid by James to entrap the Ruthvens, and the only question is, was the brawl in which they fell accidental, or had a plot hatched in deep secrecy been frustrated by unexpected circumstances? (In *James VI. and the Gowrie Conspiracy* the writer argues in favour of the latter solution.) In any case the scepticism of the Edinburgh ministers, especially of Bruce, encouraged the tendency of the people to think the worst, and led to the banishment, followed by other restrictions and sufferings, of Bruce himself. The house of Gowrie, so long hostile to Mary Stuart and James, was forfeited and ruined. Charles I. was

born just after the trial of the dead Ruthvens (19th of November 1600), and his mother was, as usual, opposed to the king's recent proceedings.

In 1602 Cecil was engaged in dark plots against James; the rising of Essex (of which James probably was expectant) had failed; but by the end of the year Cecil had entered into a secret understanding with James to favour his claims to the English succession. Elizabeth's last letter to the king was of the 5th of January 1603; she died in the earliest hour of the 1st of April, and James, late on the 3rd of April, had the news from Carey. He entered London on the 6th of May, whence he henceforth, as he said, governed Scotland "by the pen." Entirely safe from the usual turbulent movements of Scottish opposition, and but ill acquainted with Scottish opinion, he could dictate measures which were oppressive to the preachers and unwelcome to the majority of the laity. He kept the kirk for two or three years without a General Assembly, to which they had a legal right, and (with at least a shadow of legal right) he proclaimed unlawful the assembly of Aberdeen (1605). Though the recalcitrants who held it were punished, James's own officials saw that he had gone too far. His bishops were already becoming odious to his nobles; his prorogation of General Assemblies continued, and the brothers Melville, called to England, were treated with unconstitutional harshness. Andrew, who behaved with injudicious violence, was banished to France, James to Newcastle; other preachers were confined to their parishes; and by a mixture of chicanery (as at the pseudo assembly of Linlithgow) and of violence, the king established his tottering episcopacy, and sowed the dragon's teeth of civil war. Catholics were equally or more severely persecuted; and though the Borderers were brought into tranquillity, it was by measures of indiscriminate severity.

James becomes king of England.

A scheme for complete union of England and Scotland, promoted by James and by Francis Bacon, was unwelcome to and rejected by the two jealous countries (1604–1606). But *Postnati*, subjects born in Scotland after James's accession to the English throne, were allowed to purchase and hold real property, and "to bring real actions for the same," in England (1608).

In 1610 James had three Scottish bishops consecrated by three English bishops, ensuring for the northern country apostolic succession; and justices of the peace were created in Scotland. The "plantation" of Ulster by Scottish colonists was begun and flourished. Catholics were more and more persecuted, and in 1615 Father Ogilvie was executed, after abominably cruel treatment in which Spotiswoode, archbishop of Glasgow, took an unworthy share. In the same year the king's "Courts of High Commission" were consolidated, and an organ was actually placed in the royal chapel at Holyrood.

In 1617 James visited his native land: ecclesiastical brawls at once broke out, and James vigorously pushed, in face of the disfavour even of his bishops, the acceptance of his famous Five Articles. They were accepted at Perth, in 1618, but were evaded wherever evasion was possible. Communicants were to kneel, not to sit, a thing that had, of all others, been odious to John Knox; Easter was to be observed, also Christmas, contrary to earnest consciences; confirmation was introduced; the Communion might be administered to the dying in their houses; and baptism must be on the first Sunday after the child's birth. These articles, harmless as they may seem to us, were the last straw that Scottish loyalty could bear. In 1621, they were carried in parliament by a fair majority; to the horror and bitter indignation of all men and women of the old leaven. Worse, the English liturgy was used in a college chapel of St Andrews on the 15th of January 1623. James tried to suppress the general irritation by a proclamation against conventicles, and a threat to take away the courts of law from Edinburgh, if people did not go to church on Christmas day. He postponed the threat till Easter 1625, but, says Calderwood, "The Lord removed him out of the way fourteen days before the Easter Communion." He died on the 27th of March. Encouraged by safety and adulation in England; grasping at the Tudor ideal of kingship, determined to reduce to order the kirk from which he had suffered so many injuries and insults, he sowed the wind and his son reaped the whirlwind.

Only the chief moments in the struggle between Charles I. and the Scots can be touched on in this summary. James VI. had succeeded in his struggle with the preachers partly by satisfying the nobles with gifts out of old church lands. Charles I. reunited the kirk and the nobles by threatening, or seeming to threaten, to resume or impair these gifts, and also by his favour towards the universally detested bishops (1625–1629). Mr S. R. Gardiner speaks of the final shape of Charles's measure as "a wise and beneficent reform"; and he did aim at recovering the "teinds" or tithes, and securing something like a satisfactory sustenance for ministers. But he had caused alarm, and he refused all demands for the withdrawal of the loathed articles of Perth. The younger bishops too were not "sound" in Calvinism; many were looked on as Arminians. Protests were uttered in 1633, when Charles entered Edinburgh and held a parliament. Above all, and most legitimately, the revival of General Assemblies, now long discussed, was demanded vainly.

Charles I.

By 1636, Charles and Laud had decided to introduce a liturgy, a slightly, but in Scottish apprehensions "idolatrously," modified version of the Anglican prayer-book. Anglicanism was a limb of Antichrist; extempore prayers were regarded as inspired: a liturgy was "a Mass-book." The procedure was purely despotic, and at the first attempt to use the liturgy in St Giles's there broke out the famous "Jenny Geddes" riot in the church (23rd of July 1637). The nobles of the country, the ministers and lairds, met in Edinburgh and sent a petition against the liturgy to Charles. In November were formed "The Tables," a standing revolutionary committee of all Estates.

Constant meetings hurled protestations against the bishops; no man was more active than the young Montrose. In February 1638 the Covenant, practically a "band" of the whole country, enforced on reluctant signers, was launched. It made Scotland, like Israel, "a covenanted people" for the defence and propagation of the old Presbyterianism of Andrew Melville, and many devotees held that it was for ever binding on the nation. Legists differ as to whether the band was legal or not, but revolutions make their own laws, and the Covenant could not be more illegal than the imposure of the liturgy. Charles drove on the bishops, who better understood the situation, and he sent the half-hearted Hamilton to negotiate and threaten in Edinburgh, where the Covenanters were blockading the castle. But Charles did grant a General Assembly in Glasgow (21st of November), where, among unseemly uproar, the ecclesiastical legislation of James I. was rescinded, the law and custom of forty years were abolished, conformist clerics were expelled, and the earl of Argyll appeared as leader of the extreme party, while Montrose was the general of the armed Covenanters. In 1639 he was as active in arms in the north as Hamilton, on the king's side, was dilatory and helpless in the south. By May the chief clerical leader, Henderson of Leuchars, was denouncing Royalists as "Amalekites," and by biblical precedent Amalekites receive no quarter. Prelacy was "Baal worship," and the kirk thus turned the strife in the direction of religious ferocity.

The Covenanters.

While Charles hung irresolute on the eastern border, the Covenanters, under Alexander Leslie, took heart, occupied Duns Law, and terrified Charles into negotiations (11th–18th June). A hollow pacification was made: the assembly of August 1639 imposed the signing of the Covenant on all Scotsmen. A parliament (31st of August) demanded the loss of votes (fourteen) by bishops, and freedom of debate on bills formed by the Lords of the Articles, who had practically held all power; while Argyll carried a bill demanding for each estate the right to select its own representatives among these lords. Traquhair, as royal commissioner, prorogued parliament; negotiations with the king in London had no result; and in 1640 the prorogation was contemned, and though opposed by Montrose, the parliament constituted itself, with no royal warrant. War was at hand, but Montrose formed a party by "the band of Cumbernauld,"

to suppress the practical dictatorship of his rival and enemy, Argyll, who, he understood, was to be one of a triumvirate, and absolute north of Forth. Argyll allowed the committee of Estates to rule, as before, and bided his time. On the 20th of August Montrose was the first of the Covenanting army to cross the Tweed; Newcastle was seized, and Charles, unsupported by England, entered on the course of the Long Parliament and the slaying of Strafford. In Scotland the secret of the Cumbernauld band came out; Montrose, Napier and other friends were imprisoned on the strength of certain ambiguous messages to Charles, and on the 27th of July, being called before parliament, Montrose said—"My resolution is to carry with me honour and fidelity to the grave." Montrose kept his word, while Hamilton stooped to sign the Covenant. Montrose lay in prison while Charles I. visited Scotland and met the parliament, perturbed by the dim and unintelligible plot called "The Incident" (October 1641), which seems to have aimed at seizing the persons of Argyll, Hamilton and his brother Lanark. All that is known of Montrose, in this matter, is that from prison he had written thrice to Charles, and that Charles had intended to show his third letter to Argyll, Hamilton and Lanark, on the very day when they, suspecting a plot, retired into the country (12th of October). An agitated inquiry which only found contradictory evidence was disturbed by the news of the Irish rebellion (28th of October). Charles heaped honours on his opponents (Argyll was the one marquis of his name), and hastened to England. The country was governed by fifty-six members of the Estate and by the dreaded commission of the General Assembly, for now the kirk dominated Scotland, denying even the right of petition to the lieges.

The "Incident."

The English parliament, at war with the king, demanded aid from Scotland; it was granted under the conditions of the Solemn League and Covenant (1643), by which the Covenanters expected to secure the establishment of Presbyterianism in England, though the terms of agreement are dubious. Scotland, however, regarded herself as bound to war against "Sectaries," and so came into collision with Cromwell, to her undoing. In January 1644, a Scottish army crossed Tweed, to aid the parliament, with preachers to attend the synod of Westminster. Already some 2000 men from Ireland, mainly of Macdonalds and other clans driven into Ireland by the Argylls, were being despatched to the west Highland coast. Lanark, from Oxford, fled to join the Covenanters; Charles imprisoned Hamilton in Cornwall; Montrose was made a marquis; Leslie, with a large Scottish force and 4000 horse, besieged Newcastle. Montrose arrived a day too late for Marston Moor (2nd of July 1644); Rupert took his contingent; he entered Scotland in disguise, met the ill-armed Irish levies under Colkitto, raised the Gordons and Ogilvies, who supplied his cavalry, raised the fighting Macdonalds, Camerons and Macleans; in six pitched battles he routed Argyll and all the Covenanting warriors of Scotland, and then, deserted by Colkitto and the Gordons, and surprised by Leslie's cavalry withdrawn from England, was defeated at Philiphaugh near Selkirk, while men and women of his Irish contingent were shot or hanged months after the battle.

The Great Rebellion.

The clamour of the preachers was now for blood, and gentlemen taken under promise of quarter were executed by command of the Estates at St Andrews, for to give quarter was "to violate the oath of the Covenant"—as interpreted by the clergy. It would have been wiser to put the revenges as reprisals for the undeniable horrors committed by Montrose's Irish levies. The surrender of Charles to the Scots, the surrender by the Scots of Charles to the English, for £200,000 of arrears of pay, with hopes of another £200,000 (February 1647), were among the consequences of Montrose's defeat. But the surrender of the king festered in Scottish consciences; for the country was far from acquiescing in the transaction.

Leslie, by the advice of one Nevoy, a preacher, massacred, on his return to Scotland, the Macdonalds in Dunaverty castle. A strife arose between Hamilton, who wished to disband the Covenanting army, and Argyll, and gradually the struggle was between Hamilton and the sympathizers with the imprisoned king and Argyll at the head of (or under the heels of) the more fanatical preachers and Presbyterians. The Scottish commissioners in England, with Lauderdale, and with the approval of Hamilton's faction, signed, at the end of 1647, "The Engagement" with Charles, and broke away from the tyranny of the preachers. The Engagers had the majority in parliament, but were frantically cursed from the pulpits; they and their army mustered for the deliverance of their king. In August 1648, they crossed the border, leaving the fanatics to arm in their rear, but Cromwell, by a rapid march across the fells, caught and utterly routed them at Preston and on the line of the Ribble, taking captive the infantry and Hamilton, who was sent to the block.

This was the kirk's proudest triumph; the countrymen of the preachers had been ruined on "St Covenant's Day." The preachers, with Lords Loudoun and Eglintoun, Argyll and Cassilis, armed and raised the godly, and occupied Edinburgh. The parliamentary committee capitulated with the extremists, who sent friendly messages to Cromwell, and Argyll met him on the Tweed. Thence Cromwell sent Lambert with seven regiments to Edinburgh, where he himself stayed for some time. A parliament in Argyll's and the preachers' interest met there in January 1649; only sixteen nobles were present, as against fifty-six in the previous year. The execution of Charles I. (30th of January 1649) left the extreme party in a quandary. How could they keep terms with "bloody Sectaries" that had slain their king, in face of the protests of their envoys? They did pass the Act of the Classes, disabling all "Engagers" from all manner of offices, military and civil, and dividing the distracted country into two hostile camps. On the 5th of February Charles II. was proclaimed king in Edinburgh, if he took the two Covenants. This meant war against England, and war in which the Engagers and Royalists could not take part. The situation developed into ruin under the strife of the wilder and the gentler preachers.

Execution of Charles I.

Communications with Charles II. at the Hague were opened, and the Scots accused the English of breach of the Solemn League and Covenant. Huntly, as a Royalist, was decapitated at Edinburgh; and the envoys of Charles, thanks to the advice of Montrose, failed to induce him to stamp himself a recreant and a hypocrite by signing any covenants. But Montrose (January 1650) was sent by Charles to "search his death," as he said, in an expedition to the north of Scotland, while, in the absence of his stainless servant, Charles actually signed the treaty of Breda (1st of May). In April Montrose was abandoned by his royal master, and was defeated at Carbiesdale, on the south side of the kyle, or estuary, of Shin and Oykel; he was betrayed, insulted, bullied by the preachers, and, going to his death like a bridegroom to the altar, was hanged at Edinburgh, on the 20th of May. "Great in life, Montrose was yet greater in his death." He had kept his word, he had "carried fidelity and honour to the grave" (Gardiner). His head was set on a spike and his quartered limbs were exposed in various places.

Death of Montrose.

Charles came to Scotland; he signed the Covenants, while his tormentors well and duly knew that the action was a base hypocrisy, that they had tempted him to perjury. Cromwell, who now crossed the border, impressed this truth, as far as he might, on the preachers, who made Charles sign declarations yet more degrading, to the discredit of his father and mother. Meanwhile David Leslie, with singularly excellent strategy, foiled and evaded Cromwell in the neighbourhood of Edinburgh, till the great cavalry leader was forced to retreat towards England. At Dunbar Leslie held Cromwell in the hollow of his hand, but his army had been repeatedly "purged" of all Royalist men of the sword by the preachers; they are said, and Cromwell believed it, to have constrained Leslie to leave his impregnable position and attack on the lower levels. Leslie appears to have intended a surprise, as at Philiphaugh, but "through our own laziness," he confesses, the surprise came from Cromwell's side, and few of the Scots except the mounted gentry escaped from the crushing defeat at

Royalist cause in Scotland.

Dunbar (3rd of September). Of the prisoners an unknown number died of hunger in Durham cathedral, others were sold to slavery in the colonies.

Cromwell had occupied the country south of the Forth, while Argyll was Charles's master, extorting hard terms from the prisoner, who once ran away. The committee of Estates, on hard terms, gave an indemnity to Royalists whose swords they needed; many ministers acquiesced ("The Resolutioners"), the more fanatical dissidents were called "Remonstrants," and now the kirk was rent in twain by the disputes of these two factions. The Remonstrants, clerical and military (Guthrie and Strachan), would not support Charles while he was not "under conviction," and Strachan was excommunicated by the Resolutioners. On the 20th of July 1651 Lambert defeated the Royalists at Inverkeithing; Forth no longer bridled Cromwell; Leslie was sure to be outflanked, and, with Charles, he evaded Cromwell, marched into the heart of England (unaccompanied by Argyll), and was defeated and taken, while Charles made a marvellous escape at Worcester (3rd of September 1651).

The conquest of Scotland was soon completed; at last she lay at an English victor's feet; the General Assembly was turned out into the street by "some rats of Musketeers and a troup of horse," and the risings of Glencairn, Lorne (eldest son of Argyll) and others in the highlands were easily crushed. Argyll, deserted and detested, compromised himself by letters to Monk, containing intelligence as to the movements of the Royalists. While the rival bands of preachers squabbled, Cromwell, like Edward I., arranged that Scottish members should sit in Westminster, and, commercially, as in the administration of fair justice, and the peace of the country, Scotland prospered under English rule. But Monk withdrew his force to London in January 1660, and hurrying events brought the joyous Restoration of the 29th of May.

The Restoration.

The festivities in Scotland were exuberant, but it was impossible that tranquillity should be restored. The Remonstrants, that is, the clerical fanatics to whom toleration was more especially abominable, are reckoned (Hume Brown) as the majority of the preachers, but exact statistics cannot be obtained. In their eyes, as Charles had taken both Covenants, he was bound to remain a Presbyterian and to establish Presbyterianism in England, a thing impossible and entailing civil war in the attempt. Even the representatives of the Resolutioners urged Charles not to use the Anglican service, though they confided to Sharp, their agent in London, their opinion that, if the Remonstrants (or Protesters) had any hand in affairs, "it cannot but breed continual distemper and disorders." Suppose that the kirk was restored by Charles to her position in 1592, with General Assemblies. With the violent party in a majority, refusing the jurisdiction of the state, insisting on the establishment of Presbyterianism in England, excommunicating and scolding, Scotland would be as much disturbed as in the days of Andrew Melville. "Neither fair nor other means are likely to do with them" (the fanatics), says Baillie, principal of Glasgow University, himself a Covenanter from the beginning. He wished to banish the Remonstrants to Orkney.

Historians do not usually seem to perceive that Charles was faced by the old quarrel of church and state, in which "fair means" were seen to be unavailing, while "unfair means" only succeeded, after some thirty years, in breaking down the old Presbyterian spirit so much that, after 1688, the state could hold her own. Charles, without first summoning the Estates, named his own privy council and ministers, of whom Lauderdale, long a Covenanter, came presently to be governor of Scotland. As Argyll, in face of all warnings, went to court, he was arrested, and during the session of parliament of January 1661 was tried for treason, and, on the ground of his letters to Monk, was convicted and executed, as was the leading Remonstrant preacher, James Guthrie, accused of holding an illegal conventicle, "tending to disturbance, . . . and, if possible, rekindling a civil war."

The history of the country during the Restoration falls naturally into four periods.

Four periods during the Restoration.

I. In the first (1660–1663) the royal commissioner to parliament was the earl of Middleton, a soldier of fortune who had been in arms for the Crown as late as 1655, who had been excommunicated by the kirk, and was determined to keep down the preachers. With him were the Cavalier party, anxious to recover their losses during the civil war. All were impoverished, and greed was the dominant motive of the members of the privy council, the rulers of the country. Meanwhile, in London, the earl of Lauderdale, once a fervent Covenanter, was secretary for Scotland, had the king's ear, and would have restored presbytery, at least by way of experiment. The "creature" of Charles, as he called himself, this burly, violent scholar, buffoon and bully, was reckoned a patriot. As an "Engager" he had seen his country conquered by English arms. His policy was to keep Scotland in good humour by restoring presbytery; to raise in the country a militia strong enough to support Charles against the English parliament, and thus, in both countries, to make the royal prerogative absolute. The first parliament (1661–1663), under Middleton, was obsequious enough to grant the king £40,000 annually, to abolish the covenants and to rescind all but the private legislation of the revolutionary years (1638–1660). The Lords of the Articles were restored, mere nominees of government. Middleton, Tarbat and Clarendon overcame Charles's reluctance to restore episcopacy; Lauderdale fell into the background; the Rev. James Sharp, hitherto the agent of the Resolutioners, or milder party among the preachers, turned his coat, and took the archbishopric of St Andrews. Episcopacy being restored, some three or four hundred preachers were driven from their parishes (1663). "We made a waste," said Archbishop Leighton, "and stocked it with owls and satyrs," the detested "curates." The Shorter Catechism was taught; the liturgy was not brought in; the sole change was in kirk government.

Meanwhile the Cavalier party invented a system of heavily fining men who had been their opponents in the troubles. Middleton coveted the estates of the earl of Argyll, son of the late marquis, and on a trumped-up charge of "leasing making" (he had spoken in a private letter of "the tricks of parliament") had him condemned to death. He was saved by the exertions of Lauderdale, and Tarbat suggested, while Middleton adopted, a scheme for ostracizing, and making incapable of office, twelve of their opponents, including Lauderdale. But Lauderdale had the skill to turn the cards on Middleton, accusing him of tricking both parliament and king, and of usurping royal prerogative. Middleton and Tarbat were cashiered, and the able but profligate earl of Rothes united four of five of the highest offices in his own person, Lauderdale remaining at court as secretary for Scotland.

II. We come now to the years from 1664 to 1667. Middleton, with Archbishop Sharp, misgoverned the country, established a high court of commission, exiled the fiercest preachers to Holland, whence they worked endless mischief by agitation and a war of pamphlets; irritated the Covenanting shires, Fife and the south-west, by quartering troops on them to exact fines for Nonconformity, and so caused, during a war with Holland, the Pentland Rising (November 1666). This unconcerted movement arose out of an act of cruelty by soldiers in the remote Glenkens, and was unsupported by Holland, with which the Covenanters had been intriguing. Crushed at Rullion Green in the Pentlands, by General Dalziel, this movement left the Presbyterians the more angry, by reason of the cruelty of its suppression, and the use of torture to extract information from Mackail, a preacher, and Neilson of Corsack, a laird.

III. Lauderdale again saw his chance; Rothes was deprived of all offices save the chancellorship: Sharp was "snibbed" and disgraced, attempts at concession were begun, and the indulgence of 1669 licensed a number of Presbyterian ministers, under restrictions. The indulgence accentuated the division between those who accepted and those who rejected it. Outrages on conformist ministers were frequent, and conventicles were accompanied by armed men. A popular book, *Jus Populi*

Vindicatum (1669), demanded the restoration of the covenants, which meant civil war, the hanging of the bishops, and even applauded assassination by men who had "a call," like Phinehas. In a parliament with Lauderdale as commissioner (1669–1673) "clanking acts" were passed against nonconformity, but the laws were too severe to be executed, save spasmodically, and were followed by a second indulgence (1672). Lauderdale having married the rapacious countess of Dysart, corruption was rife; his brother, Haltoun, was an example of reckless greed; opposition arose to a scheme of union, presently dropped, and by 1673 the duke of Hamilton and Sir George Mackenzie led an organized political opposition. Lauderdale's Militia Act gave Charles a force of 22,000 men, who would "go anywhere" (that is, would invade England), at the king's command, and in 1673–1675 Lauderdale was attacked in the English House of Commons. Charles stood by him, but his best allies, Kincardine and Sir Robert Murray, deserted him, while Sir George Mackenzie of Rosehaugh came over to his party, became king's advocate (1677), and till 1686 was the Achitophel and public prosecutor of the government. After an alleged attempt to negotiate through Argyll (1678) with the preachers, in view of the threatening increase of armed conventicles, Lauderdale resolved on suppression. Without money, and without anything like an adequate regular force, he called out the clansmen of Atholl, Perth and other nobles, and quartered "the Highland host" on the disturbed districts. He would either put them down, or, what he preferred, bring rebellion to a head. The gentry, who had proclaimed their inability to suppress conventicles, were ordered to sign a bond making them responsible for their tenants, and were bound over to keep the king's peace by "law burrows," a method common in private life but unheard of between monarch and people. After six weeks the plundering clansmen were withdrawn, and in the spring of 1678, also of 1679, Hamilton with his allies carried their complaints to Charles. Mackenzie, in a controversy at Windsor (1679), proved to Charles that in Scotland he was as absolute as the kings of France and Spain, over church, state and all his subjects, and indeed, by various acts of James VI. and of his own reign, Charles really was a despot (British Museum, Additional MSS. 23,244, pp. 20-28).

Meanwhile, armed conventicles abounded, and the extreme faction openly denounced and separated themselves from the rapidly growing mass of the Indulged. Early in May 1679 Sharp was hacked to death on Magus Moor near St Andrews. The murderers rode to the west, joined the company of Robert Hamilton, defeated Graham of Claverhouse with a small force of horse at Drumclog, occupied Glasgow, and proved the total inability of the regular forces to cope with a rising. Charles might have been unable, in the frenzy of the popish plot of Titus Oates, to send forces from England, but as he chose the popular Protestant, the duke of Monmouth, to command them, he was allowed to despatch some regiments. The rebels, who were in two hostile parties, Indulged and Separatists, failed to hold Bothwell Bridge, and were easily routed. The duke of York was sent, in honourable banishment, to Scotland, and in the parliament of 1681 was royal commissioner.

IV. Here begins the fourth period (1680–1688), the domination of the duke, Queensberry, Perth, and his brother, Drummond of Lundin (earl of Melfort). Lauderdale was out of favour, and died. Now "by concession" (a third indulgence) "and repression, the once mighty force of Scottish Presbyterianism had at length been broken" (Hume Brown). By "Presbyterianism" we are here to understand, not the Presbyterian form of church government—the kirk whose motto is *Nec tamen consumebatur*—but the pretensions of preachers to dominate the state by the mythical "power of the keys," by excommunication with civil penalties and by the fiercest religious intolerance. Presbyterianism can exist and flourish without these survivals of the proudest pretensions of Romanism. To quote Dr Hume Brown again, "When the absolutism of the Stuarts was succeeded by a more rational government (1689), the example of the Indulged ministers, who composed the great mass of the Presbyterian clergy, was of the most potent effect in substituting the idea of toleration for that of the religious absolutism of Knox and Melville." Save for the fact that the ministers were as intolerant as ever of Nonconformists, Catholics and heretics, this is a just view, but Charles II. had to deal with a kirk in which the Remonstrants, the more fanatical ministers, were potent, whether the majority or not, while, after 1689, government found "the once mighty force of Presbyterianism broken." It was broken by the two last Stuart kings, who employed methods the most brutal and repulsive for the crushing of consciences trained in the theocratic ideas of Knox and Melville. The memory of the courage and devotion with which men, women and even children faced torture, death and ruin for an ideal impossible and undesirable is dear to the Scottish people.

On the side of the extremists, Cameron was happy enough to die in fair fight at Airs Moss (22nd of July 1680), after publicly disowning the king for his breach of the Covenant. Cargill next excommunicated the king, Dalziel and Mackenzie, and his followers separated themselves from "the ordinances dispensed by any Presbyterian minister." The followers of these two men, and of their successor, Renwick, who later was hanged, became the armed and organized "Societies," a large force of yeomen and farmers in south-western Scotland, usually styled Cameronians. After the Revolution, the government left them alone, and could afford to do so.

In 1681, parliament, under the duke of York as commissioner, passed a test act so drafted that no human being could honestly and logically take the test. The earl of Argyll, son of the marquis, added a qualifying clause; he would take the test, "as far as it was consistent with itself." By the influence of his countless creditors, who desired to be paid out of his estates, and in revenge for his seizure, on claims for debts, of the whole estates of clan Maclean (1674–1680), he was tried and was actually found guilty of treason. He escaped, but was condemned on the old charge after his later invasion of Scotland (1685).

In 1684, while Perth, and his brother, Melfort, who went over to Rome, were in power, Renwick emitted an "Apologetical Declaration," in which the active enemies of his sect were threatened with secret trials and with assassination (October), and a "curate," with some soldiers, was murdered. This, coming on the head of the Rye House murder plot (of which the Rev. Mr Carstairs, the agent of Argyll, and probably Argyll himself, then in Holland, were not ignorant), caused the government to demand, at the hands of the military, from all and sundry, an "Abjuration" of Renwick's anarchist utterances. Recusants were shot. The test was carefully framed so as to include no disavowal of religious principles, and was "universally unscrupled, even by the generality of great professors and ministers too," says Sheilds, an advanced extremist. However, the peasantry found, in the abjuration, matter contrary to their consciences, and while some recusants were shot out of hand, a girl named Margaret Wilson, with an old woman, Margaret MacLauchlan, were tied to stakes and drowned by the incoming tide, near Wigtown (13th of May 1685). How the penalty came to be inflicted, as the pair had what Wodrow calls "a material pardon," while there is no record of the withdrawal of the reprieve, remains a mystery. The guilt appears to attach to the local authorities at Wigtown.

In this cruel affair, Claverhouse, who caused to be shot the celebrated John Brown, "the Christian carrier," had no hand. To quote Dr Hume Brown, Claverhouse "kept strictly within the limits of his commission, and he carried out his orders with the distinct aim of saving blood in the end. To those who he thought had been led astray, it was his policy not to be unmerciful; for, in his own words, 'it renders three desperate where it gains one.' On the other hand, in the case of the obdurate, he showed a relentless precision, which gained for him his evil name, 'The Bloody Clavers,' the commissioned servant of the powers of darkness." As constable of Dundee he secured the commutation of the death penalty on minor offenders under his jurisdiction, and his expressed maxim was

"in the greatest crimes it is thought wisest to pardon the multitude and punish the ringleaders." It is no exaggeration to say that, of the governors of Scotland under the Restoration, Claverhouse was the ablest, the most honourable, the least rapacious and even the most clement. But "Bluidy Claverhouse" will continue to enjoy his traditional reputation in popular tracts and popular histories.

Charles II. had died on the 2nd of February 1685, and there were in Scotland some who wept for him. The year of his death was, *par excellence*, "The Killing Time," thanks to Renwick and his associates and the Rye House plotters. Now, too, came the attempts of Monmouth and of Argyll, who, owing to divided counsels in his camp, and want of support either from his clan or from the southern malcontents, failed in his invasion of Scotland, was taken, and was executed, suffering like his father with great courage and dignity. Many recusants were penned up, starved and cruelly treated, even tortured when they attempted escape, in the vaults of Dunottar Castle.

In 1686 James claimed and used the dispensing power as to penal laws against Catholics, in face of the opposition of two of the Scottish bishops (who were ejected from their sees) and of parliament. Mackenzie, for his opposition, lost office. The privy council was opened to Catholics, but on the landing of William III. the populace, in 1688, wrecked the chapel of Holyrood and began to "rabble" conformist ministers, or "curates." Of the guard that defended Holyrood "the gentlemen and the rabble, when they saw all danger over, killed some and put the rest in prison, where many of them died of their wounds and hunger," a parallel to the Dunottar cruelties not usually mentioned by historians ("Balcarres Memoirs"). A Convention of Estates, without a royal commissioner, met at Edinburgh on the 14th of March 1689, and it is curious that Williamites and Jacobites were not unequally represented. For president, Hamilton, who had been in opposition from 1673 to 1682, was preferred to Atholl by a small majority, but it soon appeared that William's friends were in the ascendant.

Revolution of 1688.

Claverhouse, now Viscount Dundee, despairing of his party, and under apprehension of an attack in arms, rode northward with a handful of horse, and began to play the part of Montrose, while the Convention offered the crown to William and Mary, adding the claim of right to dethrone a king who had infringed the laws. In May, William, in London, took the coronation oath, but firmly refused to accept, except in some sense of his own not easily understood, the clause, "to be careful to root out all heretics." The castle of Edinburgh was surrendered by Gordon, and Balcarres was put in that prison where, according to legend, he was visited by the wraith of Dundee, on the night of the battle of Killiecrankie. While Dundee was raising the clans and outmanœuvring Mackay, a party in parliament was agitating for constitutional reforms, and especially for freedom from the Lords of the Articles. William opposed, and party war was furious, when news came of Dundee's complete victory at Killiecrankie. The terror of the Whigs turned to joy when they heard that Dundee himself had fallen in the arms of victory. Two murderers had been sent by the earl of Nottingham to "seize," that is to despatch, Dundee. They left London for Mackay's camp on the 19th of July. On the 27th of July Dundee was shot, and on the 21st of October Nottingham wrote that his emissaries "had done very good service to the King" (*State Papers*, "Domestic," July 17th, 18th, 19th, October 21st, 1689). Henceforth, for lack of a commander of Dundee's genius, there was no real danger from the clans, and absolutely no chance of a rising of the lowland Jacobites in their support. At Dunkeld the newly raised Cameronian regiment successfully repulsed the highlanders, ill led by General Cannon as they were. They were never again dangerous at this period, were scattered by Livingstone in a surprise at Cromdale haughs, and government began to attempt to buy from the chiefs the peace of the clans.

Killiecrankie.

Meanwhile complex intrigues occurred, and were betrayed, between "the Club" (the advanced constitutionalists) and the Jacobites. In 1690 an act restored the kirk to the legal position of 1592, under sixty of the surviving ministers deprived in 1661. An act abolished civil penalties upon sentences of excommunication, and thus broke the terrible weapon which the preachers had wielded so long. Nothing was said about the eternally binding Covenant, which continued to be the fetish of the Cameronians and of later seceders. The General Assemblies, henceforth, under the influence of the diplomatic Carstairs (who had been cruelly tortured in 1684, to extract information about the Rye House Plot), did little to thwart government, though many "placed ministers" were, at heart, attached to the ancient claims of Knox and Melville. Laws as to patronage, an inflammatory question, were made, abolished and remade, causing, from about 1730 onwards, passions which exploded in the great Disruption of 1842. The dealings with the clans culminated in the massacre of the MacIans of Glencoe (13th February 1692). Through military inefficiency the hill passes were not stopped, and the murders of a peaceful and hospitable population were relatively few. That Dalrymple arranged for actual extermination of the males of the clan is certain, but there is no proof that he knew of the *modus operandi*, the betrayal of hospitality, "murder under trust." It is conceivable that William signed the orders under the impression that a "punitive expedition" of the ordinary sort was alone intended, but remonstrance from the Estates brought no punishment on any man except the dismissal, later, of Dalrymple (Viscount Stair) from office.

Massacre of Glencoe.

In 1693–1694 the kirk was much irritated by William's demands for oaths of allegiance to himself, without the consent of the ecclesiastical courts. William gave way, but similar Hanoverian demands later caused great searchings of heart and divisions among the preachers. The Episcopal party among the ministers was excluded from a share in church government and tended to dwindle; the bishops had no territorial sees; and gradually Episcopalians came to be Jacobites, professing a strange loyalty to James, who had treated them so unjustly, and later to his son, "James VIII.," the Chevalier de St George (b. June 10, 1688).

Since the Cromwellian occupation the interest of Scottish men had slowly shifted from religion to commerce; but a tariff war between England and Scotland had checked manufacturing and other enterprises. One William Paterson, instrumental in founding the Bank of England, conceived the plan of a Scottish East India Company, which, in 1695, obtained a patent by act of parliament. William complained, later, that he had no notice of the terms of that patent till after it was passed (he was fighting under Namur at the time), and the act not unnaturally aroused the jealousy of the rival English companies. It committed William to conditions which might readily produce a great naval war with Spain, for Paterson's real design was to establish an entrepôt in Panama, at Darien, within the undeniable sphere of Spanish influence. The Scots invested very largely, for them, but their expeditions were ill-found and worse managed; the Spaniards seized one of their vessels with its crew; the colonists deserted the colony; a fresh expedition was expelled by Spain, and William refused to take up the Scottish quarrel (1695–1700). The losses and the apparent injustice caused a frenzy of excitement in Scotland, and William could only express his regret and his desire for an incorporating Union of the two kingdoms. He died on the 7th of March, when the project of Union was to be debated by the English parliament. Under William, Scotland was a constitutional country; the absolute despotism enjoyed by Charles II. ceased to be; a free debating parliament existed, and torture was inflicted only by decree of king and parliament. It was abolished two years after the Union of 1707.

Darien Scheme.

Anne, from the beginning of her reign, advocated union, which, with the question of the succession, was the subject of constant and furious debates in the Scots parliament, till, on the 4th of March 1707, the act received the royal assent. Scotland was to have forty-five members and sixteen elected peers at Westminster; the holders of Darien stock were compensated; as a balance to equality of taxation a

The Union.

pecuniary equivalent was to be paid, the kirk and Scottish courts of justice were safeguarded (final appeal being to the British House of Lords), and Scots shared English facilities and privileges of trade, in name, for many years passed before Scotland really began to enjoy the benefits. Mar, Queensberry, Stair (of Glencoe) and Argyll (Red John of the Battles) were the leading statesmen of the Unionist party; being opposed by Hamilton, Atholl and Lockhart of Carnwath as Jacobites; by Fletcher of Saltoun as an independent patriot; by popular sentiment, by mob violence, and by many of the preachers, though not by the General Assembly. Every sentimental consideration was against a union with a prelatic kingdom, "an auld enemy," which drove a hard bargain by threats of excluding Scottish commodities. The negotiations were constantly disturbed by Jacobite intrigues with France in favour of James VIII.; by Scottish adherence to the Act of Security, which might give Scotland a king other than a Hanoverian in succession to Anne; and by the hanging of an Englishman, Captain Green, for piracy on a lost Scottish vessel (1705). The final debates of 1706 were conducted under apprehensions of an invasion of Edinburgh by highlanders and wild western fanatics of the Covenant; but the astuteness of Harley's agent in Edinburgh, de Foe, the resolution of Argyll and the tact of Queensberry, who easily terrified the duke of Hamilton, carried the measure into haven. The Union was at first rich in causes of friction, and in nothing else; even as late as 1745 it was most unpopular, but Scotland had no choice. The nation would never accept a Catholic king, a Stuart, nor revert, as against England, to the ancient French alliance. The religious objection was insuperable; opportunities of commercial development were indispensable; war with England was not to be contemplated by the common sense of the country; and thus, as de Foe wrote, "The Union was merely formed by the nature of things." In Lockhart's words, the 30th of April 1707 "was the last day that Scotland was Scotland. I may lament and weep," he adds, "but truly I have had admirable sport," with his greyhounds.

Friction about matters of trade was the instant sequel of the Union: so much ill-feeling was provoked that, in the general opinion, had King James VIII. landed alone when brought to the Scottish coast by Forbin's fleet in March 1708, he would have carried Scotland with him. But Forbin was chased away from the Firth of Forth by a fleet under Sir George Byng; he refused to allow the young adventurer to land farther north, and the Jacobites doubted that France was never serious in the enterprise. The Jacobites also, through mistrust of each other—none could trust Hamilton—and finally through the intoxication of a pilot who failed to reach Forbin, led to the imbecile fiasco. In the English parliament the Jacobites managed to secure a measure of toleration for the Episcopal clergy, after one of them, Mr Greenshields, had long lain in prison for his use of the liturgy (1711). The kirk was incensed by the growth of Episcopalianism and of Popery, the restoration of patronage, and the pressure to accept an oath abjuring James, which divided a church that was absolutely anti-Jacobite. Repeal of the Union was actually mooted in 1712, and even Argyll was restive. The fatal duel in which Hamilton was slain by Mohun, when on the eve of going as ambassador to France, with the interests of James in his eye, was a blow to the Jacobites; as were the death of Anne, the fall of Bolingbroke and the unopposed succession of George I. (August 1714). Their king over the water had, in a manly and magnanimous letter to his adherents, refused to change his creed, and when Bolingbroke fled from England his evangelical efforts at proselytizing James were fruitless. Berwick and Bolingbroke were his ministers, but Berwick would not accompany him to Scotland, and Bolingbroke did not provide the necessary munitions of war. Through a series of confusions and blunders, Mar prematurely raised on the 16th of September 1715 the standard of King James, and though in command of a much larger army than ever followed Montrose, was baffled by Argyll, who held Stirling with a very small force. Mar never crossed the Forth, and the command of Mackintosh, who did, was captured, with his Northumbrian cavaliers, at Preston, on the very day (12th of November) when Argyll foiled Mar in the confused battle of Sheriffmuir. Mar's highlanders began to desert; his council was a confusion of opinions and discontents, and when, after many dangers and in the worst of health, James joined the Jacobites at Perth, it was only to discourage his friends by his gloom, and to share their wintry flight before Argyll to Montrose. Thence he furtively sailed with Mar to France, a broken man, leaving his army to shift for themselves. Many of his noble supporters escaped, he did his best to provide them with ships, others were executed, while the great Whig, Forbes of Culloden, protested against the bad policy of the repressive measures. Argyll, who had saved the country, was regarded as lukewarm, and lost the royal favour, while James, at Avignon, intrigued with Charles XII. of Sweden and with Argyll and his brother, the earl of Islay, till he was driven from France to take refuge in Italy. Spain backed him in 1719, but the death of Charles XII., and the utter failure of a Spanish expedition to Scotland in 1719, when the Jacobites were scattered, and the Spaniards taken, in a fight at Glensheil, ruined what had seemed a fair chance of success. Returning from Spain, James married Maria Clementina Sobieska, daughter of Prince James Sobieski, a pretty bride whom Charles Wogan rescued from durance in Innsbruck, an adventure of romantic gallantry. The marriage was unhappy; James was eternally occupied with the business of his cause and the feuds of his adherents; Clementina lost her gaiety and became causelessly jealous; and her retreat to a convent in 1725 was a greater blow to the cause than the failure of Atterbury's plot (1720), the alleged treason of Mar and the splits in the Jacobite party. Clementina, however, was the mother of two sons, Charles Edward, the hope of his party, and Henry. The cause slumbered, till in 1742–1743 the outbreak of wars with France and Spain gave Prince Charles a chance of showing his mettle. The Jacobites surrounding James in Rome never ceased to weave at the endless tissue of their plot, but in Scotland nothing more substantial than the drinking of loyal healths was done, between the flight of Lockhart of Carnwath, the manager of the party, and the years of 1737-1744. The old Jacobites were dying out; James never had a minister who was not baited by three-fourths of the party, and denounced as a favourite at best, at worst a traitor; and the Cause would have sunk into ashes but for the promise of his eldest son, Prince Charles.

Jacobite failures.

In Scotland the kirk, as ever, was militant, but it could no longer wage war on kings and their ministers, nor attempt to direct foreign and domestic policy. The preachers thus fell into parties, which attacked each other in a brotherly way. The grounds of strife were the spread of "liberal" religious ideas; on one side heretical and anti-Calvinistic doctrines, and on the other a tendency to stretch Calvinistic principles till they were scarcely to be distinguished from Antinomianism. A Glasgow professor, the Rev. Mr Simson, was attacked for Arminianism and Socinianism as early as 1717; and the battle raged between the more severe Presbyterians—who still hankered after the Covenant, approved of an old work *The Marrow of Modern Divinity* (1646), and were especially convinced that preachers must be elected by the people—and the Moderates, who saw that the Covenant was an anachronism, thought conduct more important than Calvinistic convictions, and supported in the General Assembly the candidates selected by patrons, as against those chosen by the popular voice. *The Marrow* was discouraged as verging on Antinomianism (1720); and in 1722 its protesting admirers were rebuked by the Assembly. *The Marrow* men put in protests, and were clearly on the way to secession from the kirk. The oath of abjuration of James was another cause of division, at least till it was watered down in 1719; and by 1726 a revival of the charges of heresy against Simson, with the increase of agitation against the majority of the Assembly who supported patrons, lighted a flame which burned the slight bonds that kept the extremists in union with the kirk.

Parties in the kirk.

In 1732 their leaders were the brothers Erskine, one of whom, Ebenezer, preached a sermon accusing professed Presbyterians

as guilty of "an attempt to jostle Christ out of his church." For this and other severe censures of his brethren, Mr Erskine would not apologize: he had "delivered the utterance given to him by the Lord": his was the very attitude of the preachers who thundered against James VI. Mr Erskine was rebuked in the Assembly of 1733; he protested with three friends: they were deprived of their charges; they vowed that they were "the True Presbyterian Covenanted Church of Scotland," and had the power of the keys. They constituted themselves a presbytery, and maintained that the covenants were perpetually binding. The Assembly went as far as was possible in offers of reconciliation, but the seceders were irreconcilable, and were deposed in 1740. In 1744 they made the "Taking of the Covenants" a term of ministerial and Christian communion. It is impossible here to follow the schisms which split the seceding body within itself: the Erskines themselves were handed over to Satan; their very families adopted opposite factions: there were "Burghers" and "Anti-Burghers," "New Lights" and "Old Lights"; besides the sects which in the 19th century merged in United Presbyterians, and merged themselves later with the Free Church of the Disruption, itself the parent of a small protesting body, popularly styled "The Wee Frees" (see SCOTLAND, CHURCH OF). The whole movement, intended as a return to the kirk of Knox and Melville and the Covenanters, was a not unneeded protest against the sleepy "moderation," and want of spiritual enthusiasm, which invaded the established kirk in the latter part of the 18th century, a period in which she possessed such distinguished writers as John Home, author of the drama of *Douglas*, Robertson, the historian, and Dr Carlyle, whose amusing autobiography draws a perfect portrait of an amiable and highly educated "Moderate" and man of the world. Naturally the opposite party, whether seceders, or "High Flyers," as they were called, within the church, had most influence with the populace, so that "the Trew Universal Kirk" of Scotland was broken into several communions, differing but slightly in accepted doctrines, and not at all in mode of worship. Their tendency has been centripetal, and all the "Free Churches" are agreed in their views concerning the prolonged existence of "the Auld Kirk." The Episcopalians, in this period, were nearly as much perturbed as the Presbyterians, by questions as to the election of bishops in relation to their exiled king, and by the introduction of ritualism in the shape of "the usages." They passed through much persecution, in consequence of the rising of 1745, but, after the death of their King Charles, they became as loyal as any other religious body, managing their own affairs with no more turmoil than is caused by the co-existence of the Anglican and the Laudian prayer-books, with their different forms of the communion service.

As to civil matters, the country was troubled by riots against the Malt Tax, but the clans submitted to a very superficial disarmament; companies of highlanders were em-

The highland clans.

ployed to preserve order and check cattle-raiding; and one of these, "The Black Watch" (the Forty-Second), greatly distinguished itself at the battle of Fontenoy. Wade drove his military roads through the highlands, and, poor as the country still was, the city of Glasgow throve on the tobacco and sugar trade with America and the West Indies. Yet Duncan Forbes of Culloden, president of the Court of Session, after the outbreak of the war with Spain, reported amazing scarcity of money in the country, and strenuously advised legislative checks on the taste for tea, which naturally diminished the profits of the excise on more generous beverages. The fact is that as English companies for foreign trade had long been in chartered existence, Scotsmen and Scottish capital had no profitable outlets, while agriculture was conducted on slovenly medieval or prehistoric methods; and only the linen trade of the country was really flourishing. Thus, except in the case of the west coast trade with the colonies, Scotland had reaped little commercial benefit from the Union, and the loss of business caused by the abolition of the parliament, and the rush of noble families to London, was severely felt in Edinburgh. Yet there existed no dangerous political dissatisfaction. Though the chief religions of the highlanders, the Episcopalian and Catholic forms, were depressed by persecution, and priests were few, the clans had long been accustomed to lack of religious functions and did not feel the want. But the hereditable jurisdictions and feudal powers, as of calling out tenants by the fiery cross and punishing the peaceful by burning their cottages, had never been abolished; the chief's will was law, and if the chiefs headed a rising, their clansmen would follow them, willingly or "forced out." They formed a remarkable militia, trained to the use of arms; wonderfully mobile and rapid on the march and dauntlessly courageous.

The years 1737–1739 saw the germs of civil war beginning to take active life. Simon Fraser, Lord Lovat, an aged intriguer, conceived discontent against the government for the loss of his independent company, and began to intrigue with France and with James in Rome. In the same year a young Tweedside laird, Murray of Broughton, visited Rome, fell in love with Prince Charles, then a handsome, wayward, stalwart and ambitious lad, with "a body made for war," and, returning home, Murray practically succeeded to the duties once performed by Lockhart of Carnwath, as Jacobite agent and organizer.

Bonny Prince Charlie.

In 1738 the waning power of Walpole and the approaching war with Spain caused Forbes of Culloden to propose the raising of four or five highland regiments for foreign service. Walpole, urged by Lord Islay, brother of Argyll, is said to have approved, but nothing was done. The declaration of war with Spain and the certainty of war with France promised to the Jacobites good fishing in turbid waters; and they entertained futile hopes of enlisting Argyll with his potent clan. Walpole entered into communication with James, who saw through the manœuvre, and in 1741 a Jacobite association was formed, which included Lovat and Lochiel. Their agent was Drummond (Macgregor really) of Balhaldie, who in 1741–1743 dealt with the English Jacobites, and persuaded France that they were powerful and eager. In fact the Scots were feebly organized, and the English Jacobites were not organized at all. Says Murray, "there was not the least ground for encouragement," but, thanks to Balhaldie, Louis XV. began to mobilize an invading force in November 1743. Balhaldie carried to James in Rome an invitation for Prince Charles to go to France, a *verbal* invitation, which James reluctantly accepted. Cardinal Tencin was not in the secret, and by the time Charles made his way to Paris in January 1744, James clearly perceived the duplicity of France. The Scottish Jacobites were left in ignorance of the French attempt to land in the mouth of the Thames (February–March 1744), an effort frustrated by a disastrous tempest, and by the slackness of the English conspirators.

Prince Charles was left in neglect and obscurity; till, unchecked by Murray, relying on hasty Jacobite promises brought by him, and encouraged by the French victory of Fontenoy, he started with seven companions for the west highland coast on the 21st of July 1745. His landing at Borradale on the 5th of August brought a few enthusiastic Macdonalds about him; from a sense of honour Lochiel joined with the Camerons. Keppoch and Clanranald would not desert a prince with a reward of £30,000 on his head, but Macleod and Sleat held aloof; and Lovat wrecked the adventure by his doubts and delays. None the less a small ill-armed force of some 2000 men marched south; Cope did not oppose them, but evaded them and went to Inverness, leaving open the road to Edinburgh. At Perth Charles was joined by a skilled soldier, Lord George Murray, brother of the Whig duke of Atholl, a pardoned veteran who had been out in 1715 and 1719.

But Lord George's previous dealings with Cope inspired in Charles a distrust which was to prove fatal. Charles entered Edinburgh unopposed on the 16th of September, made his quarters in Holyrood, and on the 21st of September routed Cope at Prestonpans. But he had not the force to invade England, or to take the castle, and waited, collecting recruits and money, and encouraged by empty promises from France, till, as he wrote to James (26th of October), "I shall have one decisive

stroke for 't, but unless the French land, perhaps none. As matters stand, I must either conquer or perish in a little." His English adherents did not come in, and, after marching to Derby, his council insisted that enough had been done for honour, that Wade was on their flank and rear, the duke of Cumberland in their front, and an army was gathered to defend London. A broken-hearted man, Charles was compelled to acquiesce in retreat (5th of December). If the chiefs had possessed information now accessible to us, they might not have made "the great refusal," but with only the intelligence which they possessed they could not have followed their audacious prince to the south. Their force was not more than 5000 men; and they were wholly unskilled in the use of the guns which they had captured at Prestonpans. The retreat was admirably conducted; Lord George and Cluny fought a gallant and successful rear guard at Clifton; they escaped from Cumberland across the border, but Charles, against advice, left a doomed garrison in Carlisle. After a stay to re-fit at Glasgow, Charles moved to besiege Stirling castle, and to join a force from the north, almost as numerous as that with which he had invaded the heart of England.

Cumberland had returned to London, but Hawley marched from Edinburgh with an army which Charles drove to the winds on Falkirk Moor. Hawley's guns were never in action, the Macdonalds charged and scattered his cavalry on the right wing, but pursued too far, and as the pipers had gone in sword in hand, they could not be recalled. On the left the prince's men could not load their pieces, their powder being ruined by the tempestuous rain. They were checked by two steady regiments; many fled, all was darkness and confusion, but, on returning into Falkirk, Charles found that Hawley had decamped in a disgraceful rout. He could not pursue; the whereabouts of his right was unknown, and after the battle his best officers felt rather dismayed than encouraged by the conspicuous lack of discipline. In place of advancing on Edinburgh, they dallied round Stirling castle in futile siege, and, on the news of Cumberland's advance, alarmed by desertions which they appear to have greatly exaggerated, the chiefs compelled Charles to a fresh retreat. His expostulations perhaps prove him to have been "the best general in his army," but he was dragged northwards to Inverness, and with depleted ranks of starving men, outworn by the fatigue of a long night's march to surprise Cumberland at Nairn, he stood on Culloden Moor in defence of Inverness, his base and only source of supplies (16th of April 1746). Charles had some 5000 men, Cumberland had nearly 9000 and eighteen well-served guns. Here for the first time the highlanders were under heavy fire of grape and roundshot, to which they could not reply, and though the right wing and centre, Camerons, Atholl men, Macleans, Clan Chattan, Appin Stewarts, under Lord George and Lochiel, fought with even more than their usual gallantry and resolution, the Macdonalds on the left, discouraged by the death of Keppoch, Scotus and other officers in the advance, never came to the shock. Though outflanked, enfiladed and met by heavy musketry fire in front, the right wing broke Barrel's regiment and passed the guns, but the attack was checked by the bayonets of the second line and a rapid retreat became general. Charles did not leave the field till all was lost; so much seems clear from Yorke's evidence; but the price on his head, and probably suspicions urged by some of his Irish officers, induced him to desert his army and hurry secretly to the west coast and the western isles. He was rewarded by five or six months of dangerous and distressful wanderings, and would certainly have been taken at one juncture but for the courageous and wise assistance of Flora Macdonald, while on all hands the highlanders displayed the most devoted loyalty.

Culloden.

Into the ferocious conduct displayed by Cumberland after the victory, and in the suppression of the clans, we need not enter; nor is the list of executions of rebels alluring. The spirit of the clans remained true indeed, but their prince became "a broken man": his clemency, and courage, and all that had endeared him to his people, perished under the disgusts and vices engendered by many years of a secret fugitive existence, after he was driven from France in 1749 (see A. Lang's *Pickle, the Spy*, and *Life of Prince Charles*).

As far as the rising had a political aim and reason for existence, apart from mere dynastic sentiment, that aim was "to break the Union"; in the prince's words, "to make Scotland once more a free and happy people." But the vast majority of Scots, though not in love with the Union, preferred it to the rule of a Catholic king—Charles probably, for James had every desire to abdicate. The failure of Charles had, in fact, the result of assimilating Scotland much more closely to England. A disarming act, and the prohibition of the highland dress, did not indeed break, but it transferred to other fields the military spirit of the clans. The chiefs first raised the highland regiments which have covered themselves with glory from Ticonderoga to Dargai and Elandslaagte. The reward which many of the clansmen of the Peninsula and Waterloo received may be appreciated by those who read the introduction to Scott's *Legend of Montrose*. They returned to glens desolate of men, deserted, first, by the voluntary emigrations of the clans, and later by forced emigrations in the interests of sheep farms and deer forests. The abolition of hereditable jurisdictions and of the claims of feudal superiors to military service, after Culloden, broke the bond between chiefs and clans, and introduced new social and economical conditions, bequeathing the Land Question to the 20th century. The "planting" of ministers in the highlands, which had since the Reformation been almost destitute of religious instruction, bred a populace singularly strict in the matter of "Sabbath observance," and, except in districts still Catholic or Episcopalian, eager supporters of the Free churches. In outlying places the old popular beliefs linger; second sight is common in some glens; and the interesting poetical traditions, like Jacobite sentiment, survive in the memories of the people, despite cheap newspapers and modern education.

Modern Scotland.

With the failure of the last armed attempt to "break the Union," Scottish history is merged in that of Great Britain; it was a British force that routed the Jacobites at Culloden. After 1745 the men of letters of the country continued with intense eagerness the movement initiated by John Knox, when he wrote in English, not in the old Scots that he learned at his mother's knee. Hutchinson, David Hume, Home and Robertson were assiduous in avoiding Scotticisms as far as they might; even Burns, who summed up the popular past of Scotland in his vernacular poetry, as a rule wrote English in his letters, and when he wrote English verse he often followed the artificial style of the 18th century. The later famous men of letters, Scott, Carlyle and R. L. Stevenson, appealed as much to English readers as to their countrymen, patriotic as each of them was in his own way. As early as 1730–1740, the great English public schools and universities began to attract the Scottish youths of the wealthier classes, and now good Scots is seldom heard in conversation and is not always written in popular Scottish novels. Scotland and England, however, will always remain pleasantly distinct by virtue of their historical past and inherited traditions.

BIBLIOGRAPHY.—The best general History of Scotland is that by Patrick Fraser-Tytler (1841–1843). It ends, however, with the Union of the crowns in 1603, and though it is based on thorough research in MSS., many documents now available, such as the despatches of Spanish ambassadors to England, were not accessible to the learned author. The History by John Hill Burton (Edinburgh, 1867–1870) ends with the Jacobite Rising of 1746. It is of unequal merit, being best in places where the author was most interested, especially in points of the development of law. Here the works of Cosmo Innes are valuable, *Lectures on Scotch legal antiquities* (Edinburgh, 1872); and *Scotland in the middle ages* (Edinburgh, 1860). Burton's anti-Celticism, and scepticism as to archaeology, make his work inadequate in the earlier parts. On the Celtic beginnings the best books are E. W. Robertson's *Scotland under her Early Kings* (Edinburgh, 1862) and W. F. Skene's *Celtic Scotland* (Edinburgh, 1876–1880), with his *Highlanders of Scotland* in the edition edited by A. Macbain (Stirling, 1902); other views are maintained in Rhys's *Celtic Britain* (1884). David Stewart of Garth's *Sketches of the Highlanders* (Edinburgh, 1822) is interesting, though the author leans too much on tradition; and Dr Gregory's *History of the Highlands* (1881) is excellent, but closes with the Union of the crowns. Scott's *Tales of a Grandfather* is, of course, full of interest, but is inevitably somewhat behind the mark of later years

of research. The Foreign Calendars of State Papers, especially J. Bain's *Calendars* (Edinburgh, 1881–1888), are useful indices, but not infrequently need to be checked by the manuscripts.

There is much new information among the documents published by the Historical Manuscripts Commission, by the Scottish History Society, and the Register of the Privy Council, edited by Professors Masson and Hume Brown. The volumes of the book clubs, Bannatyne, Maitland, Abbotsford and Spalding, are full of matter; also those of the Early Scottish Texts Society and the Wodrow Society, with the works of Knox, Calderwood and the *History of the Sufferings* by Woodrow (edited by the Rev. Robert Burns, 1837–1838). Knox, like Bishop Burnet, needs to be read critically and in the light of contemporary documents; especially those in the Hamilton Papers, The Border Papers and English State Papers (Foreign). The most recent general Histories of Scotland are those of P. Hume Brown (Cambridge, 1899), and on a larger scale, but ending at 1746, of A. Lang (Edinburgh, 1900–1907). Mathieson's works deal with the period of the Covenant and Civil War, and, like Mackinnon's, with the Union; while Sir H. Craik's *A Century of Scottish History* (Edinburgh, 1901) gives a full account of the disruption of the Kirk. Many important manuscripts in muniment rooms are still uncalendared; those of the French Foreign Office are imperfect in places, and have been little consulted; and a complete calendar of the treasures of the Advocate's Library was only recently begun.

Among monographs, *Six Saints of the Covenant* and *The Life of Mary Stuart* (up to 1568), by D. Hay Fleming; the *Life of Knox*, by P. Hume Brown, and *John Knox and the Reformation*, by A. Lang; Miss Shield's *King over the Water* and Martin Haile's *James Francis Stuart* (the old Chevalier); Omond's *Lord Advocates of Scotland*; Willcock's *The Great Marquess* (of Argyll); Napier's *Lives of Montrose and Dundee*; Clarke and Foxcroft's *Life of Bishop Burnet*; Sir Herbert Maxwell's *Robert Bruce* and *Book of Douglas*, with all Sir W. Fraser's family histories, and Patrick's *Statutes of the Scottish Church*, may on various points prove serviceable. For Scottish constitutional history, what there is of it, Sanford Terry's *Scottish Parliaments* may be recommended. (A. L.)

IV. Scottish Literature

"Scottish Literature" is taken here in the familiar sense of the Teutonic vernacular of Scotland, not in the more comprehensive sense of the literature of Scotland or of writings by men of Scottish birth, whether in Gaelic (see Celt) or Latin or Northern English. The difference between the two definitions, however, is of small practical concern. The Scottish-Gaelic literature, which is separately dealt with (see Celt: *Literature*) is, by comparison, of minor importance; and the Latin, though it has a range and influence in Scotland to which it is difficult to find a parallel in the history of the literatures of Europe, is (perhaps for the very reason of its persistency and extent) so bound up with the vernacular that it may be conveniently treated with that literature. It is true that down to the 15th century there were many Teutonic Scots who had difficulty in expressing themselves in "Ynglis," and that, at a later date, the literary vocabulary was strongly influenced by the Latin habit of Scottish culture; but the difficulty was generally academic, arising from a scholarly sensitiveness to style in the use of a medium which had no literary traditions; perhaps also from medieval and humanistic contempt of the vulgar tongue; in some cases from the cosmopolitan circumstance of the Scot and the special nature of his appeal to the learned world. The widespread use of Latin was, however, seldom or never antagonistic to the preservation of national sentiment. That it was used for other than literary purposes strengthened that sentiment in a way which mere scholarly or literary interest could not have done. The Scottish *timbre* is rarely wanting, even in places where scholastic or classical custom might have claimed, as in other literatures, an exclusive privilege. And to say this implies no disrespect to the quality of early Scottish Latinity.

In a survey of the vernacular literature of Scotland it is advantageous to keep in mind that there are two main streams or threads running throughout, the one *literary* in the higher sense, expressing itself in "schools" of a more artificial or academic type; the other *popular*, also in the better sense of that term, more native, more rooted in national tradition, more persistent and conversely less bookish in fashion. The former is represented by the group known as the Scottish Chaucerians, by the 17th-century Court poets, by the "English" writings of literary Edinburgh of the 18th century; the latter by the domestic and "rustic" muse from *Christis Kirk on the Grene* to the work of the 18th century revival begun in Ramsay. There is, of course, frequent interaction between these two movements, but recognition of their separate development is necessary to the understanding of such contemporary contrasts as the *Thrissil and the Rois* and *Peblis to the Play*, Drummond and Montgomerie, Ramsay and Hume. In our own day, when the literary medium of Scotland is identical with that of England, the term Scottish literature has been reserved for certain dialectal revivals, more or less bookish in origin, and often as artificial and as unrelated to existing conditions as the most "aureate" and Chaucerian "Ynglis" of the 15th century was to the popular speech of that time.

This sketch is concerned only with the general process of Scottish literature. An estimate of the writings of individual authors will be found in separate articles, to which the reader is, in each case, referred.

I. *Early Period* (from the beginnings to the earlier decades of the 15th century). The literary remains of this period written in the vernacular, which is in its main characteristics "Northern English," are in the familiar medieval kinds of romance and rhymed chronicle. After the Wars of Independence a national or Scottish sentiment is discernible, but it does not colour the literature of this age as it does that of later periods when political and social conditions had suffered serious change.

The earliest extant verse has been associated with Thomas of Ercildoune (*q.v.*), called The Rhymer, but the problem of the Scot's share in reworking the Tristrem saga is in some important points undetermined. Uncertainty also hangs round the later Huchown (*q.v.*), who continues in the 14th century the traditions of medieval romance. Contemporary with the work of the latter are a few anonymous fragments such as the verses on the death of Alexander II., first quoted by Wyntoun in the 15th century, and the snatches on the "Maydens of Englelonde" and "Long beerdys," quoted by Fabyan. The type of alliterative romance shown in the work ascribed to Huchown continued to be popular throughout the period (*e.g. The Knightly Tale of Golagros and Gawane*), and lingered on in the next in *The Buke of the Howlat* by Holland (*q.v.*), the anonymous *Rauf Coilȝear* of the third quarter of the 15th century, and in occasional pieces of burlesque by the "Chaucerian" makars.

Independent of this group of alliterative romances is the not less important body of historical verse associated with the names of John Barbour (*q.v.*), Andrew of Wyntoun (*q.v.*), and, in the middle period, Harry the Minstrel (*q.v.*). Barbour has been called the Father of Scottish Poetry, apparently for no other reason than that he is the oldest writer who has held place in popular esteem. Though his work shows some of the qualities of a poet, which are entirely lacking in the annalistic verse of Wyntoun, he is without literary influence. Later political fervour has grouped him with the author of the *Wallace*, and treated the unequal pair as the singers of a militant patriotism. That association is not only unjust to Barbour's literary claims, but a misinterpretation of the general terms of his political appeal. The "Scottish prejudice" which Burns tells us was "poured" into his veins from the *Wallace* is not obvious to the dispassionate reader of the *Brus*.

II. *Middle Period* (extending, roughly, throughout the 15th and 16th centuries). To this period belongs the important group of Middle Scots "makars" or poets who, in the traditional phrase of the literary historians, made their age "the Golden Age of Scottish Poetry"; it is in the writings of this time that we find the practice of the artificial literary dialect known as Middle Scots; but there is also in this period the first clear indications of other literary types of great prospective interest in the historical development of the literature of Scotland.

The prevailing influence in the writers of greater account is Chaucerian. These writers, to whom the name of "The Scottish Chaucerians" has been given, broke with the manner of 14th-century verse, and carried over from the south much of the verbal habit and not a little of the literary sentiment of the master-poet. In both respects they are always superior to Lydgate, Occleve and other southern contemporaries; and not

rarely they approach Chaucer in sheer accomplishment. The first example of this new style is the *Kingis Quair* of James I. (*q.v.*), a dream-poem written in Troilus verse, and reminiscent of Chaucer's translation of the *Romance of the Rose*. The indebtedness to Chaucer, even when full allowance is made for the young poet's individuality, is direct and clear. The language, like that of the later *Lancelot of the Laik* and the *Quare of Jelousy*, represents no spoken dialect. Whether it is to be explained by the deliberate adoption of southern literary forms by the author, which his enthusiasm for Chaucer and the circumstances of his sojourn in England made inevitable, or whether the single text which is extant is a Scottish scribe's rendering of a text purely southern in character, is a nice academic question. The balance of evidence, and the presumption is strongly in favour of the former, which is the traditional view.. When the linguistic forms of the other pieces in the Selden MS., presumably by the same scribe, have been carefully examined and compared, it should not be difficult to reach a final settlement.

The later Scots Chaucerian type is less directly derivative in its treatment of allegory and in its tricks of style, and less southern in its linguistic forms; but, though it is more original and natural, it nevertheless retains much of the Chaucerian habit. The greater poets who represent this type are Robert Henryson, William Dunbar, Gavin Douglas, and, to a large extent, Sir David Lyndsay—whose united genius has given high literary reputation to the so-called Golden Age. General opinion has exaggerated the importance of the minor writers who shared in this poetical outburst. There is, of course, some historical significance in the drawing up of such lists as we have in Dunbar's *Lament for the Makaris*, or in Douglas's *Palice of Honour*, or in Lyndsay's *Testament of the Papyngo*, but it is at the same time clear that their critical importance has been exaggerated. Several of the writers named belong to an earlier period; of many of the others we know little or nothing; and of the best known, such as Walter Kennedy (*q.v.*) and Quintyn Schaw, it would be hard to say that they are not as uniformly dull as any of Occleve's southern contemporaries.

The greater portion of this Middle Scots "Chaucerian" literature is courtly in character, in the literary sense, that it continues and echoes the sentiment and method of the verse of the *cours d'amour* type; and in the personal sense, that it was directly associated with the Scottish court and conditioned by it. All the greater writers, with the exception of Robert Henryson, were well born and connected with the Household, or in high office. Hence what is not strictly allegorical after the fashion of the *Romaunt of the Rose* or Chaucer's exercises in that kind, is for the most part occasional, dealing with courtiers' sorrow and fun, with the conventional plaints on the vanity of the world and with pious ejaculation. Even Henryson, perhaps the most original of these poets, is in his most original pieces strongly "Chaucerian" in method, notably in his remarkable series of *Fables*, and his *Testament of Cresseid*, a continuation of the story left untold by Chaucer. In his *Robene and Makyne*, on the other hand, he breaks away, and follows, if he follows anything, the tradition of the *pastourelles*. Dunbar often, and at times deliberately, recalls the older verse-habit, even in his vigorous shorter poems; and Douglas, in his *Palice of Honour* and *King Hart*, and even in his translation of Virgil, is unequivocally medieval. Still later, amid the satire and Reformation heat of Lyndsay we have the old manner persisting in the *Testaments* and in the tale of *Squyer Meldrum*.

There are, as might be expected, points of contact between the work of the greater makars and the more native and "popular" material. It is remarkable that each of these poets has left one example of the old manner, shown in the alliterative romance-poem; but the fact that in each case their purpose is strongly burlesque is significant of the change in literary outlook.

The non-Chaucerian verse of this period is represented by (*a*) alliterative romance-poems and (*b*) verse of a rustic, domestic and "popular" character. Of the historical romance-poem there is little or nothing beyond Henry the Minstrel's *Wallace* (*supra*). The outstanding type is shown in such pieces as Holland's (*q.v.*) *Buke of the Howlat*, and in the anonymous poems *Golagros and Gawane*, *The Awntyrs of Arthur at the Terne Wathelyne*, *Rauf Coil3ear* and *The Pistill of Susan*. These, however, were already outworn forms, lingering on in a period which had chosen other ideals.

Strong as the Chaucerian influence was, it was too artificial to change the native habit of Scots verse; and though it helps to explain much in the later history of Scots literature, it offers no key to the main process of that literature in succeeding centuries. Our knowledge of this non-Chaucerian material, as of the Chaucerian, is chiefly derived from the MS. collections of Asloan, Bannatyne (*q.v.*) and Maitland (*q.v.*), supplemented by the references to "fugitive" and "popular" literature in Dunbar, Douglas, Lyndsay and, in especial, the prose *Complaynt of Scotlande*. Classification of this literature by traditional subdivision into *genres* is difficult, and, at the best, unprofitable. The historical student will be mainly interested in discovering anticipations of the later style and purpose of Ramsay, Fergusson and Burns, and in finding therein early evidence of what has been too often treated as the characteristics of later Scotticism. It would not be difficult to show that the reaction in the 18th century against literary and class affectation —however editorial and bookish it was in the choice of subjects and forms—was in reality a re-expression of the old themes in the old ways, which had never been forgotten, even when Middle Scots, Jacobean and early 18th-century verse-fashions were strongest. It is impossible here to do more than to point out the leading elements and to name the leading examples. These elements are, briefly stated, (1) a strong partiality for subjects dealing with humble life, in country and town, with the fun of taverns and village greens, with that domestic life in the rough which goes to the making of the earlier farces in English and French; (2) a whimsical, elfin kind of wit, delighting in extravagance and topsy-turviness; (3) a frank interest in the pleasures of good company and good drink. The reading of 15th- and 16th-century verse in the light of these will bring home the critical error of treating such poems as Burns's *Cottar's Saturday Night*, the *Address to the Deil*, and *Scotch Drink* as entirely expressions of the later poet's personal predilection. Of the more serious, or "ethical" or "theological" mood which counts for so much in the modern estimate of Scottish literature, there is but little evidence in the popular verse of the middle period. Even in the deliberately religious and moral work of the more academic poets this seriousness is never more exclusive or oppressive than it is in any other literature of the time. If it becomes an obsession of many of the post-Reformation writers, it becomes so by the *force majeure* of special circumstances rather than in the exercise of an old-established habit.

Outstanding examples of this rustic style are *Peblis to the Play* and *Christis Kirk on the Grene*, ascribed by some to James V. (*q.v.*), *Sym and his Brudir*, a satirical tale of two palmers, *The Wyf of Auchtirmuchty*, and the *Wowing of Jok and Jynny*. The more imaginative, elfin quality, familiar in Dunbar's *Ballad of Kynd Kittok* and his *Interlude of the Droichis Part* appears in such pieces as *Gyre Carling* (the mother-witch), *King Berdok*, and *Lichtounis Dreme*. The convivial verse, at its best in Dunbar's *Testament of Mr Andrew Kennedy*, may be studied in *Quhy sould nocht Allane honorit be*, one of the many eulogies of John Barleycorn anticipatory of Burns's well-known piece.

In the collections there are few examples of the simple fabliau, the best being the *Thrie Priestis of Peblis* and *The Dumb Wyf*, or of the social variety of the same as shown in *Rauf Coil3ear* and *John the Reeve*. For the latter Sir David Lyndsay remains the chief exponent. Of historical and patriotic verse there are few specimens, but some of the lyrics and love-songs, more or less medieval in *timbre* and form, are of importance. Of these, *Tayis Bank* and *The Murning Maiden* are perhaps the best.

Vernacular prose was, as might be expected, and especially in Scotland, late in its appearance. The main work continued to be done in Latin, and to better purpose by Hector Boece (*q.v.*), John Major (*q.v.*) and George Buchanan (*q.v.*) than by the earlier annalists Fordun (*q.v.*) and Bower (*q.v.*). It is not till the middle

of the 15th century that we encounter any works seriously undertaken in the vulgar: before that time there is nothing but an occasional letter (*e.g.* that of the earl of March to Henry IV.), a few laws, and one or two scraps in the Asloan and other MSS., all of the plainest and without any effort towards style. Nor can it be said that the first works of a more extensive and deliberate character show any consciousness of pure art as we find it in contemporary writings in England, though the fact that they are translations has some prospective significance. The earliest books are Sir Gilbert Haye's *Buke of the Law of Arms, Buke of the Order of Knighthood,* and *Government of Princes,* preserved in a single MS. at Abbotsford. The dull treatise of John of Ireland (*q.v.*) lays claim to originality of a kind. The author's confession that, being "thretty 3eris nurist in Fraunce, and in the noble study of Paris in Latin toung," he "knew nocht the gret eloquens of Chauceir," and again that he had written another work in Latin, "the tounge that I knaw better," is valuable testimony to the difficulties in the way of a struggling Scots prose. Other preliminary efforts are the *Portuus of Nobilnes* in the Asloan MS.; the *Spectakle of Luf,* translated by G. Mill (1492); and the *Schort Memoriale of the Scottis Corniklis,* an account of the reign of James II. In the early 16th century the use of the vernacular is extended, chiefly in the treatment of historical and polemical subjects, as in Murdoch Nisbet's version of Purvey (in MS. till 1901), a compromise between northern and southern usage; Gau's (*q.v.*) *Richt Vay,* translated from Christiern Pedersen; Bellenden's (*q.v.*) translation of Livy and *Scottish History*; the *Complaynt of Scotlande,* largely a mosaic of translation from the French; Ninian Winzet's (*q.v.*) *Tractates*; Lesley's (*q.v.*) *History of Scotland*; Knox's (*q.v.*) *History*; Buchanan's (*q.v.*) *Chamaeleon*; Lindesay of Pitscottie's (*q.v.*) *History*; and the tracts of Nicol Burne and other exiled Catholics. In these works, and especially in Knox, the language is strongly southern. The Scriptures, which had an important bearing on the literary style, as on other matters, were, with the exception of Nisbet's version, which does not appear to have widely circulated, accepted in the southern text. It was not till the publication of Bassandyne's Bible in 1576–1579 that a Scottish version was used officially. Lyndsay in the midst of passages in Scots quotes directly from the Genevan version. The literary influence of the Bassandyne was unimportant. Of the prose books named the *Complaynt of Scotlande* is the most remarkable example of aureate Middle Scots, the prose analogue of the verse of the "Chaucerians." This characteristic is by no means strong in Scots prose, even at this time: the last, and most extravagant, example is the *Rolment of Courtis* by Abacuck Bysset, as late as 1622.

So far in our treatment of the Middle Period we have taken account of the "Chaucerian" and more popular verse and of the prose. There appear towards the close of the period certain verse-writers, who, despite points of difference with their Middle Scots predecessors, belong as much to this period as to the next. In language they are still Scottish; if they show any southern affectations, it is (all echoes of the older aureate style notwithstanding) the affectation of Tudor and Elizabethan English. This poetry, like that of the early half of the period, is courtly; its differences are the differences between the atmosphere of the reigns of the first and fourth Jameses and that of the sixth. When the sixth James becomes the first of England, a more thorough transformation is discernible. In the centre of this group is King James (*q.v.*) himself, poet and writer of prose; but he yields in literary competence to Alexander Scott (*q.v.*) and Alexander Montgomerie (*q.v.*). Their interest on the formal side is retrospective, but it is possible to find even in the persistent reiteration of medieval sentiment and methods, a fresh feeling for nature, and a lyrical quality of later *timbre*. With these may be named the minors, William Fowler (*q.v.*), Alexander Arbuthnot (*q.v.*) and John Rolland (*q.v.*), the last most strongly influenced by Douglas and the earlier "makars."

III. The third period begins with the 17th century, with the union of the English and Scottish crowns, if we seek the aid of political history for our literary finger-posts. Strict accuracy would place the date of change earlier than 1600 or 1603, for there is evidence in the 16th century, even outside the region of diplomatic and official correspondence, of the intermingling of the north and south. It is, however, when James is established on his new throne that we have the clearest signs of the changes which had been at work and were ultimately to transform the entire literary habit of his ancient kingdom. The recital of the names of the Anglo-Scots poets will make this clear: Robert Ker, earl of Ancram, best known for his *Sonnet in Praise of a Solitary Life*; Sir David Murray of Gorthy, who wrote *The tragicall Death of Sophonisba*; Sir William Alexander (*q.v.*), afterwards earl of Stirling; William Drummond, laird of Hawthornden (*q.v.*); Sir Robert Aytoun (*q.v.*); James Grahame, marquess of Montrose; Patrick Hannay; and the covenanting Sir William Mure of Rowallan (*q.v.*); a group whose "courtly" style might be assumed, had the literary evidence been less ample than it is. So, too, in prose. There we have Drummond again, and that strange genius Sir Thomas Urquhart (*q.v.*); a crowd of polemical writers, mostly ecclesiastics; all the historians, including Spotswood and Calderwood. There is small room for the old vernacular here; and less when we take into account the still active Latinity, shown in the publication by the poet Arthur Johnston (*q.v.*) of the two volumes of *Delitiae poëtarum Scotorum hujus aevi illustrium* (1637), and in the writings of John Barclay (*q.v.*) author of the *Argenis*, Sir Robert Aytoun (*v.s.*), Thomas Dempster (*q.v.*), the historian, David Hume of Godscroft, Sir John Scot of Scotstarvet, best known for his prose *Staggering State*, Sir Thomas Craig, author of the *Jus Feudale*, Andrew Melville and others represented in Johnston's volumes.

There is nothing in Scots to balance this English and Latin list. The play *Philotus*, a poor example in a *genre* rarely attempted in the north, is indebted to the south for more than its subject. The interesting philological tractate *Of the Orthographie and Congruitie of the Britan Tongue* by Alexander Hume (not the verse writer, *u.s.*) is in its language a medley; and William Lithgow had travelled too widely to retain his native speech in purity, even in his indifferent verse. Scraps may be unearthed as mediocre as the *Answer to Curat Caddel's Satyre upon the Whigs*, which attempts to revive the mere vulgarity of the Scots "flyting." The only contributions which redeem these hundred years and more from the charge of disrespect to the native muse come from the pen of the Sempills (*q.v.*). And even here individual merit must yield to historical interest. We are attracted to Beltrees and his kinsmen less by their craftsmanship than by the fact that they supplied the leaders of the vernacular revival of the 18th century with many subjects and verse-models, and that by their treatment of these subjects and models, based on the practice of an earlier day, they complete the evidence of the continuity of the domestic popular type of Scots verse.

In the 18th century the literary union of the North and South is complete. The Scot, whatever dialectal habits marked his speech, wrote the English of Englishmen. The story of his triumphs belongs to the story of English literature: to it we leave James Thomson, Adam Smith, David Hume, James Boswell and Sir Walter Scott. If the work begun by Allan Ramsay, continued by Fergusson and completed by Burns, were matter for separate treatment, it would be necessary to show not only that the editorial zeal which turned these writers to the forgotten vernacular and to "popular" themes was inspired by the general conditions of reaction against the artificiality of the century; but that it was because these poets were Scots, and in Scotland, that they chose this line of return to nature and naturalness, and did honour, partly by protest, to the slighted efforts of the "vulgar" muse. Yet even they did not abjure the "southern manner," and their work in it is matter of some critical significance, whatever may be said of its inferiority in spirit and craftsmanship.

BIBLIOGRAPHY.—Authorities dealing with individual authors and their generation are named in the bibliographies appended to the articles on Scottish writers. Reference may be made here to the following general works (given in chronological order): Warton, *History of English Poetry* (1774–1781); D. Irving, *Scotish Writers* (1839), and *History of Scotish Poetry* (1861); H. Ward, *The English*

Poets (1880–1881), *passim*; H. Craik, *English Prose Selections* (1893–1896), *passim*; W. J. Courthope, *History of English Poetry*, i. and ii. (1895–1897); J. J. Jusserand, *Literary History of the English People*, i. and ii. (1895, 1906); T. F. Henderson, *Scottish Vernacular Literature* (1898); G. Gregory Smith, *The Transition Period* (1900), and *Specimens of Middle Scots* (1902); *Chambers's Cyclopaedia of English Literature* (1901–1903); J. H. Millar, *A Literary History of Scotland* (1903); *The Cambridge History of English Literature*, ii. (1908). (G. G. S.)

SCOTLAND, CHURCH OF. The purpose of this article is to trace the growth of the Scottish "Kirk" as a whole, defining the views on which it was based and the organization in which they took form. The controversies within the Church of Scotland have not arisen out of matters of faith but out of practical questions of church government and of the relation of church and state. Holding a church theory to which the rulers of the country were for a century strongly opposed, Scotland became the leading exponent of Presbyterianism (*q.v.*); and this note has been the dominant one in her religious history even in recent times.

The Scottish Reformation came out of a covenant in which the barons, inspired by John Knox, then abroad, bound themselves in 1557 to oppose the Roman Catholic religion and to promote the cause of the Reformation. When parliament, on the 24th of August 1560, passed the acts abolishing the papal jurisdiction and the mass in Scotland, it was able, as Knox had been preparing for this crisis, to sanction a new confession of faith for the Reformed church. Other documents of the new system were quickly forthcoming. The First Book of Discipline set forth the whole of the proposed religious and educational constitution, and this book speaks of "the order of Geneva which is now in use in some of our churches." This order, afterwards with some modifications known as John Knox's Liturgy, and used in the church down to the reign of Charles I., is a complete directory of worship, with forms of all the services to be held in the church.

Scottish Reformation.

First Book of Discipline.

The type of religion found in these documents is that of Geneva, the unit being the self-governing congregation, and the great aim of the system the pure preaching of the Word. The congregation elect the minister; in no other way can he enter on his functions; but once elected and admitted he is recognized as a free organ of the divine spirit, not subject in spiritual things to any earthly authority but that of his fellow-ministers; the word of God is the supreme authority, and the spoken word of God the vital element of every religious act. The word of God is to prevail in all matters, in conduct as well as doctrine, and in the affairs of government as well as in the church. The terrible power of excommunication is claimed for the church; but the council of the realm also is called to use the power given them by God to put down all religion but the reformed, and to further the aims and carry out the sentences of the church. It was a matter of course that saints' days and church festivals were abolished as having no warrant in Scripture; Sunday alone remained, as the principal day of preaching. In towns a week-day was to be set apart for the "exercise" or public interpretation of Scripture, in which all qualified persons in the neighbourhood were to take part, as if the whole country were a school of the Bible.

The First Book of Discipline does not set forth any complete scheme of church government. Its arrangements are in part provisional. In addition to the minister, who is its most definite figure and proved to be the most permanent, it recognizes the superintendent, the lay elder and the reader. Ten or twelve superintendents were to be appointed, "a thing most expedient at this time." They were parish ministers and subject like their brethren to church courts; their added function was to plant churches, and place ministers, elders and deacons where required. This was also the duty of "commissioners" who were superintendents over smaller territories and for a shorter term. Whether the superintendents were meant to be permanent in the church is not clear. The lay elder was very much what he is still. The reader was to conduct service when no minister was available, reading the Scriptures and the Common Prayer. When there was preaching, it was accompanied by free prayer; the liturgy was not then called for. Of church courts the assembly is taken for granted, having existed from the first; the minor church courts are not yet defined, though the elements of each of them are present. A noble scheme of education was sketched for the whole country, but neither this nor the provision made for ministers' stipends was carried out, the revenues of the old church, from which the expenses of both were to be paid, being in the hands of the barons.

The system naturally took time to get into working order. The old clergy, bishops, abbots and priests were still on the ground, and were slow to take service in the new church. In 1574 there were 289 ministers and 715 readers; in the district of the presbytery of Auchterarder, which now has fifteen parishes, there were then four ministers and sixteen readers. As the ranks of the clergy slowly filled, questions arose which the Reformation had not settled, and it was natural that the old system with which the country was familiar should creep in again. Presbytery was never much in favour with the crown—this was the case in other countries as well as in Scotland—and when the crown, so weak at the Reformation, gained strength, encroachments were made on the popular character of the kirk; while the barons also had obvious reasons for not wishing the kirk to be too strong. The first parliament of the Regent Murray (1567), while confirming the establishment of the Reformed church as the only true church of Christ, settling the Protestant succession, and doing something to secure the right of stipend to ministers, reintroduced lay patronage, the superintendent being charged to induct the patron's nominee—an infringement of the reformed system against which the church never ceased to protest. In 1572 a kind of Episcopacy was set up in the interest of the nobles, who in order to draw the income of the episcopal sees had to arrange with men possessing a legal title to them. These "tulchan"[1] bishops did not make the episcopal office respected in the country; but their appointment was not opposed by the church leaders. They had no episcopal ordination, nor did they exercise any authority over their brother ministers. Knox was called to preach the sermon at the admission of one of them, John Douglas, to the archbishopric of St Andrews, and while he denounced both patron and presentee for the corrupt bargain they had made, he did not protest against the office of bishop as contrary to the constitution of the church.

To this declaration, however, the church soon came. Andrew Melville (*q.v.*) came to Scotland at this time, and became the leader of the church in place of Knox, who died in 1572. He brought with him from Geneva, where he had been the colleague of Beza, a fervent hatred of ecclesiastical tyranny and a clear grasp of the Presbyterian church system. The Scottish church, hitherto without a definite constitution, soon espoused under his able leadership a logical and thorough Presbyterianism, which was expressed in the Second Book of Discipline, adopted by the assembly in 1577, and was never afterwards set aside by the church when acting freely. The assembly of 1575 decided that all ministers were bishops; that of 1578 abolished the name of bishop as denoting an office in the church, and that of 1580 in spite of a royal remonstrance abolished Episcopacy, a decree to which all the bishops except five submitted. The Second Book of Discipline recognizes four kinds of office in the church, and no one can lawfully be placed in any of them except by being called to it by the members. Pastor, bishop and minister are all titles of the same office, that of those who preach the word and administer the sacraments, each to a particular congregation. The doctor is a teacher in school or university; he is an elder and assists in the work of government. Elders are rulers; their function also is spiritual, though practical and disciplinary. The fourth office is that of the deacons, who have to do with

Second Book of Discipline.

[1] "Tulchan," a calf-skin filled with straw, supposed to induce the cow to give milk freely; hence a term of contempt for one who is used as a dummy for the advantage of another.

matters of property and are not members of church courts. Neither superintendent nor reader now appears; all the functions of bishops and superintendents are vested in the elderships, or church courts, and it is urged that the parts which still remain in Scotland of the old system should be cleared away and the sole jurisdiction of the kirk, as then constituted, recognized. The assembly is to have the right to fix its own time of meeting, and its decision in matters ecclesiastical is not to be subject to any review. Kirk-sessions and presbyteries are not named, but the principles are clearly laid down on which these institutions were to rest.

Presbyterian principle.

By committing herself to this system the Church of Scotland established between herself and the Church of England a division which became more and more apparent and was the cause of much of her subsequent sufferings. It is no doubt strange that she should have endured so much not for any great Christian principle, but for a question of church government. On the other hand, Presbyterianism stood in Scottish history for freedom, and for the rights of the middle and lower classes against the crown and the aristocracy; and it might not have been held with such tenacity or proved so incapable of compromise but for the opposition and persecution of the three Stuart kings. The history of the Scottish church for a century after the date of the Book of Discipline is that of a religious struggle between the people and the crown.

For some years after its inception Presbyterianism carried all before it. The presbyteries came quickly into existence; that of Edinburgh dates from 1580. In that year it was found that there were 924 parishes in Scotland, but not nearly all supplied with ministers; it was proposed that there should be 50 presbyteries (in 1910 there are 84) and 400 ministers. A great part of the country, especially in the north and west, had not yet been reached by the Reformation. At this time began the long series of attempts made by James VI. in the direction of curbing Presbyterian liberty and of the restoration of Episcopacy. In 1584 were passed the acts called the Black Acts, which made it treason to speak ill of the bishops, declared the king to be supreme in all causes and over all persons, thus subverting the jurisdiction of the church, and made all conventions illegal except those sanctioned by the king. The bishops were to do what had hitherto been done by the assembly and presbyteries, and no attacks were to be made at religious meetings on the king or council. Other acts followed by which the episcopate was strengthened, though the act of 1587 annexing the temporalities of the bishops to the crown, while fatal to the old episcopate, made the prospects of the new more doubtful. In 1588 a change took place. A Roman Catholic rising threw James into the arms of the kirk; in 1592 the acts of 1584 were abrogated, the Second Book of Discipline legalized and Presbytery established. The church was at the time very powerful, the people generally sympathizing with her system, and her assemblies being attended by many of the nobles and the foremost men. Discipline was strict; the temper of the church was in accordance with the Old rather than the New Testament.

Another sudden change took place a few years later, James falling out of humour with the church on the question of the restoration of the Roman Catholic lords and angered by the free criticism of some of the ministers. His *Basilicon Doron*, published in 1599, shows a determination to make the church episcopal. With this end assemblies, from which Melville was excluded, and which were otherwise tampered with and terrorized, were got to agree that a number of ministers should sit in parliament, and to surrender the assembly's right of meeting. On his accession to the throne of England in 1603 James entered on a new set of attempts to assimilate the Scottish church to that of England. Melville was brought to London, imprisoned and sent abroad; other ministers who had acted or spoken too freely were banished. The powers of the bishops were increased, and their brethren brought in various ways under subjection to them, and in 1609 two courts of high commission were set up by the royal authority with plenary powers to enforce conformity to the new arrangements. In 1610 three ministers were called to London to be consecrated as bishops, as if there had till now been no bishops in Scotland; these on their return consecrated ten others. In 1612 the act of 1592 which established Presbytery was rescinded, and Episcopacy became the legal church system of Scotland.

In all this it was the position and rights of the clergy that were assailed; and James showed kindness to the church in seeking to secure that stipends should be paid and that new churches should be provided where required. The people had been less interfered with; the change of church government involved no change in the conduct of worship. But the articles passed by the packed assembly of Perth in 1618 touched on the religious habits and postures of the people, and in this it soon appeared that a crisis had been reached. These famous articles were: (1) That the communion should be received kneeling; (2) That it might be administered in private; (3) That baptism might be in the home; (4) That children of eight should be taken to the bishop for examination and his blessing; (5) That Christmas, Good Friday, Easter and Whitsunday should be observed. These articles were opposed in parliament and were strongly resented throughout the country. When Charles became king in 1625 he at once let it be known that the Articles of Perth were not to be abrogated, and that no meeting of the assembly was to be allowed. During the first years of his reign he was occupied in other directions; but when he came to Scotland in 1633 to be crowned, Laud came with him, and though like his father he showed himself kind to the clergy in matters of stipend, and adopted measures which caused many schools to be built, he also showed that in the matter of worship the policy of forcing Scotland into uniformity with England was to be carried through with a high hand. A book of canons and constitutions of the church which appeared in 1636, instead of being a digest of acts of assembly, was English in its ideas, dealt with matters of church furniture, exalted the bishops and ignored the kirk-session and elders. The liturgy was ordered to be used, which had not yet appeared, but which proved to be a version, with somewhat higher doctrine, of the Anglican Common Prayer. The introduction of this service book in St Giles's Church, Edinburgh, on the 16th of July 1637, occasioned the tumult of which Jenny Geddes will always figure as the heroine. The sentiment was echoed throughout Scotland. Petitions against the service book and the book of canons poured in from every quarter; the tables or committee formed to forward the petition rapidly became a powerful government at the head of a national movement, the action of the crown was temporizing, and on the 28th of February the National Covenant was signed in the famous scene in Greyfriars church and churchyard. This document consisted of three parts: (1) A covenant signed by King James and his household in 1580, to uphold Presbyterianism and to defend the state against Romanism; (2) A recital of all the acts of parliament passed in the reigns of James and Charles in pursuance of the same objects; and (3) The covenant of nobles, barons, gentlemen, burgesses, ministers and commons to continue in the reformed religion, to defend it and resist all contrary errors and corruptions. The Covenant was no doubt an act of revolt against legal authority, and can only be justified on the ground that the crown had for many years acted oppressively and illegally in its attempt to coerce Scotland into a religious system alien to the country, and that the subjects were entitled to free themselves from tyranny. The crown was unable either to check the popular movement or to come to any compromise with it, and the Glasgow assembly of 1638, the first free assembly that had met for thirty years, proceeded to make the church what the Covenant required. A clean sweep was made of the legislation of the preceding period; the five articles of Perth, the service book and book of canons and the court of high commission were all condemned. The bishops were tried not for being bishops but on exaggerated charges of false doctrine and loose living; and all were deposed from the ministry. Many ministers were also deposed on the charge of Arminianism. It was by an assembly that the second reformation was effected; but the assembly contained the most

Articles of Perth.

National covenant.

influential of the nobility and gentry, and was carried on the crest of a great national movement. The Covenant was accepted by parliament in 1639.

The succeeding decennium is the culminating period of Scottish Presbyterianism, when, having successfully resisted the crown, it not only was supreme in Scotland but exercised a decisive influence over England. The causes which brought about this state of affairs are to be sought to a large extent in the civil history of England. Presbytery was rapidly growing in that country, and the English parliament sought the alliance of the assembly, while the Independents, though in the event Presbytery was as little to their liking as Episcopacy, joined in the wish to get rid of the episcopal system. In its period of triumph the Presbyterianism of Scotland displayed its character. After the injustice and persecution it had suffered it could scarcely prove moderate or tolerant; it showed a vehement determination to carry out the truth it had vindicated with such enthusiasm, to the full extent and wherever possible. The Covenant, at first a standard of freedom, was immediately converted into a test and made the instrument of oppression and persecution. All policy was to be determined by the Covenant; the king and every official was to be obliged to take it. The mind of the nation being so preoccupied with the Covenant, it naturally followed that those who carried their fanaticism farthest were ready to denounce and to unchurch those who showed any inclination to moderation and political sanity, and that the beginnings of schism soon appeared in the ranks of the Covenanters.

In 1643, when the full legal establishment of Presbytery had just been consummated, the assembly, asked by the English parliament to arrange a league to be signed in both countries for the furtherance of reformed religion, agreed, but asked that the league should be a religious one. The result was the Solemn League and Covenant. The league did not mention Presbyterianism; but the assembly had refused to hear of any recognition of independency; if religion were thoroughly reformed, they considered the result must be Presbyterianism in England as in Scotland. In the Westminster Standards also, which were the fruit of the Scottish desire for a religious uniformity, Scotland did not obtain by any means all it desired in its church documents. The Scottish divines in the Westminster Assembly were only five in number, while the assembly contained effective parties of Erastians and Independents. The Confession of Faith contains no approval of any system of church government, and when she adopted it in 1647 the kirk gave up her old confession in which the principles at least of true church order are laid down. In accepting in 1645 the Westminster Directory of Public Worship she tacitly gave up her own liturgy which had been in use till recently, and committed herself to a bald and uninviting order of worship, in which no forms of prayer were allowed to be used. So much did Scotland for the sake of uniformity accept from England. The metrical psalms also, which are still sung in Scottish churches, were adopted at this time; they are based mainly on the version, which had been approved by the Westminster Assembly, of Francis Rouse (1579–1659), a member of the English House of Commons.

Westminster confession.

The engagement made with Charles, then a prisoner in the Isle of Wight in 1647, which promised him support on condition of his sanctioning the Solemn League and Covenant and pledging himself to set up after three years a church according to the Confession of Faith, was protested against by the assembly; and from this came the famous "Act of Classes" by which the Covenanters disqualified for public office and even for military service all who had been parties to the engagement. The rescinding of this act in 1651 led to a serious breach in the ranks of the Scottish clergy. The Resolutioners, or supporters of the resolution to rescind that act, were opposed by the Protesters, the rigid adherents to the strictest interpretation of the Covenant. The period of the Commonwealth was filled with the strife between these two parties, its bitterness not lessened by the fact that the assembly dissolved in 1653 by Cromwell's soldiers was not allowed to meet again in his protectorate. The Protesters, who were in favour with the common people, are chargeable with having brought into Scottish church life the observance of fast-days, and of the long and excited Communion services which were kept up for two and a half centuries and may still be witnessed in the Highlands.

If the mismanagement of Scottish religious affairs under James and Charles I. is a melancholy story, what took place under Charles II. is infinitely sadder. A series of blunders was committed in the attempt to compel Scotland to submit to the religion the government prescribed, and the failure of each measure was followed by more inhuman severities. Detail is impossible here. From the first Charles showed himself determined to force Episcopalianism on Scotland, and not too scrupulous in the choice of methods for securing his ends. The attempt was nearly successful. In the greater part of the country little change took place in the religious services. The service book was not read nor kneeling at communion required, and it made no immediate difference to the people that the clergy should be under bishops. The inferior church courts still sat, though not the assembly. At the Restoration it was a question whether the bulk of the population was in favour of Presbytery or of Episcopacy. But the matter was handled in such a way in the west of Scotland that an extreme Covenanting spirit arose, nourished on intolerable grievances, and that the nation as a whole decided against the system which had been promoted by such means.

Struggle against Episcopacy.

The Rescissory Act of 1661 swept away the legislation of the preceding twenty years, and so disposed of the Presbyterian polity of the church. Episcopacy was restored by a letter from the king on the 5th of September 1661. James Sharp (*q.v.*), Fairfoul, James Hamilton (1610–1674) and Robert Leighton (*q.v.*) were the new bishops; Sharp and Leighton having to be ordained as deacons, then as priests, before the consecration, and the party travelling to Scotland in state, though Leighton left them before crossing the border. An act requiring all ministers appointed during the period when patronage was abolished to get presentation from their patrons and institution from their bishops was applied in the west of Scotland in such a way that 300 ministers left their manses. Their places were filled with less competent men whom the people did not wish to hear, and so conventicles began to be held. The attempts to suppress these, the harsh measures taken against those who attended them or connived at them, or refused to give information against them, the military violence and the judicial severities, the confiscations, imprisonments, tortures, expatriations, all make up a dreadful narrative. Indulgences were tried, and were successful in bringing back about 100 ministers to their parishes and introducing a new cause of division among the clergy. On the other hand, the Covenanting spirit rose higher and higher among the persecuted till the armed risings took place and the formal rebellion of a handful of desperate men against the ruler of three kingdoms. The story of Richard Cameron (*q.v.*) is one of the highest romantic heroism; his name was perpetuated in that of the Cameronian body ("first-born of the Scottish sects"), which, as the Reformed Presbyterian Church, kept up a separate existence till 1876, when it united with the Free Church, and in that of the Cameronian regiment, originally formed from his followers after his death and distinguished since in every part of the world. The proclamation of toleration in 1685 was intended mainly for Roman Catholics and excluded field preachers.

When William landed in England in 1688, the scene changed in Scotland. The soldiery was withdrawn from the west, and the people at once showed their feelings by the "rabbling" or ejection of the curates who occupied the manses of the ousted ministers, in which, however, no lives were lost. William would have decided for Episcopacy in Scotland, as the great body of the nobles and gentry adhered to it, but only on condition that the Episcopalians agreed to support him and that they had the people with them. Neither of these conditions was fulfilled. On the 22nd of July

Revolution of 1688.

1689 the Convention which declared the throne vacant and called William and Mary to fill it, declared in its Claim of Right that prelacy and the superiority of any office in the church above ministers had been a great and insupportable grievance to Scotland. Effect was given to this; and in April 1690 the act was passed on which the establishment of the Church of Scotland rests, the Westminster Confession being recognized, the laws in favour of Episcopacy repealed, though the Rescissory Act remained on the statute book, and the assembly appointed to meet. The Covenants were not mentioned; at his coronation William had refused to be a persecutor, and he desired that the church should embrace all who were willing to be in it. The Revolution church contained from the first men of different views. Its first assembly in 1690 received into the church the three remaining ministers of the Cameronians, though their followers refused to come with them. With regard to Episcopalian ministers, by whom the majority of parishes were served, there was more difficulty. The Presbyterians were not ready for union with them, and many of them were put out of their livings, ostensibly by way of discipline. The king and his representatives at the assembly pressed hard for their reception, and in 1693 the "Act for settling the quiet and peace of the Church" was passed, which provided for their admission on taking the oaths of allegiance and assurance, subscribing the Confession of Faith and acknowledging Presbyterian government. This act fixed the formula of subscription to be signed by all ministers.

From this time forward the church, while jealously asserting her spiritual independence, was on the side of the crown against the Jacobites, and became more and more an orderly and useful ally of the state. In 1697 the Barrier Act was passed, which provides that any act which is to be binding on the church is to come before the assembly as an overture and to be transmitted to presbyteries for their approval. The difficulties which threatened to arise about the union were skilfully avoided; the Act of Security provided that the Confession of Faith and the Presbyterian government should "continue without any alteration to the people of this land in all succeeding ages," and the first oath taken by Queen Anne at her accession was to preserve it. The Act of Toleration of 1712 allowed Episcopalian dissenters to use the English liturgy. This had not hitherto been done, and the claim of the Episcopalians for this liberty had been the occasion of a bitter controversy. The same parliament restored lay patronage in Scotland, an act against which the church always protested and which was the origin of great troubles.

Presbytery, being loyal to the house of Hanover, while Episcopacy was Jacobite, was now in enjoyment of the royal favour and was treated as a firm ally of the government. ***Patronage difficulties.*** But while the church as a whole was more peaceful, more courtly, more inclined to the friendship of the world than at any former time, it contained two well-marked parties. The Moderate party, which maintained its ascendancy till the beginning of the 19th century, sought to make the working of the church in its different parts as systematic and regular as possible, to make the assembly supreme, to enforce on presbyteries respect for its decisions, and to render the judicial procedure of the church as exact and formal as that of the civil courts. The Popular party, regarding the church less from the side of the government, had less sympathy with the progressive movements of the age, and desired greater strictness in discipline. The main subject of dispute arose at first from the exercise of patronage. Presbyteries in various parts of the country were still disposed to disregard the presentations of lay patrons, and to settle the men desired by the people; but legal decisions had shown that if they acted in this way their nominee, while legally minister of the parish, could not claim the stipend. To the risk of such sacrifices the church, led by the Moderate party, refused to expose herself. By the new policy inaugurated by Dr William Robertson (1721–1793), which led to the second secession, the assembly compelled presbyteries to give effect to presentations, and in a long series of disputed settlements the "call," though still held essential to a settlement, was less and less regarded, until it was declared that it was not necessary, and that the church courts were bound to induct any qualified presentee. The substitution of the word "concurrence" for "call" about 1764 indicates the subsidiary and ornamental light in which the assent of the parishioners was now to be regarded. The church could have given more weight to the wishes of the people; she professed to regard patronage as a grievance, and the annual instructions of the assembly to the commission (the committee representing the assembly till its next meeting) enjoined that body to take advantage of any opportunity which might arise for getting rid of the grievance of patronage, an injunction which was not discontinued till 1784. It is not likely that any change in the law could have been obtained at this period, and disregard of the law might have led to an exhausting struggle with the state, as was actually the case at a later period. Still it was in the power of the church to give more weight than she did to the feelings of the people; and her working of the patronage system drove large numbers from the Establishment. A melancholy catalogue of forced settlements marks the annals of the church from 1749 to 1780, and wherever an unpopular presentee was settled the people quietly left the Establishment and erected a meeting-house. In 1763 there was a great debate in the assembly on the progress of schism, ***Growth of dissent.*** in which the Popular party laid the whole blame at the door of the Moderates, while the Moderates rejoined that patronage and Moderatism had made the church the dignified and powerful institution she had come to be. In 1764 the number of meeting-houses was 120, and in 1773 it had risen to 190. Nor was a conciliatory attitude taken up towards the seceders. The ministers of the Relief desired to remain connected with the Establishment, but were not suffered to do so. Those ministers who resigned their parishes to accept calls to Relief congregations, in places where forced settlements had taken place, and who might have been and claimed to be recognized as still ministers of the church, were deposed and forbidden to look for any ministerial communion with the clergy of the Establishment. Such was the policy of the Moderate ascendancy, or of Principal Robertson's administration, on this vital subject. It had the merit of success in so far as it completely established itself in the church. The presbyteries ceased to disregard presentations, and lay patronage came to be regarded as part of the order of things. But the growth of dissent steadily continued and excited alarm from time to time; and it may be questioned whether the peace of the church was not purchased at too high a price. The Moderate period is justly regarded as in some respects the most brilliant in the history of the church. Her clergy included many distinguished Scotsmen, among them Thomas Reid, George Campbell, Adam Ferguson, John Home, Hugh Blair, William Robertson and John Erskine. The labours of these men were not mainly in theology; in religion the age was one not of advance but of rest; they gained for the church a great and widespread respect and influence.

Another salient feature of the Moderate policy was the consolidation of discipline. It is frequently asserted that discipline was lax at this period and that ministers of scandalous lives were allowed to continue in their charges. It cannot, however, be shown that the leaders of the church at this time sought to procure the miscarriage of justice in dealing with such cases. That some offenders were acquitted on technical grounds is true; it was insisted that in dealing with the character and status of their members the church courts should proceed in as formal and punctilious a manner as civil tribunals, and should recognize the same laws of evidence; in fact, that the same securities should exist in the church as in the state for individual rights and liberties.

The religious state of the Highlands, to which at the period of the Union the Reformation had only very partially penetrated, occupied the attention of the church during the whole of the 18th century. In 1725 the gift called the "royal bounty" was first granted—a subsidy amounting at first to £1000

per annum, increased in George IV.'s reign to £2000, and continued to the present day; its original object was to assist the reclamation of the Highlands from Roman Catholicism by means of catechists and teachers. The Society for Propagating Christian Knowledge, incorporated in 1709, with a view partly to the wants of the Highlands, worked in concert with the Church of Scotland, setting up schools in remote and destitute localities, while the church promoted various schemes for the dissemination of the Scriptures in Gaelic and the encouragement of Gaelic students. In these labours as well as in other directions the church was sadly hampered by poverty. The need of an increase in the number of parishes was urgently felt, and, though chapels began to be built about 1796, they were provided only in wealthy places by local voluntary liberality; for the supply of the necessities of poor outlying districts no one as yet looked to any agency but the state. In every part of the country many of the ministers were miserably poor; there were many stipends, even of important parishes, not exceeding £40 a year; and it was not till after many debates in the assembly and appeals to the government that an act was obtained in 1810 which made up the poorer livings to £150 a year by a grant from the public exchequer. The churches and manses were frequently of the most miserable description, if not falling to decay.

Religious condition of Highlands.

With the close of the 18th century a great change passed over the spirit of the church. The new activity which sprang up everywhere after the French Revolution produced in Scotland a revival of Evangelicalism which has not yet spent its force. Moderatism had cultivated the ministers too fast for the people, and the church had become to a large extent more of a dignified ruler than a spiritual mother. About this time the brothers Robert and James Haldane devoted themselves to the work of promoting Evangelical Christianity, James making missionary journeys throughout Scotland and founding Sunday schools; and in 1798 the eccentric preacher Rowland Hill visited Scotland at their request. In the journals of these evangelists dark pictures are drawn of the religious state of the country, though their censorious tone detracts greatly from their value; but there is no doubt that the efforts of the Haldanes brought about or coincided with a quickening of the religious spirit of Scotland. The assembly of 1799 passed an act forbidding the admission to the pulpits of laymen or of ministers of other churches, and issued a manifesto on Sunday schools. These acts helped greatly to discredit the Moderate party, of whose spirit they were the outcome; and that party further injured their standing in the country by attacking Leslie, afterwards Sir John Leslie, on frivolous grounds—a phrase he had used about Hume's view of causation—when he applied for the chair of mathematics in Edinburgh. In this dispute, which made a great sensation in the country, the popular party successfully defended Leslie, and thus obtained the sympathy of the enlightened portion of the community. In 1810 the *Christian Instructor* began to appear under the editorship of Dr Andrew Thomson, a churchman of vigorous intellect and noble character. It was an ably written review, in which the theology of the Haldanes asserted itself in a somewhat dogmatic and confident tone against all unsoundness and Moderatism, clearly proclaiming that the former things had passed away. The question of pluralities began to be agitated in 1813, and gave rise to a long struggle, in which Dr Thomas Chalmers (*q.v.*) took a notable part, and which terminated in the regulation that a university chair or principalship should not be held along with a parish which was not close to the university seat.

The Haldanes.

The growth of Evangelical sentiment in the church, along with the example of the great missionary societies founded in the end of the 18th and the beginning of the 19th century, led to the institution of the various missionary schemes still carried on, and their history forms the chief part of the history of the church for a number of years. The education scheme, having for its object the planting of schools in destitute Highland districts, came into existence in 1824. The foreign mission committee was formed in 1825, at the instance of Dr John Inglis (1763–1834), a leader of the Moderate party; and Dr Alexander Duff (*q.v.*) went to India in 1829 as the first missionary of the Church of Scotland. The church extension committee was first appointed in 1828, and in 1834 it was made permanent. The colonial scheme was inaugurated in 1836 and the Jewish mission in 1838, Robert Murray M'Cheyne (1813–1843) and Andrew Alexander Bonar (1810–1892) setting out in the following year as a deputation to inquire into the condition of the Jews in Palestine and Turkey and on the continent of Europe. Of these schemes that of church extension has most historical importance. It was originally formed to collect information regarding the spiritual wants of the country, and to apply to the government to build the churches found to be necessary. As the population of Scotland had doubled since the Reformation, and its distribution had been completely altered in many counties, while the number of parish churches remained unchanged, and meeting-houses had only been erected where seceding congregations required them, the need for new churches was very great. The application to government for aid, however, proved the occasion of a "Voluntary controversy," which raged with great fierceness for many years and has never completely subsided. The union of the Burgher and the Anti-burgher bodies in 1820 in the United Secession—both having previously come to hold Voluntary principles—added to the influence of these principles in the country, while the political excitement of the period disposed men's minds to such discussions. The government built forty-two churches in the Highlands, providing them with a slender endowment; and these are still known as parliamentary churches. Under Thomas Chalmers, however, the church extension committee struck out a new line of action. That great philanthropist had come to see that the church could only reach the masses of the people effectively by greatly increasing the number of her places of worship and abolishing or minimizing seat-rents in the poorer districts. In his powerful defence of establishments against the voluntaries in both Scotland and England, in which his ablest assistants were those who afterwards became, along with him, the leaders of the Free Church, he pleaded that an established church to be effective must divide the country territorially into a large number of small parishes, so that every corner of the land and every person, of whatever class, shall actually enjoy the benefits of the parochial machinery. This "territorial principle" the church has steadily kept in view ever since. With the view of realizing this idea he appealed to the church to provide funds to build a large number of new churches, and personally carried his appeal throughout the country. By 1835 he had collected £65,626 and reported the building of sixty-two churches in connexion with the Establishment. The keenness of the conflict as it approached the crisis of 1843 checked the liberality of the people for this object, but by 1841 £305,747 had been collected and 222 churches built.

Church extension.

The zealous orthodoxy of the church found at this period several occasions to assert itself. John M'Leod Campbell (*q.v.*). minister of Row, was deposed by the assembly of 1830 for teaching that assurance is of the essence of faith and that Christ died for all men. He has since been recognized as one of the profoundest Scottish theologians of the 19th century, although his deposition was never removed. The same assembly condemned the doctrine put forth by Edward Irving, that Christ took upon Him the sinful nature of man and was not impeccable. and Irving was deposed five years later by the presbytery of Annan, when the outburst of supposed miraculous gifts in his church in London had rendered him still more obnoxious to the strict censures of the period. In 1841 Thomas Wright of Borthwick (1785–1855) was deposed for a series of heretical opinions, which he denied that he held, but which were said to be contained in a series of devotional works of a somewhat mystical order which he had published.

The influence of dissent also acted along with the rapidly rising religious fervour of the age in quickening in the church that sense of a divine mission, and of the right and power to carry out that mission without obstruction from any worldly

authority, which belongs to the essential consciousness of the Christian church. An agitation against patronage, the ancient root of evil, and the formation of an anti-patronage society, helped in the same direction. The Ten Years' Conflict, which began in 1833 with the passing by the assembly of the Veto and the Chapel Acts, is treated in the article FREE CHURCH OF SCOTLAND, and it is not necessary to dwell further in this place on the consequences of those acts. The assembly of 1843, from which the exodus took place, proceeded to undo the acts of the church during the preceding nine years. The Veto was not repealed but ignored, as having never had the force of law; the Strathbogie ministers were recognized as if no sentence of deposition had gone forth against them. The protest which the moderator had read before leaving the assembly had been left on the table; and an act of separation and deed of demission were received from the ministers of the newly formed Free Church, who were now declared to have severed their connexion with the Church of Scotland. The assembly addressed a pastoral letter to the people of the country, in which, while declining to "admit that the course taken by the seceders was justified by irresistible necessity," they counselled peace and goodwill towards them, and called for the loyal support of the remaining members of the church.

Disruption of 1843.

Two acts at once passed through the legislature in answer to the claims put forward by the church. The Scottish Benefices Act of Lord Aberdeen, 1843, gave the people power to state objections personal to a presentee, and bearing on his fitness for the particular charge to which he was presented, and also authorized the presbytery in dealing with the objections to look to the number and character of the objectors. Sir James Graham's Act, 1844, provided for the erection of new parishes, and thus created the legal basis for a scheme under which chapel ministers might become members of church courts.

The Disruption left the Church of Scotland in a sadly maimed condition. Of 1203 ministers 451 left her, and among these were many of her foremost men. A third of her membership is computed to have gone with them. In Edinburgh many of her churches were nearly empty. The Gaelic-speaking population of the northern counties completely deserted her. All her missionaries left her but one. She had no gale of popular enthusiasm to carry her forward, representing as she did not a newly arisen principle but the opposition to a principle which she maintained to be dangerous and exaggerated. For many years she had much obloquy to endure. But she at once set herself to the task of filling up vacancies and recruiting the missionary staff. A lay association was formed, which raised large sums of money for the missionary schemes, so that their income was not allowed seriously to decline. The good works of the church, indeed, were in a few years not only continued but extended. All hope being lost that parliament would endow the new churches built by the church extension scheme of Dr Chalmers, it was felt that this also must be the work of voluntary liberality. Under Dr James Robertson, professor of church history in Edinburgh, one of the leading champions of the Moderate policy in the Ten Years' Conflict, the extension scheme was transformed into the endowment scheme, and the church accepted it as her duty and her task to provide the machinery of new parishes where they were required.[1] By 1854, 30 new parishes had been added at a cost of £130,000, and from this time forward the work of endowment proceeded still more rapidly. In 1843 the number of parishes had been 924; in 1909 it was 1437. By the Poor Law Act of 1845 parishes were enabled to remove the care of the poor from the minister and the kirk-session, in whom it was formerly vested, and to appoint a parochial board with power to assess the ratepayers. The

Development of the church since 1843.

[1] Those branches of the church extension scheme which dealt with church building, and with the opening of new missions to meet the wants of increasing populations, were taken up by a new department, called the Home Mission scheme. The home mission as the pioneer in opening up new fields of labour, and the endowment scheme which renders permanent the religious centres that the mission has founded, are both traceable to Dr Chalmers.

Education Act of 1872 severed the ancient tie connecting church and school together, and created a school board having charge of the education of each parish. At that date the Church of Scotland had 300 schools, mostly in the Highlands. The church continued till lately to carry on normal schools for the training of teachers in Edinburgh, Glasgow and Aberdeen; but these, along with the normal schools of the United Free Church, were recently made over to the state.

In 1874 patronage was abolished. The working of Lord Aberdeen's Act had given rise to many unedifying scenes and to lengthy struggles over disputed settlements, and it was early felt that some change at least was necessary in the law. The agitation on the subject went on in the assembly from 1857 to 1869, when the assembly by a large majority condemned patronage as restored by the Act of Queen Anne, and resolved to petition parliament for its removal. The request was granted, and the right of electing parish ministers was conferred by the Patronage Act 1874 on the congregation; thus a grievance of old standing, from which all the ecclesiastical troubles of a century and a half had sprung, was removed and the church placed on a thoroughly democratic basis. This act, combined with various efforts made within the church for her improvement, secured for the Scottish Establishment a large measure of popular favour, and in the last half of the 19th century she grew rapidly both in numbers and in influence. This revival was largely due on the one hand to the improvement of her worship which began with the efforts of Dr Robert Lee (1804–1868), minister of Old Greyfriars, Edinburgh, and professor of Biblical criticism in Edinburgh university. By introducing into his church a printed book of prayers and also an organ, Dr Lee stirred up vehement controversies in the church courts, which resulted in the recognition of the liberty of congregations to improve their worship. The Church Service Society, having for its object the study of ancient and modern liturgies, with a view to the preparation of forms of prayer for public worship, was founded in 1865; it has published eight editions of its "Book of Common Order," which, though at first regarded with suspicion, has been largely used by the clergy. Church music has been cultivated and improved in a marked degree; and hymns have been introduced to supplement the psalms and paraphrases; in 1898 a committee appointed by the Church of Scotland, the Free Church, the United Presbyterian Church and the Presbyterian Church in Ireland issued *The Church Hymnary*, which is authorized for use in all these churches alike. Architecture has restored many of the larger churches from their disfigurement by partition walls and galleries—though much still remains to be done in this way—and has erected new churches of a style favourable to devotion. The cathedral churches of St Giles, Edinburgh, and of Brechin and Dunblane, the abbey church of Paisley and the Church of the Holy Trinity, St Andrews, have been restored; and the abbey of Iona, handed over to the Church of Scotland by the duke of Argyll, is now once more fitted up for worship.

Abolition of patronage.

Improvements in public worship.

The fervour of the church found a channel in the operations of a "Committee on Christian Life and Work," appointed in 1869 with the aim of exercising some supervision of the work of the church throughout the country, stimulating evangelistic efforts and organizing the labours of lay agents. This committee publishes a magazine of "Life and Work," which has a circulation of over 100,000, and has organized young men's gilds in connexion with congregations and revived the ancient order of deaconesses. It was to reinforce this element of the church's activity, as well as to strengthen her generally, that James Baird (1802–1876) in 1873 made the munificent gift of £500,000. This fund is administered by a trust which is not under the control of the church, and the revenue is used mainly in aid of church building and endowment throughout the country.

Committee on Christian Life and Work.

The church has greatly increased of late years in width of view and liberality of sentiment, and shelters various tendencies of thought. A volume of *Scotch Sermons*, published in 1880 by ministers holding liberal views, brought out the fact that the

church would not willingly be led into prosecutions for heresy. After this, however, there was a revival on the part of some of the clergy of High Church and orthodox sentiment. The Scottish Church Society was founded in 1892 with Dr John Macleod of Govan as president, "to defend and advance catholic doctrine as set forth in the ancient creeds and embodied in the standards of the Church of Scotland." In 1897, however, Alexander Robinson of Kilmun was deposed by the presbytery of Dunoon acting under the orders of the Assembly on account of the views contained in his book *The Saviour in the Newer Light*, in which the results of modern criticism of the Gospels were set forth with some ability. The National Church Union, of which Professor A. Menzies was president, was formed after this event by ministers and elders who feared that the cause of free theological inquiry was in peril in the church. This body at once raised the question of the relaxation of subscription, which was in a few years seriously taken up by the church, and the National Church Union, feeling that in this, as well as in the growth of liberal opinion in the church its object had been attained, discontinued its operations. The Scottish Church Society still carries on its work.

Questions of heresy.

The question of subscription has been more or less before the church for many years. The formula adopted by the assembly of 1711 had still to be signed by ministers, and was felt to be much too strict. After debates extending over many years, the assembly of 1889 fell back on the words of the act of parliament 1693, passed to enable the Episcopalian clergy to join the establishment, in which the candidate declared the Confession of Faith to be the confession of his faith, owned the doctrine therein contained to be the true doctrine and promised faithfully to adhere to it. This was accompanied by a Declaratory Act in which the church expressed its desire to enlarge rather than curtail the liberty hitherto enjoyed. Ten years later the assembly was again debating the question of subscription. A committee appointed in 1899 to inquire into the powers of the church in the matter reported that the power of the church was merely administrative—it was in her power as cases arose to prosecute or to refrain from prosecuting, but that she had no power to modify the confession in any way. Here the matter might have remained, but that the approach to parliament of the United and the Free Churches after the decision of the House of Lords in 1904 (see FREE CHURCH and UNITED FREE CHURCH) offered an opportunity for asking parliament to remove a grievance the church herself had no power to deal with. The Scottish Churches Bill of 1905 afforded relief to all the Presbyterian churches. It did not do what the Church of Scotland asked, viz. allow the words of the act of 1690 to be used as the formula; but it removed that of 1693 and left it to the church to frame a new formula for her ministers and professors, an undertaking to which she is seriously addressing herself.

The agitation for disestablishment sprang up afresh after the passing of the Church Patronage Act (Scotland); each assembly of the Free Church passed a resolution in favour of it, and the United Free Church continued this testimony. In 1890 Mr Gladstone declared for disestablishment, and under his government of 1892 a Disestablishment Bill was introduced in the House of Commons by Sir Charles Cameron, in two successive sessions, 1893–1894. After the defeat of the Liberal government in 1895, the church was for ten years relieved from this anxiety, nor had the attack been renewed up to 1911. A counter-movement was represented by a bill introduced into parliament in 1886 in order to declare the spiritual independence of the Church of Scotland, in the hope that the way might be opened to a reunion of the Presbyterian bodies. The act of 1905 has altered the circumstances of the churches in this regard. During the agitation the church was much occupied with the question of her own defence, and after it died down, various schemes were entertained for the improvement of her position without and within. She more than once expressed her willingness to confer with the daughter Presbyterian churches, with a view to their sharing with her the benefits of her position.

Attacks on the establishment.

Since 1908 the subject of the union of the churches has been much spoken of. The quater-centenary of the birth of Calvin occurring at the time of the Church assemblies of 1909 brought the Church of Scotland and the United Free Church assembly together for a memorial service in St Giles's; and a committee on union, consisting of 105 representatives from each assembly, was appointed.

The Church of Scotland has made few contributions of importance to the movement of Biblical Criticism which has entered so deeply into the religious life of Scotland, but she has had distinguished writers on theology. Robert Lee (1804–1868), minister of Old Greyfriars and professor of Biblical criticism in Edinburgh University, fought a long battle for the liberty and the improvement of worship, of which the churches generally now reap the advantage. He held clear views as to the necessity of reform in the doctrine of the church as well; but these he died without publishing. Norman Macleod (*q.v.*), minister of the Barony Parish, Glasgow, a man of great natural eloquence and an ardent philanthropist, enjoyed the warm friendship of Queen Victoria and was beloved by his nation. John Caird (*q.v.*), professor of divinity and then principal of Glasgow University, wrote *An Introduction to the Philosophy of Religion*, exercised a deep influence as a teacher on Scottish thought, and was the most distinguished British preacher, of the intellectual order, of his day. John Tulloch (*q.v.*), principal of St Mary's College, St Andrews, wrote *Theism*, *Leaders of the Reformation*, *Rational Theology and Christian Philosophy in England in the 17th century*, and many other works, and was an effective champion of doctrinal liberty. He was succeeded at St Andrews and as Liberal leader in the assembly by John Cunningham (1819–1893), who wrote a very successful *History of the Church of Scotland*. Robert Herbert Story (1835–1906), principal after Caird of Glasgow University, stood by the side of Lee and Tulloch in their assembly contendings and was an outspoken defender of the National Church against her spoliators from without. Of his works may be mentioned lives of his father Dr Story, of Carstairs, and of Robert Lee. His life was written by his daughters. Andrew K. H. Boyd (1825–1899), minister of St Andrews, was widely known by the numerous volumes of essays, especially the "Recreations of a Country Parson." His "Twenty-five Years of St Andrews" contains a good deal of information. Robert Flint (*q.v.*) published *The Philosophy of History in Europe*, *Historical Philosophy in France*; his volumes on *Theism and Antitheistic Theories* have passed through many editions.

Scottish theologians.

The Church of Scotland in 1909 had 1437 parishes and 251 chapels and preaching stations. The General Assembly consisted of 741 members. The professors of divinity at the four Scottish universities must be ministers of the church, but a proposal has been made to throw the chairs open to ministers of any of the Presbyterian bodies. The foreign mission employs fifty-two ordained and about as many unordained, medical, industrial and other missionaries, with a large number of native agents, in India, East Africa and China. Jewish missions are kept up at five stations in the East, and the colonial committee supplies ordinances to emigrants from Scotland in many of the dependencies of the empire. The small-livings fund aims at bringing up to £200 a year all stipends which fall short of that sum, of which there are nearly 400. About £4000 a year was still required in 1910 to carry out the object of this scheme.

Statistics.

The parliamentary return of 1888 showed the value of the teinds of 876 parishes to be £375,678 and the stipends paid to amount (exclusive of manses and glebes) to £242,330. The value of augmentations obtained since that date is more than balanced by the decline of fiars prices, so that the total revenue of the church from this source is about £220,000. The unexhausted teinds, according to the return in 1907, amounted to about £133,000. The exchequer pays to 190 poor parishes and 42 Highland churches, from church property in the hands of the crown, £17,040. From burgh and other local funds the church derives a revenue of £23,501. The church has herself added to her endowments, for the equipment of 453 new parishes, £1,681,330, yielding over £54,000 a year. The entire endowments of the church, including manses and glebes but not church buildings, is about £300,000.

For detailed accounts of the separate bodies—the UNITED PRESBYTERIAN CHURCH, the FREE CHURCH and the UNITED FREE CHURCH—see the articles on each of these. The table on the following page shows the material progress of the respective organizations in recent years.

In the absence of a religious census it is not possible to deduce from statistics supplied by the churches themselves any trustworthy conclusion as to the percentage of the population adhering to each church. The Communion rolls of the parish churches require to be kept with care, as in vacancies they form the register of those entitled to vote for the new minister. In the able statistical discussions in the reports of the United Free Church it is pointed out that in the figures furnished by the churches the numbers of members and the numbers of deaths are not in the same proportion as the population of the country and the general death-rate, and the conclusion is drawn that the number of members is in each case too great.

	1879.	1899.	1909.
Congregations :—			
Church of Scotland	1,337	1,447	1,687
Free Church	1,033	1,101	
United Presbyterian	533	577	
United Free Church			1,620
Membership :—			
Church of Scotland	518,146	648,476	706,653
Free Church	246,250	293,684	
United Presbyterian	172,150	195,498	
United Free Church			506,573
Income :—			
Church of Scotland	£311,378	£492,816	£554,145
Free Church	594,050	706,546	
United Presbyterian	367,915	392,116	
United Free Church			1,089,101 (for 1908)

The Free Church in 1909 had 150 congregations and 77 ministers; its members and adherents are stated to number 60,000, and its income, apart from investments, is £22,542. The membership of the larger churches is that of communicants only; in the Highlands especially the adherents of these churches who do not communicate form a large proportion of those connected with the church.

According to the figures given above the communicants of the Church of Scotland represent 14·7 of the population and those of the United Free 10·6. A study of the figures for many years past shows that the proportion of the people attached to these churches is not decreasing.

The Scottish Episcopal Church in 1909 numbered 388 charges with 52,029 communicants. Its charges are numerous in proportion to its membership, having an average of 134 members, while the Church of Scotland averages 497 and the United Free Church 313 members for each congregation. The adherents of each of these churches outnumber their communicants in a ratio which is variously estimated. The Roman Catholic hierarchy [1] was restored in Scotland in 1878 There are six dioceses (two archbishops, one of Edinburgh and St Andrews and the other of Glasgow; and four suffragans, Aberdeen, Argyll and the Isles, Dunkeld and Galloway), with, in 1909, 550 priests; 398 churches, chapels and stations; and a Roman Catholic population estimated at about 519,000.

The original Secession Church has 5 presbyteries and 26 congregations; and the remnant of the Reformed Presbyterian Church which did not join the Free Church in 1876, 2 presbyteries and 11 congregations. The Congregational and Evangelical Union (formed by the amalgamation of the Congregational and Evangelical Churches in 1896), has 183 churches; and the remnant of the Evangelical Union, 7 churches. The Baptist Union has 128 congregations and the Wesleyan Methodists 40 churches.

LITERATURE.—For the earlier history of the kirk the outstanding authorities are the histories of Knox, Calderwood, Baillie's *Letters*, and Wodrow's *History*: Knox's liturgy has been edited by Dr Sprott, and on the Westminster Standards the reader may consult Dr Mitchell's *Minutes of the Westminster Assembly*, and Baird lectures on the same subject. Modern histories of the church have been written by Cook, Hetherington and Principal Cunningham; Dr Story's *Church of Scotland* in 5 vols. contains information on every side of the subject. Among books professedly dealing with the Free Church question, the most valuable are Sydow's *Die Schottische Kirchenfrage* (Potsdam, 1845), and *The Scottish Church Question* (London, 1845); Buchanan's *Ten Years' Conflict* (1849); Hanna's *Life of Chalmers* (1852); and Taylor Innes on *The Law of Creeds in Scotland* (1867). See also Cockburn, *Memorials of His Time* (Continuation, 1874); Walker, *Dr Robert Buchanan: an Ecclesiastical Biography* (1877); *Annals of the Disruption* (published by authority of a committee of the Free Church (1876–1877). On the United Presbyterian Church see McKerrow, *History of the United Secession Church* (1841); Struthers, *History of the Relief Church* (1843); McKelvie, *Annals and Statistics of the United Presbyterian Church* (1873). For a concise account of all the Secessions and Unions, Logan, *The United Free Church* (1681–1906). (A. M.*)

SCOTLAND, EPISCOPAL CHURCH OF, a Scottish church (see above) in communion with, but historically distinct from, the Church of England, and composed of seven dioceses: Aberdeen and Orkney; Argyll and the Isles; Brechin; Edinburgh; Glasgow and Galloway; Moray, Ross and Caithness; and St Andrews, Dunkeld and Dunblane. All, except Edinburgh, founded by Charles I., are pre-Reformation sees. The bishops constitute the episcopal synod, the supreme court of appeal, whose president, elected by the members from among themselves, has the style, not the functions, of a metropolitan, being called primus. The legislature is the provincial synod, consisting of the bishops, at whose discretion it is summoned, and a lower chamber of presbyters. The canons have the authority of this synod. The representative church council, including laymen, administers finance. Each diocese has its synod of the clergy. Its dean is appointed by the bishop, and, on the voidance of the see, summons the clerical and lay electors, at the instance of the primus, to choose a bishop, who is presented to the episcopal synod for confirmation and to the primus for consecration. There are cathedrals at Perth, Inverness, Edinburgh and Cumbrae; the sees of Aberdeen, Brechin and Glasgow have no cathedrals. The Theological College was founded in 1810, incorporated with Trinity College, Glenalmond, in 1848, and re-established at Edinburgh in 1876. There were 356 congregations, with a total membership of 124,335, and 324 working clergy in 1900. No existing ministry can claim regular historic continuity with the ancient hierarchy of Scotland, but the bishops of the Episcopal Church are direct successors of the prelates consecrated to Scottish sees at the Restoration. On the refusal of the bishops to recognize William III. (1689), the presbyterian polity was established in the kirk, the effect of which on its ecclesiastical status is a matter of theological opinion, but the Comprehension Act of 1690 allowed episcopalian incumbents, on taking the Oath of Allegiance, to retain their benefices, though excluding them from any share in the government without a further declaration of presbyterian principles. Many non-jurors also succeeded for a time in retaining the use of the parish churches. The extruded bishops were slow to organize the episcopalian remnant under a jurisdiction independent of the state, regarding the then arrangements as provisional, and looking forward to a reconstituted national kirk under a "legitimate" sovereign. A few prelates, known as college bishops, were consecrated without sees, to preserve the succession rather than to exercise a defined authority. But at length the hopelessness of the Stewart cause and the growth of congregations outside the establishment forced the bishops to dissociate canonical jurisdiction from royal prerogative and to reconstitute for themselves a territorial episcopate. The act of Queen Anne (1712), which protects the "Episcopal Communion," marks its virtual incorporation as a distinct society. But matters were still complicated by a considerable, though declining, number of episcopalian incumbents holding the parish churches. Moreover, the Jacobitism of the non-jurors provoked a state policy of repression in 1715 and 1745, and fostered the growth of new Hanoverian congregations, served by clergy episcopally ordained but amenable to no bishop, who qualified themselves under the act of 1712. This act was further modified in 1746 and 1748 to exclude clergymen ordained in Scotland. These causes reduced the Episcopalians, who included at the Revolution a large section of the people, to what is now, save in a few corners of the west and north-east of Scotland, a small minority. The official recognition of George III. on the death of Charles Edward in 1788, removed the chief bar to progress. The "qualified" congregations were gradually absorbed, though traces of this ecclesiastical solecism still linger. In 1792 the penal laws were repealed, but clerical disabilities were only finally removed in 1864. In 1784 Seabury, the first American bishop, was consecrated at Aberdeen. The Book of Common Prayer, which came into general use at the Revolution, is now the authorized service book. The Scottish Communion Office, compiled by the non-jurors in accordance with primitive models, has had a varying co-ordinate authority, and the modifications of the English liturgy adopted by the American Church were mainly determined by its influence. Among the clergy of post-Revolution days the most eminent are Bishop Sage, a well-known patristic scholar; Bishop Rattray, liturgiologist; John Skinner, of Longside, author of *Tullochgorum*; Bishop Gleig, editor of the 3rd edition of the *Encyclopaedia Britannica*; Dean Ramsay, author of *Reminiscences of Scottish Life and Character*; Bishop A. P. Forbes; G. H. Forbes, liturgiologist; and Bishop Charles Wordsworth.

[1] During the long period of proscription, the Roman Catholic Church in Scotland survived in scattered groups; after the Reformation it was at first under the jurisdiction of the English arch-priest, but from 1653 to 1694 it was governed by prefects apostolic and from 1694 to 1878 by vicars apostolic appointed by the pope.

AUTHORITIES.—Carstares, *State Papers*; Keith, *Historical Catalogue of the Scottish Bishops* (Russel's edition, 1824); Lawson, *History of the Scottish Episcopal Church from the Revolution to the Present Time* (1843); Stephen, *History of the Church of Scotland from the Reformation to the Present Time* (4 vols., 1843); Lathbury, *History of the Nonjurors* (1845); Grub, *Ecclesiastical History of Scotland* (4 vols., 1861); Dowden, *Annotated Scottish Communion Office* (1884). (J. G. S.)

SCOTT, ALEXANDER (fl. 1550), Scottish poet, was probably a Lothian man, but particulars of his origin and of his life are entirely wanting. It is only by gathering together a few scraps of internal evidence that we learn that his poems were written between 1545 and 1568 (the date of the Bannatyne MS., the only MS. authority for the text). Allan Ramsay was the first to bring Scott's work to the notice of modern readers, by printing some of the poems in his *Ever Green*. In a copy of verses ("Some Few of the Contents") on the Bannatyne MS., he thus refers to Scott:

> "Licht skirtit lasses, and the girnand wyfe,
> Fleming and Scot haif painted to the lyfe.
> Scot, sweit tunged Scot, quha sings the welcum hame
> To Mary, our maist bony soverane dame;
> How lyflie he and amorous Stuart sing!
> Quhen lufe and bewtie bid them spred the wing."

The sketch is just, for Scott's poems deal chiefly with female character and with passion of a strongly erotic type. He is "sweit tunged," for his technique is always good, and his lyrical measures show remarkable accomplishment. In this respect he holds his own with the best of the "makars" represented in the Bannatyne MS. In what may appear excessive coarseness to present-day taste, he makes good claim to rival Dunbar and his contemporaries. The poems referred to by Ramsay are "Ane Ballat maid to the Derisioun and Scorne of Wantoun Wemen," "Ane New Yeir Gift to the Queen Mary quhen scho come first Hame, 1562," and some or all of his amorous songs (about 30 in number). Of these "To luve unluvit," "Ladeis, be war," and "Lo, quhat it is to lufe" are favourable examples of his style. No early Scots poet comes nearer the quality of the Caroline love-lyric. His *Justing and Debait vp at the Drum betwix W[illiam] Adamsone and Johine Sym* follows the literary tradition of *Peblis to the Play* and *Christis Kirk on the Grene*. He has left verse-renderings of the 1st and 50th Psalms.

The first collected edition was printed by D. Laing in 1821; a second was issued privately at Glasgow in 1882. The latest edition is that by James Cranstoun (Scottish Text Society, 1 vol., 1896). (G. G. S.)

SCOTT, DAVID (1806–1849), Scottish historical painter, brother of William Bell Scott, was born at Edinburgh in October 1806, and studied art under his father, Robert Scott, the engraver. In 1828 he exhibited his first oil picture, the "Hopes of Early Genius dispelled by Death," which was followed by "Cain, Nimrod, Adam and Eve singing their Morning Hymn," "Sarpedon carried by Sleep and Death," and other subjects of a poetic and imaginative character. In 1829 he became a member of the Scottish Academy, and in 1832 visited Italy, where he spent more than a year in study. At Rome he executed a large symbolical painting, entitled the "Agony of Discord, or the Household Gods Destroyed." The works of his later years include "Vasco da Gama encountering the Spirit of the Storm," a picture—immense in size and most powerful in conception—finished in 1842, and now preserved in the Trinity House, Leith; the "Duke of Gloucester entering the Water Gate of Calais" (1841); the "Alchemist" (1838), "Queen Elizabeth at the Globe Theatre" (1840) and "Peter the Hermit" (1845), remarkable for varied and elaborate character-painting; and "Ariel and Caliban" (1837) and the "Triumph of Love" (1846), distinguished by beauty of colouring and depth of poetic feeling. The most important of his religious subjects are the "Descent from the Cross" (1835) and the "Crucifixion—the Dead Rising" (1844). Scott also executed several remarkable series of designs. Two of these—the Monograms of Man and the illustrations to Coleridge's *Ancient Mariner*—were etched by his own hand, and published in 1831 and 1837 respectively, while his subjects from the *Pilgrim's Progress* and Nichol's *Architecture of the Heavens* were issued after his death. He died in Edinburgh on the 5th of March 1849.

See W. Bell Scott, *Memoir of David Scott, R.S.A.* (1850), and J. M. Gray, *David Scott, R.S.A., and his Works* (1884).

SCOTT, SIR GEORGE GILBERT (1811–1878), English architect, was born in 1811 at Gawcott near Buckingham, where his father was rector; his grandfather, Thomas Scott (1747–1821), was a well-known commentator on the Bible. In 1827 young Scott was apprenticed for four years to an architect in London named Edmeston, and at the end of his pupildom acted as clerk of the works at the new Fishmongers' Hall and other buildings. In Edmeston's office he became acquainted with W. B. Moffat, a fellow-pupil, who possessed considerable talents for the purely business part of an architect's work, and the two entered into partnership. In 1834 they were appointed architects to the union workhouses of Buckinghamshire, and for four years were busily occupied in building a number of cheap and ugly unions, both there and in Northamptonshire and Lincolnshire. In 1838 Scott built at Lincoln his first church, the design for which won the prize in an open competition, and this was quickly followed by six others, all very poor buildings without chancels; church building in England had then reached its very lowest point both in style and in poverty of construction. About 1839 his enthusiasm was aroused by some of the eloquent writings of Pugin on medieval architecture, and by the various papers on ecclesiastical subjects published by the Camden Society. These opened a new world to Scott, and he thenceforth studied and imitated the architectural styles and principles of the middle ages with the utmost zeal and patient care. The first result of this new study was his design for the Martyrs' Memorial at Oxford, erected in 1840, a clever adaptation of the late 13th-century crosses in honour of Queen Eleanor. From that time Scott became the chief ecclesiastical architect in England, and in the next twenty-eight years completed a large number of new churches and "restorations," the fever for which was fomented by the Ecclesiological Society and the growth of ecclesiastical feeling in England.

In 1844 Scott won the first premium in the competition for the new Lutheran church at Hamburg, a noble building with a very lofty spire, designed strictly in the style of the 13th century. In the following year his partnership with Moffat was dissolved, and in 1847 he was employed to renovate and refit Ely cathedral, the first of a long series of English cathedral and abbey churches which passed through his hands. In 1851 he visited and studied the architecture of the chief towns in northern Italy, and in 1855 won the competition for the town-house at Hamburg, designed after the model of similar buildings in north Germany. In spite of his having won the first prize, another architect was selected to construct the building, after a very inferior design. In 1856 a competition was held for designs of the new government offices in London; Scott obtained the third place in this, but the work was afterwards given to him on the condition (insisted on by Lord Palmerston) that he should make a new design, not Gothic, but Classic or Renaissance in style. To this Scott very reluctantly consented, as he had little sympathy with any styles but those of England or France from the 13th to the 15th century. In 1862–1863 he was employed to design and construct the Albert Memorial, a costly and elaborate work, in the style of a magnified 13th-century reliquary or ciborium, adorned with many statues and reliefs in bronze and marble. On the partial completion of this he was knighted. In 1866 he competed for the new London law-courts, but the prize was adjudged to his old pupil, G. E. Street. In 1873, owing to illness caused by overwork, Scott spent some time in Rome and other parts of Italy. The mosaic pavement which he designed for Durham cathedral soon afterwards was the result of his study of the 13th-century mosaics in the old basilicas of Rome. On his return to England he resumed his professional labours, and continued to work almost without intermission till his short illness and death on the 27th of March 1878. He was buried in the nave of Westminster Abbey, and an engraved brass, designed by G. E. Street, was

placed over his grave. In 1838 Scott married his cousin, Caroline Oldrid, who died in 1870; they had five sons, two of whom adopted their father's profession.

An incomplete list of his works from 1847 in the *Builder* for 1878 (p. 360) ascribes to Scott 732 buildings with which he was connected as architect, restorer or the author of a report. These include 29 cathedrals, British or colonial, 10 minsters, 476 churches, 25 schools, 23 parsonages, 58 monumental works, 25 colleges or college chapels, 26 public buildings, 43 mansions and a number of small ecclesiastical accessories. While a member of the Royal Academy, Scott held for many years the post of professor of architecture, and gave a long series of able lectures on medieval styles, which were published in 1879. He wrote a work on *Domestic Architecture*, and a volume of *Personal and Professional Recollections*, which, edited by his eldest son, was published in 1879, and also a large number of articles and reports on many of the ancient buildings with which he had to deal.

SCOTT, MICHAEL (1789–1835), British author, was born at Cowlairs, near Glasgow, on the 30th of October 1789, the son of a Glasgow merchant. In 1806 he went to Jamaica, first managing some estates, and afterwards joining a business firm in Kingston. The latter post necessitated his making frequent journeys, on the incidents of which he based his best known book, *Tom Cringle's Log*. In 1822 he left Jamaica and settled in Glasgow, where he engaged in business. *Tom Cringle's Log* began to appear serially in *Blackwood's Magazine* in 1829. Scott's second story, *The Cruise of the Midge*, was also first published serially in *Blackwood's* in 1834–1835. The first appearance in book-form of each story was in Paris in 1834. Both stories were originally published anonymously, and their authorship was not known till after Scott's death at Glasgow, on the 7th of November 1835.

SCOTT, ROBERT (1811–1887), English divine and lexicographer, was born on the 26th of January 1811, at Bondleigh in Devonshire, where his father was rector. Educated at Shrewsbury School and Christ Church, Oxford, after a brilliant university career he was elected fellow of Balliol, where he was tutor from 1835 to 1840. After holding successively the college livings of Duloe and South Luffenham, in 1854 he was elected master of Balliol. This office he held, together (from 1861) with that of the professorship of the exegesis of Holy Scriptures, down to 1870, when he accepted the deanery of Rochester. As master of Balliol he kept the college up to the high level it had attained under his predecessor Dr Jenkyns. As a Greek scholar, he had few equals among his contemporaries. His great literary achievement, which may be said to constitute his life's work, was his collaboration with Dean Liddell in the Greek lexicon which bears their names. He died at Rochester on the 2nd of December 1887.

SCOTT, SIR WALTER, BART. (1771–1832), Scottish poet and novelist, was born at Edinburgh on the 15th of August 1771. His pedigree, in which he took a pride that strongly influenced the course of his life, may be given in the words of his own fragment of autobiography. "My birth was neither distinguished nor sordid. According to the prejudices of my country it was esteemed *gentle*, as I was connected, though remotely, with ancient families both by my father's and mother's side. My father's grandfather was Walter Scott, well known by the name of *Beardie*. He was the second son of Walter Scott, first laird of Raeburn, who was third son of Sir William Scott, and the grandson of Walter Scott, commonly called in tradition *Auld Watt* of Harden. I am therefore lineally descended from that ancient chieftain, whose name I have made to ring in many a ditty, and from his fair dame, the Flower of Yarrow—no bad genealogy for a Border minstrel."

In a notice of John Home, Scott speaks of pride of family as "natural to a man of imagination," remarking that, "in this motley world, the family pride of the north country has its effects of good and of evil." Whether the good or the evil preponderated in Scott's own case would not be easy to determine. It tempted him into courses that ended in commercial ruin; but throughout his life it was a constant spur to exertion, and in his last years it proved itself as a working principle capable of inspiring and maintaining a most chivalrous conception of duty. If the ancient chieftain Auld Watt was, according to the anecdote told by his illustrious descendant, once reduced in the matter of live stock to a single cow, and recovered his dignity by stealing the cows of his English neighbours, Scott's Border ancestry were sheep-farmers, who varied their occupation by "lifting" sheep and cattle, and whatever else was "neither too heavy nor too hot." The Border lairds were really a race of shepherds in so far as they were not a race of robbers. Scott may have derived from this pastoral ancestry an hereditary bias towards the observation of nature and the enjoyment of open-air life. He certainly inherited from them the robust strength of constitution that carried him successfully through so many exhausting labours. And it was his pride in their real or supposed feudal dignity and their rough maraudings exploits that first directed him to the study of Border history and poetry, the basis of his fame as a poet and romancer. His father, Walter Scott, a writer to the signet (or attorney) in Edinburgh—the original of the elder Fairford in *Redgauntlet*—was the first of the family to adopt a town life or a learned profession. His mother was the daughter of Dr John Rutherford, a medical professor in the university of Edinburgh, who also traced descent from the chiefs of famous Border clans. The ceilings of Abbotsford display the arms of about a dozen Border families with which Scott claimed kindred through one side or the other. His father was conspicuous for methodical and thorough industry; his mother was a woman of imagination and culture. The son seems to have inherited the best qualities of the one and acquired the best qualities of the other.

The details of his early education are given with great precision in his autobiography. John Stuart Mill was not more minute in recording the various circumstances that shaped his habits of mind and work. We learn from himself the secret—as much at least as could be ascribed to definite extraneous accident—of the "extempore speed" in romantic composition against which Carlyle protested in his famous review of Lockhart's *Life of Scott*. The indignant critic assumed that Scott wrote "without preparation"; Scott himself, as if he had foreseen this cavil, is at pains to show that the preparation began with his boyhood, almost with his infancy. The current legend when Carlyle wrote his essay was that as a boy Scott had been a dunce and an idler. With a characteristically conscientious desire not to set a bad example, the autobiographer solemnly declares that he was neither a dunce nor an idler, and explains how the misunderstanding arose. His health in boyhood was uncertain;[1] he was consequently irregular in his attendance

[1] Dr Charles Creighton contributes the following medical note on Scott's early illness: "Scott's lameness was owing to an arrest of growth in the right leg in infancy. When he was eighteen months old he had a feverish attack lasting three days, at the end of which time it was found that he 'had lost the power of his right leg'—*i.e.* the child instinctively declined to move the ailing member. The malady was a swelling at the ankle, and either consisted in or gave rise to arrest of the bone-forming function along the growing line of cartilage which connects the lower epiphysis of each of the two leg-bones with its shaft. In his fourth year, when he had otherwise recovered, the leg remained 'much shrunk and contracted.' The limb would have been blighted very much more if the arrest of growth had taken place at the upper epiphysis of the tibia or the lower epiphysis of the femur. The narrowness and peculiar depth of Scott's head point to some more general congenital error of bone-making allied to rickets but certainly not the same as that malady. The vault of the skull is the typical 'scaphoid' or boat-shaped formation, due to premature union of the two parietal bones along the sagittal suture. When the bones of the cranium are universally affected with that arrest of growth along their formative edges, the sutures become prematurely fixed and effaced, so that the brain-case cannot expand in any direction to accommodate the growing brain. This universal synostosis of the cranial bones is what occurs in the case of microcephalous idiots. It happened to me to show to an eminent French anthropologist a specimen of a miniature or microcephalic skull preserved in the Cambridge museum of anatomy; the French *savant*, holding up the skull and pointing to the 'scaphoid' vault of the crown and the effaced sagittal suture, exclaimed 'Voilà Walter Scott!' Scott had fortunately escaped the early closure or arrest of growth at other cranial sutures than the sagittal, so that the growing brain could make room for itself by forcing up the vault of the skull bodily. When his head was opened after death, it was observed that 'the brain was not large, and the cranium thinner than it is usually found to be.' In favour of the theory of congenital liability it has to be said that he was the ninth of a family of whom the first six died in 'very early youth.'"

at school, never became exact in his knowledge of Latin syntax, and was so belated in beginning Greek that out of bravado he resolved not to learn it at all.

Left very much to himself throughout his boyhood in the matter of reading, so quick, lively, excitable and uncertain in health that it was considered dangerous to press him and prudent rather to keep him back, Scott began at a very early age to accumulate the romantic lore of which he afterwards made such splendid use. As a child he seems to have been an eager and interested listener and a great favourite with his elders, apparently having even then the same engaging charm that made him so much beloved as a man. Chance threw him in the way of many who were willing to indulge his delight in stories and ballads. Not only his own relatives—the old women at his grandfather's farm at Sandyknowe, his aunt, under whose charge he was sent to Bath for a year, his mother—took an interest in the precocious boy's questions, told him tales of Jacobites and Border worthies of his own and other clans, but casual friends of the family—such as the military veteran at Prestonpans, old Dr Blacklock the blind poet, Home the author of *Douglas*, Adam Ferguson the martial historian of the Roman republic—helped forward his education in the direction in which the bent of his genius lay. At the age of six he was able to define himself as "a virtuoso," "one who wishes to and will know everything." At ten his collection of chap-books and ballads had reached several volumes, and he was a connoisseur in various readings. Thus he took to the High School, Edinburgh, when he was strong enough to be put in regular attendance, an unusual store of miscellaneous knowledge and an unusually quickened intelligence, so that his master "pronounced that, though many of his schoolfellows understood the Latin better, *Gualterus Scott* was behind few in following and enjoying the author's meaning."

Throughout his school days and afterwards when he was apprenticed to his father, attended university classes, read for the bar, took part in academical and professional debating societies, Scott steadily and ardently pursued his own favourite studies. His reading in romance and history was really study, and not merely the indulgence of an ordinary schoolboy's promiscuous appetite for exciting literature. In fact, even as a schoolboy he specialized. He followed the line of overpowering inclination; and even then, as he frankly tells us, "fame was the spur." He acquired a reputation among his schoolfellows for out-of-the-way knowledge, and also for story-telling, and he worked hard to maintain this character, which compensated to his ambitious spirit his indifferent distinction in ordinary school-work. The youthful "virtuoso," though he read ten times the usual allowance of novels from the circulating library, was carried by his enthusiasm into fields much less generally attractive. He was still a schoolboy when he mastered French sufficiently well to read through collections of old French romances, and not more than fifteen when, attracted by translations to Italian romantic literature, he learnt the language in order to read Dante and Ariosto in the original. This willingness to face dry work in the pursuit of romantic reading affords a measure of the strength of Scott's passion. In one of the literary parties brought together to lionize Burns, when the peasant poet visited Edinburgh, the boy of fifteen was the only member of the company who could tell the source of some lines affixed to a picture that had attracted the poet's attention—a slight but significant evidence both of the width of his reading and of the tenacity of his memory. The same thoroughness appears in another little circumstance. He took an interest in Scottish family history and genealogy, but, not content with the ordinary sources, he ransacked the MSS. preserved in the Advocates' Library. By the time he was one and twenty he had acquired such a reputation for his skill in deciphering old manuscripts that his assistance was sought by professional antiquaries.

This early, assiduous, unintermittent study was the main secret, over and above his natural gifts, of Scott's extempore speed and fertility when at last he found forms into which to pour his vast accumulation of historical and romantic lore. He was, as he said himself, "like an ignorant gamester who keeps up a good hand till he knows how to play it." That he had vague thoughts from a much earlier period than is commonly supposed of playing the hand some day is extremely probable, if, as he tells us, the idea of writing romances first occurred to him when he read Cervantes in the original. This was long before he was out of his teens; and, if we add that his leading idea in his first novel was to depict a Jacobitic Don Quixote, we can see that there was probably a long interval between the first conception of *Waverley* and the ultimate completion.

Scott's preparation for painting the life of past times was probably much less unconsciously such than his equally thorough preparation for acting as the painter of Scottish manners and character in all grades of society. With all the extent of his reading as a schoolboy and a young man he was far from being a cloistered student, absorbed in his books. In spite of his lameness and his serious illnesses in youth, his constitution was naturally robust, his disposition genial, his spirits high: he was always well to the front in the fights and frolics of the High School, and a boon companion in the "high jinks" of the junior bar. The future novelist's experience of life was singularly rich and varied. While he liked the life of imagination and scholarship in sympathy with a few choice friends, he was brought into intimate daily contact with many varieties of real life. At home he had to behave as became a member of a Puritanic, somewhat ascetic, well-ordered Scottish household, subduing his own inclinations towards a more graceful and comfortable scheme of living into outward conformity with his father's strict rule. Through his mother's family he obtained access to the literary society of Edinburgh, at that time electrified by the advent of Burns, full of vigour and ambition, rejoicing in the possession of not a few widely known men of letters, philosophers, historians, novelists and critics, from racy and eccentric Monboddo to refined and scholarly Mackenzie. In that society also he may have found the materials for the manners and characters of *St Ronan's Well*. From any tendency to the pedantry of over-culture he was effectually saved by the rougher and manlier spirit of his professional comrades, who, though they respected *belles lettres*, would not tolerate anything in the shape of affectation or sentimentalism. The atmosphere of the Parliament House (the law-courts of Edinburgh) had considerable influence on the tone of Scott's novels. His peculiar humour as a story-teller and painter of character was first developed among the young men of his own standing at the bar. They were the first mature audience on which he experimented, and seem often to have been in his mind's eye when he enlarged his public. From their mirthful companionship by the stove, where the briefless congregated to discuss knotty points in law and help one another to enjoy the humours of judges and litigants, "Duns Scotus" often stole away to pore over old books and manuscripts in the library beneath; but as long as he was with them he was first among his peers in the art of providing entertainment. It was to this market that Scott brought the harvest of the vacation rambles which it was his custom to make every autumn for seven years after his call to the bar and before his marriage. He scoured the country in search of ballads and other relics of antiquity; but he found also and treasured many traits of living manners, many a lively sketch and story with which to amuse the brothers of "the mountain" on his return. His staid father did not much like these escapades, and told him bitterly that he seemed fit for nothing but to be a "gangrel scrape-gut." But, as the companion of "his Liddesdale raids" happily put it, "he was *makin' himsell* a' the time, but he didna ken maybe what he was about till years had passed: at first he thought o' little, I dare say, but the queerness and the fun."

His father intended him originally to follow his own business, and he was apprenticed in his sixteenth year; but he preferred the upper walk of the legal profession, and was admitted a member of the faculty of advocates in 1792. He seems to have read hard at law for four years at least, but almost from the first to have limited his ambition to obtaining some comfortable appointment such as would leave him a good deal of leisure for

literary pursuits. In this he was not disappointed. In 1799 he obtained the office of sheriff-depute of Selkirkshire, with a salary of £300 and very light duties. In 1806 he obtained the reversion of the office of clerk of session. It is sometimes supposed, from the immense amount of other work that Scott accomplished, that this office was a sinecure. But the duties, which are fully described by Lockhart, were really serious, and kept him hard at fatiguing work, his biographer estimates, for at least three or four hours daily during six months out of the twelve, while the court was in session. He discharged these duties faithfully for twenty-five years, during the height of his activity as an author. He did not enter on the emoluments of the office till 1812, but from that time he received from the clerkship and the sheriffdom combined an income of £1600 a year, being thus enabled to act in his literary undertakings on his often-quoted maxim that "literature should be a staff and not a crutch." Scott's profession, in addition to supplying him with a competent livelihood, supplied him also with abundance of opportunities for the study of men and manners.

It was as a poet that he was first to make a literary reputation. According to his own account, he was led to adopt the medium of verse by a series of accidents. The story is told by himself at length and with his customary frankness and modesty in the *Essay on Imitations of the Ancient Ballad*, prefixed to the 1830 edition of his *Border Minstrelsy*, and in the 1830 introduction to the *Lay of the Last Minstrel*. The first link in the chain was a lecture by Henry Mackenzie on German literature, delivered in 1788. This apprized Scott, who was then a legal apprentice and an enthusiastic student of French and Italian romance, that there was a fresh development of romantic literature in German. As soon as he had the burden of preparation for the bar off his mind he learnt German, and was profoundly excited to find a new school founded on the serious study of a kind of literature his own devotion to which was regarded by most of his companions with wonder and ridicule. We must remember always that Scott quite as much as Wordsworth created the taste by which he was enjoyed, and that in his early days he was half-ashamed of his romantic studies, and pursued them more or less in secret with a few intimates. While he was in the height of his enthusiasm for the new German romance, Mrs Barbauld visited Edinburgh, and recited an English translation of Bürger's *Lenore*. Scott heard of it from a friend, who was able to repeat two lines—

> "Tramp, tramp, across the land they speed;
> Splash, splash, across the sea!"

The two lines were enough to give Scott a new ambition. He could write such poetry himself! The impulse was strengthened by his reading Lewis's *Monk* and the ballads in the German manner interspersed through the work. He hastened to procure a copy of Bürger, at once executed translations of several of his ballads, published *The Chase*, and *William and Helen*, in a thin quarto in 1796 (his ambition being perhaps quickened by the unfortunate issue of a love affair), and was much encouraged by the applause of his friends. Soon after he met Lewis personally, and his ambition was confirmed. "Finding Lewis," he says, "in possession of so much reputation, and conceiving that if I fell behind him in poetical powers, I considerably exceeded him in general information, I suddenly took it into my head to attempt the style of poetry by which he had raised himself to fame." Accordingly, he composed *Glenfinlas*, *The Eve of St John*, and the *Gray Brother*, which were published in Lewis's collection of *Tales of Wonder* (2 vols., 1801). But he soon became convinced that "the practice of ballad writing was out of fashion, and that any attempt to revive it or to found a poetical character on it would certainly fail of success." His study of Goethe's *Götz von Berlichingen*, of which he published a translation in 1799, gave him wider ideas. Why should he not do for ancient Border manners what Goethe had done for the ancient feudalism of the Rhine? He had been busy since his boyhood collecting Scottish Border ballads and studying the minutest details of Border history. He began to cast about for a form which should have the advantage of novelty, and a subject which should secure unity of composition. He was engaged at the time preparing a collection of the *Minstrelsy of the Scottish Border*. The first instalment was published in two volumes in 1802; it was followed by a third next year, and by an edition and continuation of the old romance of *Sir Tristram*; and Scott was still hesitating about subject and form for a large original work. Chance at last threw in his way both a suitable subject and a suitable metrical vehicle. He had engaged all his friends in the hunt for Border ballads and legends. Among others, the countess of Dalkeith, wife of the heir-apparent to the dukedom of Buccleuch, interested herself in the work. Happening to hear the legend of a tricksy hobgoblin named Gilpin Horner, she asked Scott to write a ballad about it. He agreed with delight, and, out of compliment to the lady who had given this command to the bard, resolved to connect it with the house of Buccleuch. The subject grew in his fertile imagination, till incidents enough had gathered round the goblin to furnish a framework for his long-designed picture of Border manners. Chance also furnished him with a hint for a novel scheme of verse. Coleridge's fragment of *Christabel*, though begun in 1797—when he and Wordsworth were discussing on the Quantock Hills the principles of such ballads as Scott at the same time was reciting to himself in his gallops on Musselburgh sands was not published till 1816. But a friend of Scott's, Sir John Stoddart, had met Coleridge in Malta, and had carried home in his memory enough of the unfinished poem to convey to Scott that its metre was the very metre of which he had been in search. Scott introduced still greater variety into the four-beat couplet; but it was to *Christabel* that he owed the suggestion, as one line borrowed whole and many imitated rhythms testify.

The *Lay of the Last Minstrel* appeared in January 1805, and at once became widely popular. It sold more rapidly than poem had ever sold before. Scott was astonished at his own success, although he expected that "the attempt to return to a more simple and natural style of poetry was likely to be welcomed." Many things contributed to the extraordinary demand for the *Lay*. First and foremost, no doubt, we must reckon its simplicity. After the abstract themes and abstruse, elaborately allusive style of the 18th century, the public were glad of verse that could be read with ease and even with exhilaration, verse in which a simple interesting story was told with brilliant energy, and simple feelings were treated not as isolated themes but as incidents in the lives of individual men and women. The thought was not so profound, the lines were not so polished, as in *The Pleasures of Memory* or *The Pleasures of Hope*, but the "light-horseman sort of stanza" carried the reader briskly over a much more diversified country, through boldly outlined and strongly coloured scenes. No stanza required a second reading; you had not to keep attention on the stretch or pause and construe laboriously before you could grasp the writer's meaning or enter into his artfully condensed sentiment. To remember the pedigrees of all the Scotts, or the names of all the famous chiefs and hardy retainers "whose gathering word was Bellenden," might have required some effort, but only the conscientious reader need care to make it. The only puzzle in the *Lay* was the goblin page, and the general reader was absolved from all trouble about him by the unanimous declaration of the critics, led by Jeffrey in the *Edinburgh Review*, that he was a grotesque excrescence, in no way essential to the story. It is commonly taken for granted that Scott acquiesced in this judgment, his politely ironic letter to Miss Seward being quoted as conclusive. This is hardly fair to the poor goblin, seeing that his story was the germ of the poem and determines its whole structure; but it is a tribute to the lively simplicity of the *Lay* that few people should be willing to take the very moderate amount of pains necessary to see the goblin's true position in the action. The supernatural element was Scott's most risky innovation. For the rest, he was a cautious and conservative reformer, careful not to offend established traditions. He was far from raising the standard of rebellion, as Wordsworth had done, against the great artistic canon of the classical school—

> "True art is nature to advantage dressed.'

To "engraft modern refinement on ancient simplicity," to preserve the energy of the old ballad without its rudeness and bareness of poetic ornament, was Scott's avowed aim. He adhered to the poetic diction against which Wordsworth protested. His rough Borderers are "dressed to advantage" in the costume of romantic chivalry. The baronial magnificence of Branksome, Deloraine's "shield and jack and acton," the elaborate ceremony of the combat between the pseudo-Deloraine and Musgrave, are concessions to the taste of the 18th century. Further, he disarmed criticism by putting his poem into the mouth of an ancient minstrel, thus pictorially emphasizing the fact that it was an imitation of antiquity, and providing a scapegoat on whose back might be laid any remaining sins of rudeness or excessive simplicity. And, while imitating the antique romance, he was careful not to imitate its faults of rambling, discursive, disconnected structure. He was scrupulously attentive to the classical unities of time, place and action. The scene never changes from Branksome and its neighbourhood; the time occupied by the action (as he pointed out in his preface) is three nights and three days; and, in spite of all that critics have said about the superfluity of the goblin page, it is not difficult to trace unity of intention and regular progressive development in the incidents.

The success of the *Lay* decided finally, if it was not decided already, that literature was to be the main business of Scott's life, and he proceeded to arrange his affairs accordingly. It would have been well for his comfort, if not for his fame, had he adhered to his first plan, which was to buy a small mountain-farm near Bowhill, with the proceeds of some property left to him by an uncle, and divide his year between this and Edinburgh, where he had good hopes, soon afterwards realized, of a salaried appointment in the Court of Session. This would have given him ample leisure and seclusion for literature, while his private means and official emoluments secured him against dependence on his pen. He would have been laird as well as sheriff of the cairn and the scaur, and as a man of letters his own master. Since his marriage in 1797 with Charlotte Charpentier, daughter of a French refugee, his chief residence had been at Lasswade, about six miles from Edinburgh. But on a hint from the lord-lieutenant that the sheriff must live at least four months in the year within his county, and that he was attending more closely to his duties as quartermaster of a mounted company of volunteers than was consistent with the proper discharge of his duties as sheriff, he had moved his household in 1804 to Ashestiel. When his uncle's bequest fell in, he determined to buy a small property on the banks of the Tweed within the limits of his sheriffdom. There, within sight of Newark Castle and Bowhill, he proposed to live like his ancient minstrel, as became the bard of the clan, under the shadow of the great ducal head of the Scotts. But this plan was deranged by an accident. It so happened that an old schoolfellow, James Ballantyne (1772–1833), a printer in Kelso, whom he had already befriended, transplanted to Edinburgh, and furnished with both work and money, applied to him for a further loan. Scott declined to lend, but offered to join him as sleeping partner. Thus the intended purchase money of Broadmeadows became the capital of a printing concern, of which by degrees the man of letters became the overwrought slave, milch-cow and victim.

When the *Lay* was off his hands, Scott's next literary enterprise was a prose romance—a confirmation of the argument that he did not take to prose after Byron had "*bet* him," as he put it, in verse, but that romance writing was a long-cherished purpose. He began *Waverley*, but a friend to whom he showed the first chapters—which do not take Waverley out of England, and describe an education in romantic literature very much like Scott's own—not unnaturally decided that the work was deficient in interest and unworthy of the author of the *Lay*. Scott accordingly laid *Waverley* aside. We may fairly conjecture that he would not have been so easily diverted had he not been occupied at the time with other heavy publishing enterprises calculated to bring grist to the printing establishment. His active brain was full of projects for big editions, which he undertook to carry through on condition that the printing was done by Ballantyne & Co., the "Co." being kept a profound secret, because it might have injured the lawyer and poet professionally and socially to be known as partner in a commercial concern.

In 1806 he collected from different publications his *Ballads and Lyrical Pieces*. Between 1806 and 1812, mainly to serve the interests of the firm, though of course the work was not in itself unattractive to him, Scott produced his elaborate editions of Dryden (18 vols., 1808), Swift (19 vols., 1818), the Somers Tracts (13 vols., 1809–1815), and the *State Papers and Letters of Sir Ralph Sadler* (2 vols., 1809). Incidentally these laborious tasks contributed to his preparation for the main work of his life by extending his knowledge of English and Scottish history.

Marmion, begun in November 1806 and published in February 1808, was written as a relief to "graver cares," though in this also he aimed at combining with a romantic story a solid picture of an historical period. It was even more popular than the *Lay*. Scott's resuscitation of the four-beat measure of the old "gestours" afforded a signal proof of the justness of their instinct in choosing this vehicle for their recitations. The four-beat lines of *Marmion* took possession of the public like a kind of madness: they not only clung to the memory but they would not keep off the tongue: people could not help spouting them in solitary places and muttering them as they walked about the streets. The critics, except Jeffrey, who may have been offended by the pronounced politics of the poet, were on the whole better pleased than with the *Lay*. Their chief complaint was with the "introductions" to the various cantos, which were objected to as vexatiously breaking the current of the story.

The triumphant success of *Marmion*, establishing him as *facile princeps* among living poets, gave Scott such a *heeze*, to use his own words, "as almost lifted him off his feet." He touched then the highest point of prosperity and happiness. Presently after, he was irritated and tempted by a combination of little circumstances into the great blunder of his life, the establishment of the publishing house of John Ballantyne & Co. A coolness arose between him and Jeffrey, chiefly on political but partly also on personal grounds. They were old friends, and Scott had written many articles for the *Review*, but its political attitude at this time was intensely unsatisfactory to Scott. To complete the breach, Jeffrey reviewed *Marmion* in a hostile spirit. A quarrel occurred also between Scott's printing firm and Constable, the publisher, who had been the principal feeder of its press. Then the tempter appeared in the shape of Murray, the London publisher, anxious to secure the services of the most popular *littérateur* of the day. The result of negotiations was that Scott set up, in opposition to Constable, "the crafty," "the grand Napoleon of the realms of print," the publishing house of John Ballantyne & Co., to be managed by John Ballantyne (d. 1821), James's younger brother, whom Scott nicknamed "Rigdumfunnidos," for his talents as a mimic and low comedian. Scott interested himself warmly in starting the *Quarterly Review*, and in return Murray constituted Ballantyne & Co. his Edinburgh agents. Scott's trust in Rigdumfunnidos and his brother, "Aldiborontiphoscophornio," and in his own power to supply all their deficiencies, is as strange a piece of infatuation as any that ever formed a theme for romance or tragedy. Their devoted attachment to the architect of their fortunes and proud confidence in his powers helped forward to the catastrophe, for whatever Scott recommended they agreed to, and he was too immersed in multifarious literary work and professional and social engagements to have time for cool examination of the numerous rash speculative ventures into which he launched the firm.

The *Lady of the Lake* (May 1810) was the first great publication by the new house, and next year the *Vision of Don Roderick* followed. The *Lady of the Lake* was received with enthusiasm, even Jeffrey joining in the chorus of applause. It made the Perthshire Highlands fashionable for tourists, and raised the post-horse duty in Scotland. But it did not make up to

Ballantyne & Co. for their heavy investments in unsound ventures. The *Edinburgh Annual Register*, meant as a rival to the *Edinburgh Review*, though Scott engaged Southey to write for it and wrote for it largely himself, proved a failure. In a very short time the warehouses of the firm were filled with unsaleable stock. By the end of three years Scott began to write to his partners about the propriety of "reefing sails." But apparently he was too much occupied to look into the accounts of the firm, and, so far from understanding the real state of their affairs, he considered himself rich enough to make his first purchase of land at Abbotsford. But he had hardly settled there in the spring of 1812, and begun his schemes for building and planting and converting a bare moor into a richly wooded *pleasaunce*, than his business troubles began, and he found himself harassed by fears of bankruptcy. Rigdumfunnidos concealed the situation as long as he could, but as bill after bill came due he was obliged to make urgent application to Scott, and the truth was thus forced from him item by item. He had by no means revealed all when Scott, who behaved with admirable good-nature, was provoked into remonstrating, "For heaven's sake, treat me as a man and not as a milch-cow." The proceeds of *Rokeby* (January 1813) and of other labours of Scott's pen were swallowed up, and bankruptcy was inevitable, when Constable, still eager at any price to secure Scott's services, came to the rescue. With his help three crises were tided over in 1813.

It was in the midst of these embarrassments that Scott opened up the rich new vein of the Waverley novels. He chanced upon the manuscript of the opening chapters of *Waverley* which he had written in 1805, and resolved to complete the story. Four weeks in the summer of 1814 sufficed for the work, and *Waverley* was published by Constable without the author's name in July. The notes and introductions first appeared in the edition of 1829. Many plausible reasons might be given and have been given for Scott's resolution to publish anonymously. The reason given by Lockhart is that he considered the writing of novels beneath the dignity of a grave clerk of the Court of Session. Why he kept up the mystification, though the secret, which was formally divulged in 1827, was an open one to all his Edinburgh acquaintances, is easily understood. He enjoyed it, and his formally initiated coadjutors enjoyed it; it relieved him from the annoyances of foolish compliment; and it was not unprofitable—curiosity about "the Great Unknown" keeping alive the interest in his works. The secret was so well kept by all to whom it was definitely entrusted, and so many devices were used to throw conjecture off the scent, that even Scott's friends, who were certain of the authorship from internal evidence, were occasionally puzzled. He kept on producing in his own name as much work as seemed humanly possible for an official who was to be seen every day at his post and as often in society as the most fashionable of his professional brethren. His treatises on chivalry, romance and the drama, besides an elaborate work in two volumes on Border antiquities, appeared in the same year with *Waverley*, and his edition of Swift in nineteen volumes in the same week. In 1813 he published the romantic tale of *The Bridal of Triermain* in three cantos, enlarged from an earlier poem, printed in the *Edinburgh Annual Register* of 1809. The *Lord of the Isles* was published in January 1815; *Guy Mannering*, written in "six weeks about Christmas," in February; and *The Field of Waterloo* in the same year. *Paul's Letters to his Kinsfolk* and *The Antiquary* appeared in 1816; the first series of the *Tales of My Landlord*, edited by "Jedediah Cleishbotham"—*The Black Dwarf* and *Old Mortality*—in the same year; *Harold the Dauntless*[1] in 1817; the two volumes of *The Border Antiquities of England and Scotland* in 1814 and 1817. No wonder that the most positive interpreters of internal evidence were mystified. It was not as if he had buried himself in the country for the summer half of the year. On the contrary, he kept open house at Abbotsford in the fine old feudal fashion and was seldom without visitors. His own friends and many strangers from a distance, with or without introductions, sought him there, and found a hearty hospitable country laird, entirely occupied to all outward appearance with local and domestic business and sport, building and planting, adding wing to wing, acre to acre, plantation to plantation, with just leisure enough for the free-hearted entertainment of his guests and the cultivation of friendly relations with his humble neighbours. How could such a man find time to write two or three novels a year, besides what was published in his own name? Even the few intimates who knew how early he got up to prepare his packet for the printer, and had some idea of the extraordinary power that he had acquired of commanding his faculties for the utilization of odd moments, must have wondered at times whether he had not inherited the arts of his ancestral relation Michael Scot, and kept a goblin in some retired attic or vault.

Scott's fertility is not absolutely unparalleled; Anthony Trollope claimed to have surpassed him in rate as well as total amount of production, having also business duties to attend to. But in speed of production combined with variety and depth of interest and weight and accuracy of historical substance Scott is unrivalled. On his claims as a serious historian, which Carlyle ignored in his curiously narrow and splenetic criticism, he was always, with all his magnanimity, peculiarly sensitive. A certain feeling that his antiquarian studies were undervalued seems to have haunted him from his youth. It was probably this that gave the sting to Jeffrey's criticism of *Marmion*, and that tempted him to the somewhat questionable proceeding of reviewing his own novels in the *Quarterly* upon the appearance of *Old Mortality*. He was nettled besides at the accusation of having treated the Covenanters unfairly, and wanted to justify himself by the production of historical documents. In this criticism of himself Scott replied lightly to some of the familiar objections to his work, such as the feebleness of his heroes, Waverley, Bertram, Lovel, and the melodramatic character of some of his scenes and characters. But he argued more seriously against the idea that historical romances are the enemies of history, and he rebutted by anticipation Carlyle's objection that he wrote only to amuse idle persons who like to lie on their backs and read novels. His *apologia* is worth quoting. Historical romances, he admits, have always been failures, but the failure has been due to the imperfect knowledge of the writers and not to the species of composition. If, he says, anachronisms in manners can be avoided, and "the features of an age gone by can be recalled in a spirit of delineation at once faithful and striking, . . . the composition itself is in every point of view dignified and improved; and the author, leaving the light and frivolous associates with whom a careless observer would be disposed to ally him, takes his seat on the bench of the historians of his time and country. In this proud assembly, and in no mean place of it, we are disposed to rank the author of these works. At once a master of the great events and minute incidents of history, and of the manners of the times he celebrates, as distinguished from those which now prevail, the intimate thus of the living and of the dead, his judgment enables him to separate those traits which are characteristic from those that are generic; and his imagination, not less accurate and discriminating than vigorous and vivid, presents to the mind of the reader the manners of the times, and introduces to his familiar acquaintance the individuals of the drama as they thought and spoke and acted." This defence of himself shows us the ideal at which Scott aimed, and which he realized. He was not in the least unconscious of his own excellence. He did not hesitate in this review to compare himself with Shakespeare in respect of truth to nature. "The volume which this author has studied is the great book of nature. He has gone abroad into the world in quest of what the world will certainly and abundantly supply, but what a man of great discrimination alone will find, and a man of the very highest genius will alone depict after he has discovered it. The characters of Shakespeare are not more exclusively human, not more perfectly men and women as they live and move, than those of this mysterious author."

The immense strain of Scott's double or quadruple life as

[1] This poem, like the *Bridal of Triermain*, did not bear his name on the title-page, but the authorship was an open secret, although he tried to encourage the idea that the author was his friend Erskine.

sheriff and clerk, hospitable laird, poet, novelist, and miscellaneous man of letters, publisher and printer, though the prosperous excitement sustained him for a time, soon told upon his health. Early in 1817 began a series of attacks of agonizing cramp of the stomach, which recurred at short intervals during more than two years. But his appetite and capacity for work remained unbroken. He made his first attempt at play-writing [1] as he was recovering from the first attack; before the year was out he had completed *Rob Roy*, and within six months it was followed by *The Heart of Midlothian*, which filled the four volumes of the second series of *Tales of My Landlord*, and has remained one of the most popular among his novels. *The Bride of Lammermoor*, *The Legend of Montrose*, forming the third series by "Jedediah Cleishbotham," and *Ivanhoe* (1820) were dictated to amanuenses, through fits of suffering so acute that he could not suppress cries of agony. Still he would not give up. When Laidlaw begged him to stop dictating he only answered, "Nay, Willie, only see that the doors are fast. I would fain keep all the cry as well as the wool to ourselves; but as to giving over work, that can only be when I am in woollen."

Throughout those two years of intermittent ill-health, which was at one time so serious that his life was despaired of and he took formal leave of his family, Scott's semi-public life at Abbotsford continued as usual—swarms of visitors coming and going, and the rate of production, on the whole, suffering no outward and visible check, all the world wondering at the novelist's prodigious fertility. The first of the series concerning which there were murmurs of dissatisfaction was *The Monastery* (1820), which was the first completed after the re-establishment of the author's bodily vigour. The failure, such as it was, was possibly due to the introduction of the supernatural in the person of the White Lady of Avenel; and its sequel, *The Abbot* (1820), in which Mary, Queen of Scots, is introduced, was generally hailed as fully sustaining the reputation of "the Great Unknown." *Kenilworth* (1821), *The Pirate* (1822), *The Fortunes of Nigel* (1822), *Peveril of the Peak* (1822), *Quentin Durward* (1823), *St Ronan's Well* (1824), *Redgauntlet* (1824) followed in quick succession in the course of three years, and it was not till the last two were reached that the cry that the author was writing too fast began to gather volume. *St Ronan's Well* was very severely criticized and condemned. And yet Leslie Stephen tells a story of a dozen modern connoisseurs in the Waverley novels who agreed that each should write down separately the name of his favourite novel, when it appeared that each had without concert named *St Ronan's Well*. There is this certainly to be said for *St Ronan's*, that, in spite of the heaviness of some of the scenes at the "hottle" and the artificial melodramatic character of some of the personages, none of Scott's stories is of more absorbing or more brilliantly diversified interest. Contradictions between contemporary popular opinion and mature critical judgment, as well as diversities of view among critics themselves, rather shake confidence in individual judgment on the vexed but not particularly wise question which is the best of Scott's novels. There must, of course, always be inequalities in a series so prolonged. The author cannot always be equally happy in his choice of subject, situation and character. Naturally also he dealt first with the subjects of which his mind was fullest. But any theory of falling off or exhaustion based upon plausible general considerations has to be qualified so much when brought into contact with the facts that very little confidence can be reposed in its accuracy. *The Fortunes of Nigel* comes comparatively late in the series and has often been blamed for its looseness of construction. Scott himself always spoke slightingly of his plots, and humorously said that he proceeded on Bayes's maxim, "What the deuce is a plot good for but to bring in good things?" Yet some competent critics prefer *The Fortunes of Nigel* to any other of Scott's novels. An attempt might be made to value the novels according to the sources of their materials, according as they are based on personal observation, documentary history or previous imaginative literature. On this principle *Ivanhoe* and *The Tales of the Crusaders* (1825, containing *The Betrothed* and *The Talisman*) might be adjudged inferior as being based necessarily on previous romance. But as a matter of fact Scott's romantic characters are vitalized, clothed with a verisimilitude of life, out of the author's deep, wide and discriminating knowledge of realities, and his observation of actual life was coloured by ideals derived from romance. He wrote all his novels out of a mind richly stored with learning of all kinds, and in the heat of composition seems to have drawn from whatever his tenacious memory supplied to feed the fire of imagination, without pausing to reflect upon the source. He did not exhaust his accumulations from one source first and then turn to another, but from first to last drew from all as the needs of the occasion happened to suggest.

During the years 1821–1825 he edited Richard Franck's *Northern Memoirs* (1821), *Chronological Notes of Scottish Affairs from the Diary of Lord Fountainhall* (1822), *Military Memoirs of the Great Civil War* (1822), and *The Novelists' Library* (10 vols., London, 1821–1824), the prefatory memoirs to which were separately published in 1828.

Towards the close of 1825, after eleven years of brilliant and prosperous labour, encouraged by constant tributes of admiration, homage and affection such as no other literary potentate has ever enjoyed, realizing his dreams of baronial splendour and hospitality on a scale suited to his large literary revenues, Scott suddenly discovered that the foundations of his fortune were unsubstantial. He had imagined himself clear of all embarrassments in 1818, when all the unsaleable stock of John Ballantyne & Co. was bargained off by Rigdum to Constable for Waverley copyrights, and the publishing concern was wound up. Apparently he never informed himself accurately of the new relations of mutual accommodation on which the printing firm then entered with the great but rashly speculative publisher, and drew liberally for his own expenditure against the undeniable profits of his novels without asking any questions, trusting blindly in the solvency of his commercial henchmen. Unfortunately, "lifted off their feet" by the wonderful triumphs of their chief, they thought themselves exempted like himself from the troublesome duty of inspecting ledgers and balancing accounts, till the crash came. From a diary which Scott began a few days before the first rumours of financial difficulty reached him we know how he bore from day to day the rapidly unfolded prospect of unsuspected liabilities. "Thank God," was his first reflection, "I have enough to pay more than 20s. in the pound, taking matters at the worst." But a few weeks revealed the unpleasant truth that, owing to the way in which Ballantyne & Co. were mixed up with Constable & Co., and Constable with Hurst & Robinson, the failure of the London house threw upon him personal responsibility for £130,000.

How Scott's pride rebelled against the dishonour of bankruptcy, how he toiled for the rest of his life to clear off this enormous debt, declining all offers of assistance and asking no consideration from his creditors except time, and how nearly he succeeded, is one of the most familiar chapters in literary history, and would be one of the saddest were it not for the heroism of the enterprise. His wife died soon after the struggle began, and he suffered other painful bereavements; but, though sick at heart, he toiled on indomitably, and, writing for honour, exceeded even his happiest days in industrious speed. If he could have maintained the rate of the first three years, during which he completed *Woodstock* (1826); *Chronicles of the Canongate* (1827), which included three tales—"The Highland Widow," "The Two Drovers" and "The Surgeon's Daughter"; *The Fair Maid of Perth* (1828, in the second series of *Chronicles of the Canongate*); *Anne of Geierstein* (1829); the *Life of Napoleon* (9 vols., 1827); part of his *History of Scotland* (2 vols., 1829–1830, for *Lardner's Cabinet Cyclopaedia*); the Scottish series of *Tales of a Grandfather* (four series, 1828–1829–1830–1831; inscribed to "Hugh Littlejohn," *i.e.* John Hugh Lockhart), besides several magazine articles,

[1] *The Doom of Devorgoil*. This and his other dramatic sketches, *Macduff's Cross*, *Halidon Hill* (1822) and *Auchindrane, or The Ayrshire Tragedy*, printed with *Devorgoil* in 1830, were slight compositions, dashed off in a few days, and afford no measure of what Scott might have done as a dramatist if he had studied the conditions of stage representation.

some of them among the most brilliant of his miscellaneous writings, and prefaces and notes to a collected edition of his novels—if he could have continued at this rate he might soon have freed himself from all his encumbrances. The result of his exertions from January 1826 to January 1828 was nearly £40,000 for his creditors. But the terrific labour proved too much even for his endurance. Ugly symptoms began to alarm his family in 1829, and in February of 1830 he had his first stroke of paralysis. Still he was undaunted, and not all the persuasions of friends and physicians could induce him to take rest. "During 1830," Lockhart says, "he covered almost as many sheets with his MS. as in 1829," the new introductions to a collected edition of his poetry and the *Letters on Demonology and Witchcraft* being amongst the labours of the year. He had a slight touch of apoplexy in November and a distinct stroke of paralysis in the following April; but, in spite of these warnings and of other bodily ailments, he had two more novels, *Count Robert of Paris* and *Castle Dangerous* (constituting the fourth series of *Tales of My Landlord*), ready for the press by the autumn of 1831. He would not yield to the solicitations of his friends and consent to try rest and a change of scene, till fortunately, as his mental powers failed, he became possessed of the idea that all his debts were at last paid and that he was once more a free man. In this belief he happily remained till his death. When it was known that his physicians recommended a sea voyage for his health, a government vessel was put at his disposal, and he cruised about in the Mediterranean and visited places of interest for the greater part of a year before his death. But, when he felt that the end was near, he insisted on being carried across Europe that he might die on his beloved Tweedside at Abbotsford, where he expired on the 21st of September 1832. He was buried at Dryburgh Abbey.

Scott's wife had died in 1826. His eldest son, Walter, succeeded to the baronetcy which had been conferred on his father in 1820, and the title became extinct on his death in 1847; the second son, Charles, died at Teheran in 1841, and the second daughter, Anne, died unmarried in 1833. Scott's elder daughter Charlotte Sophia (d. 1837) was the wife of his biographer, J. G. Lockhart (*q.v.*); and their daughter Charlotte (d. 1858) married J. R. Hope-Scott (*q.v.*), and was the mother of Mary Monica, wife of the Hon. J. C. Maxwell, who in 1874 took the additional name of Scott on his marriage with the heiress of Abbotsford. Mrs Maxwell Scott inherited some of the family literary talent, and among other books wrote two volumes about Abbotsford (1893 and 1897).

Two busts of Scott were executed by Sir Francis Chantrey: one in 1820, which was presented to Scott by the sculptor in 1828; a second in 1828, which was sent by Chantrey to Sir Robert Peel about 1837, and is now in the National Portrait Gallery, London. The 1820 bust was duplicated by Chantrey for the duke of Wellington in 1827, and there is a copy in Westminster Abbey, erected in 1897. Henry Raeburn painted Scott's portrait for Archibald Constable in 1808; Scott sat to the same artist in 1809 for the portrait now at Abbotsford, and two or three times subsequently. Other notable portraits were executed by Sir Thomas Lawrence in 1820 for George IV.; by John Graham Gilbert in 1829 for the Royal Society of Edinburgh; by Francis Grant for Lady Ruthven in 1831; and a posthumous portrait of Scott with his dogs in the Rhymer's Glen by Sir Edwin Landseer. The Scott monument in Princes Street, Edinburgh, erected in 1846, was designed by George Kemp, the statue being the work of John Steell.

BIBLIOGRAPHY.—*The Miscellaneous Prose Works of Sir Walter Scott* (6 vols., Edinburgh, 1827) were subsequently printed in 30 vols. (London, 1834–1871) and in 3 vols. (1841–1847). The collected editions of the novels and tales are very numerous. Among them are that known as the "author's favourite edition" (48 vols., Edinburgh, 1829–1833), for which Scott wrote new prefaces and notes; an édition de luxe of the Waverley novels, illustrated by A. Lalauze, E. Riou and others (25 vols., London, 1882–1898); the "Border" edition (48 vols., 1892–1894), with introductory essays and notes by A. Lang; and many modern cheap reprints. His *Poetical Works* were printed in 12 vols. (Edinburgh, 1820); they were edited by J. G. Lockhart (12 vols., Edinburgh, 1833–1834), with 24 steel engravings from illustrative drawings by Turner; by F. T. Palgrave for the "Globe" edition (1866); by W. Minto (2 vols., Edinburgh, 1888); by J. Logie Robertson (Oxford complete edition, 1904). Many of the novels have been adapted for the stage, the most famous of these dramatizations being the libretto of Donizetti's *Lucia di Lammermoor* and the *Ivanhoe* of Sir Arthur Sullivan and J. R. Sturgis. His *Minstrelsy of the Scottish Border* (3 vols., 1802–1803) was edited (4 vols., 1902) by T. F. Henderson.

The standard life by his son-in-law, J. G. Lockhart, *Memoirs of the Life of Sir Walter Scott* (7 vols., Edinburgh, 1837–1838), left little new material for later biographers. It was supplemented by the publication (2 vols., 1890) of Scott's *Journal*, covering the years from 1825 to 1832, and of his *Familiar Letters* (2 vols., 1894), both edited by David Douglas. Some unpublished letters from Scott to the marchioness of Abercorn were sold at Sotheby's in 1909. Shorter lives, chiefly based on Lockhart, are by R. H. Hutton ("English Men of Letters," London, 1898); by C. D. Yonge ("Great Writers," London, 1888), with bibliography by J. P. Anderson; by Robert Chambers (Edinburgh, 1871); by K. Elze (2 vols., Dresden, 1864); by G. E. B. Saintsbury ("Famous Scots" Series, 1897); by Andrew Lang ("Literary Lives," London, 1906), and by G. le Grys Norgate (London, 1906). For the Ballantyne controversy see also *The Ballantyne Press and its Founders* (1909), which should be taken into account in considering Lockhart's attitude on the subject.

In the long list of critical essays on Scott and his works may be mentioned:—W. Bagehot, "The Waverley Novels," in *Literary Studies* (1879, vol. ii.); W. Hazlitt, in his *Spirit of the Age* (1825); James Hogg, *The Domestic Manners and Private Life of Sir Walter Scott* (Glasgow, 1834); A. Lang, in *Letters to Dead Authors* (1886); Catalogue of the Scott Exhibition held at Edinburgh in 1871, preface by Sir W. Stirling-Maxwell (Edinburgh, 1872); Sir Leslie Stephen, *Hours in a Library* (London, 1874); J. Veitch, *The History and Poetry of the Scottish Border* (Glasgow, 1878); L. Maigron, *Le Roman historique à l'époque romantique, Essai sur l'influence de Walter Scott* (Paris, 1898). An account of the portraits of Scott, and a bibliography of his works, are given in Sir W. Stirling-Maxwell's *Catalogue of the Scott Exhibition*, commemorating Scott's centenary at Edinburgh in July–August 1871. (W. M.; X.)

SCOTT, WILLIAM BELL (1811–1890), British poet and artist, son of Robert Scott (1777–1841), the engraver, and brother of David Scott, the painter, was born in Edinburgh on the 12th of September 1811. While a young man he studied art and assisted his father, and he published verses in the Scottish magazines. In 1837 he went to London, where he became sufficiently well known as an artist to be appointed in 1844 master of the government school of design at Newcastle-on-Tyne. He held the post for twenty years, and did good work in organizing art-teaching and examining under the Science and Art Department. He did much fine decorative work, too, on his own account, notably at Wallington Hall, in the shape of eight large pictures illustrating Border history, with life-size figures, supplemented by eighteen pictures illustrating the ballad of *Chevy Chase* in the spandrels of the arches of the hall. For Penhill Castle, Perthshire, he executed a similar series, illustrating *The King's Quhair*. After 1870 he was much in London, where he bought a house in Chelsea, and he was an intimate friend of Rossetti and in high repute as an artist and an author. His poetry, which he published at intervals (notably *Poems*, 1875, illustrated by etchings by himself and Alma-Tadema), recalled Blake and Shelley, and was considerably influenced by Rossetti; he also wrote several volumes of artistic and literary criticism, and edited Keats, "L.E.L.," Byron, Coleridge, Shelley, Shakespeare and Scott. He resigned his appointment under the Science and Art Department in 1885, and from then till his death (22nd November 1890) he was mainly occupied in writing his reminiscences, which were published posthumously in 1892, with a memoir by Professor Minto. It is for his connexion with Rossetti's circle that Bell Scott will be chiefly remembered.

SCOTT, WINFIELD (1786–1866), American general, was born near Petersburg, Virginia, on the 13th of June 1786. In 1805 he entered the College of William and Mary, where he studied law, and he continued his studies in the law office of David Robertson in Petersburg. In 1807 he removed to Charleston, South Carolina, but as war with England seemed imminent he soon left for Washington and offered his services. In 1808 he was commissioned as a captain of artillery, recruited a company in Richmond and Petersburg, and was ordered to New Orleans. His criticism of his superior officer, General James Wilkinson, led to his being suspended for a year, but the

term was eventually reduced to three months. In July 1812, as a lieutenant-colonel of artillery, he was sent to the Niagara frontier and fought at Queenstown, where he was taken prisoner. He was exchanged in January 1813, became colonel in the following March, in March 1814 was promoted to the rank of brigadier-general, and in July received the brevet of major-general. In the battles of Chippewa (5th July 1814) and Lundy's Lane (25th July) he took a conspicuous part, being twice wounded in the latter engagement. For his services he was presented with a gold medal by Congress and with a sword by the state of Virginia. Among the difficult tasks that he was called upon to perform between 1815 and 1861, for the last twenty years of which period he was the commanding general of the U.S. army, were: an expedition to the Middle West in 1832, where, after the end of the Black Hawk War, he negotiated treaties of peace with the Sauk, Fox, Winnebago, Sioux, and Menominee Indians; a journey to Charleston in the same year to watch the progress of the nullification movement, and to strengthen the garrisons of the forts in the harbour; an expedition in 1836 against the Seminole Indians in Florida; the supervision of the removal in 1838 of the Cherokee Indians from Georgia, North Carolina, Alabama and Tennessee to the reservation set apart for them by treaty W. of the Mississippi river; a visit to the Niagara river in the autumn and winter of 1838 to put an end to the acts by Canadian insurgents in violation of American neutrality; a similar mission to Maine in 1839 to restore tranquillity between the citizens of Maine and New Brunswick, who were disputing the possession of a tract of land along the Aroostook river; and a journey to the north-west in 1859 to adjust a dispute between American and British officers concerning the joint occupation of San Juan Island in Puget Sound. His greatest achievement was the brilliant Mexican campaign of 1847. As the senior officer of the army, he was placed in command of the invading expedition, and after capturing Vera Cruz (March 29th, 1847), and winning victories at Cerro Gordo (April 18th), Contreras-Churubusco (August 19th-25th), Molino del Rey (September 8th), and Chapultepec (September 13th), he crowned his campaign by the capture, on the 14th of September, of the Mexican capital. In March 1848 he received a vote of thanks from Congress, which ordered a gold medal to be struck in commemoration of his services. Scott appeared to have an excellent opportunity for a political career; his nomination for the presidency by the Whigs had been suggested in 1839 and in 1848, and in 1852 he received it; but his candidacy was doomed to failure. The Whigs, divided on the slavery question, gave only half-hearted support to their compromise platform; and Scott made several extemporaneous addresses which did him harm. He received the electoral votes of only four states—Kentucky, Virginia, Massachusetts and Vermont. This defeat, however, detracted nothing from the esteem in which he was held, and in 1852 the brevet rank of lieutenant-general was created specially for him. Among the other honours conferred upon him were the degree of Master of Arts by Princeton in 1814, and the degree of Doctor of Laws by Columbia in 1850 and by Harvard in 1861. At the outbreak of the Civil War, though a Virginian, he remained at the head of the United States armies and directed operations from Washington until November 1861. He then visited Europe for a short time, and after returning wrote his *Memoirs*, published in 1864. He died at West Point, New York, on the 29th of May 1866.

See *Memoirs of Lieutenant-General Scott, LL.D.* (2 vols., New York, 1864); Raphael Semmes, *The Campaign of General Scott in the Valley of Mexico* (Cincinnati, 3rd ed., 1852); Edward D. Mansfield, *Life and Military Services of General Scott* (New York, 1862); and Marcus J. Wright, *General Scott* (New York, 1894), in the "Great Commanders" series.

SCOUNDREL, a rogue, a rascal. Etymologists have referred the word to various sources; but Skeat (*Etym. Dict.*) refers it to the provincial or Scottish *scunner* (O. Eng. *scunian*, to shun), to shrink back in fear or loathing.

SCOURGE (Ital. *scoriada*, from Lat. *excoriare*, to flay, *corium*, skin), a whip or lash, especially one used for the infliction of punishment. The typical scourge (Lat. *flagellum*) has several thongs or lashes attached to a single handle, as in the modern "cat-o'-nine-tails." The scourge or flail, and the crook, are the two symbols of power and domination depicted in the hands of Osiris in ancient Egyptian monuments; these show the unchanging form of the instrument throughout the ages.

SCOUT (from O. Fr. *escouter*, mod. *écouter*, Lat. *auscultare*, to listen), a soldier sent out to watch the enemy and bring information of his numbers, movements, whereabouts, &c. The name has also been applied to a particular class of light speedy cruisers in the British navy. After the South African War of 1899–1902, the importance of military scouting received much attention in England in consequence of the prominence given to it by Major-General Baden-Powell, of Mafeking fame. Under the latter's auspices an unofficial attempt to foster the qualities required was made by the institution of the Boy Scouts, a voluntary organization which, starting in 1908, had by 1910 enrolled many hundreds of thousands of boys throughout the United Kingdom, with branches overseas.

Various birds of the auk family, such as the guillemot and the puffin, are known as "scouts." The name is also given colloquially to college servants at Oxford and Harvard Universities. It then answers to the "gyp" of Cambridge, Trinity College, Dublin, and Durham, which has been variously explained as short for "gipsy," as taken from γύψ, vulture, from a supposed reference to a grasping character, or as representing an old word "gippo" (Fr. *jupeau*, tunic), used of a scullion or kitchen servant.

In the above senses, "scout" must be distinguished from the word meaning to flout, or reject with ridicule and scorn, which is derived from the Icel. *skúta*, taunt, jeer.

In the military sense, see Sir R. S. Baden-Powell, *Scouting*, and *Scouting for Boys*. The Boy Scouts' movement in England has official papers in the weekly *Scout* and monthly *Headquarters Gazette*.

SCRANTON, a city and the county-seat of Lackawanna county, Pennsylvania, U.S.A., at the confluence of the Lackawanna river and Roaring Brook, about 162 m. by rail N. by W. of Philadelphia and about 146 m. W.N.W. of New York. Pop. (1890) 75,215; (1900) 102,026, of whom 28,973 were foreign-born (including 7193 Irish, 4704 Germans, 4621 Welsh and 3692 English) and 521 were negroes; (1910, census) 129,867. Scranton is served by the Erie, the Delaware, Lackawanna & Western, the Central of New Jersey, the New York, Ontario & Western, the Delaware & Hudson, and the Lackawanna & Wyoming Valley railways. It occupies an area of about 20 sq. m. Among the principal public buildings are the United States Government building, the County Court House, the City Hall, the Albright Memorial building, housing the public library (55,800 vols. in 1908), the armoury of the 13th Regiment, State National Guard, the Board of Trade building, some fine churches and school-houses, a Young Men's Christian Association building and a Young Women's Christian Association building. Scranton is the see of a Roman Catholic bishop, has a good public school system, and is the seat of the International Correspondence Schools (1891), which give instruction by mail in the trades and professions to large numbers of students; Mt. St Mary's Seminary (1902) for girls, and the W. T. Smith (Memorial) Manual Training School (1905), a part of the public school system. The city has an Institute of History and Science, and the Everhart Museum of natural history, science and art (dedicated 1908), founded and endowed by Dr I. F. Everhart (b. 1840) of Scranton, a Soldiers' and Sailors' Monument, and monuments to the memory of Columbus and Washington. Scranton is the largest city in the great anthracite-coal region of the United States; and 17,525,995 long tons of coal were produced within the county in 1905. The chief manufactures are silk goods (21·6 % of all in value) and other textiles, but large quantities of foundry and machine-shop products, malt liquors, flour, and planing mill products are also manufactured. The total value of the city's factory products in 1905 was $20,453,285. The Delaware, Lackawanna & Western railway has since built large machine and car shops.

A permanent settlement was established within the present

limits of Scranton in 1788, and a primitive grist-mill, a saw-mill and a charcoal iron-furnace were erected during the next few years; but there was little further development until 1840, when the Lackawanna Iron Company was formed for the manufacture of iron here. The limestone and iron ore of the vicinity proved to be of inferior quality, and the failure of the enterprise was prevented only by the persistent efforts of George Whitefield Scranton (1811–1861), aided by his brother Selden T. Scranton and his cousin Joseph Hand Scranton. Under the leadership of George W. Scranton better grades of iron ore and of limestone were procured, and within a decade a rolling mill, a nail factory and a manufactory of steel rails were established, and adequate facilities for railway transportation were provided. Scranton was incorporated as a borough in 1854, was chartered as a city of the third class in 1866, and became a city of the second class in 1901.

See B. H. Throop, *A Half-Century in Scranton* (Scranton, 1895).

SCREAMER, a bird inhabiting Guiana and the Amazon valley, so called in 1781 by T. Pennant (*Gen. Birds*, p. 37) "from the violent noise it makes"—the *Palamedea cornuta* of Linnaeus. First made known in 1648 by G. de L. Marcgrav under the name of "Anhima," it was more fully described and better figured by Buffon under that of *Kamichi*, still applied to it by French writers. Of about the size of a turkey, it is remarkable for the curious "horn" or slender caruncle, more than three inches long, it bears on its crown, the two sharp spurs with which each wing is armed, and its elongated toes. Its plumage is plain in colour, being of an almost uniform greyish black above, the space round the eyes and a ring round the neck being variegated with white, and a patch of pale rufous appearing above the carpal joint, while the lower parts of the body are white. Closely related to this bird is another first described by Linnaeus as a species of *Parra* (see JAÇANÃ), to which group it certainly does not belong, but separated therefrom by Illiger to form the genus *Chauna*, and now known as *C. chavaria*, very generally in English as the "Crested Screamer," a name which was first bestowed on the Seriema (*q.v.*). This bird inhabits the lagoons and swamps of Paraguay and Southern Brazil, where it is called "Chajá" or "Chaka," and is smaller than the preceding, wanting its "horn," but having its head furnished with a dependent crest of feathers; while the plumage is grey. Its nest is a light construction of dry rushes, having its foundation in the water, and contains as many as six eggs, which are white tinged with buff. The young are covered with down of a yellowish-brown colour. A most singular habit possessed by this bird is that of rising in the air and soaring there in circles at an immense altitude, uttering at intervals the very loud cry of which its local name is an imitation. From a dozen to a score may be seen at once so occupying themselves. The young are often taken from the nest and reared by the people to attend upon and defend their poultry, a duty which is faithfully[1] and, owing to the spurs with which the chaka's wings are armed, successfully discharged. Another very curious property of this bird, which was observed by Jacquin, who brought it to the notice of Linnaeus,[2] is its emphysematous condition—there being a layer of air-cells between the skin and the muscles, so that on any part of the body being pressed a crackling sound is heard. In Central America occurs another species, *C. derbiana*, chiefly distinguished by the darker colour of its plumage. For this a distinct genus, *Ischyrornis*, was proposed, but apparently without necessity, by A. B. Reichenbach (*Syst. Avium*. p. xxi.).

The taxonomic position of the Palamedeidae, for all will allow to the screamers the rank of a family at least, has been much debated. Their anserine relations were pointed out by W. K. Parker in the Zoological *Proceedings* for 1863 (pp. 511-518), and in the same work for 1867 T. H. Huxley placed the family among his *Chenomorphae*; but this view was contravened in 1876 by A. H. Garrod, who said, "The screamers must have sprung from the primary avian stock as an independent offshoot at much the same time as did most of the other important families." P. L. Sclater in 1880 placed them in a distinct order, *Palamedeae*, which he, however, placed next to the true *Anseres*, and they are now generally regarded as forming a sub-order of anseriform *birds*.

SCREEN (usually, but very doubtfully, connected with Lat. *scrinium*, a box for holding books, from *scribere*, to write; a connexion with Ger. *Schranke*, barrier, has been suggested), in architecture, any construction subdividing one part of a building from another—as a choir, chantry, chapel, &c. The earliest screens are the low marble *podia*, shutting off the *chorus cantantium* in the Roman basilicas, and the perforated *cancelli* enclosing the bema, altar, and seats of the bishops and presbyters. The chief screens in a church are those which enclose the choir or the place where the breviary services are recited. This is done on the continent of Europe, not only by doors and screen-work, but also, when these are of open work, by curtains, the laity having no part in these services. In England screens were of two kinds: one of open woodwork; the other, massive enclosures of stonework enriched with niches, tabernacles, canopies, pinnacles, statues, crestings, &c., as at Canterbury, York, Gloucester, and many other places both in England and abroad (see ROOD and JUBÉ).

As an article of furniture, the screen is an ornamental frame, usually of wood, but sometimes of metal, for protection from observation, draught, or the heat of a fire. Screens are made of all shapes and sizes, and may consist of leather, paper or textile materials fastened to the framework; they may have several leaves or only one—thus a fourfold screen has four leaves. Fire-screens are usually small, with a single leaf—indeed in the Georgian period of English furniture they often took the form of a circular, oval, heart-shaped or oblong piece of framed embroidery fixed to a wooden pole or upright, upon which they could be raised or lowered. This variety, which was called a pole-screen, was more effective as an ornament than as a protection. The hand-screen was light and portable, as the name implies. At the present time fire-screens are often of glass set in metal frames. The larger type of screen, with several leaves, is of uncertain origin, but probably first came into use towards the end of the 16th century. The earlier examples were of stamped or painted Spanish leather or of some rich stuff such as tapestry; at a later date lacquer was extensively used. They were tall enough to conceal the person sitting behind them, and were frequently exceedingly handsome and stately.

SCREW (O.E. *scrue*, from O. Fr. *escroue*, mod. *écrou*; ultimate origin uncertain; the word, or a similar one, appears in Teutonic languages, cf. Ger. *Schraube*, Dan. *skrue*, but Skeat, following Diaz, finds the origin in Lat. *scrobs*, a ditch, hole, particularly used in Low Latin for the holes made by pigs boring in the ground with their snouts), a cylindrical or conical piece of wood or metal having a groove running spirally round it. The surface thus formed constitutes an external or male screw, while a similar groove cut round the interior of a cylindrical hole, as in a nut, constitutes an internal or female screw. The ridge between successive turns of the groove is the "thread," and the distance between successive turns of the thread is the "pitch." The present article will deal with the standard pitches in common use and with modern methods of manufacture, the earlier history of which, down to the time of Sir Joseph Whitworth, may be read in Holtzapffel's *Turning and Mechanical Manipulation*. For the screw as a mechanical power see MECHANICS; for the screw used to propel steamships see SHIPBUILDING.

Standardization of Screws.—All screws made to-day are copies of pre-existing or master screws, which are familiarly known as "guide screws," "hobs" or "leaders," "chasers" or "comb tools," "taps," and "dies" in numerous forms. These are so standardized that a thread cut to a given standard in England fits its fellow thread cut to the same standard in America, Germany or elsewhere. At one time screws cut by one firm would not match those cut by another. Formerly there was no "tackle," but large screws were cut with chisel and file, and a nut was cast around them and used for correction, until gradually

[1] Hence J. Latham's name for this species is "Faithful Jacana"—he supposing it to belong to the genus in which Linnaeus placed it.

[2] "Tacta manu cutis, sub pennis etiam lanosa, crepat ubique fortiter" (*Syst. Nat.* ed. 12, i. p. 260).

the coarser errors were eliminated. Another method was that of the mathematical instrument makers, who used a screw and tangent wheel by which a cutter was moved along synchronously with the revolution of the screw blank, a method only suitable for short screws. The first attempt at securing uniformity in screw threads was made by Sir Joseph Whitworth, who communicated a paper on the subject to the Institution of Civil Engineers in 1841. In the course of about twenty years the Whitworth system generally displaced the previous heterogeneous designs of threads, by the existence of which engineers' repairs had been rendered most inconvenient and costly, almost every establishment having its own "standard" set of screwing tackle. In fact it was suspected that firms thought their interest lay in this separation of practice in order to capture repairs, each of its own work.

When Whitworth began his work he made an extensive collection of screw bolts from the principal English workshops, and an average observed for diameters of ¼ in., ½ in., 1 in., and 1½ in. chiefly was taken and tabulated in exact numbers and equal fractional parts of threads per inch, the scale being afterwards extended to 6-in. diameter. In cases above an inch the same pitch is maintained for two sizes, the object being to avoid small fractions, and to simplify the construction of screwing apparatus. The system is therefore a practical compromise based on previous practice. The proportion between pitch and diameter varies throughout the series, and at the extremes the amount of power required to turn a nut is either in excess or insufficient.

When the Whitworth threads were accepted in England, Germany and the United States, it appeared as though they were established for ever in an impregnable position, as a unification evolved from chaos. Moreover, Great Britain at that time occupied a position of pre-eminence in manufacturing engineering, which was favourable to the establishment of an English system. But two things were wanting to permanence—the facts that the Whitworth threads were not based on the metric system, and that the United States was destined to come into rivalry with Great Britain. Metric systems became standardized on the continent of Europe and the Sellers thread in America overshadowed the Whitworth, though it is impossible to doubt that the Sellers like the Whitworth must in time be swallowed up by some one metric system.

It is easier to devise new standards than to induce manufacturers to accept them. Change means the purchase of a very costly new equipment of screwing tackle, both hand and machine, besides the retention of the old for effecting repairs. There is no question of accommodating or bringing in the threads of one system to others nearly like them. They either fit or do not fit, they are right or wrong, so that a clean sweep has to be made of the entire screwing tackle in favour of the new. The two great attacks that have been made on the Whitworth thread came, one from the Franklin Institute in 1864, when the Sellers thread was adopted and recommended to American engineers, and the other in 1873, when Delisle of Carlsruhe initiated a metric system. As a result, after several years of effort, the Society of German Engineers took the matter up, and the appointment of a committee gave birth to the International Screw Thread Congress, which has met from time to time for the discussion of the matter. We have thus two broad lines of departure from the Whitworth standard.

The history of the battle of the screw threads in England, America, Germany, Switzerland and France would occupy a volume. The subject is highly technical, involving practical points concerned with manufacture as well as with questions of strength and durability. We can merely state the fact that the threads now recognized as standard are included in about eight great systems, out of about sixty that have been advocated and systematized. Their elements are shown by the diagram, fig. 1; but tables of dimensions are omitted, since they would demand too much space.

Methods of Cutting Screws.—There are four methods employed for the cutting of screw threads: one by means of a single-edged tool held in the saddle of the screw-cutting lathe, and traversed horizontally only, the cylinder which is to receive the thread revolving the while; another by means of short master screws, hobs or leaders, controlling chasers or comb tools; the third by means of screw taps

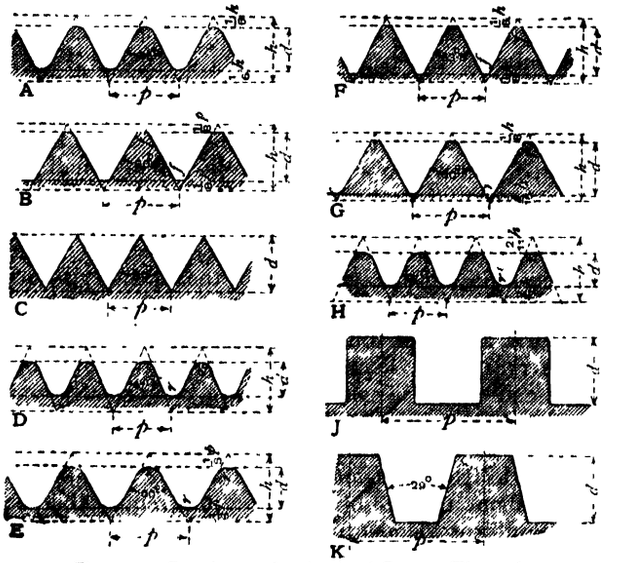


FIG. 1.—Sections of principal Screw Threads.

Formulae: p = pitch, or distance between centres of contiguous threads; d = depth of thread; h = total height of thread construction; r = radius; f = flat.

A. Whitworth thread. $h = 0{\cdot}9605\ p$; $d = 0{\cdot}6403\ p$; leaving ⅛th h to be rounded at top and bottom.

B. Sellers, or Franklin Institute, or U.S. standard thread. $h = 0{\cdot}866\ p$; $d = 0{\cdot}6495\ p$; $f = \frac{1}{8}$th p.

C. Sharp Vee thread. $d = 0{\cdot}8660\ p$.

D. British Association standard thread. $d = 0{\cdot}6\ p$; $r = \frac{2}{11}$th p.

E. C.E.I. or Cycle Engineers' Institute standard thread. $h = 0{\cdot}866\ p$; $d = 0{\cdot}5327\ p$; $r = \frac{1}{8}$th p.

F. Löwenherz or Delisle thread (metric, used largely on the continent of Europe). $h = p$; $d = 0{\cdot}75\ h$; $f = \frac{1}{8}$th h.

G. International standard thread (metric). $d = 0{\cdot}6495\ p$; $f = \frac{1}{8}$th h; $r = \frac{1}{16}$th h.

H. Thury thread (metric). $d = \frac{3}{8}$th p; $r = \frac{1}{8}$th p; $r' = \frac{1}{8}$th p.

J. Square thread. $d = \frac{1}{2}\ p$.

K. Acme thread. $d = \frac{1}{2}\ p + 0{\cdot}010$; $f = 0{\cdot}3707\ p$.

and dies, either the work or the tool being absolutely still. The fourth is by means of a milling cutter presented to the work in a special screw-milling machine, both the work and the cutter revolving.

In the lathe.

The problem of screw-cutting in the lathe in the simplest form resolves itself into the relative number of revolutions of the lathe spindle and of the lead screw (fig. 2). If the two rotate at the same speed, the thread cut on the spindle axis will be equal in pitch to that of the lead screw. If the spindle revolves more slowly than the lead screw, a thread coarser than that in the latter will result; if it revolves more rapidly, one of finer pitch will be produced. The spindle is the first factor, being the *driver*, and the lead screw is *driven* therefrom through the change wheels—the variables—which determine the number of revolutions of the latter whether the same, or slower, or faster than the spindle. Screw-cutting in all its details is an extensive subject, including the cutting of what are termed odd or unequal pitches, that is, those which involve fractions, the catching of threads for successive traverses of the tool, the cutting of multiple threads and of right- and left-hand threads, which involve much practical detail. The principle of screw-cutting may be stated briefly thus: the pitch of the guide screw is to that of the screw to be cut as the number of teeth on the mandrel or (headstock) wheel is to the number of teeth on the lead screw wheel. It is therefore simply a question of ratio. Hence for cutting threads finer than that of the lead screw, the guide screw must rotate more slowly than the lathe mandrel; and for cutting threads coarser than those of the guide screw, the lead screw must rotate faster than the lathe mandrel (fig. 2, C and D). When the ratios are ascertained, these facts indicate when the larger or the smaller wheels must be placed as drivers, or be driven. "Simple trains" are those which contain only one pair of change wheels; "compound trains" have two, three, four or more pairs (fig. 2), and are necessary when the ratio between the guide screw and the screw to be cut exceeds about six to one.

A device which has become very popular under the name of Hendey-Norton gears comprises a nest of twelve change wheels, mounted and keyed on the end of the lead screw. A stud wheel is made to engage through an intermediate wheel with any one of the twelve change gears, on the simple movement of a lever, giving twelve

different ratios for screw-cutting. These again are doubled or trebled by altering the ratios of other gears connected therewith, so that for each position of engagement of the stud wheel, two, or in some cases three, pitches can be cut. This avoids the waste of time involved in setting up fresh wheels on the swing-plate as often as a screw of different pitch has to be cut.

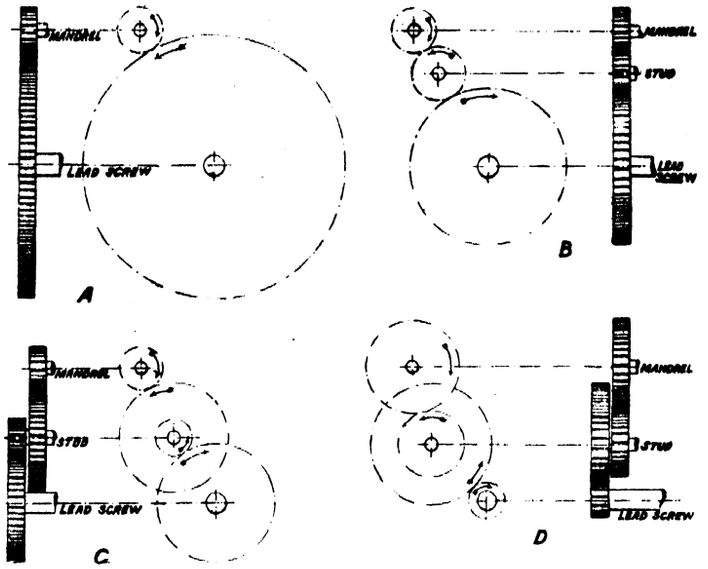


FIG. 2.

A, Simple train which rotates lead screw in opposite direction to mandrel, and makes slide-rest feed away from the headstock.
B, Simple train with intermediate wheel on stud, which rotates lead screw in same direction as mandrel, making slide-rest feed towards the headstock. Intermediate on "stud" does not alter ratio.
C, Typical compound train arranged for cutting a screw finer than that of the lead screw.
D, Ditto for screw coarser than that of the lead screw.

Another step in the direction of economy depends on the removal of all screw-cutting, except those screws which are of several feet in length, from the ordinary lathe to the special chasing and screwing machines. The screw-cutting arrangement of an engineer's lathe is a cumbrous apparatus to fit up and set in motion for the cutting of screws of small dimensions. When there was no other method available except that of common dies operated by hand or carried in a screwing machine, there was good reason why a true cutting tool should be operated in the lathe through change wheels. But the reason no longer exists, since for the single cutting tool of the lathe the two or three cutters of the chasing and screwing machines (figs. 3 and 4) are substituted, and the hollow mandrel embodied in the latter permits of screws being cut and parted from the solid bars of several feet in length. Except for the cutting of long screws and screws of odd pitches, the ordinary lathe is now a wasteful machine.

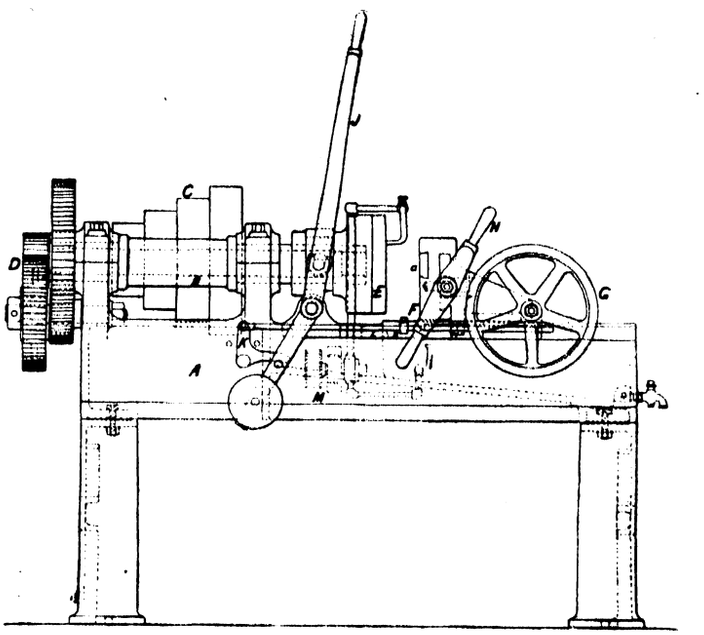


FIG. 3.—Bolt-Screwing Machine (John Stirk & Sons, Ltd., Halifax).

A, Bed. B, Spindle.
C, Four-step belt pulley, driving through triple spur gears D, to B.
E, Opening die head.
F, Bolt carriage racked to or fro along the bed by rotation of hand-wheel G.
H, Handle for opening and closing vee-jaws at *a* for gripping and releasing bolts by means of a right- and left-hand screw.
J, Handle for opening the dies.
K, Lever for automatically opening the dies, operating through J.
L, Rod having adjustable dog *b*, struck by carriage at a definite position of its travel, thus throwing the dies off the work.
M, Pump drawing lubricant from reservoir in bed.

The second method of cutting screws is that by means of hobs or leaders, and either comb or single-edged tools. That is, a short

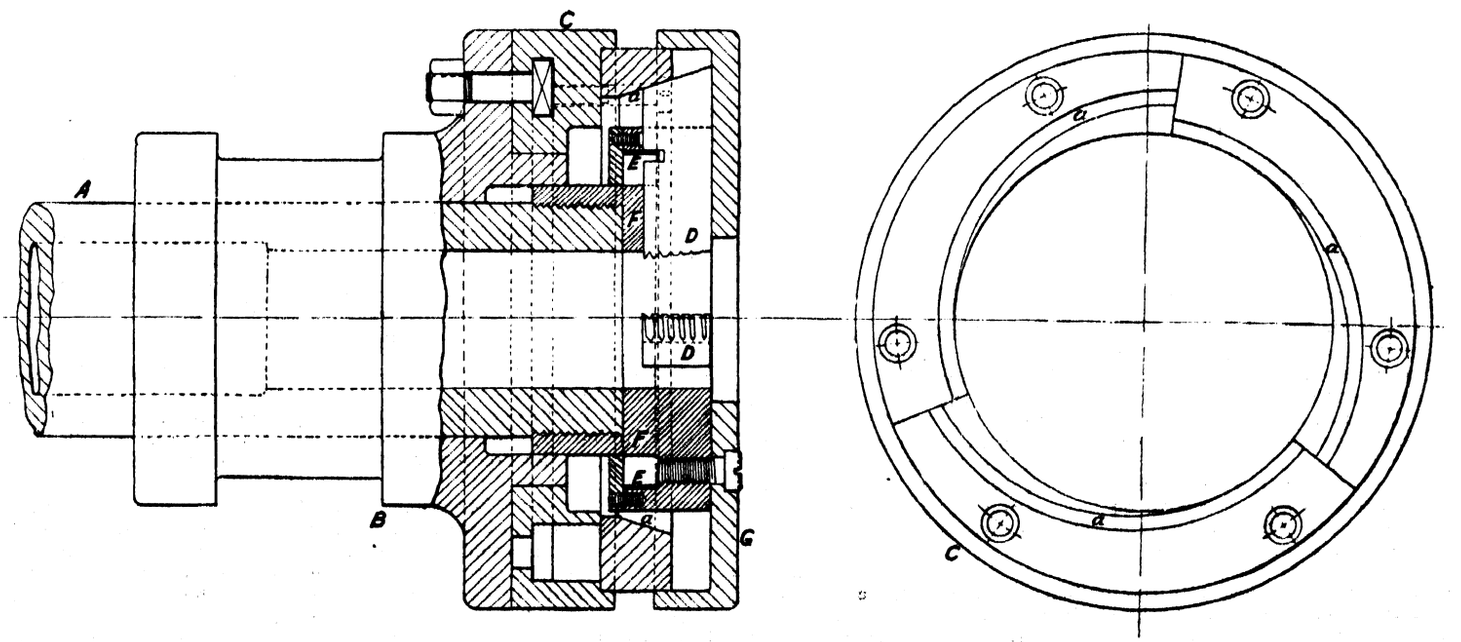


FIG. 4.—Opening Die-head for Screwing Machine.

A, Spindle end.
B, Sliding collar.
C, Ring bolted to B, and enclosing ring having three coned grooves *a*, *a*, *a*, set eccentrically to close in or let out the chasers D.
E, Curled spring keeping chasers outwards in contact with *a*.
F, Piece screwed to end of A, and provided with three grooves to carry the chasers.
G, Cover plate confining the chasers, and unscrewed from F when changing chasers for other sizes.

standard screw is mounted somewhere on the lathe, at the rear, or in front, and a nut partly embracing this becomes a guide to a bar which is attached to the tool slide directly. These are termed chasing lathes. Their value lies in the cutting of screws of but a few inches in length, of which large numbers are required, a familiar example being the screwed stays for the fire-boxes of steam boilers, hundreds of which are used in a single boiler.

By hobs.

The third method embodies the use of taps and dies in their numerous designs. The simpler forms used are those operated by hand at the bench, from which all the machine taps and dies have been elaborated. The tap is the solid screwed cylindrical tool which cuts an internal thread (fig. 5); the die is the hollow tool which cuts a thread on the outside of a cylinder (fig. 6).

By taps and dies.

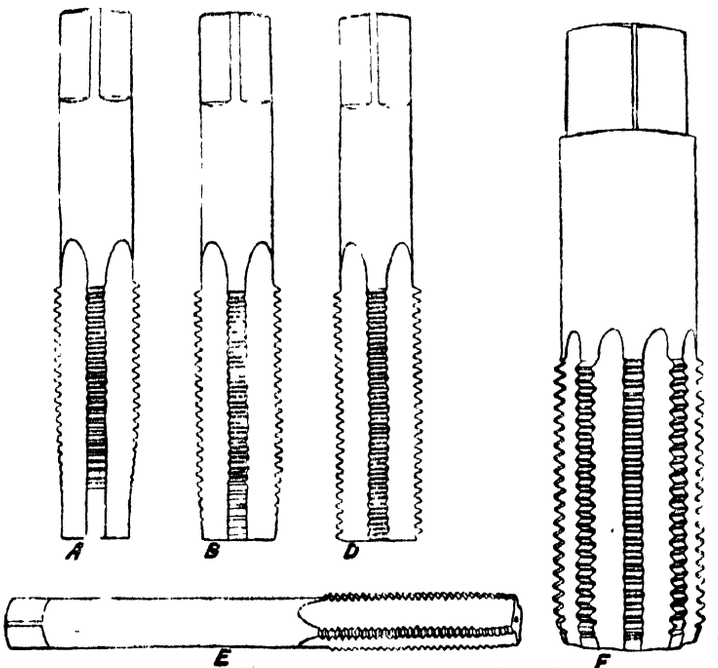


FIG. 5.—Taps. A, Entering or taper tap; B, middle or second tap; D, bottoming or plug tap; E, machine tap; F, hob or master tap.

These taps and dies are, or should be, true cutting tools, and if we examine any of those of approved form we shall see that they are so in fact. But none of the early taps was in any sense a cutting tool. They ground, and scraped, and squeezed, but never cut. They were usually made of round steel rod, screwed, and having three or four flats filed down upon them. The angles therefore which abraded the work were always obtuse, and as proper backing off was often neglected, or insufficiently done, the labour not only of running them down, but also of running them back out of their holes, was very great. This, combined with the inefficient form of solid screw plates used at the same time, made the work of fitting nuts and bolts one of constant trial and error, of easing and doctoring; and when this had been done, nuts and bolts were not interchangeable, but each nut was marked for its own bolt. The earliest screw plates were probably of the same forms which are used now for screws below $\frac{1}{4}$ in. diameter—mere hardened plates of steel, having holes of graduated diameters screwed to the various sizes required.

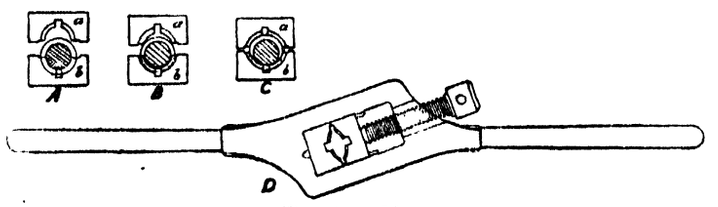


FIG. 6.—Dies.

A, Dies cut over hob of same size as screw to be cut; the lead is bad, there is coincidence only at the completion of the thread, and they are seldom used except in solid screw plates.

B, Dies cut over hob one thread deeper than the screw to be cut, the standard form; the lead is good and there is coincidence at about the middle of action.

C, Dies cut over hob two threads deeper than screw to be cut, frequently used; the lead is good and there is coincidence at the beginning of action. *a*, dies at beginning of action, *b*, at completion.

D, Screw stock.

In all taps and dies the problem is to cut a screw, of which the angle of thread changes from point to root, with tools whose angle must remain constant. In taps there is no choice of angle, since they must be the exact counterparts of the tapped threads when finished. But in dies a compromise is made by cutting them with hobs, or master taps (fig. 5), one thread larger than the thread to be cut by the dies. Briefly, the practical effect is that the dies are only counterparts of the thread to be cut at about the middle part of their action (fig. 6, B).

Though the action of taps resembles in some respects that of common dies, the results achieved are better, partly because the backing off is generally superior, partly because taper taps are commonly used to start a screw hole. Tapered solid dies are also used in some kinds of turret work with the same object, namely, to facilitate the work of an inherently badly formed tool. With a tapered tap, or a tapered solid die, the full threads do not come into operation until after the tapered threads have started the cut. A properly made throughfare tap, or a tapered die, will cut an average-sized screw at one traverse, provided lubrication is ample. Taps are now made with very narrow edges and wider clearances than formerly, very different from the common taps with broad edges and narrow grooves. There is thus little friction, and there is plenty of clearance for the chips, essential conditions for cutting screws rapidly at a single traverse.

Dies are held in stocks. In the common die stocks one adjustable die is moved forward with a screw, which forms one of the handles of the stock, or a separate tightening screw is used at right angles with the handles, or the tightening screw is set diagonally in relation to the handle (fig. 6, D). Sir Joseph Whitworth's well known "guide" screw stock (fig. 7) is an example of the embodiment of the principle just stated, the dies being cut over a hob two depths of thread larger than the screw; one, a broad die, is used for guidance only, and two narrow dies do all the cutting. The guide-screw stock derives its name from the fact that it embodies a guide *a* distinct from the cutters *b*,*b*, the guide doing very little actual cutting; it is one of the best tools for screw-cutting outside the lathe, but some of the American types of dies, such as in fig. 8, A and B, give very accurate results, especially when they are combined with a guide in advance of the dies, to keep them truly parallel on the work. The common dies are inferior in operation to those used in the guide-screw stock. Nevertheless, the common die stocks are used most extensively. The reason is that, although they are of faulty construction regarded strictly from the mechanician's point of view, yet they do their work in a very satisfactory manner if moderate care be exercised in their construction and working.

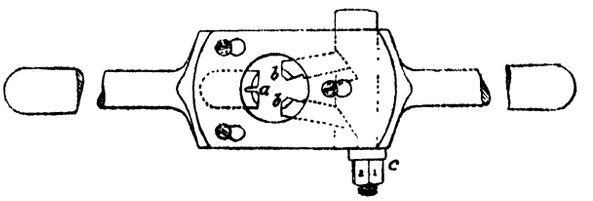


FIG. 7.—Whitworth Guide-Screw Stock. *a*, Guide; *b*,*b*, cutters; *c*, adjusting bolt.

Machine Work.—Hand tapping and screwing has long been confined to occasional pieces of work done by the fitter at the bench, the erecter and repairer. Screws and tapped holes required in quantities are done on machines which include numerous types, at a rate of production which would seem incredible were it not so common. For cutting common screws of no very great length the lathe has long been superseded by the various screwing machines. The earlier forms were provided with clutch mechanism for running the solid dies back off the thread, in imitation of the action of the hands, and the dies could not cut a complete thread at one traverse, two or three traverses being necessary in the production of a full thread. In the modern screwing machines (fig. 3) the cutters are closed and released by cam mechanism, and all threads except those of large diameter are cut at a single traverse. Common bolts and nuts are cut in

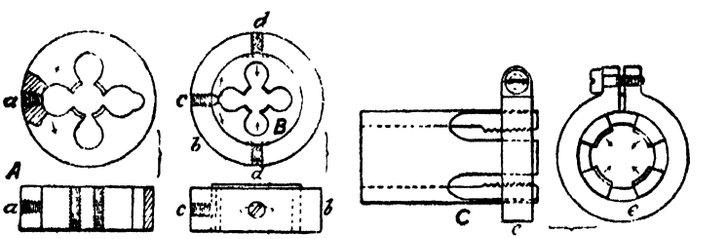


FIG. 8.

A, Common split spring die, adjusted by taper screw, *a*.

B, Split die held in collet, *b*, and expanded or contracted by turning in the taper-pointed screw, *c*, and slackening the screws *d*,*d*, or vice versa.

C, Spring die for lathes, adjusted to cut larger or smaller by means of the split ring *e*.

machines of this kind, machine taps, which are longer than hand operated taps, being employed in the same machines.

But the smaller screws made in large quantities, and screws which have to be cut on pieces of work on which other operations, as turning, boring, facing, knurling, have to be performed, are made in the numerous capstan or turret lathes, the dies or taps being held in the turrets. Often a cam-operated screwing plate is pulled into line with the work, operating independently of the turret head. But in most cases the dies (fig. 8) are held in a chuck which is inserted in one of the holes in the turret and which is better for the cutting of the finer screws. More valuable than any other single improvement is the automatic opening of many dies used in turret lathes, by which the running back of the die over the work is avoided. These opening die heads are of several designs. They are so beautifully contrived that contact with a stop, the position of which can be regulated, arrests the cutting action and causes the dies to fly open away from the screw, so that the turret can be slid away instantly, while the dies close in readiness for the next screw.

Sizing Taps are used for the finishing of threads which are required to be finished so uniformly as to be interchangeable one with the other. These are ordinary plug or second taps, generally short in length, and as they remove but a mere trifle of material they retain their size for a very long time. The case of sizing taps is more difficult than that of dies, because a die can be readily compressed to compensate for wear (fig. 8), but a tap has to be expanded. The result is that while plenty of adjustable dies are made, there are few expanding taps. Many have been designed, but they are used to a much less extent than the dies. A sizing tap is kept true as long as possible by careful use, and when it falls below the limit dimensions it is replaced by a new one.

Screw milling.

Screw milling, the latest development in screw-cutting, involves the use of a special machine, something like the lathe in outline, the piece of work to be threaded being rotated in the axis of the machine. The cutter is carried in a head, with swivelling arrangements, to provide for variations in screw angles, and is rotated at speeds suitable for the metal or alloy being cut. The necessary traverse is imparted either to the work or to the cutter, according to the design of machine, by lead screw and change gears. This method is employed to a considerable extent, chiefly for cutting coarsely threaded screws and worms. The great advantage which the revolving cutter possesses over the single-edged tool is its rapidity of action, by which threads may be produced more quickly than in the lathe.

Testing Screws. The screws cut in engineers' shops are sufficiently true for all practical purposes. But the fact remains that no guide screw yet made is true, and no true screw can be made apart from the use of devices which are unknown in the machine shop. Actually no screw ever has been, or probably ever will be, made perfect, but the variation from truth has been in some cases only $\frac{1}{25,000}$ or $\frac{1}{30,000}$ part of an inch. The microscope is brought into requisition for testing standard screws, but commercial screws simply have to pass the test of gauges. A screw 21 ft. long was made by the Pratt & Whitney Co., and tested by Professor W. A. Rogers. A scale, the corrections of which were known to within $\frac{1}{25,000}$ in., was mounted parallel with the axis of the screw. A microscope containing a cross bar was mounted on the carriage actuated by the screw. The cross bar was furnished with a micrometer by which the deviations for any revolution of the screw could be measured. A reading was taken for each half inch in length of the screw. Special tests were made at various points by turning the screw through 45° at a time. The maximum error in the entire length of the screw was found to be less than $\frac{1}{10}$ in.

The problem of producing a true screw has occupied investigators since the days of Henry Maudslay (1771–1831). The great difficulty is that of attaining accurate pitch, so that the distances between all the threads shall be uniform, and consequently that a nut on the screw shall move equably during the rotation. The importance of this point is felt in the dividing engines of various classes employed for ruling, and in measuring machines used for testing standards of length. The ordinary screw, cut by dies or in the screw-cutting lathe, is found, on applying comparatively coarse tests, to be far from accurate in pitch, while the thread may be wavy or "drunken" and the diameter may not be uniform at all points. There are several methods of correcting the errors in screws; the principal one is that of retarding or accelerating the traverse motion of the screw-cutting tool by means of a compensating lever bearing on a compensating bar, which is formed after observations have been made on the degree of accuracy of the leading screw used to propel the tool carriage. The original errors in the leading screw are therefore eliminated as far as possible. The inspection of the screw is done by means of the microscope working in conjunction with a line measure fastened down parallel with the axis of the screw, so that the coincidence or otherwise of the screw pitches with the subdivisions of the measure may be compared. (J. G. H.)

Errors of Screws.—For scientific purposes the screw must be so regular that it moves forward in its nut exactly the same distance for each given angular rotation around its axis. As the mountings of a screw introduce many errors, the final and exact test of its accuracy can only be made when it is finished and set up for use. A large screw can, however, be roughly examined in the following manner:—(1) See whether the surface of the threads has a perfect polish. The more it departs from this, and approaches the rough torn surface as cut by the lathe tool, the worse it is. A perfect screw has a perfect polish. (2) Mount it between the centres of a lathe and then slip upon it a short nut which fits perfectly. If the nut moves from end to end with equal friction, the screw is uniform in diameter. If the nut is long, unequal resistance may be due to either an error of run or a bend in the screw. (3) Fix a microscope on the lathe carriage and focus its single cross-hair on the edge of the screw and parallel to its axis. If the screw runs true at every point its axis is straight. (4) Observe whether the short nut runs from end to end of the screw without a wabbling motion when the screw is turned and the nut kept from revolving. If it wabbles the screw is said to be drunk. One can see this error better by fixing a long pointer to the nut, or by attaching it to a mirror and observing an image in it with a telescope. The following experiment will also detect this error. (5) Put upon the screw two well-fitting and rather short nuts, which are kept from revolving by arms bearing against a straight-edge parallel to the axis of the screw. Let one nut carry an arm which supports a microscope focused on a line ruled on the other nut. Screw this combination to different parts of the screw. If during one revolution the microscope remains in focus, the screw is not drunk; and, if the cross-hairs bisect the line in every position, there is no error of run. Where the highest accuracy is needed, we must resort in the case of screws, as in all other cases, to grinding. A long solid nut, tightly fitting the screw in one position, cannot be moved freely to another position unless the screw is very accurate. If grinding material is applied and the nut is constantly tightened, it will grind out all errors of run, drunkenness, crookedness and irregularity of size. The condition is that the nut must be long, rigid and capable of being tightened as the grinding proceeds; also the screw must be ground longer than it will finally be needed, so that the imperfect ends may be removed.

The following process will produce a screw suitable for ruling gratings for optical purposes. Suppose it is our purpose to produce a screw which is finally to be 9 in. long, not including bearings, and $1\frac{1}{8}$ in. in diameter. Select a bar of soft Bessemer steel, which has not the hard spots usually found in cast steel, about $1\frac{3}{8}$ in. in diameter and 30 in. long. Put it between lathe centres and turn it down to 1 in. diameter everywhere, except about 12 in. in the centre, where it is left a little over $1\frac{1}{8}$ in. in diameter for cutting the screw. Now cut the screw with a triangular thread a little sharper than 60°. Above all, avoid a fine screw, using about 20 threads to the inch.

The grinding nut, about 11 in. long, has now to be made. Fig. 9 represents a section of the nut, which is made of brass, or better,

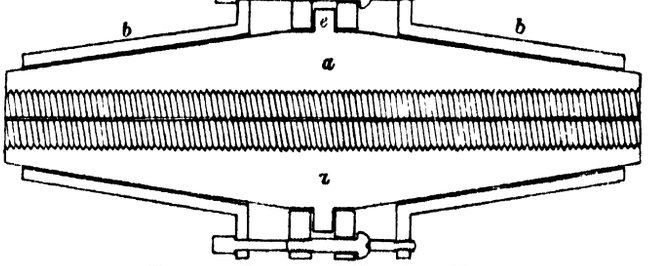


FIG. 9.—Section of Grinding Nut.

of Bessemer steel. It consists of four segments, *a*,*a*, which can be drawn about the screw by two collars, *b*,*b*, and the screw *c*. Wedges between the segments prevent too great pressure on the screw. The final clamping is effected by the rings and screws, *d*,*d*, which enclose the flanges, *e*, of the segments. The screw is now placed in a lathe and surrounded by water whose temperature can be kept constant to 1° C., and the nut placed on it. In order that the weight of the nut may not make the ends too small, it must either be counterbalanced by weights hung from a rope passing over pulleys in the ceiling, or the screw must be vertical during the whole process. Emery and oil seem to be the only available grinding materials, though a softer silica powder might be used towards the end of the operation to clean off the emery and prevent future wear. Now grind the screw in the nut, making the nut pass backwards and forwards over the screw, its whole range being nearly 20 in. at first. Turn the nut end for end every ten minutes and continue for two weeks, finally making the range of the nut only about 10 in., using finer washed emery and moving the lathe slower to avoid heating. Finish with a fine silica powder or rouge. During the process, if the thread becomes too blunt, recut the nut by a *short* tap, so as not to change the pitch at any point. This must of course not be done less than five days before the finish. Now cut to the proper length; centre again in the lathe under a microscope; and turn the bearings. A screw so ground has fewer errors than from any other system of mounting. The periodic error especially will be too small to be discovered, though the mountings and graduation and centering of the head will introduce it; it must therefore finally be corrected.

Mounting of Screws.—The mounting must be devised most care-

fully, and is indeed more difficult to make without error than the screw itself. The principle which should be adopted is that no workmanship is perfect; the design must make up for its imperfections. Thus the screw can never be made to run true on its bearings, and hence the device of resting one end of the carriage on the nut must be rejected. Also all rigid connexion between the nut and the carriage must be avoided, as the screw can never be adjusted parallel to the ways on which the carriage rests. For many purposes, such as ruling optical gratings, the carriage must move accurately forward in a straight line as far as the horizontal plane is concerned, while a little curvature in the vertical plane produces very little effect. These conditions can be satisfied by making the ways V-shaped and grinding with a grinder somewhat shorter than the ways. By constant reversals, and by lengthening or shortening the stroke, they will finally become nearly perfect. The vertical curvature can be sufficiently tested by a short carriage carrying a delicate spirit-level. Another and very efficient form of ways is V-shaped with a flat top and nearly vertical sides. The carriage rests on the flat top and is held by springs against one of the nearly vertical sides. To determine with accuracy whether the ways are straight, fix a flat piece of glass on the carriage and rule a line on it by moving it under a diamond; reverse and rule another line near the first, and measure the distance apart at the centre and at the two ends by a micrometer. If the centre measurement is equal to the mean of the two end ones, the line is straight. This is better than the method with a mirror mounted on the carriage and a telescope. The screw itself must rest in bearings, and the end motion be prevented by a point bearing against its flat end, which is protected by hardened steel or a flat diamond. Collar bearings introduce periodic errors. The secret of success is so to design the nut and its connexions as to eliminate all adjustments of the screw and indeed all imperfect workmanship. The connexion must also be such as to give means of correcting any residual periodic errors or errors of run which may be introduced in the mountings or by the wear of the machine.

The nut is shown in fig. 10. It is made in two halves, of wrought iron filled with boxwood or lignum vitae plugs, on which the screw is cut. To each half a long piece of sheet steel is fixed which bears against a guiding edge, to be described presently. The two halves are held to the screw by springs, so that each moves forward almost independently of the other.

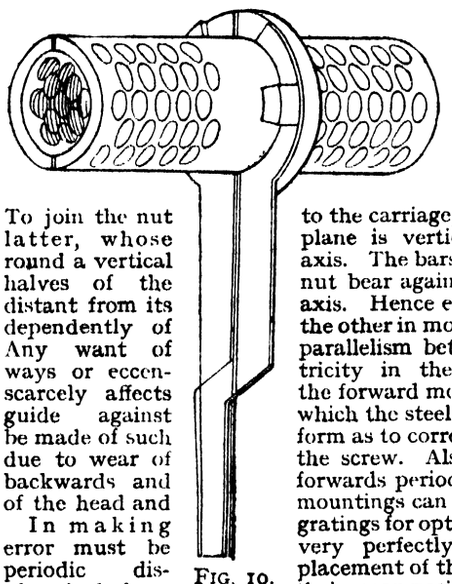


FIG. 10.

To join the nut to the carriage, a ring is attached to the latter, whose plane is vertical and which can turn round a vertical axis. The bars fixed midway on the two halves of the nut bear against this ring at points 90° distant from its axis. Hence each half does its share independently of the other in moving the carriage forward. Any want of parallelism between the screw and the ways or eccentricity in the screw mountings thus scarcely affects the forward motion of the carriage. The guide against which the steel pieces of the nut rest can be made of such form as to correct any small error of run due to wear of the screw. Also, by causing it to move backwards and forwards periodically, the periodic error of the head and mountings can be corrected.

In making gratings for optical purposes the periodic error must be very perfectly eliminated, since the periodic displacement of the lines only one-millionth of an inch from their mean position will produce "ghosts" in the spectrum. (See DIFFRACTION.) Indeed this is the most sensitive method of detecting the existence of this error, and it is practically impossible to mount the most perfect of screws without introducing it. A very practical method of determining this error is to rule a short grating with very long lines on a piece of common thin plate glass; cut it in two with a diamond and superimpose the two halves with the rulings together and displaced sideways over each other one-half the pitch of the screw. On now looking at the plates in a proper light so as to have the spectral colours show through it, dark lines will appear, which are wavy if there is a periodic error and straight if there is none. By measuring the comparative amplitude of the waves and the distance apart of two lines, the amount of the periodic error can be determined. The phase of the periodic error is best found by a series of trials after setting the corrector at the proper amplitude as determined above.

A machine properly made as above and kept at a constant temperature should be able to make a scale of 6 in. in length, with errors at no point exceeding $\frac{1}{100000}$ of an inch. When, however, a grating of that length is attempted at the rate of 14,000 lines to the inch, four days and nights are required and the result is seldom perfect, possibly on account of the wear of the machine or changes of temperature. Gratings, however, less than 3 in. long are easy to make. (H. A. R.)

SCREW-PINE, the popular name for plants of the genus *Pandanus*, which are shrubs or trees of peculiar habit, having a main stem and a few branches at the ends of which is a tuft of long, stiff, narrow leaves closely arranged in three strongly twisted lines. The stem forms stout roots, which grow obliquely downwards to the soil, and owing to the decay of the lower part of the stem the plant is often supported merely by these strong prop-like roots. The ripe fruits are borne in often very large spherical or cylindrical heads, which are often extremely hard. The genus is the principal one of the family Pandanaceae, a small order of Monocotyledons, which is widely distributed through the tropics of the Old World, especially in the islands of the Malay Archipelago and of the Indian and Pacific Oceans.

SCRIBE, AUGUSTIN EUGÈNE (1791–1861), French dramatist, was born in Paris on the 24th of December 1791. His father was a silk merchant, and he was well educated, being destined for the bar. But, having a real gift for the theatre, a gift which unfortunately was not allied with a corresponding literary power, he very soon began to write for the stage. His first piece, *Le Prétendu sans le savoir*, was produced without his name at the Variétés in 1810, and was a failure. Numerous other plays, written in collaboration with various authors, followed; but Scribe achieved no distinct success till 1815, when *Une Nuit de la garde nationale*, written in collaboration with Delestre-Poirson, made him famous. Thenceforward his fertility was unceasing and its results prodigious. He wrote every kind of drama—vaudevilles, comedies, tragedies, opera-libretti. To the Gymnase theatre alone he is said to have furnished a hundred and fifty pieces before 1830. This extraordinary fecundity is explained by the systematic methods of collaboration which he established. He had a number of co-workers, one of whom supplied the story, another the dialogue, a third the jokes and so on. He is said in some cases to have sent sums of money for "copyright in ideas" to men who were unaware that he had taken suggestions from their work. Among his collaborators were Jean Henri Dupin (1787–1887), Germain Delavigne, Delestre-Poirson, Mélesville (A. H. J. Duveyrier), Marc-Antoine Desaugiers, Xavier Saintine and Gabriel Legouvé. His début in serious comedy was made at the Théâtre Français in 1822 with *Valérie*, the first of many successful pieces of the same kind. His industry was untiring and his knowledge both of the mechanism of the stage and of the tastes of the audience was wonderful. For purely theatrical ability he is unrivalled, and his plays are still regarded as models of dramatic construction. Moreover he was for fifty years the best exponent of the ideas of the French middle classes, so that he deserves respectful attention, even though his style be vulgar and his characters commonplace. He wrote a few novels, but none of any mark. The best-known of Scribe's pieces after his first successful one are *Une Chaîne* (1842); *Le Verre d'eau* (1842); *Adrienne Lecouvreur* (1849), in conjunction with Legouvé; *Bertrand et Raton, ou l'art de conspirer*; and the libretti of many of the most famous operas of the middle of the century, especially those of Auber and Meyerbeer. The books of *La Muette de Portici, Fra Diavolo, Robert le Diable*, and of *Les Huguenots* are wholly or in part by him. Scribe died in Paris on the 20th of February 1861.

His *Œuvres complètes* appeared in seventy-six volumes in 1874-1885. See Legouvé, *Eugène Scribe* (1874).

SCRIBES. The word "scribe" (from Lat. *scribere*, to write) means generally a writer; but it has a more special application as the English term for the Jewish class called in Hebrew *Sopherim* (Gr. γραμματεῖς). Both the Hebrew and the Greek word are used to denote something equivalent to secretary of state or town-clerk in general; and through the influence of the law, revealed through Moses, upon the Jewish nation conceived as a theocracy, both words denote in particular one learned in Scripture. Jeremiah (for example) knew of Scribes who made the law of the Lord falsehood (viii. 8), just as he knew of false prophets and profane priests (xxiii.). The function of writing belongs rather to the scribe or secretary in general than to the specifically Jewish scribe, whose primary business was to read and interpret the existing revelation of God's will, just as the town-clerk at Athens read public documents to the assembly (Thuc. vii. 10). So Ezra, the most famous of the early

Scribes, is described as "the scribe of the commandments of the Lord and of his statutes to Israel" (Ezra vii. 11), and again as "a ready scribe in the law of Moses which the Lord, the God of Israel, had given." As a Scribe he read the Law to the congregation of the children of Israel and the Levites recited a paraphrase to enable them to understand it (Nehemiah viii.). But even Jewish scribes were not only readers (as the old Greek version of 1 Esdras calls Ezra) but writers. Jeremiah (viii. 8) had a feud with the Scribes of his day, who wrote what they thought necessary as a compendium or supplement of the Law; but ben Sira, a Scribe himself, left such a book (Ecclesiasticus), which is reckoned Apocryphal, indeed, but is on its merits worthy to be "read for example of life and instruction of manners" (Thirty-Nine Articles of Religion, vi.; following Jerome). The book contains the Scribes' ideal (xxxviii. 24–xxxix. 11) as well as a typical performance. To be a Scribe requires a man's whole life; a ploughman (for example) has not leisure enough to acquire such wisdom—and here it is well to notice that experience taught the Jews the necessity of teaching all their children some handicraft, even if they were to be Scribes. But a Scribe must devote himself to the study of the law, the wisdom of the fathers and the prophets, *i.e.* the written law, and he must receive the oral tradition which will teach him to unlock its secrets. He must wander through the lands of the nations and explore things good and evil among men. So trained he will stand beside the rulers of his people because the law covers all the departments of their life. And he may be inspired to speak or write the wisdom he has gained. Ben Sira's grandson (natural or spiritual) in the prologue to the Greek version of this collection of such wisdom speaks of him as having been led forward to write it as an aid to the progressive fulfilment of God's law.

Such were the Scribes of the Jews, an order of learned theologians who practised applied theology, a succession of religious teachers and thinkers controlled in their speculations by their oral tradition to some extent and always by the principles of the law and the other scriptures so far as they accepted them and regarded them as consistent with the teaching of Moses. Their general aim was progress in knowledge of God's will, but apart from fundamental principles there were no tests or formularies to which their teaching must conform. Necessarily they differed from one another even in the same generation according to their different temperaments and their different experiences, especially of foreign lands. And different generations had to adapt themselves to different needs. In the time of Antiochus Epiphanes (for example) they had to face the problem, Was the law of the Sabbath to be broken, or was the whole nation to perish and leave none to keep the rest of the law and that part in happier days? A company of them decided with a unanimity rare in the history of the order that the Sabbath must be broken (1 Macc. ii. 40-42). Later these Hasidaeans deserted the Maccabean rebels, when some relief had been effected on the coming of a priest of the seed of Aaron (1 Macc. vii. 12-16). Their massacre, like the massacres which led to the suspension of the Sabbath law, was another fact to be assimilated for the guidance of posterity, and, as Scribes always did, they found and cited the prophecy which was thus fulfilled (Ps. lxxix. 2, 3; 1 Macc. vii. 17).

Later they are represented as falling generally into two classes, the Pharisees and the Sadducees, for it is obvious that the Sadducees needed doctors of the law to answer the Scribes of the Pharisees as long as they could, and as long as they dared to hold out against the Pharisaic tradition, backed as it was by the popularity of the Pharisees. But it must not be supposed that the Pharisees all held identical views or insisted upon all points in the tradition which accumulated and tended to crystallize as of equal importance. The Sadducean position was probably more definite and more commonly held by individual Sadducees because it was mainly based on negations. The rivals may be compared roughly to theists and atheists of the present day so far as their relative solidarity is concerned. As an example of the broad and conspicuous divergences among the Pharisees it is enough to point to the Zealots; they had isolated precursors before the final coalition of Pharisees, who thought that the time had come for the sword of Gideon as well as the sword of the Lord, with others who seemed to Josephus to love bloodshed for its own sake. And the Talmud speaks of the Pairs of Scribes—*e.g.* Hillel and Shammai—as contending with one another.

In the Gospel according to St John, which is wholly, and the Gospel of St Luke, which is partially in touch with the life of the time of our Lord, the different receptions which different Scribes accorded to the new teachers is clearly recognized. St Paul was of course a Scribe, and helped St Luke, it may fairly be supposed, to resist Christian prejudice against the whole order—the mere name of Scribe—without any discrimination in favour of such men as Nathaniel, Nicodemus and Gamaliel. The Gospel associated with the name of St Matthew has at any rate something of the intolerance with which a tax-gatherer might well regard those of the Pharisees (*i.e.* the Zealots, to use the term handed down) who condemned them as breakers of God's law. But in respect of its wholesale denunciations of "Scribes and Pharisees, hypocrites," it must be said that there were many Scribes and Pharisees who were not hypocrites, and were therefore entitled to say, "Let the galled jade wince, our withers are unwrung." It appears that the parable of the Pharisee and the Publican ended originally with a question, "Which went home justified"—the Pharisee who thanked God because he had been saved from the grosser sins, or the Publican who recognized that his calling was in itself sinful, and without venturing to pass beyond the Court of the Gentiles whom he served—without even promising to abandon their service—prayed for mercy to the God whom he feared? The official text of St Luke has answered the question in one way: Christian practice is, on the whole, in favour of the Pharisee.

Other views of the ancient Scribes are too notorious to need statement here. Broadly speaking they have no connexion with the real evidence, because they rest upon the denunciations of the First Gospel. If it is necessary to begin historical investigation at the wrong end, it is advisable to take into account the whole evidence available. The Scribes of the 1st century A.D. preserved Judaism in spite of the destruction of the Temple, and this fact is enough to refute the view too commonly taken of them by Christians in spite of St Luke and St John. The common view is as reasonable and just as an account of the Prophets based on Jeremiah's denunciations would be—or an estimate of the Church of England which consisted of summary accounts of its criminous clerks.

See Schürer's *History of the Jewish People*, with full authorities.

(J. H. A. H).

SCRIM, a light open texture, usually made of cotton or flax. It is used in bookbinding, upholstery and other industries. It is also used as a backing to strengthen paper, as in maps and packing paper. Sometimes jute scrims are made for the latter purpose, and the whole made impervious to moisture by the addition of some waterproof solution. Certain varieties of jute scrims or nets are used for supporting the branches of fruit trees, and for preventing birds from damaging the fruit.

SCRIP, properly any written document; the word is a corruption of "script" (Lat. *scribere*, to write), possibly from an assimilation with "scrip," a pilgrim's bag or wallet, which is borrowed from the Scandinavian (cf. Nor. *skreppa*, knapsack), and is ultimately cognate with "scrap," shred. In commercial usage, "scrip" is a document or certificate issued by a public company when instalments upon its shares are payable at different dates, or the whole amount to be paid has not been called up. Such a document entitles the person named to be treated as the allottee of the shares mentioned; it is transferable, and entitles the allottee on payment of all the calls to a share certificate. Scrip requires a penny stamp impressed upon it. The word is frequently loosely used for the share certificates or shares collectively.

SCROFULA (Lat. for "little sow"), or STRUMA, the general names formerly given to the disease now termed tuberculosis (*q.v.*)—"scrofulous," "strumous" and "tuberculous" being nearly interchangeable. The particular characters associated with "scrofula" have, therefore, varied at different periods

when the real nature of the disease was misunderstood; but essentially what was meant was tuberculosis of the bones and lymphatic glands, with its attendant symptoms, and it is in this sense that the word survives. The old English popular name was "king's evil," so called from the belief that the sovereign's touch could effect a cure. This superstition can be traced back to the time of Edward the Confessor in England, and to a much earlier period in France. Samuel Johnson was touched by Queen Anne in 1712, and the same prerogative of royalty was exercised by Prince Charles Edward in 1745.

SCROGGS, SIR WILLIAM (*c.* 1623–1683), lord chief justice of England, was the son of a butcher of sufficient means to give his son a university education. Scroggs went to Oriel College, and later to Pembroke College, Oxford, where he graduated in 1640, having acquired a fair knowledge of the classics. There is some evidence that he fought on the royalist side during the Civil War. In 1653 he was called to the bar, and soon gained a good practice in the courts. He was appointed a judge of the common pleas in 1676, and two years later was promoted to be lord chief justice, his advancement being due to his unfailing readiness to degrade the administration of justice to serve the purposes of the court. He was a man of debauched life and coarse and violent manners; and these qualities were conspicuous in his demeanour on the bench. As lord chief justice Scroggs presided at the trial of the persons denounced by Titus Oates for complicity in the "popish plot," and he treated these prisoners with characteristic violence and brutality, overwhelming them with indecent sarcasm and abuse while on their trial, and taunting them with savage mockery when sentencing them to death. He may at first have been a sincere believer in the existence of a plot; if so he showed himself not less gullible than the ignorant multitude out of doors; at all events he did nothing to test the credibility of such perjured witnesses as Oates, Bedloe and Dangerfield. At the trial in February 1679 of the prisoners accused of the murder of Sir Edmund Godfrey he gave a characteristic exhibition of his methods, indulging in a vituperative tirade against the Roman Catholic religion, and loudly proclaiming his satisfaction in the guilt of the accused. It was only when, in July of the same year, Oates's accusation against the queen's physician, Sir George Wakeman, appeared likely to involve the queen herself in the ramifications of the plot, that Scroggs began to think matters were going too far; he was probably also influenced by the discovery that the court regarded the plot with discredit and disfavour, and that the country party led by Shaftesbury had less influence than he had supposed with the king. The chief justice on this occasion threw doubt on the trustworthiness of Bedloe and Oates, and warned the jury to be careful in accepting their evidence. This change of front inflamed public opinion against Scroggs, for the popular belief in the plot was still undiminished. Scroggs, however, was no less violent than before against Catholic priests who came before him for trial, as he showed when he sentenced Andrew Bromwich to death at Stafford in the summer of 1679; but his proposing the duke of York's health at the lord mayor's dinner a few months later in the presence of Shaftesbury indicated his determination not to support the Exclusionists against the known wishes of the king. Acting in the assurance of popular sympathy, Oates and Bedloe now arraigned the chief justice before the privy council for having discredited their evidence and misdirected the jury in the Wakeman case, accusing him at the same time of several other misdemeanours on the bench, including a habit of excessive drinking and bad language. In January 1680 the case was argued before the council and Scroggs was acquitted. At the trials of Elizabeth Cellier and of Lord Castlemaine in June of the same year, both of whom were acquitted, he discredited Dangerfield's evidence, and on the former occasion committed the witness to prison. In the same month he discharged the grand jury of Middlesex before the end of term in order to save the duke of York from indictment as a popish recusant, a proceeding which the House of Commons declared to be illegal, and which was made an article in the impeachment of Scroggs in January 1681. The dissolution of parliament put an end to the impeachment, but in April Scroggs was removed from the bench with a pension; he died in London on the 25th of October 1683.

Scroggs was perhaps the worst of the judges who disgraced the English bench at a period when it had sunk to the lowest degradation; and although his infamy is less notorious than that of Jeffreys, his character exhibited fewer redeeming features. Scroggs was the author of a work on the *Practice of Courts-Leet and Courts-Baron* (London, 1701), and he edited reports of the state trials over which he presided. He was the subject of many contemporary satires.

See W. Cobbett, *Complete Collection of State Trials* (vols. i.-x. of *State Trials*, 33 vols., London, 1809); Roger North, *Life of Lord Guilford*, &c., edited by A. Jessopp (3 vols., London, 1890), and *Examen* (London, 1740); Narcissus Luttrell, *A Brief Relation of State Affairs, 1678–1714* (6 vols., Oxford, 1857); Anthony à Wood, *Athenae Oxonienses*, edited by P. Bliss (4 vols., London, 1813–1820); *Correspondence of the Family of Hatton*, edited by E. M. Thompson (2 vols., Camden Soc. 22, 23, London, 1878); Lord Campbell, *Lives of the Chief Justices of England* (3 vols., London, 1849–1857); Edward Foss, *The Judges of England* (9 vols., London, 1848–1864); Sir J. F. Stephen, *History of the Criminal Law of England* (3 vols., London, 1883); Henry B. Irving, *Life of Judge Jeffreys* (London, 1898). (R. J. M.)

SCROLL, a strip or roll of paper, parchment, &c. The word in Mid. Eng. was *scrow*, and came from Fr. *escrou*, modern *écrou*; the French form is preserved in the legal term "escrow" (see DEED); the French diminutive *escrouel* gave the English form "scroll." The Fr. *escrou* is of Teutonic origin and is connected with "shred," "shard" and "sherd"; and meant a "shred" of paper. The term is sometimes given in architecture to the volute of the Ionic capital, to the termination of the hand-rail of a staircase, and also to the wave-like decorations of Roman red glazed pottery, and more particularly in Samian ware.

SCROPE, the name of an old English family of Norman origin. Sir William le Scrope, of Bolton, in Wensleydale, Yorkshire, had two sons, HENRY (d. 1336) and GEOFFREY (d. 1340), both of whom were in succession chief justice of the king's bench and prominent supporters of the court in the reign of Edward II. Henry was father of RICHARD LE SCROPE, 1st Baron Scrope of Bolton (*c.* 1327–1403), chancellor of England, an active adherent of John of Gaunt. Having been knight of the shire for Yorkshire in the parliament of 1364, he was summoned to the upper house as a baron by writ in 1371, when he was made treasurer and keeper of the great seal. In 1378 Lord Scrope became chancellor, in which office he attempted to curb the extravagance of Richard II., an offence for which he was deprived of office in 1382. Scrope engaged in several disputes with regard to his armorial bearings, the most celebrated of which was with Sir Richard Grosvenor as to his right to the shield blazoned "Azure, a bend or," which a court of chivalry decided in his favour after a controversy extending over four years. Both as a soldier and a statesman Lord Scrope was a man of high attainments, his integrity and prudence being conspicuous. His eldest son WILLIAM (*c.* 1350–1399) was created earl of Wiltshire in 1397 by Richard II., of whose evil government he was an active supporter. Wiltshire bought the sovereignty of the Isle of Man from the earl of Salisbury. In 1398 he became treasurer of England. His execution at Bristol was one of the first acts of Henry IV., and the irregular sentence of an improvised court was confirmed by that monarch's first parliament. Wiltshire's father, Lord Scrope, and his other sons were not included in the attainder, but received full pardon from Henry. Scrope, who was the builder of Bolton Castle, his principal residence, died in 1403. He was succeeded in the barony by his second son, Roger, whose descendants held it till 1630. HENRY, 9th Baron Scrope of Bolton (1534–1592), was governor of Carlisle in the time of Elizabeth, and as such took charge of Mary queen of Scots when she crossed the border in 1568; and he took her to Bolton Castle, where she remained till January 1569. He was grandfather of Emmanuel Scrope, 11th baron (1584–1630), who was created earl of Sunderland in 1627; on his death without legitimate issue in 1630 the earldom became extinct, and

the immense estates of the Scropes of Bolton were divided among his illegitimate children, the chief portion passing by marriage to the marquis of Winchester, who was created duke of Bolton in 1689; to the Earl Rivers; and to John Grubham Howe, ancestor of the earls of Howe. The barony of Scrope of Bolton seems then to have become dormant; but the title might, it would appear, be claimed through the female line by the representative of Charles Jones (d. 1840) of Caton, Lancashire. From Stephen, third son of the 1st Baron Scrope of Bolton, were descended the Scropes of Castle Combe, Wiltshire, the last of whom was William Scrope (1772–1852), an artist and author, who was an intimate friend of Sir Walter Scott. His daughter married George Poulett Thompson (1797–1876), an eminent geologist and prolific political writer, who took the name of Scrope, and who after his wife's death sold Castle Combe, of which he wrote a history. Probably from the same branch of the family was descended Adrian Scrope, or Scroope (1601–1660), who was prominent on the parliamentarian side in the Civil War, and one of the signatories of Charles I.'s death warrant.

Sir Geoffrey le Scrope (d. 1340), chief justice of the king's bench as mentioned above, uncle of the first Baron Scrope of Bolton, had a son Henry (1315–1391), who in 1350 was summoned to parliament by writ as Baron Scrope, the designation "of Masham" being added in the time of his grandson to distinguish the title from that held by the elder branch of the family. Henry's fourth son was Richard le Scrope (*c.* 1350–1405), archbishop of York, who took part with the Percies in opposition to Henry IV., and was beheaded for treason in June 1405. Henry le Scrope, 3rd Baron Scrope of Masham (*c.* 1376–1415), was a favourite of Henry V., by whom he was made treasurer in 1410 and employed on diplomatic missions abroad. But in 1415 he was concerned in a conspiracy to dethrone Henry and was executed at Southampton, when his title was forfeited. It was, however, restored to his brother John in 1455; and it fell into abeyance on the death, in 1517, of Geoffrey, 11th Baron Scrope of Masham, without male heirs.

See Sir N. H. Nicolas, *The Scrope and Grosvenor Controversy* (2 vols., London, 1832), containing much detailed information about the various branches of the Scrope family; J. H. Wylie, *History of England under Henry IV.* (4 vols., London, 1884–1898); Edward Foss, *The Judges of England* (9 vols., London, 1848–1864); G. P. Scrope, *History of the Manor and Ancient Barony of Castle Combe, Wilts* (London, 1852); G. E. C., *Complete Peerage*, vol. vii. (London, 1896). (R. J. M.)

SCROPE, GEORGE JULIUS POULETT (1797–1876), English geologist and political economist, was born on the 10th of March 1797, the second son of J. Poulett Thompson of Waverley Abbey, Surrey. He was educated at Harrow, and for a short time at Pembroke College, Oxford, but in 1816 he entered St John's College, Cambridge, graduated B.A. in 1821, and through the influence of E. D. Clarke and Sedgwick became interested in mineralogy and geology. During the winter of 1816–1817 he was at Naples, and was so keenly interested in Vesuvius that he renewed his studies of the volcano in 1818; and in the following year visited Etna and the Lipari Islands. In 1821 he married the daughter and heiress of William Scrope of Castle Combe, Wiltshire, and assumed her name; and he entered parliament in 1833 as M.P. for Stroud, retaining his seat until 1868. Meanwhile he began to study the volcanic regions of Central France in 1821, and visited the Eifel district in 1823. In 1825 he published *Considerations on Volcanos, leading to the establishment of a new theory of the Earth*, and in the following year was elected F.R.S. This earlier work was subsequently amplified and issued under the title of *Volcanos* (1862): an authoritative text-book of which a second edition was published ten years later. In 1827 he issued his classic *Memoir on the Geology of Central France, including the Volcanic formations of Auvergne, the Velay and the Vivarais*, a quarto volume illustrated by maps and plates. The substance of this was reproduced in a revised and somewhat more popular form in *The Geology and extinct Volcanos of Central France* (1858). Scrope was awarded the Wollaston Medal by the Geological Society in 1867. Among his other works was the *History of the Manor and Ancient Barony of Castle Combe* (printed for private circulation, 1852). He died at Fairlawn near Cobham in Surrey on the 19th of January 1876.

Biography (with portrait) in *Geol. Mag.* for May 1870.

SCROPHULARIACEAE, in botany, a natural order of seed-plants belonging to the sympetalous section of Dicotyledons, and a member of the series Tubiflorae. It is a cosmopolitan order containing about 180 genera with about 2000 species; the majority occur in temperate regions, the numbers diminishing rapidly towards the tropics and colder regions. About 30% of the species are annual herbs, such as eyebright (*Euphrasia officinalis*), cow-wheat (*Melampyrum*), and species of *Veronica*;

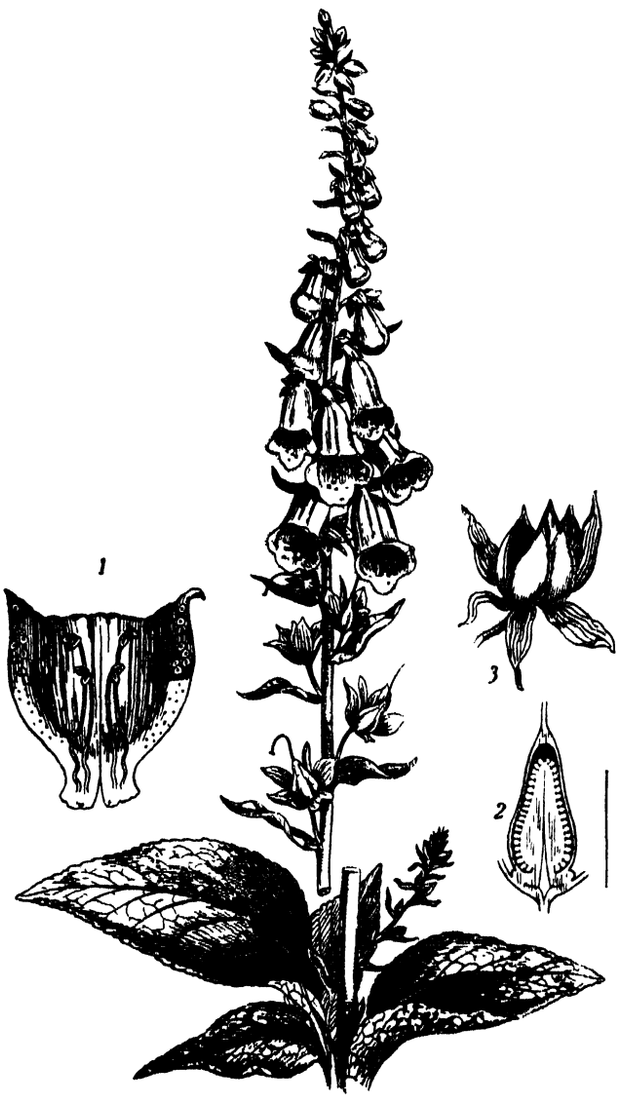


Fig. 1.—Foxglove (*Digitalis purpurea*) ½ nat. size.

1, Corolla cut open showing the four stamens, rather more than ½ nat. size.
2, Unripe fruit cut lengthwise, showing the thick axial placenta bearing numerous small seeds.
3, Ripe capsule split open

more than 60% are biennial or generally perennial herbs and undershrubs, such as species of *Veronica*, mullein (*Verbascum*), foxglove (*Digitalis*; fig. 1), &c., while shrubs and trees are rare; *Paulownia*, a native of the mountains of Japan, a tree with large leaves and handsome panicles of violet flowers, is grown in European gardens.

The stem is sometimes prostrate and creeping, as in ivy-leaved toad-flax (*Linaria Cymbalaria*) and some of the native British Veronicas, but generally erect as in foxglove, figwort, mullein, &c.; a few are climbers as *Rhodochiton* and *Maurandia*. The South African genera *Hyobanche* and *Harveya* are parasites almost devoid of chlorophyll with scale-like leaves; and many genera are semiparasitic, having green leaves, but attaching themselves by root-suckers to roots of grass, &c., from which they derive part of their nourishment; such are *Euphrasia*, *Rhinanthus*, *Pedicularis*, &c. A few

genera are aquatic e g *Ambulia* (old world tropics), and have much divided submerged leaves and entire aerial leaves The leaf arrangement varies the leaves are alternate as in *Verbascum* or the lower leaves are opposite and the upper alternate as in *Antirrhinum* (snapdragon) or all are opposite (*Mimulus*), or whorled (some Veronicas) All varieties of leaf arrangement are found in the one genus Veronica (*q v*) in some New Zealand species of which the leaves are small and appressed to the stem The flowers are solitary in the leaf axils as in *Mimulus* species of *Linaria* &c or form spikes or racemes which are terminal as in foxglove species of Veronica &c or axillary as in *Veronica* (*Chamaedrys* section) Cymose inflorescences also occur, as in *Verbascum*, consisting of dichasia arranged in spikes racemes or panicles The flowers are hermaphrodite hypogynous and zygomorphic in the median plane being often more or less two-lipped and having five sepals joined below and persisting in the fruiting stage five petals uniting to form a corolla of very various shape generally four stamens the fifth (posterior) being suppressed or represented by a rudiment while the anterior pair are longer than the posterior and two generally equal carpels in the median plane forming a two-celled ovary containing numerous anatropous ovules on a thick axile placenta, and bearing a simple or bilobed style (fig 2)

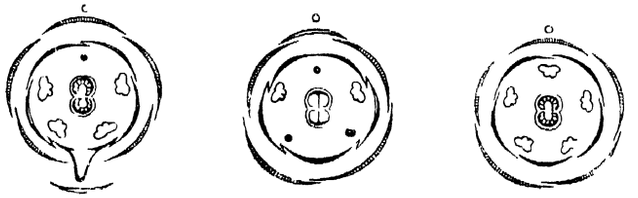


FIG 2a FIG 2b FIG 2c

FIG 2.—Floral Diagrams of Scrophulariaceae *a* Linaria *b* Veronica *c*, Verbascum

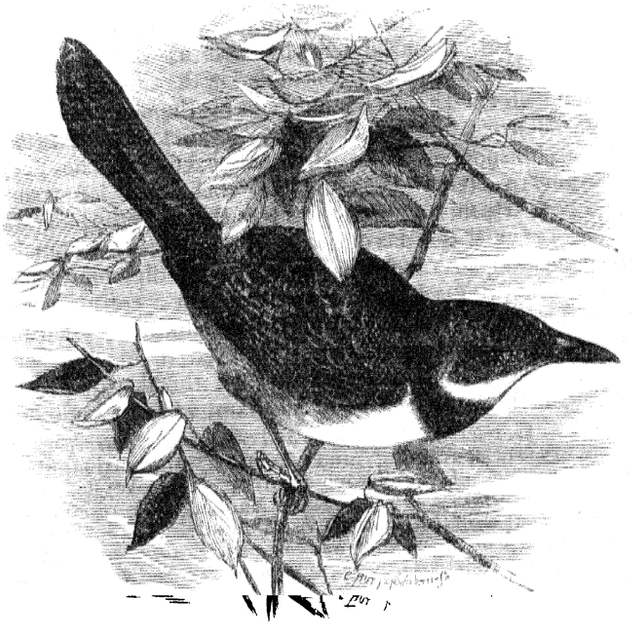
When a terminal flower is present it becomes regular as in toad flax where radial symmetry is produced by development of a spur to each petal—such flowers are termed peloric all the flowers in a spike are sometimes peloric In *Euphrasia* and many species of *Veronica* the posterior sepal is suppressed and in *Calceolaria* the anterior petals are completely united The form of the corolla shows great variety, depending on the length and breadth of the tube—which in *Veronica* is almost obsolete while in foxglove it is large and almost bell-shaped—and the development of the limbs which are spreading in Veronica small and almost erect in figwort or form a pair of closed lips as in *Linaria* and *Antirrhinum* In *Linaria* the anterior petal is spurred in *Calceolaria* a very short tube is succeeded by a two lipped limb a smaller upper lip representing the two posterior petals and a larger, often very large lower lip representing the three anterior petals In *Verbascum* the five segments are almost equal forming a nearly regular corolla in Veronica the two posterior petals have united and the corolla is four lobed The approach to regularity in the corolla in *Verbascum* is associated with the presence of five fertile stamens but the three posterior are generally larger than the two anterior In *Veronica* *Calceolaria* and other genera only two stamens are present The anthers generally open introrsely by a longitudinal slit their form shows great variety These differences in the form of the corolla, the position and length of the stamens and the form of the anthers, are associated with their pollination by insects which probe the flower for honey which is secreted by a disk surrounding the base of the ovary or by special nectaries below it *Verbascum* and *Veronica* with a short tubed corolla represent an open type of flower with more exposed nectar in foxglove the honey is at the base of the long tube and a bee crawling to reach it will rub with its back the anthers or stigmas which are placed on the upper side of the bell The closed flowers of *Linaria* and *Antirrhinum* can be visited only by insects which are strong enough to separate the lips In *Euphrasia* and others the pollen is loose and powdery and the anthers have appendages which when touched by the head of the insect-visitor cause the pollen to be scattered

The fruit is generally a capsule surrounded at the base or sometimes as in yellow-rattle (*Rhinanthus*) enveloped in the persistent calyx it opens by two or four valves or as in *Antirrhinum* by pores Occasionally it is a berry The seeds are generally small and numerous rarely few and large as in *Veronica* In *Linaria Cymbalaria* the fruit becomes buried by the stalks bending downwards when ripe

The order is divided into tribes by characters derived from the number of fertile stamens present and the form of the corolla It is well represented in Britain by 13 genera viz Verbascum (mullein) *Linaria* (toad flax) *Antirrhinum* (snapdragon) *Scrophularia* (figwort) *Limosella*—a small creeping annual found on edges of ponds *Sibthorpia* a small herb with creeping thread like stems *Digitalis* (foxglove) Veronica (speedwell) *Bartsia* *Euphrasia* (eyebright) *Rhinanthus* (yellow rattle) *Pedicularis* (louse-wort) and *Melampyrum* (cow-wheat) An American species of *Mimulus* (*M Langsdorfii*) has become naturalized by river-sides in many places Several genera are well known in gardens such are *Calceolaria*, an important genus in temperate South America *Collinsia* *Pentstemon* and *Mimulus* (musk), also American genera

Scrophulariaceae are closely allied to Solanaceae (*q v*), from which they are distinguished by the median position of the carpels and generally by the zygomorphic flower *Verbascum* and its allies in which the flower approaches regularity form a connecting link An anatomical distinction is found in the arrangement of the wood and bast in the stem which is collateral not bicollateral as in Solanaceae

SCRUB-BIRD, the name of an Australian genus, one of the most curious ornithological types of the many furnished by that country The first examples were procured between Perth and Augusta in West Australia, and were described by J Gould in the Zoological Society's *Proceedings* for 1844 (pp 1, 2) as forming a new genus and species under the name of *Atrichia clamosa* the great peculiarity observed by that naturalist being the absence of any bristles around the gape in which respect alone it seemed to differ from the already known genus *Sphenura* Later, however it was given its modern name *Atrichornis clamosa*, and on account of the discovery of its peculiar sternum (made by A Newton) it was removed from Oscine division of the Passeres, and the family *Atrichornithidae* in the suboscine division of Passeres was made for the genus, the nearest ally



West-Australian Scrub-bird (*Atrichornis clamosa*)

being the lyre-bird (*q v*), now placed in the family Menuridae Both the known species of scrub-bird are about the size of a small thrush—*A clamosa* being the larger of the two This species is brown above each feather barred with a darker shade the throat and belly are reddish white, and there is a large black patch on the breast while the flanks are brown and the lower tail-coverts rufous *A rufescens* of New South Wales has the white and black of the fore parts replaced by brown, barred much as is the upper plumage Both species inhabit the thickest 'scrub' or brushwood forest but little has been ascertained as to their mode of life except that the males are noisy imitative of the notes of other birds and given to violent gesticulations The nest and eggs seem never to have been found, and indeed no example of the female of either species is known to have been procured, whence that sex may be inferred to escape observation by its inconspicuous appearance and retiring habits (A N)

SCRUPLE, a term used in the two senses of (1) perplexity, doubt, reluctance or hesitation especially the moral doubt arising from the difficulties of conscience (2) a unit of weight, $\frac{1}{24}$ part of the ounce in apothecaries weight, $=\frac{1}{3}$ of a dram 20 grains (1296 grammes) The word is an adaptation of Fr *scrupule*, Lat *scrupulus*, *scrupulum*, primarily a small sharp stone, also used in both the English meanings, dim of *scrupus*, a rough stone, figuratively uneasiness of mind, probably to be connected with the root *skar*, to cut, cf Gr σκῶρον, stone-chippings, ξυρόν, a razor

SCRUTIN DE LISTE (Fr. *scrutin*, voting by ballot, and *liste*, a list), a system of election of national representatives by which the electors of a department vote for all the deputies to be elected in that department (compare the "general ticket" in the United States). It is distinguished from the *scrutin d'arrondissement*, under which the electors in each arrondissement vote only for the deputy to be elected in it. See REPRESENTATION.

SCRUTINY (Fr. *scrutin*, Late Lat. *scrutinium*, from *scrutari*, to search or examine thoroughly), careful examination or inquiry. The word is specifically applied in the early church to the examination of the catechumens or those under instruction in the faith. They were taught the creed and the Lord's Prayer, examined therein, and exorcized prior to baptism. The days of scrutiny varied at different periods from three to seven. From about the beginning of the 12th century, when it became usual to baptize infants soon after their birth instead of at stated times (Easter and Pentecost), the ceremony of scrutiny was incorporated with that of the actual baptism. Scrutiny is also a term applied to a method of electing a pope in the Roman Catholic church, in contradistinction to two other methods, acclamation and accession. (See CONCLAVE.) In the law of elections, scrutiny is the careful examination of votes cast after the unsuccessful candidate has lodged a petition claiming the seat, and alleging that he has the majority of legal votes. Each vote is dealt with separately, notice being given beforehand by one party to the other of the votes objected to and the grounds of objection.

SCUDÉRY, the name of a family said to have been of noble Italian origin and to have transferred itself to Provence, but only known by the singular brother and sister who represented it during the 17th century.

GEORGES DE SCUDÉRY (1601–1667), the elder of the pair, was born at Havre, whither his father had moved from Provence, on the 22nd of August 1601. He served in the army for some time, and, though in the vein of gasconading which was almost peculiar to him he no doubt exaggerated his services, there seems little doubt that he was a stout soldier. But he conceived a fancy for literature before he was thirty, and during the whole of the middle of the century he was one of the most characteristic figures of Paris. He gained the favour of Richelieu by his opposition to Corneille. He wrote a letter to the Academy criticizing the *Cid*, and his play, *L'Amour tyrannique* (1640), was patronized by the cardinal in opposition to Corneille. Possibly these circumstances had something to do with his appointment as governor of the fortress of Notre-Dame de la Garde, near Marseilles in 1643, and in 1650 he was elected to the Academy. During the troubles of the Fronde he was exiled to Normandy, where he made his fortune by a rich marriage. He was an industrious dramatist, but *L'Amour tyrannique* is practically the only piece among his numerous tragi-comedies and pastorals that has escaped oblivion. His other most famous work was the epic of *Alaric* (1655). He lent his name to his sister's first romances, but did little beyond correcting the proofs. He died at Paris on the 14th of May 1667. Scudéry's swash-buckler affectations have been rather exaggerated by literary gossip and tradition. Although possibly not quite sane, he had some poetical power, a fervent love of literature, a high sense of honour and of friendship.

His sister MADELEINE (1607–1701), born also at Havre on the 15th of November 1607, was a writer of much more ability and of a much better regulated character. She was very plain and had no fortune, but her abilities were great and she was very well educated. Establishing herself at Paris with her brother, she was at once admitted to the Rambouillet coterie, afterwards established a *salon* of her own under the title of the *Société du samedi*, and for the last half of the 17th century, under the pseudonym of "Sapho" or her own name, was acknowledged as the first blue-stocking of France and of the world. She formed with Pellisson a close friendship only terminated by his death in 1693. Her lengthy novels, such as *Artamène, ou le grand Cyrus* (10 vols. 1648–1653), *Clélie* (10 vols. 1654–1661), *Ibrahim, ou l'illustre Bassa* (4 vols. 1641), *Almahide, ou l'esclave reine* (8 vols. 1661–1663) were the delight of all Europe, including persons of the wit and sense of Madame de Sévigné. But neither in conception nor in execution will they bear criticism as wholes. With classical or Oriental personages for nominal heroes and heroines, the whole language and action are taken from the fashionable ideas of the time, and the personages can be identified either really or colourably with Mademoiselle de Scudéry's contemporaries. In *Clélie*, Herminius represents Paul Pellisson; Scaurus and Lyriane were Paul Scarron and his wife (afterwards Mme de Maintenon); and in the description of Sapho in vol. x. of *Le Grand Cyrus* the author paints herself. It is in *Clélie* that the famous Carte de Tendre appeared, a description of an Arcadia, where the river of Inclination waters the villages of Billet Doux, Petits Soins and so forth. The interminable length of the stories is made out by endless conversations and, as far as incidents go, chiefly by successive abductions of the heroines, conceived and related in the most decorous spirit, for Mademoiselle de Scudéry is nothing if not decorous. Nevertheless, although the books can hardly now be read through, it is still possible to perceive their attraction for a period which certainly did not lack wit. In that early day of the novel prolixity did not repel. "Sapho" had really studied mankind in her contemporaries and knew how to analyse and describe their characters with fidelity and point. Moreover her novels had the interest always attaching to the *roman à clef*. She was a real mistress of conversation, a thing quite new to the age as far as literature was concerned, and proportionately welcome. She had a distinct vocation as a pedagogue, and is compared by Sainte-Beuve to Mme de Genlis. She could moralize—a favourite employment of the time—with sense and propriety. Though she was incapable of the exquisite prose of Mme de Sévigné and some other of her contemporaries, her purely literary merits were considerable. Madeleine survived her brother more than thirty years, and in her later days published numerous volumes of conversations, to a great extent extracted from her novels, thus forming a kind of anthology of her work. She outlived her vogue to some extent, but retained a circle of friends to whom she was always the "incomparable Sapho." She died in Paris on the 2nd of June 1701.

Her *Life and Correspondence* were published at Paris by MM. Rathery and Boutron in 1873. An amusing sketch of her is to be found in vol. iv. of Sainte-Beuve's *Causeries du lundi*. Georges de Scudéry is sketched by Théophile Gautier in his *Grotesques*. See also V. Cousin, *La Société française au XVIIe siècle*, vol. ii.

SCULL (the same word as "skull," cf. Swed. *skål*, basin, *hufvud-skål*, skull of the head), a light oar with blade more concave than the ordinary racing oar and with shorter helm, thus allowing the user to hold one in each hand. "Sculling" is therefore the propulsion of a boat by one person with a pair of sculls. The word is also applied to the propulsion of a boat by one scull worked over the stern, the blade being swept through the water from side to side, turning diagonally at each stroke; the sculler usually stands. The principles of sculling with a pair of sculls are the same as those of rowing (*q.v.*). For the type of boat used in racing see BOAT. The Wingfield Sculls, a race which forms the English Amateur championship, was instituted in 1830. It is rowed from Putney to Mortlake. The Diamond Challenge Sculls, instituted 1844, are rowed for at Henley Regatta. The earliest professional championship sculling race was rowed on the Thames in 1831. Since 1876, when an Australian (E. Trickett, of Sydney) beat J. H. Sadler, the professional championship of the world has been held by Australians or Canadians; the principal champions have been E. Hanlan (Toronto), 1880–1884, W. Beach (New South Wales), 1884–1887; other names are H. E. Searle, J. Stanbury, G. Towns and R. Arnst (New Zealand). Most of the races have been rowed on the Paramatta river. In August 1910 the race was rowed on the Zambezi between E. Barry of England and Arnst, the latter winning.

SCULLERY, a back-kitchen, the place where dishes, plates, kettles, &c., are washed and cleaned, and the rough work connected with the domestic service of a house is performed. The Med.

Lat. *scutellarius*, keeper of dishes and plates (*scutella*), became in O. Fr. *escueillier* or *sculier*, whence in English *sculler*, *squiler*, &c. A "sergeaunt-squylloure" is found amongst the officials of the royal household; and the *Promptorium parvulorum*, dating about 1400, glosses *lixa*, a sutler or camp-cook, by "squyllare, dysche-wescheare." "Scullion," a kitchen-wench, has been naturally connected with scullery, but is derived from O. Fr. *escouillon*, dish-cloth, cf. Span. *escobillon*, spring for a gun, ultimately from Lat. *scopa*, birch tree, *scopae*, broom of birch twigs.

SCULPTURE (Lat. *sculptura*, from *sculpere*, to carve, cognate with Gr. γλύφειν), a general term for the plastic art of carving, especially in stone and marble, but also in such materials as wood (see WOOD-CARVING), ivory (see IVORY), metal (see METAL-WORK) and gems (see GEM).

The production of bronze statues by the *cire perdue* (*anglice*, "lost wax") process is described in the article METAL-WORK; until (since its revival) recent times but little practised in Europe outside of Paris, it has now invaded most countries where fine casting is appreciated, and where naturalistic rendering is desired. There are signs, however, of its being ousted for a certain class of handling by the "galvanoplastic" method—a system of copper deposit by an electrical process—whereby "going over" the work after it has been reproduced in metal is avoided.

Technical methods of the sculptor.

For the execution of a marble statue the sculptor first models a finished preliminary sketch on a small scale in clay or wax. He then, in the case of a life-size or colossal statue, has a sort of iron skeleton set up, with stout bars for the arms and legs, fixed in the pose of the future figure. This is called the "armature." It is placed on a stand, called a *chassis*, with a revolving top, so that the sculptor can easily turn the whole model round and thus work with the light on any side of it. Over this iron skeleton well-tempered modelling-clay is laid and is modelled into shape by the help of wood and bone tools; without the sustaining assistance of the ironwork a soft clay figure, if more than a few inches high, would collapse with its own weight and squeeze the lower part out of shape. While the modelling is in progress it is necessary to keep the clay moist and plastic by squirting water on to it with a sort of garden syringe capped with a finely perforated rose. When the sculptor is not at work the whole figure is kept wrapped up in damp cloths. A modern improvement is to mix the modelling-clay, not with water, but with stearin and glycerin; this, while keeping the clay soft and plastic, has the great advantage of not being wet, and so the sculptor avoids the chill and consequent risk of rheumatism which follow from a constant manipulation of wet clay. This method, however, has not been very extensively adopted. When the clay model is finished it is cast in plaster. A "piece-mould"[1] is formed by applying patches of wet plaster of Paris all over the clay statue in such a way that they can be removed piecemeal from the model, and then be fitted together again, forming a complete hollow mould. The inside is then rinsed out with plaster and water mixed to the consistency of cream till a skin of plaster is formed all over the inner surface of the mould, and thus a hollow cast is made of the whole figure. The "piece-mould" is then taken to pieces and the casting set free. If skilfully done by a good *formatore* or moulder the plaster cast is a perfect facsimile of the original clay, very slightly disfigured by a series of lines showing the joints in the piece-mould, the sections of which cannot be made to fit together with absolute precision. Many sculptors have their clay model cast in plaster before the modelling is quite finished, as they prefer to put the finishing touches on the plaster cast—good plaster being a very easy and pleasant substance to work on.

Clay model.

The next stage is to copy the plaster model in marble. The model is set on a large block called a "scale stone," while the marble for the future statue is set upon another similar block. The plaster model is then covered with a series of marks, placed on all the most salient parts of the body, and the front of each "scale stone" is covered with another series of points, exactly the same on both stones. An ingenious instrument called a pointing machine, which has arms ending in metal points or "needles" that move in ball-socket joints, is placed between the model and the marble block. Two of its arms are then applied to the model, one touching a point on the scale stone while the other touches a mark on the figure. The arms are fixed by screws in this position, and the machine is then revolved to the marble block, and set with its lower needle touching the corresponding point on the scale stone. The upper needle, which is arranged to slide back on its own axis, cannot reach the corresponding point on the statue because the marble block is in the way; a hole is then drilled into the block at the place and in the direction indicated by the needle, till the latter can slide forward so as to reach a point sunk in the marble block exactly corresponding to the point it touched on the plaster mould. This process is repeated both on the model and on the marble block till the latter is drilled with a number of holes, the bottoms of which correspond in position to the number of marks made on the surface of the model. A comparatively unskilled *scarpellino* or "chisel-man" then sets to work and cuts away the marble till he has reached the bottoms of all the holes, beyond which he must not cut. The statue is thus roughly blocked out, and a more skilled *scarpellino* begins to work. Partly by eye and partly with the constant help of the pointing machine, which is used to give any required measurements, the workman almost completes the marble statue, leaving only the finishing touches to be done by the sculptor. In the opinion of many artists the use of the mechanical pointing-machine is responsible in a great measure for the loss of life and fire in much of modern sculpture.

Pointing the marble.

The scarpellino.

Among the ancient Greeks and Romans and in the medieval period it was the custom to give the nude parts of a marble statue a considerable degree of polish, which really suggests the somewhat glossy surface of the human skin very much better than the dull loaf-sugar-like surface which is left on the marble by most modern sculptors. This high polish still remains in parts of the pedimental figures from the Parthenon, where, at the back, they have been specially protected from the weather. The Hermes of the Vatican Belvidere is a remarkable instance of the preservation of this polish. Michelangelo carried the practice further still, and gave certain parts of some of his statues, such as the Moses, the highest possible polish in order to produce high lights just where he wanted them; the artistic legitimacy of this may perhaps be doubted, and in weak hands it might degenerate into mere trickery. It is, however, much to be desired that modern sculptors should to some extent at least adopt the classical practice, and by a slight but uniform polish remove the disagreeable crystalline grain from all the nude parts of the marble.

Polish on marble.

A rougher method of obtaining fixed points to measure from was occasionally employed by Michelangelo and earlier sculptors. They immersed the model in a tank of water, the water being gradually allowed to run out, and thus by its sinking level it gave a series of contour lines on any required number of planes. In some cases Michelangelo appears to have cut his statue out of the marble without previously making a model—a marvellous feat of skill.

In modelling bas-reliefs the modern sculptor usually applies the clay to a slab of slate on which the design is sketched; the slate forms the background of the figures, and thus keeps the relief absolutely true to one plane. This method is one of the causes of the dulness and want of spirit so conspicuous in most modern sculptured reliefs. In the best Greek examples there is no absolutely fixed plane surface for the backgrounds. In one place, to gain an effective shadow, the Greek sculptor would cut below the average surface; in another he would leave the ground at a higher plane,

Relief sculpture.

[1] Moulds made in one or few pieces, from which the cast can only be extracted by destroying the mould, are called "spoil-moulds." A large number of casts can be made from a "piece-mould," but only one from a "spoil-mould."

exactly as happened to suit each portion of his design. Other differences from the modern mechanical rules can easily be seen by a careful examination of the Parthenon frieze and other Greek reliefs. Though the word "bas-relief" is now often applied to reliefs of all degrees of projection from the ground, it should, of course, only be used for those in which the projection is slight; "basso," "mezzo" and "alto rilievo" express three different degrees of salience. Very low relief is but little used by modern sculptors, mainly because it is much easier to obtain striking effects with the help of more projection. Donatello and other 15th-century Italian artists showed the most wonderful skill in their treatment of very low relief. One not altogether legitimate method of gaining effect was practised by some medieval sculptors: the relief itself was kept very low, but was "stilted" or projected from the ground, and then undercut all round the outline. A 15th-century tabernacle for the host in the Brera at Milan is a very beautiful example of this method, which as a rule is not pleasing in effect, since it looks rather as if the figures were cut out in cardboard and then stuck on (see RELIEF).

Sculptor's assistants.

The practice of most modern sculptors is to do very little to the marble with their own hands; some, in fact, have never really learnt how to carve, and thus the finished statue is often very dull and lifeless in comparison with the clay model. Most of the great sculptors of the middle ages left little or nothing to be done by an assistant; Michelangelo especially did the whole of the carving with his own hands, and when beginning on a block of marble attacked it with such vigorous strokes of the hammer that large pieces of marble flew about in every direction. But skill as a carver, though very desirable, is not absolutely necessary for a sculptor. If he casts in bronze by the *cire perdue* process he may produce the most perfect plastic works without touching anything harder than the modelling-wax. The sculptor in marble, however, must be able to carve a hard substance if he is to be master of his art. Unhappily some modern sculptors not only leave all manipulation of the marble to their workmen, but they also employ men to do their modelling, colloquially termed "ghosts," the supposed sculptor supplying little or nothing but his sketch and his name to the work. The practice, however, is less common nowadays than formerly, owing mainly to one or two exposures which brought the matter sharply before the public. In some cases sculptors of ability who suffer under an excess of popularity are induced to employ aid of this kind on account of their undertaking more work than any one man could possibly accomplish—a state of things which is necessarily very hostile to the interests of true art. As a rule, however, the sculptor's *scarpellino*, though he may and often does attain the highest skill as a carver and can copy almost anything with wonderful fidelity, seldom develops into an original artist. The popular admiration for pieces of clever trickery in sculpture, such as the carving of the open meshes of a fisherman's net, or a chain with each link free and movable, or a veil over and half revealing the features of the face, would perhaps be diminished if it were known that such work as this is invariably done, not by the sculptor, but by the *scarpellino*. Unhappily at the present day there is, especially in England, little appreciation of what is valuable in plastic art; there is probably no other civilized country where the State does so little to give practical support to the advancement of monumental and decorative sculpture on a large scale—the most important branch of the art—which it is hardly in the power of private persons to further.

Medieval methods and materials.

It may here be well to say a few words on the technical methods employed in the execution of medieval sculpture, which in the main were very similar in England, France and Germany. When bronze was used—in England as a rule only for the effigies of royal persons or the richer nobles—the metal was cast by the delicate *cire perdue* process, and the whole surface of the figure was then thickly gilded. At Limoges in France a large number of sepulchral effigies were produced, especially between 1300 and 1400, and exported to distant places. These were not cast, but were made of hammered (*repoussé*—*q.v.*) plates of copper, nailed on a wooden core and richly decorated with champlevé enamels in various bright colours. Westminster Abbey possesses a fine example, executed about 1300, in the effigy of William of Valence (d. 1296).[1] The ground on which the figure lies, the shield, the border of the tunic, the pillow, and other parts are decorated with these enamels very minutely treated. The rest of the copper was gilt, and the helmet was surrounded with a coronet set with jewels, which are now missing. One royal effigy of later date at Westminster, that of Henry V. (d. 1422), was formed of beaten silver fixed to an oak core, with the exception of the head, which appears to have been cast. The whole of the silver disappeared in the time of Henry VIII., and nothing now remains but the rough wooden core; hence it is doubtful whether the silver was decorated with enamel or not; it was probably of English workmanship.

In most cases stone was used for all sorts of sculpture, being decorated in a very minute and elaborate way with gold, silver and colours applied over the whole surface. In order to give additional richness to this colouring the surface of the stone, often even in the case of external sculpture, was covered with a thin skin of *gesso* or fine plaster mixed with size; on this, while still soft, and over the drapery and other accessories, very delicate and minute patterns were stamped with wooden dies, and upon this the gold and colours were applied; thus the gaudiness and monotony of flat smooth surfaces covered with gilding or bright colours were avoided.[2] In addition to this the borders of drapery and other parts of stone statues were frequently ornamented with crystals and false jewels, or, in a more laborious way, with holes and sinkings filled with polished metallic foil, on which very minute patterns were painted in transparent varnish colours; the whole was then protected from the air by small pieces of transparent glass, carefully shaped to the right size and fixed over the foil in the cavity cut in the stone. It is difficult now to realize the extreme splendour of this gilt, painted and jewelled sculpture, as no perfect example exists, though in many cases traces remain of all these processes, and show that they were once very widely applied.[3] The architectural surroundings of the figures were treated in the same elaborate way. In the 14th century in England alabaster came into frequent use for monumental sculpture; it too was decorated with gold and colour, though in some cases the whole surface does not appear to have been so treated. In his wide use of coloured decoration, as in other respects, the medieval sculptor came far nearer to the ancient Greek than do any modern artists. Even the use of inlay of coloured glass was common at Athens during the 5th century B.C. as, for example, in the plait-band of some of the marble bases of the Erechtheum—and five or six centuries earlier at Tiryns and Mycenae.

Another material much used by medieval sculptors was wood, though, from its perishable nature, comparatively few early examples survive;[4] the best specimen is the figure of George de Cantelupe (d. 1273) in Abergavenny church. This was decorated with *gesso* reliefs, gilt and coloured in the same way as the stone. The tomb of Prince John of Eltham (d. 1334) at Westminster is a very fine example of the early use of alabaster, both for the recumbent effigy and also for a number of small figures of mourners all round the arcading of the tomb. These little figures, well preserved on the side which is protected by the screen, are of very great beauty and are executed with the most delicate minuteness; some of the heads are equal to the best contemporary work of the son and pupils of Niccola Pisano. The tomb once had a high stone canopy of open work—arches, canopies and pinnacles—a class of architectural sculpture of which many extremely rich examples exist, as, for instance, the tomb of Edward II. at Gloucester, the de Spencer tomb at Tewkesbury, and, of rather later style, the tomb of Lady Eleanor Fitzalan de Percy at Beverley. This last is remarkable for the great richness and beauty of its sculptured foliage, which is of the finest Decorated period and stands unrivalled by any Continental example. The condition of this shrine (erected about 1335 to 1340) is almost perfect.

On technical methods, see (specially for the explanation of modelling, &c.) Edward Lanteri, *Modelling* (London, vol. 1, 1903, vol. 2. 1904, vol. 3, 1910), and Albert Toft, *Modelling and Sculpture* (London, 1910). These volumes give in detail every process and method of the sculptor's craft with a fulness to be found in no other works of their class in the English language.

[1] Other effigies from Limoges were imported into England, but no other example now exists in the country.

[2] In the modern attempts to reproduce the medieval polychromy these delicate surface reliefs have been omitted; hence the painful results of such colouring as that in Notre-Dame and the Sainte Chapelle in Paris and many other "restored" churches, especially in France and Germany.

[3] On the tomb of Aymer de Valence (d. 1326) at Westminster a good deal of the stamped *gesso* and coloured decoration is visible on close inspection. One of the cavities of the base retains a fragment of glass covering the painted foil, still brilliant and jewel-like in effect.

[4] The Victoria and Albert Museum possesses a magnificent colossal wood figure of an angel, not English, but Italian work of the 14th century. A large stone statue of about the same date, of French workmanship, in the same museum is a most valuable example of the use of stamped *gesso* and inlay of painted and glazed foil.

History

The following general sketch of the history of sculpture is confined mainly to that of the middle ages and modern times. The philosophy and aesthetics of the subject—the relation of sculpture to the other arts and the nature of its appeal to the emotions—are treated in the article Fine Arts. What is known as "classical" sculpture is dealt with under Greek Art and Roman Art; see also, for other allied aspects, China, *Art*; Japan, *Art*; Egypt, *Art*; Byzantine Art; and articles on Metal-work, Ivory, Wood-carving, &c.; the article Architecture and allied articles (*e.g.* Capital); and the articles on the several individual artists.

Early Christian.

In the 4th century A.D., under the rule of Constantine's successors, the plastic arts in the Roman world reached the lowest point of degradation to which they ever fell. Coarse in workmanship, intensely feeble in design, and utterly without expression or life, the pagan sculpture of that time is merely a dull and ignorant imitation of the work of previous centuries. The old faith was dead, and the art which had sprung from it died with it. In the same century a large amount of sculpture was produced by Christian workmen, which, though it reached no very high standard of merit, was at least far superior to the pagan work. Although it shows no increase of technical skill or knowledge of the human form, yet the mere fact that it was inspired and its subjects supplied by a real living faith was quite sufficient to give it a vigour and a dramatic force which raise it aesthetically far above the expiring efforts of paganism. Apart from ivories (see Ivory), a number of large marble sarcophagi are the chief existing specimens of this early Christian sculpture. In general design they are close copies of pagan tombs, and are richly decorated outside with reliefs. The subjects of these are usually scenes from the Old and New Testaments. From the former those subjects were selected which were supposed to have some typical reference to the life of Christ: the Meeting of Abraham and Melchisedec, the Sacrifice of Isaac, Daniel among the Lions, Jonah and the Whale, are those which most frequently occur. Among the New Testament scenes no representations occur of Christ's sufferings;[1] the subjects chosen illustrate his power and beneficence: the Sermon on the Mount, the Triumphal Entry into Jerusalem, and many of his miracles are frequently repeated. The Vatican and Lateran museums are rich in examples of this sort. One of the finest in the former collection was taken from the crypt of the old basilica of St Peter; it contained the body of a certain Junius Bassus, and dates from the year 359.[2] Many other similar sarcophagi were made in the provinces of Rome, especially Gaul; and fine specimens exist in the museums of Arles, Marseilles and Aix; those found in Britain are of very inferior workmanship.

Sculpture in the round, with its suggestion of idol worship which was offensive to the Christian spirit, was practically non-existent during this and the succeeding centuries, although there are a few notable exceptions, like the large bronze statue of St Peter[3] in the nave of St Peter's in Rome, which is probably of 5th-century workmanship and has much of the repose, dignity and force of antique sculpture.

Italian plastic art in the 5th century continued to create in the spirit of the 4th century, especially reliefs in ivory (to a certain extent imitations of the later consular diptychs), which were used to decorate episcopal thrones or the bindings of MSS. of the Gospels. The so-called chair of St Peter, still preserved (though hidden from sight) in his great basilica, is the finest example of the former class; of less purely classical style, dating from about 550, is the ivory throne of Bishop Maximianus in Ravenna cathedral. Another very remarkable work of the 5th century is the series of small panel reliefs on the doors of S. Sabina on the Aventine Hill at Rome. They are scenes from Bible history carved in wood, and in them much of the old classic style survives.[4]

In the 6th century, under the Byzantine influence of Justinian, a new class of decorative sculpture was produced, especially at Ravenna. Subject reliefs do not often occur, but large slabs of marble, forming screens, altars, pulpits and the like, were ornamented in a very skilful and original way with low reliefs of graceful vine-plants, with peacocks and other birds drinking out of chalices, all treated in a very able and highly decorative manner. Byzantium, however, in the main, became the birthplace and seat of all the medieval arts soon after the transference thither of the headquarters of the empire (see Byzantine Art). It was natural that love of splendour and sumptuousness in the Eastern capital found expression in colour and richness of material rather than in monumental impressiveness. The school of sculpture which arose at Byzantium in the 5th or 6th century was therefore essentially decorative, and not monumental; and the skill of the sculptors was most successfully applied to work in metals and ivory, and the carving of foliage on capitals and bands of ornament, possessed of the very highest decorative power and executed with unrivalled spirit and vigour. The early Byzantine treatment of the acanthus or thistle, as seen in the capitals of S. Sophia at Constantinople, the Golden Gate at Jerusalem, and many other buildings in the East, has never since been surpassed in any purely decorative sculpture; and it is interesting to note how it grew out of the dull and lifeless ornamentation which covers the degraded Corinthian capital used so largely in Roman buildings of the time of Constantine and his sons.

Influence of Byzantine art.

Till about the 12th century, and in some places much later, the art of Byzantium dominated that of the whole Christian world in a very remarkable way. The spread of this art was to a great extent due to the iconoclast riots which not only led to the destruction of images and works of art, but threatened the very life of the artists and craftsmen, who thereupon sought refuge in foreign countries, especially at the court of Charlemagne, and for several centuries determined the course of European art. From Russia to Ireland and from Norway to Spain any given work of art in one of the countries of Europe might almost equally well have been designed in any other. Few or no local characteristics or peculiarities can be detected, except of course in the methods of execution, and even these were wonderfully similar everywhere. The dogmatic unity of the Catholic Church and its great monastic system, with constant interchange of monkish craftsmen between one country and another, were the chief causes of this widespread monotony of style. An additional reason was the unrivalled technical skill of the early Byzantines, which made their city widely resorted to by the artist-craftsmen of all Europe—the great school for learning any branch of the arts.

The extensive use of the precious metals for the chief works of plastic art in this early period is one of the reasons why so few examples still remain—their great intrinsic value naturally causing their destruction. One of the most important existing examples, dating from the 8th century, is a series of colossal wall reliefs executed in hard stucco in the church of Cividale (Friuli) not far from Trieste. These represent rows of female saints bearing jewelled crosses, crowns and wreaths, and closely resembling in costume, attitude and arrangement the gift-bearing mosaic figures of Theodora and her ladies in S. Vitale at Ravenna. It is a striking instance of the almost petrified state of Byzantine art that so close a similarity should be possible between works executed at an interval of fully two hundred years. Some very interesting small plaques of ivory in the library of St Gall show a still later survival of early forms. The central relief is a figure of Christ in Majesty, closely resembling those in the colossal apse mosaic of S. Apollinare in Classe and other churches

[1] A partial exception to this rule is the scene of Christ before Pilate, which sometimes occurs.

[2] See Dionysius, *Sac. Vat. Bas. Cryp.*, and Bunsen, *Besch. d. Stadt Rom* (1840).

[3] There is no ground for the popular impression that this is an antique statue of Jupiter transformed into that of St Peter by the addition of the keys.

[4] Various dates have been assigned to these interesting reliefs by different archaeologists, but the costumes of the figures are strong evidence that they are not later than the 5th century.

of Ravenna; while the figures below the Christ are survivals of a still older time, dating back from the best eras of classic art. A river-god is represented as an old man holding an urn, from which a stream issues, and a reclining female figure with an infant and a cornucopia is the old Roman Tellus or Earth-goddess with her ancient attributes.[1]

Norse and Celtic influences in England.

While the countries of the north could not altogether resist the rising tide of Byzantinism, in Scandinavia, and to a great extent in England, the autochthonous art was not altogether obliterated during the early middle ages. In England, during the Saxon period, when stone buildings were rare and even large cathedrals were built of wood, the plastic arts were mostly confined to the use of gold, silver, and gilt copper. The earliest existing specimens of sculpture in stone are a number of tall churchyard crosses, mostly in the northern provinces and apparently the work of Scandinavian sculptors. One very remarkable example is a tall monolithic cross, cut in sandstone, in the churchyard of Gosforth in Cumberland. It is covered with rudely carved reliefs, small in scale, which are of special interest as showing a transitional state from the worship of Odin to that of Christ. Some of the old Norse symbols and myths sculptured on it occur modified and altered into a semi-Christian form. Though rich in decorative effect and with a graceful outline, this sculptured cross shows a very primitive state of artistic development, as do the other crosses of this class in Cornwall, Ireland and Scotland, which are mainly ornamented with those ingeniously intricate patterns of interlacing knotwork designed so skilfully by both the early Norse and the Celtic races.[2] They belong to a class of art which is not Christian in its origin, though it was afterwards largely used for Christian purposes, and so is thoroughly national in style, quite free from the usual widespread Byzantine influence. Of special interest from their early date—probably the 11th century—are two large stone reliefs now in Chichester cathedral, which are traditionally said to have come from the pre-Norman church at Selsey. They are thoroughly Byzantine in style, but evidently the work of some very ignorant sculptor; they represent two scenes in the Raising of Lazarus; the figures are stiff, attenuated and ugly, the pose very awkward, and the drapery of exaggerated Byzantine character, with long thin folds. To represent the eyes pieces of glass or coloured enamel were inserted; the treatment of the hair in long ropelike twists suggests a metal rather than a stone design.

Romanesque sculpture.

The Romanesque period in art was essentially one of architectural activity. The spirit of the time did not encourage that individual thought which alone can produce a great development of sculpture and painting. Thus the plastic art of the 11th and 12th centuries, which was still entirely at the service and under the rule of the Church, was strictly confined to conventional symbols, ideas and forms. It is based, not on the study of nature, but on the late Roman reliefs. The treatment of the figures, though often rude and clumsy, and sometimes influenced by Byzantine stiffness, is on the whole dignified, solemn and serious, and bent upon the expression of the typical, and not of the individual. The tympana of the porches, the capitals of columns and the pulpits and choir-screens of the Romanesque churches, and, on a smaller scale, the ivory carvings for book-covers and portable miniature altars, provided the field for the Romanesque sculptors' activity.

In Italy the strong current of hierarchal Byzantinism had never altogether supplanted the antique tradition, though the works based upon the latter, before Niccola Pisano revived for a short while the true spirit of the antique, are of almost barbaric rudeness, like the bronze gates of S. Zeno at Verona, and the stone-carving of The Last Supper on the pulpit of S. Ambrogio, in Milan. The real home of Romanesque sculpture was beyond the Alps, in Germany and France, and much of the work done in Italy during the 12th century was actually due to northern sculptors—as, for example, the very rude sculpture on the façade of S. Andrea at Pistoia, executed about 1186 by Gruamons and his brother Adeodatus,[3] or the relief by Benedetto Antelami for the pulpit of Parma cathedral of the year 1178. Unlike the sculpture of the Pisani and later artists, these early figures are thoroughly secondary to the architecture they are designed to decorate; they are evidently the work of men who were architects first and sculptors in a secondary degree. After the 13th century the reverse was usually the case, and, as at the west end of Orvieto cathedral, the sculptured decorations are treated as being of primary importance—not that the Italian sculptor-architect ever allowed his statues or reliefs to weaken or damage their architectural surroundings, as is unfortunately the case with much modern sculpture. In southern Italy, during the 13th century, there existed a school of sculpture resembling that of France, owing probably to the Norman occupation. The pulpit in the cathedral of Ravello, executed by Nicolo di Bartolommeo di Foggia in 1272, is an important work of this class; it is enriched with very noble sculpture, especially a large female head crowned with a richly foliated coronet, and combining lifelike vigour with largeness of style in a very remarkable way. The bronze doors at Monreale (by Barisanus of Trani), Pisa and elsewhere are among the chief works of plastic art in Italy during the 12th century. The history of Italian sculpture of the best period is given to a great extent in the separate articles on the Pisani and other Italian artists. Here it suffices to say that sculpture never became as completely subservient to architecture, as it did in the north, and that with Giovanni Pisano the almost classic repose and dignity of his father Niccola's style gave way—probably owing to northern influences—to an increased sense of life and freedom and dramatic expression. Niccola stands at the close of the Romanesque, and Giovanni on the threshold of the Gothic period. During the 13th century Rome and the central provinces of Italy produced very few sculptors of ability, almost the only men of note being the Cosmati.

Italy.

German bronze work.

The power acquired by Germany under the Saxon emperors, upon whom had descended the mantle of the Roman Caesars, was the chief reason that led to the great development of Romanesque art in Germany. It is true that, in the 11th century, Byzantine influences stifled the spontaneous *naïveté* of the earlier work; but about the end of the 12th century a new free and vital art arose, based upon a better understanding of the antique, and fostered by the rise of feudalism and the prosperity of the cities. Next in importance to the numerous examples of German Romanesque ivory carvings are the works in bronze, in the technique of which the German craftsmen of the pre-Gothic period stand unrivalled. This is seen in the bronze pillar reliefs and other works, notably the bronze gates of Hildesheim Cathedral, produced by Bishop Bernward (d. 1022) after his visit to Rome. Hildesheim, Cologne and the whole of the Rhine provinces were the most active seats of German sculpture, especially in metal, till the 12th century. Many remarkable pieces of bronze sculpture were produced at the end of that period, of which several specimens exist. The bronze font at Liége, with figure-subjects in relief of various baptismal scenes from the New Testament, by Lambert Patras of Dinant, cast about 1112, is a work of most wonderful beauty and perfection for its time; other fonts in Osnabrück, by Master Gerhard, and Hildesheim cathedrals are surrounded by spirited reliefs, fine in conception, but inferior in beauty to those on the Liége font. Fine bronze candelabra exist in the abbey church of Combourg and at Aix-la-Chapelle,

[1] On early and medieval sculpture in ivory consult Gori, *Thesaurus veterum diptychorum* (Florence, 1759); Westwood, *Diptychs of Consuls* (London, 1862); Didron, *Images ouvrantes du Louvre* (Paris, 1871); William Maskell, *Ivories in the South Kensington Museum* (London, 1872 & 1875); Wieseler, *Diptychon Quirinianum zu Brescia* (Göttingen, 1868); Wyatt and Oldfield, *Sculpture in Ivory* (London, 1856); Alfred Maskell, *Ivories* (London, 1905), one of the best treatises in the English language; E. Molinier, *Les Ivoires*; *Die Elfenbeinbilder* (Berlin Museum, 1903).

[2] See O'Neill, *Sculptured Crosses of Ireland* (London, 1857).

[3] The other finest examples of this early class of sculpture exist at Pisa, Parma, Modena and Verona; in most of them the old Byzantine influence is very strong.

the latter of about 1165. Merseburg cathedral has a strange realistic sepulchral figure of Rudolf of Swabia, executed about 1100; and at Magdeburg is a fine effigy, also in bronze, of Bishop Frederick (d. 1152), treated in a more graceful way. The last figure has a peculiarity which is not uncommon in the older bronze reliefs of Germany: the body is treated as a relief, while the head sticks out and is quite detached from the ground in a very awkward way. One of the finest plastic works of this century is the choir screen of Hildesheim cathedral, executed in hard stucco, once rich with gold and colours; on its lower part is a series of large reliefs of saints modelled with almost classical breadth and nobility, with drapery of especial excellence. In the 13th century German sculpture had made considerable artistic progress, but it did not reach the high standard of France. One of the best examples of the transition period from German Romanesque to Gothic is the "golden gate" of Freiburg cathedral, with sculptured figures on the jambs after the French fashion. The statues of the apostles on the nave pillars, and especially one of the Madonna at the east end (1260–1270), possess great beauty and sculpturesque breadth. Of the same period, and kindred in style and feeling, are the reliefs on the eastern choir-screen in Bamberg cathedral.

France is comparatively poor in characteristic examples of Romanesque sculpture, as the time of the greatest activity coincides with the beginnings of the Gothic style, so that in many cases, as for instance on the porches of Bourges and Chartres cathedrals, Romanesque and Gothic features occur side by side and make it impossible to establish a clear demarcation between the two. Among the most important Romanesque monuments of the early 12th century are the sculptures on the porch of the abbey church of Conques, representing the Last Judgment; the somewhat barbaric tympanum of Autun cathedral (*c.* 1130); and that of the church of Moissac.

France.

During the 12th and 13th centuries the prodigious activity of the cathedral builders of France and their rivalry to outshine each other in the richness of the sculptured decorations, led to the glorious development that culminated in the full flower of Gothic art. The façades of large cathedrals were completely covered with sculptured reliefs and thick-set rows of statues in niches. The whole of the front was frequently one huge composition of statuary, with only sufficient purely architectural work to form a background and frame for the sculptured figures. A west end treated like that of Wells cathedral, which is almost unique in England, is not uncommon in France. Even the shafts of the doorways and other architectural accessories were covered with minute sculptured decoration,—the motives of which were often, especially during the 12th century, obviously derived from the metal-work of shrines and reliquaries studded with rows of jewels. The west façade of Poitiers cathedral is one of the richest examples; it has large surfaces covered with foliated carving and rows of colossal statues, both seated and standing, reaching high up the front of the church. Of the same century (the 12th), but rather later in date, is the very noble sculpture on the three western doors of Chartres cathedral, with fine tympanum reliefs and colossal statues (all once covered with painting and gold) attached to the jamb-shafts of the openings. These latter figures, with their exaggerated height and the long straight folds of their drapery, are designed with great skill to assist and not to break the main upward lines of the doorways. The sculptors have willingly sacrificed the beauty and proportion of each separate statue for the sake of the architectonic effect of the whole façade. The heads, however, are full of nobility, beauty, and even grace, especially those that are softened by the addition of long wavy curls, which give relief to the general stiffness of the form. The sculptured doors of the north and south aisles of Bourges cathedral are fine examples of the end of the 12th century, and so were the west doors of Notre Dame in Paris till they were hopelessly injured by "restoration." The early sculpture at Bourges is specially interesting from the existence in many parts of its original coloured decoration.

Romanesque sculpture in England, during the Norman period, was of a very rude sort and generally used for the tympanum reliefs over the doors of churches. Christ in Majesty, the Harrowing of Hell and St George and the Dragon occur very frequently. Reliefs of the zodiacal signs were a common decoration of the richly sculptured arches of the 12th century, and are frequently carved with much power. The later Norman sculptured ornaments are very rich and spirited, though the treatment of the human figure is still very weak.[1]

Norman period in England.

The best-preserved examples of monumental sculpture of the 12th century are a number of effigies of knights-templars in the round Temple church in London.[2] They are laboriously cut in hard Purbeck marble, and much resemble bronze in their treatment; the faces are clumsy, and the whole figures stiff and heavy in modelling; but they are valuable examples of the military costume of the time, the armour being purely chain-mail. Another effigy in the same church cut in stone, once decorated with painting, is a much finer piece of sculpture of about a century later. The head, treated in an ideal way with wavy curls, has much simple beauty, showing a great artistic advance. Another of the most remarkable effigies of this period is that of Robert, duke of Normandy (d. 1134), in Gloucester cathedral, carved with much spirit in oak, and decorated with painting. The realistic trait of the crossed legs, which occurs in many of these effigies, heralds the near advent of Gothic art. Most rapid progress in all the arts, especially that of sculpture, was made in England in the second half of the 13th and the beginning of the 14th century, largely under the patronage of Henry III., who employed and handsomely rewarded a large number of English artists, and also imported others from Italy and Spain, though these foreigners took only a secondary position among the painters and sculptors of England. The end of the 13th century was in fact the culminating period of English art, and at this time a very high degree of excellence was reached by purely national means, quite equalling and even surpassing the general average of art on the Continent, except perhaps in France. Even Niccola Pisano could not have surpassed the beauty and technical excellence of the two bronze effigies in Westminster Abbey modelled and cast by William Torell, a goldsmith and citizen of London, shortly before the year 1300. These are on the tombs of Henry III. and Queen Eleanor (wife of Edward I.), and, though the tomb itself of the former is an Italian work of the Cosmati school, there is no trace of foreign influence in the figures. At this time portrait effigies had not come into general use, and both figures are treated in an ideal way.[3] The crowned head of Henry III., with noble well-modelled features and crisp wavy curls, resembles the conventional royal head on English coins of this and the following century, while the head of Eleanor is of remarkable, almost classic, beauty, and of great interest as showing the ideal type of the 13th century. In both cases the drapery is well conceived in broad sculpturesque folds, graceful and yet simple in treatment. The casting of these figures, which was effected by the *cire perdue* process, is technically very perfect. The gold employed for the gilding was got from Lucca in the shape of the current florins of that time, which were famed for their purity. Torell was highly paid for this, as well as for two other bronze statues of Queen Eleanor, probably of the same design.

Although the difference between fully developed Gothic sculpture and Romanesque sculpture is almost as clearly marked as the difference between Gothic and Romanesque architecture—

[1] In Norway and Denmark during the 11th and 12th centuries carved ornament of the very highest merit was produced, especially the framework round the doors of the wooden churches; these are formed of large pine planks, sculptured in slight relief with dragons and interlacing foliage in grand sweeping curves,—perfect masterpieces of decorative art, full of the keenest inventive spirit and originality.

[2] See Richardson, *Monumental Effigies of the Temple Church* (London, 1843).

[3] The effigy of King John in Worcester cathedral of about 1216 is an exception to this rule; though rudely executed, the head appears to be a portrait.

indeed, the evolution of the two arts proceeded in parallel stages—the change from the earlier to the later style is so gradual and almost imperceptible, that it is all but impossible to follow it step by step, and to illustrate it by examples. What distinguishes the Gothic from the Romanesque in sculpture is the striving to achieve individual in the place of typical expression. This striving is as apparent in the more flexible and emotional treatment of the human figure, as it is in the substitution of naturalistic plant and animal forms for the more conventional ornamentation of the earlier centuries. Statuesque architectonic dignity and calmness are replaced by slender grace and soulful expression. The drapery, instead of being arranged in heavy folds, clings to the body and accentuates rather than conceals the form. At the same time, the subjects treated by the Gothic sculptor do not depart to any marked degree from those which fell to the task of the Romanesque workers, though they are brought more within the range of human emotions.

Gothic sculpture in France.

It is only natural that in France, which was the birthplace of Gothic architecture, the sister art of sculpture should have attained its earliest and most striking development. During the 13th century, the *imagiers*, or stone sculptors, worked hand in hand with the great cathedral builders. This century may indeed be called the golden age of Gothic sculpture.

While still keeping its early dignity and subordination to its architectural setting, the sculpture reached a very high degree of graceful finish and even sensuous beauty. Nothing could surpass the loveliness of the angel statues round the Sainte Chapelle in Paris, and even the earlier work on the façade of Laon cathedral is full of grace and delicacy. Amiens cathedral is especially rich in sculpture of this date,—as, for example, the noble and majestic statues of Christ and the Apostles at the west end; the sculpture on the south transept of about 1260–1270, of more developed style, is remarkable for dignity combined with soft beauty.[1] The noble row of kings on the west end of Notre Dame at Paris has, like the earlier sculpture, been ruined by "restoration," which has robbed the statues of both their spirit and their vigour. To the latter years of the 13th century belong the magnificent series of statues and reliefs round the three great western doorways of the same church, among which are no fewer than thirty-four life-sized figures. On the whole, the single statues throughout this period are finer than the reliefs with many figures. Some of the statues of the Virgin and Child are of extraordinary beauty, in spite of their being often treated with a certain mannerism,—a curved pose of the body, which appears to have been copied from ivory statuettes, in which the figure followed the curve of the elephant's tusk. The north transept at Reims is no less rich: the central statue of Christ is a work of much grace and nobility of form; and some nude figures—for example, that of St Sebastian—show a knowledge of the human body which was very unusual at that early date. Many of these Reims statues, like those by Torell at Westminster, are quite equal to the best work of Niccola Pisano. The abbey church of St Denis possesses the largest collection of French 13th-century monumental effigies, a large number of which, with supposed portraits of the early kings, were made during the rebuilding of the church in 1264; some of them appear to be "archaistic" copies of older contemporary statues.[2]

In the 14th century French sculpture began to decline, though much beautiful plastic work was still produced. Some of the reliefs on the choir screen of Notre Dame at Paris belong to this period, as does also much fine sculpture on the transepts of Rouen cathedral and the west end of Lyons. At the end of this century an able sculptor from the Netherlands, Claus Sluter (who followed the tradition of the 14th-century school of Tournai which is marked by the exquisite study of the details of nature and led to the brilliant development of Flemish realism), executed much fine work, especially at Dijon, under the patronage of Philip the Bold, for whose newly founded Carthusian monastery in 1399 he sculptured the great "Moses fountain" in the cloister, with six life-sized statues of prophets in stone, painted and gilt in the usual medieval fashion. Not long before his death in 1411 Sluter completed a very magnificent altar tomb for Philip the Bold, now in the museum at Dijon. It is of white marble, surrounded with arcading, which contains about forty small alabaster figures representing mourners of all classes, executed with much dramatic power. The recumbent portrait effigy of Philip in his ducal mantle with folded hands is a work of great power and delicacy of treatment.[3]

German 13th-century sculpture.

Whilst in France there was a distinct slackening in building activity in the 14th century, which led to a corresponding decline in sculpture, Germany experienced a reawakening of artistic creative energy and power. That the Gothic style had taken root on German soil in the preceding century, is proved by the fresh, mobile treatment of the statues on the south porch of the east façade of Bamberg cathedral, and even more by the equestrian statue of Conrad III. in the market-place at Bamberg, which, supported by a foliated corbel, exhibits startling vigour and originality, and is designed with wonderful largeness of effect, though small in scale. The statues of Henry the Lion and Queen Matilda at Brunswick, of about the same period, are of the highest beauty and dignity of expression. Strassburg cathedral, though sadly damaged by restoration, still possesses a large quantity of the finest sculpture of the 13th century. One tympanum relief of the Death of the Virgin, surrounded by the sorrowing Apostles, is a work of the very highest beauty, worthy to rank with the best Italian sculpture of even a later period. Of its class nothing can surpass the purely decorative carving at Strassburg, with varied realistic foliage studied from nature, evidently with the keenest interest and enjoyment.

But such works were only isolated manifestations of German artistic genius, until, in the next century, sculpture rose to new and splendid life, though it found expression not so much in the composition of extensive groups, as in the neighbouring France, but in the carving of isolated figures of rare and subtle beauty.

Nuremberg is rich in good sculpture of the 14th century. The church of St Sebald, the Frauenkirche, and the west façade of St Lawrence are lavishly decorated with reliefs and statues, very rich in effect, but showing the germs of that mannerism which grew so strong in Germany during the 15th century. Of special beauty are the statuettes which adorn the "beautiful fountain," which was formerly erroneously attributed to the probably mythical sculptor Sebald Schonhofer, and is decorated with gold and colour by the painter Rudolf.[4] Of considerable importance are the statues of Christ, the Virgin, and the Apostles on the piers in the choir of Cologne cathedral, which were completed after 1350. They are particularly notable for their admirable polychromatic treatment. The reliefs on the high altar, which are of later date, are wrought in white marble on a background of black marble. Augsburg produced several sculptors of ability about this time; the museum possesses some very noble wooden statues of this school, large in scale and dignified in treatment. On the exterior of the choir of the church of Marienburg castle is a very remarkable colossal figure of the Virgin of about 1340–1350. Like the Hildesheim choir screen, it is made of hard stucco and is decorated with glass mosaics. The equestrian bronze group of St George and the Dragon in the market-place at Prague is excellent in workmanship and full of vigour, though much wanting dignity of style. Another fine work in bronze of about the same date is the effigy of Archbishop Conrad (d. 1261) in Cologne cathedral, executed many years after his death. The portrait appears truthful and the whole figure is noble in style. The military effigies of this time in Germany as elsewhere were almost unavoidably stiff and lifeless from the necessity of representing them in plate

[1] See Ruskin, *The Bible of Amiens* (1878).

[2] See Félibien, *Histoire de l'Abbaye de Saint-Denys* (Paris, 1706).

[3] See A. Kleinclausz, *Claus Sluter* (Paris, 1908).

[4] See Baader, *Beiträge zur Kunstgesch. Nürnberge*; Rettberg, *Nürnberge Kunstleben* (Stuttgart, 1854), and P. J. Rée, *Nuremberg and its Art to the end of the 18th Century* (London, 1905).

armour. The ecclesiastical chasuble, in which priestly effigies nearly always appear, is also a thoroughly unsculpturesque form of drapery, both from its awkward shape and its absence of folds. The Günther of Schwarzburg (d. 1349) in Frankfort cathedral is a characteristic example of these sepulchral effigies in slight relief.

Architectural sculpture in England.

In England, much of the fine 13th-century sculpture was used to decorate the façades of churches, though, on the whole, English cathedral architecture did not offer such great opportunities to the *imagier* as did that of France. A notable exception is Wells cathedral, the west end of which, dating from about the middle of the century, is covered with more than 600 figures in the round or in relief, arranged in tiers, and of varying sizes. The tympana of the doorways are filled with reliefs, and above them stand rows of colossal statues of kings and queens, bishops and knights, and saints both male and female, all treated very skilfully with nobly arranged drapery, and graceful heads designed in a thoroughly architectonic way, with due regard to the main lines of the building they are meant to decorate. In this respect the early medieval sculptor inherited one of the great merits of the Greeks of the best period: his figures or reliefs form an essential part of the design of the building to which they are affixed, and are treated in a subordinate manner to their architectural surroundings—very different from most of the sculpture on modern buildings, which frequently looks as if it had been stuck up as an afterthought, and frequently by its violent and incongruous lines is rather an impertinent excrescence than an ornament.[1] Peterborough, Lichfield and Salisbury cathedrals have fine examples of the sculpture of the 13th century: in the chapter-house of the last the spandrels of the wall-arcade are filled with sixty reliefs of subjects from Bible history, all treated with much grace and refinement. To the end of the same century belong the celebrated reliefs of angels in the spandrels of the choir arches at Lincoln, carved in a large massive way with great strength of decorative effect. Other fine reliefs of angels, executed about 1260, exist in the transepts of Westminster Abbey; being high from the ground, they are broadly treated without any high finish in the details.[2]

Purely decorative carving in stone reached its highest point of excellence about the middle of the 14th century—rather later, that is, than the best period of figure sculpture. Wood-carving (*q.v.*), on the other hand, reached its artistic climax a full century later under the influence of the fully developed Perpendicular style.

The most important effigies of the 14th century are those in gilt bronze of Edward III. (d. 1377) and of Richard II. and his queen (made in 1395), all at Westminster. They are all portraits, but are decidedly inferior to the earlier work of William Torell. The effigies of Richard II. and Anne of Bohemia were the work of Nicolas Broker and Godfred Prest, goldsmith citizens of London. Another fine bronze effigy is at Canterbury on the tomb of the Black Prince (d. 1376); though well cast and with carefully modelled armour, it is treated in a somewhat dull and conventional way. The recumbent stone figure of Lady Arundel, with two angels at her head, in Chichester cathedral is remarkable for its calm peaceful pose and the beauty of the drapery. Among the most perfect works of this description is the alabaster tomb of Ralph Nevill, first earl of Westmorland, with figures of himself and his two wives, in Staindrop church, county Durham (1426), removed, 1908, from a dark corner of the church into full light, a few feet away, where its beauty may now be examined. A very fine but more realistic work is the tomb figure of William of Wykeham (d. 1404) in the cathedral at Winchester. The cathedrals at Rochester, Lichfield, York, Lincoln, Exeter and many other ecclesiastical buildings in England are rich in examples of 14th-century sculpture, used occasionally with great profusion and richness of effect, but treated in strict subordination to the architectural background.

The finest piece of bronze sculpture of the 15th century is the effigy of Richard Beauchamp (d. 1439) in his family chapel at Warwick—a noble portrait figure, richly decorated with engraved ornaments. The modelling and casting were done by William Austen of London, and the gilding and engraving by a Netherlands goldsmith who had settled in London, named Bartholomew Lambespring, assisted by several other skilful artists.

Spain.

The first Spanish sculptor of real eminence who need be considered is Aparicio, who lived and worked in the 11th century. His shrine of St Millan, executed to the order of Don Sancho the Great is in the monastery of Yuso, and is a composition excellent, in its way, in design, grace and proportion. In the early medieval period the sculpture of northern Spain was much influenced by contemporary art in France. From the 12th to the 14th century many French architects and sculptors visited and worked in Spain. The cathedral of Santiago de Compostella possesses one of the grandest existing specimens in the world of late 12th-century architectonic sculpture; this, though the work of a native artist, Mastei Mateo,[3] is thoroughly French in style; as recorded by an inscription on the front, it was completed in 1188. The whole of the western portal with its three doorways is covered with statues and reliefs, all richly decorated with colour, part of which still remains. Round the central arch are figures of the twenty-four elders, and in the tympanum a very noble relief of Christ in Majesty between Saints and Angels. As at Chartres, the jamb-shafts of the doorways are decorated with standing statues of saints—St James the elder, the patron of the church, being attached to the central pillar. These noble figures, though treated in a somewhat rigid manner, are thoroughly subordinate to the main lines of the building. Their heads, with pointed beards and a fixed mechanical smile, together with the stiff drapery arranged in long narrow folds, recall the Aeginetan pediment sculpture of about 500 B.C. This appears strange at first sight, but the fact is that the works of the early Greek and the medieval Spaniard were both produced at a somewhat similar stage in two far distant periods of artistic development. In both cases plastic art was freeing itself from the bonds of a hieratic archaism, and had reached one of the last steps in a development which in the one case culminated in the perfection of the Phidian age, and in the other led to the exquisitely beautiful yet simple and reserved art of the end of the 13th and early part of the 14th century,—the golden age of sculpture in France and England. In the cathedral of Tarragona are nine statues, in stone, executed by Bartolomé in 1278 for the gate.

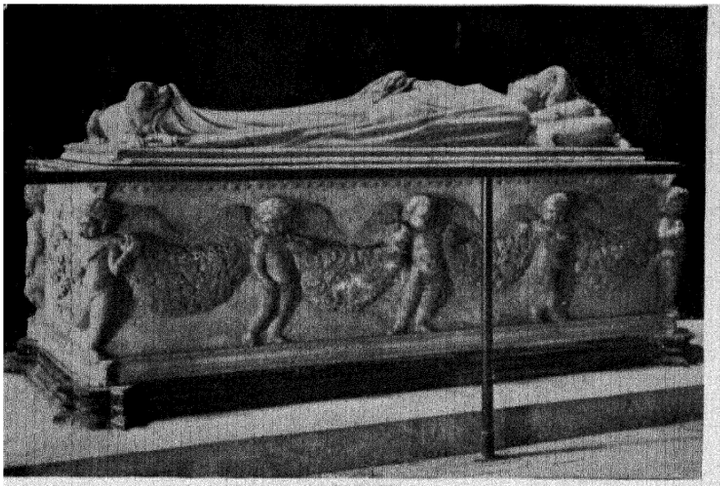
In the 14th century the silversmiths of Spain produced many works of sculpture of great size and technical power. One of the finest, by a Valencian called Peter Bernec, is the great silver retable at Gerona cathedral. It is divided into three tiers of statuettes and reliefs, richly framed in canopied niches, all of silver, partly cast and partly hammered.

In the 15th century an infusion of German influence was mixed with that of France, as may be seen in the very rich sculptural decorations which adorn the main door of Salamanca cathedral, the façade of S. Juan at Valladolid, and the church and cloisters of S. Juan de los Reyes at Toledo, perhaps the most gorgeous examples of architectural sculpture in the world. These were executed between 1418 and 1425 by a group of clever sculptors, among whom A. and F. Diaz, A. F. de Sahagun, A. Rodriguez and A. Gonzales were perhaps the chief. The marble altar-piece of the grand altar at Tarragona was begun

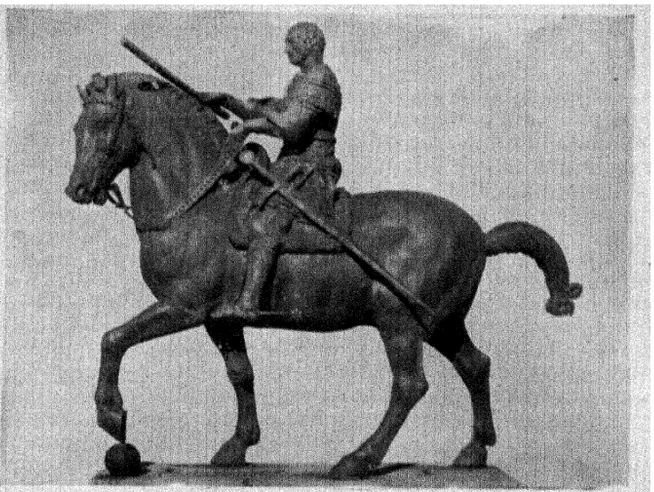
[1] The sculpture on the Paris opera house is a striking instance of this; and so, in a small way, are the statues in the reredos at Westminster Abbey and that at Gloucester cathedral. Another is afforded by the figures of modern soldiers inserted in the beautifully-designed Gothic Boer War Memorial (by G. F. Bodley, R.A.) set up in the cathedral close in York.

[2] On the whole, Westminster possesses the most completely representative collection of English medieval sculpture in an unbroken succession from the 13th to the 16th century.

[3] A kneeling portrait-statue of Mateo is introduced at the back of the central pier. This figure is now much revered by the Spanish peasants, and the head is partly worn away with kisses.



JACOPO DELLA QUERCIA—Tomb, Ilaria del Carretto, Lucca. (*Photo, Brogi.*)



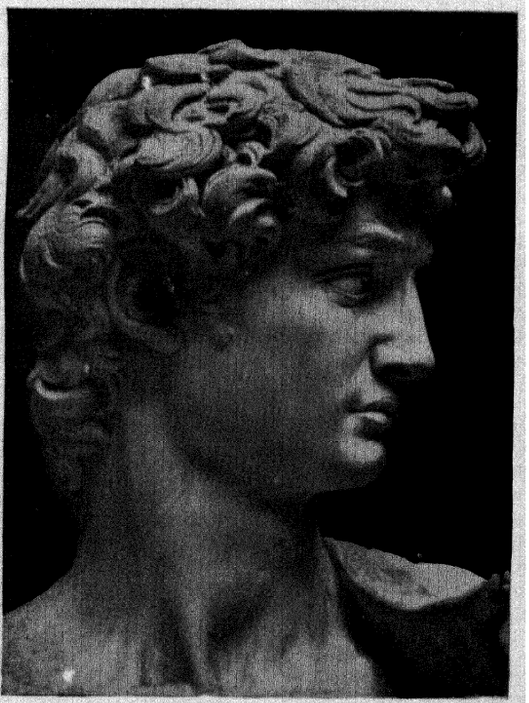
DONATELLO—Equestrian Statue, General Gattamelata, Padua. (*Photo, Anderson.*)



ANDREA PISANO—The first bronze door of the Baptistery, Florence. (*Photo, Alinari.*)



DONATELLO—Statue of St. George, Florence. (*Photo, Alinari.*)



MICHELANGELO—Head of Colossal David, Florence. (*Photo, Anderson.*)



VERROCCHIO & LEOPARDI—Bronze Colossal Statue of Bartolommeo Colleoni, Venice. (*Photo, Anderson.*)



LUCA DELLA ROBBIA—Girls and boys playing on musical instruments and dancing (Museo dell' Opera, Florence). (*Photo, Anderson.*)

SCULPTURE



(*Photo, Alinari.*)
BENVENUTO CELLINI—Bronze Statue of Perseus and Medusa, in the Loggia dei Lanzi, Florence.



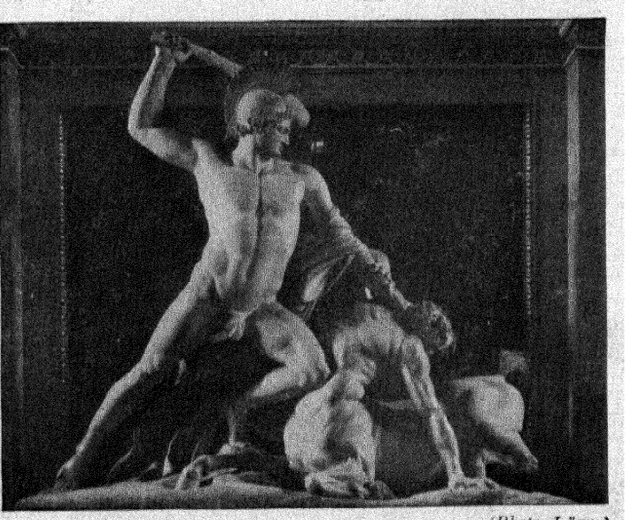
(*Photo, Wurthle & Sohn.*)
PETER VISCHER—Gilt Bronze Statue of King Arthur, Innsbruck.



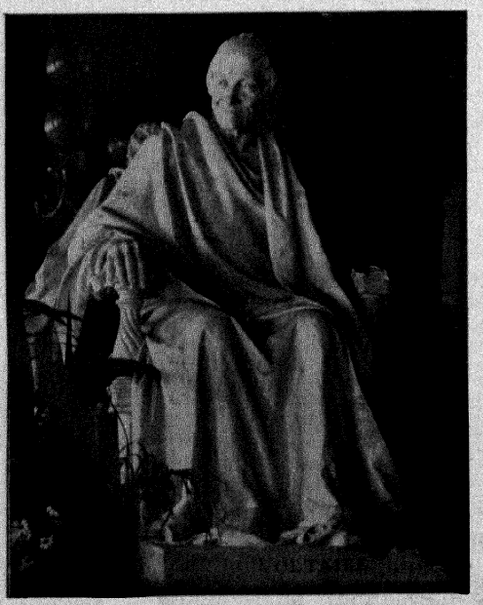
(*Photo, Anderson.*)
BERNINI—Apollo and Daphne (Borghese Gallery).



(*Photo, Giraudon.*)
JEAN GOUJON—Diane de Poitiers (as Huntress), in the Louvre.



(*Photo, Löwy.*)
CANOVA—Colossal Marble Group of Theseus and Centaur, Vienna.



(*Photo, Giraudon.*)
HOUDON—Voltaire (Théâtre Français, Paris).



(*Photo, Giraudon.*)
COYSEVOX—Bust of himself, in the Louvre.

by P. Juan in 1426 and completed by G. De La Mota. The carved foliage of this period is of especial beauty and spirited execution; realistic forms of plant-growth are mingled with other more conventional foliage in the most masterly manner. The very noble bronze monument of Archdeacon Pelayo (d. 1490) in Burgos cathedral was probably the work of Simon of Cologne, who was also architect of the Certosa at Miraflores, 2 m. from Burgos. The church of this monastery contains two of the most magnificently rich monuments in the world, especially the altar-tomb of King John II. and his queen by Gil de Siloe—a perfect marvel of rich alabaster canopy-work and intricate under-cutting. The effigies have little merit. From the 16th century onwards wood was a favourite material with Spanish sculptors, who employed it for devotional and historical groups realistically treated, such as the "Scene from Taking of Granada" by El Maestre Rodrigo, and even for portraiture, as in the Bust of Turiano by Alonzo Berruguete (1480–1561).

Gothic sculpture in Italy.

During the 14th century Florence and the neighbouring cities were the chief centres of Italian sculpture, and there numerous sculptors of successively increasing artistic power lived and worked, till in the 15th century the city had become the aesthetic capital of the world. But the Gothic sculptor's activity was by no means confined to Tuscany, for in northern Italy various schools of sculpture existed in the 14th century, especially at Verona and Venice, whose art differed widely from the contemporary art of Tuscany; but Milan and Pavia, on the other hand, possessed sculptors who followed closely the style of the Pisani. The chief examples of the latter class are the magnificent shrine of St Augustine in the cathedral of Pavia, dated 1362, and the somewhat similar shrine of Peter the Martyr (1339), by Balduccio of Pisa, in the church of S. Eustorgio at Milan, both of white marble, decorated in the most lavish way with statuettes and subject reliefs. Many other fine pieces of the Pisan school exist in Milan. The well-known tombs of the Scaliger family at Verona show a more native style of design, and in general form, though not in detail, suggest the influence of transalpine Gothic. In Venice the northern and almost French character of much of the early 15th-century sculpture is more strongly marked, especially in the noble figures in high relief which decorate the lower story and angles of the doge's palace;[1] these are mostly the work of a Venetian named Bartolomeo Bon. A magnificent marble tympanum relief by Bon can be seen at the Victoria and Albert Museum; it has a noble colossal figure of the Madonna, who shelters under her mantle a number of kneeling worshippers; the background is enriched with foliage and heads, forming a "Jesse tree," designed with great decorative skill. The cathedral of Como, built at the very end of the 15th century, is decorated with good sculpture of almost Gothic style, but on the whole rather dull and mechanical in detail, like much of the sculpture in the extreme north of Italy. A large quantity of rich sculpture was produced in Naples during the 14th century, but of no great merit either in design or in execution. The lofty monument of King Robert (1350), behind the high altar of S. Chiara, and other tombs in the same church are the most conspicuous works of this period. The extraordinary poverty in the production of sculpture in Rome during the 14th century was remarkable. The clumsy effigies at the north-east of S. Maria in Trastevere are striking examples of the degradation of the plastic art there about the year 1400; and it was not till nearly the middle of the century that the arrival of able Florentine sculptors, such as Filarete, Mino da Fiesole, and the Pollaiuoli, initiated a brilliant era of artistic activity, which, however, for about a century continued to depend on the presence of sculptors from Tuscany and other northern provinces. It was not, in fact, till the period of full decadence had begun that Rome itself produced any notable artists.

In Florence, the centre of artistic activity during the 15th as well as the 14th century, Giotto not only inaugurated the modern era of painting, but in his relief sculpture, and more particularly by the influence he exercised upon Andrea Pisano, carried the art of sculpture beyond the point where it had been left by Giovanni Pisano. In Andrea we find something of Niccola's classic dignity grafted on to Giovanni's close observation of nature. His greatest works are the bronze south gate of the Baptistery, and some of the reliefs on Giotto's Campanile. The last great master of the Gothic period is Andrea di Cione, better known as Orcagna (1308? to 1368), who, like Giotto, achieved fame in the three sister arts of painting, sculpture and architecture. His wonderful tabernacle at Or San Michele is a noble testimony to his efficiency in the three arts and to his early training as a goldsmith. Very beautiful sepulchral effigies in low relief were produced in many parts of Italy, especially at Florence. The tomb of Lorenzo Acciaioli, in the Certosa near Florence, is a fine example of about the year 1400, which has absurdly been attributed to Donatello. The similarity between the plastic arts of Athens in the 5th or 4th century B.C. and of Florence in the 15th century is not one of analogy only. Though free from any touch of copyism, there are many points in the works of such men as Donatello, Luca della Robbia, and Antonio Pisano which strongly recall the sculpture of ancient Greece, and suggest that, if a sculptor of the later Phidian school had been surrounded by the same types of face and costume as those among which the Italians lived, he would have produced plastic works closely resembling those of the great Florentine masters. Lorenzo Ghiberti may be called the first of the great sculptors of the Renaissance. But between him and Orcagna stands another master, the Sienese, Jacopo della Quercia[2] (1371–1438) who, although in some minor traits connected with the Gothic school, heralds at this early date the boldest and most vigorous and original achievements of two generations hence. Indeed, Jacopo, whose chief works are the Fonte Gaja at Siena (now reconstructed) and the reliefs on the gate of S. Petronio at Bologna, stands in his strong muscular treatment of the human figure nearer to Michelangelo than to his Gothic precursors and contemporaries. Contemporaneously with Ghiberti, the sculptor of the world-famed baptistery gates, and with Donatello, and to a certain extent influenced by them, worked some men who, like Ciuffagni, were still essentially Gothic in their style, or, like Nanni di Banco, retained unmistakable traces of the earlier manner. Luca della Robbia, the founder of a whole dynasty of sculptors in glazed terra-cotta, with his classic purity of style and sweetness of expression, came next in order. Unsensual beauty elevated by religious spirit was attained in the highest degree by Mino da Fiesole, the two Rossellini, Benedetto da Maiano, Desiderio da Settignano and other sculptors more or less directly influenced by Donatello. Through them the tomb monument received the definite form which it retained throughout the Renaissance period. Two of the noblest equestrian statues the world has probably ever seen are the Gattamelata statue at Padua by Donatello and the statue of Colleoni at Venice by Verrocchio and Leopardi. A third, which was probably of equal beauty, was modelled in clay by Leonardo da Vinci, but it no longer exists. Among other sculptors who flourished in Italy about the middle of the 15th century, are the Lucchese Matteo Civitali; Agostino di Duccio (1418–*c.* 1481), whose principal works are to be found at Rimini and Perugia; the bronze-worker Bertoldo di Giovanni (1420–1491); Antonio del Pollaiuolo, the author of the tombs of popes Sixtus IV. and Innocent VIII. at St Peter's in Rome; and Francesco Laurana (1424–1501?), a Dalmatian who worked under Brunelleschi and left many traces of his activity in Naples (Triumphal Arch), Sicily and southern France. Finally came Michelangelo, who raised the sculpture of the modern world to its highest pitch of magnificence, and at the same time sowed the seeds of its rapidly approaching decline; the head of his David at Florence is a work of unrivalled force and dignity. His rivals and imitators, Baccio Bandinelli, Giacomo della Porta, Montelupo, Ammanati and Vincenzo de' Rossi (pupils of Bandinelli) and others, copied and exaggerated his faults

[1] See Ruskin, *Stones of Venice*; and Mothes, *Gesch. der Bauk. u. Bildh. Venedigs* (Leipzig, 1859); also H. v. d. Gabelentz, *Mittelaltert. Plastik in Venedig* (Leipzig, 1902).

[2] See Carl Cornelius, *Jacopo della Quercia* (Halle a. S., 1896).

without possessing a touch of his gigantic genius. In other parts of Italy, such as Pavia, the traditions of the 15th century lasted longer, though gradually fading. The statuary and reliefs which make the Certosa near Pavia one of the most gorgeous buildings in the world are free from the influence of Michelangelo, which at Florence and Rome was overwhelming. Though much of the sculpture was begun in the second half of the 15th century, the greater part was not executed till much later. The magnificent tomb of the founder, Giovanni Galeazzo Visconti, was not completed till about 1560, and is a gorgeous example of the style of the Renaissance grown weak from excess of richness and from loss of the simple purity of the art of the 15th century. Everywhere in this wonderful building the fault is the same; and the growing love of luxury and display, which was the curse of the time, is reflected in the plastic decorations of the whole church. The old religious spirit had died out and was succeeded by unbelief or by an affected revival of paganism. Monuments to ancient Romans, such as those to the two Plinys on the façade of Como cathedral, or "heroa" to unsaintly mortals, such as that erected at Rimini by Sigismondo Pandolfo in honour of Isotta,[1] grew up side by side with shrines and churches dedicated to the saints. We have seen how the youthful vigour of the Christian faith vivified for a time the dry bones of expiring classic art, and now the decay of this same belief brought with it the destruction of all that was most valuable in medieval sculpture. Sculpture, like the other arts, became the bond-slave of the rich, and ceased to be the natural expression of a whole people. Though for a long time in Italy great technical skill continued to exist, the vivifying spirit was dead, and at last a dull scholasticism or a riotous extravagance of design became the leading characteristics.

The 16th century was one of transition to this state of degradation, but nevertheless produced many sculptors of great ability who were not wholly crushed by the declining taste of their time. John of Douai (1524–1608), usually known as Giovanni da Bologna, one of the ablest, lived and worked almost entirely in Italy. His bronze statue of Mercury flying upwards, in the Uffizi, one of his finest works, is full of life and movement. By him also is the "Carrying off of a Sabine Woman" in the Loggia de' Lanzi. His great fountain at Bologna, with two tiers of boys and mermaids, surmounted by a colossal statue of Neptune, a very noble work, is composed of architectural features combined with sculpture, and is remarkable for beauty of proportion. He also cast the fine bronze equestrian statue of Cosimo de' Medici at Florence and the very richly decorated west door of Pisa cathedral, the latter notable for the overcrowding of its ornaments and the want of sculpturesque dignity in the figures; it is a feeble imitation of Ghiberti's noble production. One of Giovanni's best works, a group of two nude figures fighting, is now lost. A fine copy in lead existed till recently in the front quadrangle of Brasenose College, Oxford, of which it was the chief ornament. In 1881 it was sold for old lead by the principal and fellows of the college, and was immediately melted down by the plumber who bought it—an irreparable loss, as the only other existing copy is very inferior; the destruction was an utterly inexcusable act of vandalism. The sculpture on the western façade of the church at Loreto and the elaborate bronze gates of the Santa Casa are works of great technical merit by Girolamo Lombardo and his sons, about the middle of the 16th century. Benvenuto Cellini (1500–1569), though in the main greater as goldsmith than as sculptor, produced one work of great beauty and dignity—the bronze Perseus in the Loggia de' Lanzi at Florence. His large bust of Cosimo de' Medici in the Bargello is mean and petty in style. A number of very clever statues and groups in terra-cotta were modelled by Antonio Begarelli of Modena (d. 1565), and were enthusiastically admired by Michelangelo; the finest are a "Pietà" in S. Maria Pomposa and a large "Descent from the Cross" in S. Francesco, both at Modena. The colossal bronze seated statue of Julius III. at Perugia, cast in 1555 by Vincenzio Danti, is one of the best portrait-figures of the time.

[1] See Yriarte, *Rimini au XVe siècle* (Paris, 1880).

The Renaissance in France

The latter part of the 15th century in France was a time of transition from the medieval style, which had gradually been deteriorating, to the more florid and realistic taste of the Renaissance. To this period belong a number of rich reliefs and statues on the choir-screen of Chartres cathedral. Those on the screen at Amiens are later still, and exhibit the rapid advance of the new style.

The transition from the Gothic to the Renaissance is to be noted in many tomb monuments of the second half of the 15th and the beginning of the 16th centuries, notably in Rouland de Roux's magnificent tomb of the cardinals of Amboise at Rouen cathedral. Italian motifs are paramount in the great tomb of Louis XII. and his wife Anne of Bretagne, at St Denis, by Jean Juste of Tours.

The Italian influence.

The influx of Italian artists into France in the reign of Francis I., who, with Leonardo da Vinci, Andrea del Sarto, Rosso, and Primaticcio, had summoned Benvenuto Cellini and other Italian sculptors to his court, naturally led to the practical extinction of the Gothic style, though isolated examples of medievalism still occur about the middle of the 16th century. Such are the "Entombment" in the crypt of Bourges cathedral, and the tomb of René of Chalons in the church of St Etienne at Bar-le-Duc. But the main current of artistic thought followed the direction indicated by the founding of the italianizing school of Fontainebleau. Jean Goujon, (d. 1572) was the ablest French sculptor of the time; he combined great technical skill and refinement of modelling with the florid and affected style of the age. His nude figure of "Diana reclining by a Stag," now in the Louvre, is a graceful and vigorous piece of work, superior in sculpturesque breadth to the somewhat similar bronze relief of a nymph by Cellini. Between 1540 and 1552 Goujon executed the fine monument at Rouen to Duke Louis de Brézé, and from 1555 to 1562 was mainly occupied in decorating the Louvre with sculpture. One of the most pleasing and graceful works of this period, thoroughly Italian in style, is the marble group of the "Three Graces" bearing on their heads an urn containing the heart of Henry II., executed in 1560 by Germain Pilon for Catherine de Médicis. The monument of Catherine and Henry II. at St Denis, by the same sculptor, is an inferior and coarser work. Maître Ponce, probably the same as the Italian Ponzio Jacquio, chiselled the noble monument of Albert of Carpi (1535), now in the Louvre. Another very fine portrait effigy of about 1570, a recumbent figure in full armour of the duke of Montmorency, preserved in the Louvre, is the work of Barthélemy Prieur. François Duquesnoy of Brussels (1594–1644), usually known as Il Fiammingo, was a clever sculptor, thoroughly French in style, though he mostly worked in Italy. His large statues are very poor, but his reliefs in ivory of boys and cupids are modelled with wonderfully soft realistic power and graceful fancy.

To these sculptors should be added Jacques Sarrazin, well known for the colossal yet elegant caryatides for the grand pavilion of the Louvre; and François Augier, the sculptor of the splendid mausoleum of the duc de Montmorency.

The Netherlands.

In the Netherlands the great development of painting was not accompanied by a parallel movement in plastic art. Of the few monuments that claim attention, we must mention the bronze tomb of Mary of Burgundy at Notre-Dame, Bruges, executed about 1495 by Jan de Baker, and the less remarkable though technically more complete companion tomb of Charles the Bold (1558).

Beginning of the Renaissance in Germany.

The course of the Renaissance movement in German sculpture differs from that of most other countries in so far as it appears to grow gradually out of the Gothic style in the direction of individual, realistic treatment of the figure which in late Gothic days had become somewhat conventional and schematic and idealized. Marked physiognomic expression, careful rendering of movement, costume and details, and the suggestion of different textures, together with almost tragic emotional intensity, are the chief aims of the 15th-century sculptors who, on the whole,

adhere to medieval thought and arrangement. The Italian influence, which did not make itself felt until the early days of the 16th century, led to brilliant results, whilst the workers retained their fresh northern individuality and keen observation of nature. But in the latter half of this century it began to choke these national characteristics, and led to somewhat theatrical and conventional classicism and mannerism.

One speciality of the 15th century was the production of an immense number of wooden altars and reredoses, painted and gilt in the most gorgeous way and covered with subject-reliefs and statues, the former often treated in a very pictorial style.[1] Wooden screens, stalls, tabernacles and other church-fittings of the greatest elaboration and clever workmanship were largely produced in Germany at the same time, and on into the 16th century.[2] Jörg Syrlin, one of the most able of these sculptors in wood, executed the gorgeous choir-stalls in Ulm cathedral, richly decorated with statuettes and canopied work, between 1469 and 1474; his son and namesake sculptured the elaborate stalls in Blaubeuren church of 1496 and the great pulpit in Ulm cathedral. Another exceptionally important work of this type is the magnificent altar at St Wolfgang in Upper Austria, carved by the Tirolese, Michael Pacher, in 1481. Veit Stoss of Cracow, who later settled in Nuremberg, a man of bad character, was a most skilful sculptor in wood; he carved the high altar, the tabernacle and the stalls of the Frauenkirche at Cracow, between 1472 and 1494. One of his finest works is a large piece of wooden panelling, nearly 6 ft. square, carved in 1495, with central reliefs of the Doom and the Heavenly Host, framed by minute reliefs of scenes from Bible history. It is now in the Nuremberg town-hall. Wohlgemuth (1434–1519), the master of A. Dürer, was not only a painter but also a clever wood-carver, as was also Dürer himself (1471–1528), who executed a tabernacle for the Host with an exquisitely carved relief of Christ in Majesty between the Virgin and St John, which still exists in the chapel of the monastery of Landau. Dürer also produced miniature reliefs cut in boxwood and hone-stone, of which the British Museum (print-room) possesses one of the finest examples. Adam Krafft (*c.* 1455–1507) was another of this class of sculptors, but he worked also in stone; he produced the great Schreyer monument (1492) for St Sebald's at Nuremberg, – a very skilful though mannered piece of sculpture, with very realistic figures in the costume of the time, carved in a way more suited to wood than stone, and too pictorial in effect. He also made the great tabernacle for the Host, 80 ft. high, covered with statuettes, in Ulm cathedral, and the very spirited "Stations of the Cross" on the road to the Nuremberg cemetery.

The Vischer family of Nuremberg for three generations were among the ablest sculptors in bronze during the 15th and 16th centuries. Hermann Vischer the elder worked mostly between 1450 and 1505, following the earlier medieval traditions, but without the originality of his son, Peter Vischer.

Next to Nuremberg, the chief centres of bronze sculpture were Augsburg and Lübeck. Innsbruck possesses one of the finest series of bronze statues of the first half of the 16th century, namely twenty-eight colossal figures round the tomb of the emperor Maximilian, which stands in the centre of the nave, representing a succession of heroes and ancestors of the emperor. The first of the statues which was completed cost 3000 florins, and so Maximilian invited the help of Peter Vischer, whose skill was greater and whose work less expensive than that of the local craftsmen. Most of them, however, were executed by sculptors of whom little is now known. They differ much in style, though all are of great technical merit. The finest is an ideal statue of King Arthur of Britain, in plate armour of the 14th or early 15th century, very remarkable for the nobility of the face and pose. That of Theodoric is also a very fine conception. Both are wrongly said to be the work of Peter Vischer himself. Of the others, the best, nine in number, are by Master Gilg. The others, which range from stiffness to exaggerated realism, are executed by inferior workers.

In the latter part of the 16th century the influence of the later Italian Renaissance becomes very apparent, and many elaborate works in bronze were produced, especially at Augsburg, where Hubert Gerhard cast the fine "Augustus fountain" in 1593, and Adrian de Vries made the "Hercules fountain" in 1599; both were influenced by the style of Giovanni di Bologna, as shown in his magnificent fountain at Bologna.

The Renaissance in England.

At the beginning of the 16th century sculpture in England was entering upon a period of rapid decadence, and to some extent had lost its native individuality. The finest series of statues of this period are those of life-size high up on the walls of Henry VII.'s chapel at Westminster and others over the various minor altars. These ninety-five figures, which represent saints and doctors of the church, vary very much in merit: some show German influence, others that of Italy, while a third class are, as it were, "archaistic" imitations of older English sculpture.[3] In some cases the heads and general pose are graceful, and the drapery dignified, but in the main they are coarse both in design and in workmanship compared with the better plastic art of the 13th and 14th centuries. This decadence of English sculpture caused Henry VII. to invite the Florentine Torrigiano (1472 ?–1522) to visit England to model and cast the bronze figures for his own magnificent tomb, which still exist in almost perfect preservation. The recumbent effigies of Henry VII. and his queen are fine specimens of Florentine art, well modelled with lifelike portrait heads and of very fine technique in the casting. The altar-tomb on which the effigies lie is of black marble, decorated with large medallion reliefs in gilt bronze, each with a pair of saints – the patrons of Henry and Elizabeth of York – of very graceful design. The altar and its large baldacchino and reredos were the work of Torrigiano, but were destroyed during the 17th century. The reredos had a large relief of the Resurrection of Christ executed in painted terra-cotta, as were also a life-size figure of the dead Christ under the altar-slab and four angels on the top angles of the baldacchino; a number of fragments of these figures have recently been found in the "pockets" of the nave vaulting, where they had been thrown after the destruction of the reredos. Torrigiano's bronze effigy of Margaret of Richmond in the south aisle of the same chapel is a very skilful but too realistic portrait, apparently taken from a cast of the dead face and hands. Another terra-cotta effigy in the Rolls chapel is also, from internal evidence, attributed to the same able Florentine. Another talented Florentine sculptor, Benedetto da Maiano, was invited to England by Cardinal Wolsey to make his tomb; of this only the marble sarcophagus now exists and has been used to hold the body of Admiral Nelson in St Paul's Cathedral. Another member of the same family, named Giovanni, was the sculptor of the colossal terra-cotta heads of the Caesars affixed to the walls of the older part of Hampton Court Palace.

Spanish Renaissance Sculpture.

In Spain, in the early part of the 16th century, a strong Italian influence superseded that of France and Germany, partly owing to the presence there of the Florentine Torrigiano and other Italian artists. The magnificent tomb of Ferdinand and Isabella in Granada cathedral is a fine specimen of Italian Renaissance sculpture, somewhat similar in general form to the tomb of Sixtus IV. by Ant. Pollaiuolo in St Peter's, but half a century later in the style of its detail. It looks as if it had been executed by Torrigiano, but the design which he made for it is said to have been rejected. The statue of St Jerome, which he executed for the convent of Buenavista, near Seville, was declared by Goya to be superior to Michelangelo's "Moses." Some of the work of this period, though purely Italian in style, was produced by Spanish sculptors,

[1] This class of large wooden retable was much imitated in Spain and Scandinavia. The metropolitan cathedral of Röskilde in Denmark possesses a very large and magnificent example covered with subject reliefs enriched with gold and colours.

[2] See Waagen, *Kunst und Künstler in Deutschl.* (Leipzig, 1843–1845).

[3] There were once no fewer than 107 statues in the interior of this chapel, besides a large number on the exterior; see J. T. Micklethwaite in *Archaeologia*, vol. xlvii. pl. x.-xii.

—for example, the choir reliefs at Toledo cathedral, and those in the Colegio Mayor at Salamanca by Alonzo Berruguete, sculptor, painter and architect, trained in Rome and Florence, and the greatest designer of Spain up to that time. He worked under Michelangelo and Vasari, and on his return to Spain in 1520 was appointed court painter and sculptor to Charles V. The same position was occupied under Philip II. by Gaspar Becerra (1520–1570), whose masterpiece is a figure of Our Lady of the Solitude, in Madrid. Esteban Jordan, Gregorio Hernandez and other Spanish sculptors produced a large number of elaborate retables, carved in wood with subjects in relief and richly decorated in gold and colours. These sumptuous masses of polychromatic sculpture resemble the 15th-century retables of Germany more than any Italian examples, and were a sort of survival of an older medieval style. J. Morlanes was the first of Spanish sculptors to adopt the style of Albert Dürer, which afterwards became general. Philip de Vigarni, Christopher of Salamanca, and Paul de Cespedes, who was native of Cordova, are names of great prominence up to the end of the century. Alonzo Cano (1600–1667), the painter, was remarkable for clever realistic sculpture, very highly coloured and religious in style. Montañes, who died in 1614, was one of the ablest Spanish sculptors of his time. His finest works are the reliefs of the Madonna and Saints on an altar in the university church of Seville, and in the cathedral, in the chapel of St Augustine, a very nobly designed Conception, modelled with great skill.

In the 17th century sculpture in wood still prevailed. The statue of St Bruno of Montañez seems to have inspired others to repeat the subject in the same material: Juan de Juin (d. 1614) is a case in point. Pedro de Mena and Zarcillo achieved great success in this class of sculpture. A. Pujol of Catalonia and Peter Roldan carried on the Spanish tradition. The chief names in the 18th century are those of Don P. Duque Cornesso of Seville, Don J. de Hinestrosa, A. Salvador (known as "the Roman," d. 1766), Philip de Castro of Galicia, one of the most eminent sculptors of his time (d. 1775), and F. Gutierrez (d. 1782).[1]

If the immediate followers of Michelangelo showed a tendency to turn the characteristics of the master's style into exaggerated mannerism, the beginning of the 17th century finds Italian sculpture in a state of complete decadence, statuesque dignity having given way to violent fluttering movement and florid excesses, such as was revived in a later century. From Italy this "baroque" style spread over the whole continent of Europe and retained its hold for nearly two centuries. The chief sculptor and architect of this period was the Neapolitan, J. L. Bernini (1598–1680), who, with the aid of a large school of assistants, produced an almost incredible quantity of sculpture of the most varying degrees of merit and hideousness. His chief early group, the Apollo and Daphne in the Villa Borghese, is a work of wonderful technical skill and delicate high finish, combined with soft beauty and grace, though too pictorial in style. In later life Bernini turned out work of brutal coarseness,[2] designed in a thoroughly unsculpturesque spirit. The churches of Rome, the colonnade of St Peter's, and the bridge of S. Angelo are crowded with his clumsy colossal figures, half draped in wildly fluttering garments, —perfect models of what is worst in the plastic art. And yet his works received perhaps more praise than those of any other sculptor of any age, and after his death a scaffolding was erected outside the bridge of S. Angelo in order that people might walk round and admire his rows of feeble half-naked angels. For all that, Bernini was a man of undoubted talent, and in a better period of art would have been a sculptor of the first rank; many of his portrait-busts are works of great vigour and dignity, quite free from the mannered extravagance of his larger sculpture. Stefano Maderna (1571–1636) was the ablest of his contemporaries; his clever and much-admired statue, the figure of the dead S. Cecilia under the high altar of her basilica, is chiefly remarkable for its deathlike pose and the realistic treatment of the drapery. Another clever sculptor was Alessandro Algardi of Bologna (1598 ?–1654), who formed a school, which included G. Brunelli, D. Guidi and C. Mazza of Bologna.

Baroque sculpture in Italy.

In the next century at Naples Queirolo, Corradini and Sammartino produced a number of statues, now in the chapel of S. Maria de' Sangri, which are extraordinary examples of wasted labour and neglect of the simplest canons of plastic art. These are marble statues enmeshed in nets or covered with thin veils, executed with almost deceptive realism, perhaps the lowest stage of tricky degradation into which the sculptor's art could possibly fall.[3] In the 18th century Italy was naturally the headquarters of the classical revival, which spread thence throughout most of Europe. Canova (1757–1822), a Venetian by birth, who spent most of his life in Rome, was perhaps the leading spirit of this movement, and became the most popular sculptor of his time. His work is very unequal in merit, mostly dull and uninteresting in style. and is occasionally marred by a meretricious spirit very contrary to the true classic feeling. His group of the "Three Graces," the "Hebe," and the very popular "Dancing-Girls," copies of which in plaster disfigure the stairs of countless modern hotels and other buildings on the Continent, are typical examples of Canova's worst work. Some of his sculpture is designed with far more of the purity that distinguished antique art; his finest work is the colossal group of Theseus slaying a Centaur, at Vienna. Canova's attempts at Christian sculpture are singularly unsuccessful, as, for example, his pretentious monument to Pope Clement XIII. in St Peter's at Rome, that to Titian at Venice, and Alfieri's tomb in the Florentine church of S. Croce. Fiesole in the 19th century produced one sculptor of great talent, named Bastianini. He worked in the style of the great 15th-century Florentine sculptors, and followed especially the methods of his distinguished fellow-townsman Mino da Fiesole. Many of Bastianini's works are hardly to be distinguished from genuine sculpture of the 15th century, and in some cases great prices have been paid for them under the supposition that they were medieval productions. These frauds were, however, perpetrated without Bastianini's consent, or at least without his power to prevent them. Several of his best terra-cotta works may be seen in the Victoria and Albert Museum.

The classicist revival in Italy.

Whilst monumental sculpture in France during the 17th century continued to be influenced by Italy, the national tradition was carried on to a certain extent by such portraitists as the two Coustous and their master Coysevox (1640–1720), whose works are marked by a great sense of life and considerable technical skill. The exaggerated elegance in the treatment of the female figure, which became so marked a characteristic of French sculpture during this period, is the chief trait of François Girardon (1630–1715), who was chiefly employed on the sculptural decorations at Versailles, and on the famous equestrian statue of Louis XIV., which was destroyed during the Revolution and for which hundreds of exquisite drawings and studies were made, now in the French national collection. Far more strength and grandeur mark the work of Pierre Puget (1622–1694), who is best known by his "Milo of Crotona" for Versailles. His training was entirely Italian, and in style considerably influenced by Bernini. He worked for some considerable time in Italy, particularly in Genoa. The same opposed movements which run side by side in French 18th-century painting, academic allegory and frivolous sensuality, can be traced in the sculpture of this period. Of

In France.

[1] For the earlier history of Spanish sculpture, see Don Juan Augustin Cean Bermudez, *Diccionario historico de los mas illustres professores de las bellas artes en Espagna* (Madrid, 1800, 6 vols.). For the later sculptors, see B. Händke, *Studien zur Geschichte der spanischen Plastik* (Strasburg, 1900).

[2] The Ludovisi group of Pluto carrying off Proserpine, now in the Borghese Gallery, is a striking example, and shows Bernini's deterioration of style in later life. It has nothing in common with the Cain and Abel or the Apollo and Daphne of his earlier years.

[3] In the 19th century an Italian sculptor named Monti won much popular repute by similar unworthy tricks; some veiled statues by him in the London Exhibition of 1851 were greatly admired; since then copies or imitations of them have enraptured the visitors who have crowded round the Italian sculpture stalls at every subsequent international exhibition.

the first, the chief representatives are Lemoyne and his pupil Falconet, who executed the equestrian statue of Peter the Great at St Petersburg; of the other, Clodion, whose real name was Claude Michel (*c.* 1745–1814). The latter worked largely in terra-cotta, and modelled with great spirit and invention, but in the sensual unsculpturesque manner prevalent in his time.

Eighteenth century.

In the later part of the 18th century France produced two sculptors of great eminence in Jean-Baptiste Pigalle (1714–1785) and Jean Antoine Houdon (1740–1828). Houdon may be regarded as the precursor of the modern school of French sculpture of the better sort. Towards the end of the 18th century a revolution was brought about in the style of sculpture by the suddenly revived taste for antique art. A period of dull pseudo-classicism succeeded, which in most cases stifled all original talent and reduced the plastic arts to a lifeless form of archaeology. Regarded even as imitations the works of this period are very unsuccessful: the sculptors got hold merely of the dry bones, not of the spirit of classic art; and their study of the subject was so shallow and unintelligent that they mostly picked out what was third-rate for special admiration and ignored the glorious beauty of the best works of true Hellenic art. Thus in sculpture, as in painting and architecture, a study which might have been stimulating and useful in the highest degree became a serious hindrance to the development of modern art; this misconception and misdirection occurred not only in France but in the other countries of Europe. In France, however, the victories of Napoleon I. and his arrogant pretension to create a Gaulish empire on the model of that of ancient Rome caused the taste for pseudo-Roman art to be more pronounced than elsewhere.

Early 19th century.

Among the first sculptors of this school were Antoine Chaudet (1763–1810) and Joseph Bosio (1769–1845). The latter was much employed by Napoleon I.; he executed with some ability the bronze spiral reliefs round the column of the Place Vendôme and the statue of Napoleon on the top, and also modelled the classical quadriga on the triumphal arch in the Place du Carrousel. Jacques Pradier of Geneva (1790–1852) produced the "Chained Prometheus" of the Louvre and the Niobe group (1822). He possessed great technical ability, but aimed in most of his works at a soft sensuous beauty which is usually considered to be specially unsuited to sculpture. François Rude (1784–1855) worked in a style modelled on Graeco-Roman sculpture treated with some freedom. His bronze Mercury in the Louvre is a clever work and the enormous high-relief on the Arc de l'Étoile in Paris, representing "The Song of Departure to Battle," is full of vigour and movement, but his statues of Marshal Ney in the Luxembourg Gardens and of General Cavaignac (1847) in the cemetery of Montmartre are conspicuously poor. The reliefs on the pediment of the Panthéon are by Pierre Jean David of Angers (1789–1856); his early works are of dull classic style, but later in life he became a realist and produced very unsculpturesque results. A bronze statue of a Dancing Fisher-lad modelled by François Joseph Duvet, now in the Luxembourg collection, is an able work of the *genre* class. Other French sculptors who were highly esteemed in their time were Ottin, Courtet, Simart, Etex and Carpeaux. The last was an artist of great ability, and produced an immense number of clever but often, sculpturesquely considered, offensive statues. He obtained the highest renown in France, and, hailed as a great innovator by those who welcomed a greater measure of naturalism, he was denounced by the "pure" and classic school as a typical example of the sad degradation of taste which prevailed under the rule of Napoleon III.

The modern schools of French sculpture are the most important in the world; they are dealt with in a separate section later. Technical skill and intimate knowledge of the human form are possessed by French artists to a degree which has probably never been surpassed. Many of their works have a similar fault to that of one class of French painters: they are much injured by an excess of sensual realism; in many cases nude statues are simply life-studies with all the faults and individual peculiarities of one model. Very unsculpturesque results are produced by treating a statue as a representation of a *naked* person,—one, that is, who is obviously in the habit of wearing clothes,—a very different thing from the purity of the ancient Greek treatment of the nude. Thus the great ability of many French sculptors has been degraded to suit, or rather to illustrate, the taste of the voluptuary. An extravagance of attitude and an undignified arrangement of the figures do much to injure some of the large groups which are full of technical merit, and executed with marvellous anatomical knowledge. This is specially the case with much of the sculpture that decorates the buildings of Paris. The group of nude dancers by Carpeaux outside the opera-house is a work of astonishing skill and sensual imagination, unsculpturesque in style and especially unfitted to decorate the comparatively rigid lines of a building. The egotism of modern French sculptors, with rare exceptions, has not allowed them, when professedly aiming at providing plastic decoration for buildings, to accept the necessarily subordinate reserve which is so necessary for architectonic sculpture. Other French works, on the other hand, have frequently erred in the direction of a sickly sentimentalism, or a petty realism, which is fatal to sculpturesque beauty; or they seek to render modern life, sometimes on the scale of life-size, even to the point of securing atmospheric effect. This exaggerated misconception of the function of sculpture can only be a passing phase; yet as any movement issuing from Paris finds adherents throughout other countries, the effect upon sculptors and upon public taste can hardly be otherwise than mischievous. The real power and merits of the modern French school make these faults all the more conspicuous.

Netherlandish sculptors.

Whatever work of importance was produced by Netherlandish sculptors in the 17th and 18th centuries, was due entirely to Italian training and influence. François Duquesnoy (usually called "The Fleming") (1594–1644) has already been mentioned; he worked principally in Rome, in rivalry with Bernini, and most of his works have remained in Italy, but, inasmuch as his style is conspicuously French, he is here included in the French school. His pupil Arthur Quellinus is best known by his allegorical groups on the pediments of Amsterdam town-hall, and has also left some traces of his activity in Berlin. P. Buyster, native of Brussels (b. 1595), passed into France and is also often classed as a French sculptor.

Scandinavian sculptors.

By far the greatest sculptor of the classical revival was Bertel Thorwaldsen (1770–1844), an Icelander by race, whose boyhood was spent at Copenhagen, and who settled in Rome in 1797, when Canova's fame was at its highest. The Swedish sculptors Tobias Sergell and Johann Byström belonged to the classic school; the latter followed in Thorwaldsen's footsteps. Another Swede named Fogelberg was famed chiefly for his sculptured subjects taken from Norse mythology. H. W. Bissen and Jerichau of Denmark produced some able works,—the former a fine equestrian statue of Frederick VII. at Copenhagen, and the latter a very spirited and widely known group of a Man attacked by a Panther.

Seventeenth century in England.

During the troublous times of the Reformation, sculpture, like the other arts, continued to decline. Of 17th-century monumental effigies that of Sir Francis Vere (d. 1607) in the north transept at Westminster is one of the best, though its design—a recumbent effigy overshadowed by a slab covered with armour, upborne by four kneeling figures of men-at-arms—is almost an exact copy of the tomb of Engelbert II. of Vianden-Nassau.[1] The finest bronze statues of this century are those of George Villiers, duke of Buckingham (d. 1628), and his wife at the north-east of Henry VII.'s chapel. The effigy of the duke, in rich armour of the time of Charles I., lies with folded hands in the usual medieval pose. The face is fine and well modelled and the casting very good. The allegorical figures at the foot are caricatures of the style of Michelangelo, and are quite devoid of merit, but the kneeling statues of the duke's children are designed with

[1] See Arendt, *Chateau de Vianden* (Paris, 1884).

grace and pathos. A large number of very handsome marble and alabaster tombs were erected throughout England during the 17th century. The effigies are poor and coarse, but the rich architectural ornaments are effective and often of beautiful materials, alabaster being mixed with various richly coloured marbles in a very skilful way. Nicholas Stone (1586–1647), who worked under the supervision of Inigo Jones and was master-mason to King Charles I., was the chief English sculptor of his time. The De Vere and Villiers monuments are usually attributed to him.[1] One of the best public monuments of London is the bronze equestrian statue of Charles I. at Charing Cross, which was overthrown and hidden during the protectorate of Cromwell, but replaced at the Restoration in 1660; it is very nobly modelled and was produced under Italian influence by the French sculptor Hubert Le Sœur (d. 1670). The standing bronze statue of James II., formerly behind the Whitehall banqueting room, very poorly designed but well executed, was the work of Grinling Gibbons (1648–1721), a native of Holland, who was chiefly famed for his extraordinary skill in carving realistic fruit and flowers in pear and other white woods. Many rich and elaborate works of his exist at Trinity College, Oxford, at Cambridge, Chatsworth, and several other places in England. In the early part of the 18th century he worked for Sir Christopher Wren, and carved the elaborate friezes of the stalls and screens in St Paul's cathedral and in other London churches.

Eighteenth century in England.

During the 18th century English sculpture was mostly in the hands of Flemish and other foreign artists, of whom Roubiliac (1695–1762), Peter Scheemakers (1691–1773), and J. M. Rysbrack (1694–1770) were the chief. The ridiculous custom of representing Englishmen of the 18th and 19th centuries in the toga or in the armour of an ancient Roman was fatal alike to artistic merit and eikonic truth; and when, as was often the case, the periwig of the Georgian period was added to the costume of a Roman general the effect is supremely ludicrous. Nollekens (1737–1823), a pupil of Scheemakers, though one of the most popular sculptors of the 18th century, was a man of very little real ability. John Bacon (1740–1799) was in some respects an abler sculptor. John Flaxman (1755–1826) was in England the chief initiator of the classical revival. For many years he worked for Josiah Wedgwood, the potter, and designed for him an immense number of vases covered with delicate cameo-like reliefs. Many of these, taken from antique gems and sculpture, are of great beauty, though hardly suited to the special necessities of fictile ware. Flaxman's large pieces of sculpture are of less merit, but some of his marble reliefs are designed with much spirit and classic purity. He modelled busts as well as small portrait medallions for production in Wedgwood's pottery. His illustrations in outline to the poems of Homer, Aeschylus and Dante, based on drawings on Greek vases, have been greatly admired, but they are unfortunately much injured by the use of a thicker outline on one side of the figures—an unsuccessful attempt to give a suggestion of shadow. Flaxman's best pupil was Baily (1788–1867), chiefly celebrated for his nude marble figure of Eve.

Modern German sculpture.

On the whole the 17th and 18th centuries in Germany, as in England, were periods of great decadence in the plastic art; little of merit was produced, except some portrait figures. Among the rare exceptions mention must be made of Andreas Schlüter, of Hamburg (*c.* 1662–1714), who produced many decorative bronze reliefs for the royal castle in Berlin, and the famous colossal equestrian statue of the Great Elector on the bridge in Berlin. Another artist who approached greatness in a period of utter degradation was Rafael Donner, whose principal work is the large fountain with lead figures of Providence and the four rivers of Austria (the Enns, Ybbs, Traun and March), in Vienna, a very remarkable example of baroque sculpture which to this day is known as the Donner fountain. In the second half of the 18th century there was a strong revival in sculpture, especially in the classic style; and since then Germany has produced an immense quantity of large and pretentious sculpture, mostly dull in design and second-rate in execution. Gottfried Schadow of Berlin (1764–1850) finished a number of portrait figures, not in the customary antique guise, but in the costume of the period. Some of his works are ably modelled. He was followed by Christian Rauch (1777–1857), whose works are, however, mostly weak and sentimental in style, as, for example, his recumbent statue of Queen Louisa at Charlottenburg (1813), and his statues of generals Bülow and Scharnhorst at Berlin. Rauch became the leader of an important school in Berlin, but will be most honourably remembered by his splendid monument of Frederick the Great, in Berlin—an elaborate work, modern in feeling and of great technical accomplishment. Friedrich Drake was the ablest of Rauch's pupils, but he lived at a very unhappy period for the sculptor's art. His chief work is perhaps the colossal bronze equestrian statue of King William of Prussia at Cologne. Albert Wolff was a sculptor of more ability; he executed the equestrian portrait of King Ernest Augustus at Hanover, and a "Horseman attacked by a Lion" now in the Berlin Museum. Augustus Kiss (1802–1865) produced the companion group to this, the celebrated Amazon and Panther in bronze, as well as the fine group of St George and the Dragon in a courtyard of the royal palace at Berlin. The St George and his horse are of bronze; the dragon is formed of gilt plates of hammered iron. Kiss worked only in metal. The bad taste of the first half of the present century is strongly shown by many of the works of Theodore Kalidè, whose "Bacchanal sprawling on a Panther's Back" is a marvel of awkwardness of pose and absence of any feeling for beauty. Ernst Rietschel (1804–1861) was perhaps the best German sculptor of this period, and produced work superior to that of his contemporaries, such as Haagen, Wichmann, Fischer and Hiedel. Rietschel's career was marked by steady progress from a meaningless classicism to serious realism. It was his task to erect monuments in memory of some of the greatest intellectual heroes of Germany, such as his Lessing monument in Braunschweig, the monument to Goethe and Schiller in Weimar, and that to Martin Luther at Worms. Some revival of a better style is shown in certain sculpture, especially reliefs, by Hähnel, whose chief works are at Dresden. Schwanthaler (1802–1848), who was largely patronized by King Louis of Bavaria, studied at Rome and was at first a feeble imitator of antique classic art, but later in life he developed a more romantic and pseudo-medieval style. By him are a large number of reliefs and statues in the Glyptothek at Munich and in the Walhalla, also the colossal but feeble bronze statue of Bavaria, in point of size one of the most ambitious works of modern times.[2] Johannes Schilling (b. 1826) is the author of the colossal national monument on the Niederwald near Rüdesheim, and Ernst Bandel of the imposing monument of Hermann Arminius in the Teutoburg Forest near Detmold.

It was Reinhold Begas (b. 1831) who definitely broke away from the all-pervading classicist tradition. His art has more in common with that of the Rococo period than with that of Canova and his followers. Not only did he excel in the rendering of textures, and in giving life and animation to his figures, but his earlier work was marked by unconventionality and great boldness of disposition. Unfortunately his rapid success, and the official favour that was shown to him, led him subsequently to hasty and what might almost be described as factory-like production. His work became pretentious, and though some of the reliefs and single figures on his monuments are remarkable for his keen gift of observation, the whole effect is frequently spoilt by the unnecessary introduction of disturbing decorative features, ill-disposed and singularly lacking in sculptural dignity. The monument of the emperor William I. with the two beautiful

[1] The Villiers monument is evidently the work of two sculptors working in very opposite styles. These monuments, however, are not included in the list of his works drawn up by Stone himself and printed in Walpole's *Anecdotes of Painting*, i. 239-243. This sculptor's receipts, recorded by his kinsman, Charles Stoakes, amounted to £10,889—an enormous sum for an English sculptor and "tomb-maker" of those days.

[2] In size, but not in merit, this enormous statue was surpassed by the figure of Liberty made in Paris by Bartholdi and erected as a beacon at the entrance to the harbour of New York City.

reliefs of Peace and War, and the Neptune fountain, both in front of the imperial palace, and the Schiller monument before the royal theatre, all in Berlin, are perhaps his most successful works. The Bismarck in front of the Reichstag building suffers from the excessive use of allegorical motifs and from other errors of taste.

Of Begas's many pupils, who participated in the execution of the numerous statues that flank the Siegesallee in the Berlin Thiergarten, the most distinguished is Joseph Uphues (b. 1850), who is the creator of the Moltke monument in Berlin, and of the Frederick the Great in the Siegesallee, a replica of which is to be found in Washington. Adolf Brütt (b. 1855) and Gustav Eberlein should be mentioned among the most successful Berlin sculptors; Robert Dietz, as the founder of an important school in Dresden; and Wilhelm Ruemann (d. 1906) and Rudolf Maison among the modern sculptors of Munich.

The closing years of the 19th century were marked by an enormous advance, not only in public appreciation of sculpture but in productive activity. The younger generation of Berlin sculptors includes such distinguished artists as Fritz Klimsch, who is best known by "The Triumph of Woman" and "The Kiss"; Hugo Lederer, the designer of the Bismarck monument in Hamburg; August Gaul, who excelled in statuettes of animals; Max Kruse, a woodcarver of great ability; and Louis Tuaillon, who spent his early years in Rome, and became famous for the excellent anatomy and action of his equine studies. Karl Seffner, of Leipzig; August Hudler, of Dresden; Georg Weba, Fritz Christ, Erwin Kurz, Hermann Hahn, Theodor von Gosen and Hugo Kaufmann, all of Munich, should also here be mentioned. Adolf Hildebrand (b. 1847) is best known by his Wittelsbach fountain in Munich and his Reinhard fountain in Strassburg. He has also executed some excellent medals and plaquettes. Franz Stuck, who has ranked among the leading painters of modern Germany, has also produced some powerful pieces of sculpture, such as the Beethoven, and the "Athlete holding a heavy Ball." Max Klinger (b. 1857), famous as painter and etcher, revived polychromatic sculpture in Germany. His Beethoven monument, at the Leipzig Museum, is the best known example of his work in this direction. The great composer is conceived as Jupiter enthroned, with the eagle at his feet. The work caused an enormous sensation on its first appearance before the public and became a veritable apple of discord around which a wordy war was waged by the different factions. The Leipzig Museum also owns his Cassandra and a rough-hewn portrait bust of Liszt. One of his most striking works is the Nietzsche bust at Weimar. At the Albertinum, in Dresden, is an important late work of his, a marble group of three beautifully modelled life-size figures, "The Drama." (J.H.M.; M.H.S.; P.G.K.)

Modern British sculpture.

During the first half of the 19th century the prevalence of a cold, lifeless pseudo-classic style was fatal to individual talent, and robbed the sculpture of England of all real vigour and spirit. Francis Chantrey (1782–1841) produced a great quantity of sculpture, especially sepulchral monuments, which were much admired in spite of their limited merits. Allan Cunningham and Henry Weekes, who excelled in busts of men, worked in some cases in conjunction with Chantrey, who was distinguished by considerable technical skill. John Gibson (1790–1866) was perhaps after Flaxman the most successful of the English classic school, and produced some works of real merit. He strove eagerly to revive the polychromatic decoration of sculpture in imitation of the *circumlitio* of classical times. His "Venus Victrix," shown at the exhibition in London of 1862 (a work of about six years earlier), was the first of his coloured statues which attracted much attention. The prejudice, however, in favour of white marble was too strong, and both the popular verdict and that of other sculptors were strongly adverse to the "tinted Venus." The fact is that Gibson's colouring was timidly applied: it was a sort of compromise between the two systems, and thus his sculpture lost the special qualities of a pure marble surface, without gaining the richly decorative effect of the polychromy either of the Greeks or of the medieval period. The other chief sculptors of the same inartistic period were Banks, the elder Westmacott (who modelled the Achilles in Hyde Park), R. Wyatt (who cast the equestrian statue of Wellington, removed from London to Aldershot), Macdowell, Campbell, Calder Marshall, and Bell. Samuel Joseph (d. 1850), working in a naturalistic spirit, produced some excellent work, notably (in 1840) the remarkable statue of Samuel Wilberforce now in Westminster Abbey. The brilliant exception of its period is the Wellington monument in St Paul's cathedral, probably the finest plastic work of modern times. It was the work of Alfred Stevens (1817–1875), a sculptor of the highest talent, who lived and died almost unrecognized by the British public. The value of Stevens's work is all the more conspicuous from the feebleness of most of the sculpture of his contemporaries.

During the last quarter of the century a great change came over British sculpture—a change so revolutionary that it gave a new direction to the aims and ambitions of the artist, and raised the British school to a level wholly unexpected. It cannot be pretended that the school yet equals either in technical accomplishment, in richness or elasticity of imagination, or in creative freedom, the schools of France and Belgium, for these have been built up upon the example of national works of many generations of sculptors during several centuries. British sculptors, whose training was far less thorough and intelligent than that which is given abroad, found themselves practically without a past of their own to inspire them, for there existed no truly national tradition; with them it was a case of beginning at the beginning.

The awakening came from without, brought to England mainly by a Frenchman—Jules Dalou as well as by Lord Leighton, Alfred Gilbert and, in a lesser degree, by Onslow Ford. To Carpeaux, no doubt—despised of the classicists—the new inspiration was in a great measure due; for Carpeaux, who infused life and flesh and blood into his marble (too much of them, as has been here shown, to please the lovers of purism), was to his classic predecessors and contemporaries much what in painting Delacroix was to David and the cold professors of his formal school. But it was to Jules Dalou that was chiefly due the remarkable development in Great Britain. A political refugee at the time of the Commune, he received a cordial welcome from the artists of England, and was invited to assume the mastership of the modelling classes at South Kensington. This post he retained for some years, until the amnesty for political offenders enabled him to return to his native land, but before he left he had succeeded in making it clear that severe training is an essential foundation of good sculpture. This had been but partly understood—is not even now wholly realized; yet by the impression he made, Dalou improved the work in the schools beyond all recognition. The whole conception of sculpture seemed to be modified, and intelligent enthusiasm was aroused in the students. When he departed, he left in his stead Professor Lantéri, who became a naturalized Englishman, and who exercised a beneficent influence over the students equal to that of his predecessor. Meanwhile, the Lambeth Art Schools—where Mr W. S. Frith, a pupil of M. Dalou, was conducting his modelling class under the directorship of John Sparkes (d. 1907)—were being maintained with great success. At the Royal Academy, where in 1901 the professorship of sculpture was revived after many years, the inspiring genius of Alfred Gilbert aroused the students to an enthusiasm curiously contrasting with the comparative apathy, which passed as dignified restraint, of earlier days. British sculpture, therefore, when it is not coloured directly from the Italian Renaissance, is certainly influenced from France. But it is remarkable that in spite of this turning of British sculptors to romantic realism as taught by Frenchmen and Italians, and in spite of the fact that the spirit of colour and decoration and greater realism in modelling had been brought from abroad, the actual character of British sculpture, even in its most decorative forms, is not in the main other than British.

Nevertheless, there has been shown a tendency towards reviving the application of colour in sculpture which has not

met with universal approval. Although the polychromatic work of the Renaissance, for example, may keep its place, it is held to clash with the idea of sculptural art; for though there is no absolute approach to imitation, there is a very strong suggestion of it. The use of a variety of marbles and metals, or other materials, such as has been increasingly adopted, does not offend in the same measure, as the result is purely formal. Yet, in the final result, the work becomes not so much sculpture broadly seen, as an "object of art," amiably imagined and delicately wrought.

Indeed, the sculptor has been greatly reinforced by the artificer in metal, enamel, and the like. But the revival of metal-work, cut, beaten, and twisted, however fine in itself, does not help sculpture forward very much. It may even keep it back; for, popular and beautiful as it is, it really tends to divert the attention from form to design, and from light and shade, with planes, to ingenuity, in pleasing lines—a very beautiful and elevated art, but not sculpture. As an adjunct, it may be extremely valuable in the hands of a fine artist who does not mistake the mere wriggles and doublings which are the mark of the more extravagant phase of the so-called "New Art" for harmonious "line." But it must always suggest the man with the anvil, shears, and pincers, rather than the man with the clay and the chisel. It is mainly to Alfred Gilbert that is due the delightful revival of metal-work in its finest form wedded to sculpture, with the introduction of marbles, gems, and so forth, felicitous and elegant in invention and ornament, and so excellent in design and taste that in his hands, at least, it is subservient to the monumental character of his sculpture.

The first effectual rebellion against the Classic, and the birth of Individualism, dates back to Alfred Stevens. The picturesque fancy of the Frenchman Roubiliac (who practised for many years in England), with his theatrical arrangement and skilful technique, inherited from his master Coustou, had left little mark on the Englishmen of his day. They went on, for the most part, with their pseudo-classic tradition, which Flaxman carried to the highest point. But until Stevens, few in England thought of instilling real life and blood and English thought and feeling into the clay and marble. It was not only life that Stevens realized, but dignity, nobility of form, and movement, previously unknown in English work. Follower though he was of Michelangelo and the Italian Renaissance, he was entirely personal. He was no copyist, although he had the Italian traditions at his fingers' ends, and his feeling for architecture helped him to treat sculpture with fine decorative effect. Yet even Stevens and his brilliant example were powerless to weaken the passion for the Greek and Roman tradition that had engrossed English sculptors—with their cold imitations and lifeless art, pursued in the name of their fetish, "the Antique."

Until towards the close of the 19th century this pseudo-classic art was blindly pursued by a non-Latin race, and a public favourite like W. Calder Marshall (1813–1894; A.R.A., 1844; R.A., 1852) never attempted, except perhaps in the "Prodigal Son," now at the Tate Gallery, to break away towards originality of thought.

Thomas Woolner (1825–1892; A.R.A., 1871; R.A., 1874), who had represented a modern heroine as a Roman matron, and had shown in his monument to Bishop Jackson in St Paul's cathedral an archaic severity and dryness altogether excessive, sought elevation of conception such as brought him applause for his "Tennyson" in portraiture and for his classically-inspired relief "Virgilia lamenting the Banishment of Coriolanus"—probably his most admirable and most exquisitely touching work.

Meanwhile, Baron Carlo Marochetti (1809–1867; A.R.A., 1861; R.A., 1866), an Italian of French parentage, had tried to introduce a more modern feeling, and his "Richard Cœur de Lion" at Westminster evoked great enthusiasm. It is difficult, now, to admire without reserve the incongruity of the 12th-century king, mounted on a modern thoroughbred, and raising arm and weapon with an action lacking in vigour. The intention was excellent and fruitful, notwithstanding, and the statue is not without merit. It was he who cast for Landseer the lions of the Nelson monument in Trafalgar Square, London.

Later on Charles Bell Birch (1832–1893; A.R.A., 1880), with his German training, introduced a new picturesque element in his "Wood Nymph," "Retaliation," "The Last Call," and the "Memorial to Lieut. Hamilton, V.C., dying before Kabul"; but neither the vigour nor the individuality of his work influenced his contemporaries to any extent, doubtless on account of the strong Teutonic feeling it displayed.

Sir Joseph Edgar Boehm, R.A. (1834–1890), an Austrian by birth, was more successful, and his influence, helped by the talent of able studio-assistants (Professor Lantéri, Alfred Gilbert, and others), contributed somewhat to thaw the chill which the cold marble still seemed to shed around. There was not much inspiration in his monument of "General Gordon" in St Paul's cathedral, and his "Wellington Memorial" is cold and empty, though correct enough; but the "Herdsman and Bull," among his ideal subjects, the "Carlyle" on Chelsea Embankment, among his portrait-statues, had the right feeling in them. His busts were usually excellent.

J. H. Foley (1818–1874; A.R.A., 1849; R.A., 1858), who at first was all for "the unities" and a "pure style," seemed in his later years to throw his previous convictions to the winds, when he produced the finely spirited equestrian statue of "General Sir James Outram," now erected in India, and the statue of Sir Joshua Reynolds in the Tate Gallery. This statue was welcomed with enthusiasm in the art world, and helped to remind the public that monuments need not be staid to dulness, nor stiff and dead in their imperturbability.

Meanwhile Henry Hugh Armstead (1828–1905; A.R.A., 1875; R.A., 1880), who had begun by devoting himself to the art of the silversmith, fashioning the "St George's Vase," "The Packington Shield," and "The Outram Shield," was working in the spirit of the younger school; he made his first appearance in the exhibitions in 1851. He was carrying out commissions of considerable magnitude—in the Palace of Westminster, and in the Abbey itself, for which he executed the marble reredos with its many figures, the whole of the external sculptural-decorations for the Colonial Office in Whitehall, as well as the eighty-four life-sized figures on two sides of the podium of the Albert Memorial, with the four bronze statues, "Chemistry," "Astronomy," "Medicine," and "Rhetoric." Portrait-figures of all ages are here classed together, and the work is a better-sustained piece of designing and carving than is commonly understood. The statue set up at Chatham of "Lieutenant Waghorn" is a good example of Armstead's sculpture, impressive by its breezy strength and picturesqueness; but a more remarkable work, technically speaking, is the memorial to a son of the earl of Wemyss, "David and the Lion," now fixed in the Guards' Chapel. It is in very flat relief; Ninevite in character of treatment, and carved wholly by the artist directly from the living model, it is, in point of technique, one of his best productions. His marble statuette of "Remorse," bought for the Chantrey Collection, is a remarkable example of combined intensity of expression and elevated purity of style. The work of Armstead is monumental in character—the quality which has been so rare among British sculptors, yet the finest quality of all; and in almost everything he did there is a "bigness" of style which assures him his place in the British school.

Following the chronological order of the artists' first public appearance, as being the most convenient and the only consistent method that will prevent overlapping, we come to F. J. Williamson (b. 1853), who executed many works for Queen Victoria; John Hutchison, R.S.A. (b. 1856), a Scottish sculptor of the Classic school; and George A. Lawson, H.R.S.A. (1832–1904). Lawson was a pupil of Alexander Ritchie, of the Royal Scottish Academy, and in a measure of Rome. He went to London in 1867, and soon proved himself one of the best sculptors Scotland has produced. "In the Arena" was his first striking group; "Daphnis" is an excellent example of his Classic life-size work; and "Motherless" one of his greater successes in a more modern and pictorial spirit, a group full of pathetic pathos and free and sympathetic handling. "Callicles," "The Weary Danaïd," "Old Marjorie," and the statue of "Robert Burns," erected at Ayr, are all in their way noticeable, Lawson's work, which only requires a little more animation to be fine, has the quality of "style," and is strong, manly, and full of distinction.

Sir Edwin Landseer (1802–1873) had exhibited in 1866 a "Stag at Bay," but his four colossal lions for the Nelson monument in Trafalgar Square, London, constitute his principal plastic works. They engaged him from 1859 to 1867, the year in which they were set up. The casting of them, as already stated, was carried out by Baron Marochetti. Each is 20 ft. in length and weighs 7 tons. They have great nobility and dignity of pose, and although they are not altogether sculptural in treatment, they are finely impressive with a good sense of style.

George Simonds (b. 1844) is a product of the foreign schools. He is the author of many monumental works and not a little decorative sculpture, but he is best recognized by ideal subjects, such as "Dionysus astride his Leopard" (his finest work), "The Goddess Gerd," "The Falconer" (in the Central Park, New York), "Cupid and Campaspe" and "Anemone, the Wind Flower." His treatment of the undraped female figure is refined and delicate, and there is an intellectual reality about his best work, as well as imagination in conception. A. Bruce-Joy (b. Dublin, 1842) has produced ideal work and statues of public men for public spaces, and many busts.

Thomas Brock (b. 1847; A.R.A., 1883; R.A., 1891), whose work is prodigious in amount as well as solid and scholarly, came to London from Worcester in 1866 and fell early under the influence of the sculptor Foley, who was soon to rebel against the formalism that prevailed. When his chief died, in 1874, Brock was appointed to carry out the great unfinished works in the studio—the "O'Connell Monument" in Dublin, the "Lord Canning" in Calcutta, and several others. But he felt the foreign current; and even when his style was formed, his career being already assured, he was perceptive enough to modify it, and, so developed, he left his master very far behind. The ideal work that marked this transition was "The

Moment of Peril," a fine, scholarly work representing a mounted Red Indian repelling the attack of a great serpent which has thrown his horse to earth. How greatly he improved in technical quality and in refinement of taste is to be seen in the life-sized marble statue called "The Genius of Poetry"—graceful where the "Moment of Peril" was violent in action, reposeful and harmonious where that was vigorous, and sculpturesque where that was anecdotal. A higher intellectual point was reached in "Song" and in the "Eve," now in the Tate Gallery in London. A similar advance is to be observed in Brock's portraiture. The statues of "Robert Raikes" (on the Thames Embankment) and "Sir Richard Temple" (in Bombay Town Hall), for example, are finely treated, unconventional figures; but "The Rt. Rev. Henry Philpott, D.D., Bishop of Worcester," in which the inherent difficulty of a seated figure is happily surmounted, marks the progress. The skill with which the artist has given the drapery, especially of the sleeves, a lightness not commonly seen, is striking. There are no black holes of shadow: the depressions are shallow and of the right shape to hold light even while securing shadow; yet weakness is avoided and crispness is secured by the sharpening of the edge of the folds—the principle which is established in the Pheidian group of "The Fates," for example, among the Elgin Marbles. Other works of importance in the same class are the effigy of "Dr Benson, archbishop of Canterbury," and the admirable statue of "Sir Richard Owen" in the Natural History Museum, South Kensington, and especially the "Thomas Gainsborough" in the Tate Gallery, are all of a high order whether as to character or handling. With these may be grouped the statue of "Sir Henry Irving," the tribute of British actors to the memory of the great dramatic artist (1910), and the seated marble statue of Lord Russell (1904). The bust of Queen Victoria is one of the noblest and most dignified works of its class executed in England; full of tenderness and of character, lovingly rendered; and with a delicate feeling for form, rightly realized. This head heralded the noble work by which the memory of Lord Leighton is to be kept green in the aisle of St Paul's cathedral. In proportion and in harmony of design and of line, alike in conception and in reticence, it is the sculptural expression of a well-ordered mind and taste. The effigy shows Leighton asleep, while figures personifying his arts, painting and sculpture, guard his sarcophagus at head and foot. There is a note of triumph in the great design for the "Queen Victoria Memorial," which provides London with its most elaborate sculptural effort, rising 70 ft. high on a plateau 200 ft. across, with numerous emblematical figures of great size and imposing arrangement. It is based on an elevated style, dignified, refined and monumental; for Brock is a sculptor in the full sense of the term, and his lines are always good.

D. W. Stevenson, R.S.A. (1842-1904), in his general work showed but little sympathy with modern developments. The "Bronze Lectern" (in St Cuthbert's Church, Edinburgh) is perhaps the most decoratively effective; but his most ambitious work, called "The Pompeian Mother," is a modern adaptation of the "Niobe and her Daughter" by a follower of the school of Scopas in the Uffizi Gallery.

Although Horace Montford, modelling master at the Royal Academy, passed much time in the studio of Matthew Noble (1818–1876), he did not thereby lose his sculptural taste. Not that he displayed it much in the share he had, as assistant to C. B. Birch, A.R.A., in the modelling of the notorious "City Griffin" at Temple Bar—a weird but spirited beast, the design for which had been supplied by the city architect, Sir Horace Jones. "A Hymn to Demeter," a life-size statue full of movement, and the statue of "Psyche and the Casket of Venus," may be named as typical of the style of Montford, whose work is usually broad and sculpturesque, distinguished by firmness and grace.

Sir Charles B. Lawes-Wittewronge (b. 1843) has produced three large works which have attracted attention: an elaborate and spirited equestrian group of a female Mazeppa—"They Bound me on" (1888); "The United States of America" (1890), decorative and not without elegance, and "The Death of Dirce." The last-named, of heroic size, in variously coloured bronze, was first exhibited at the Royal Academy in 1908, and again, in coloured marbles (yet not truly polychromatic in character) in colossal size, at the Franco-British Exhibition (1908). The complexity of the design, the skilful composition and arrangement of the elaborate group, the vigour of the modelling, and the impressiveness with which the work imposes itself upon the spectator, combine to render this perhaps the most important sculptured group of its kind exhibited in England. Sir Charles's work is always strong and robust, though occasionally somewhat lacking in repose.

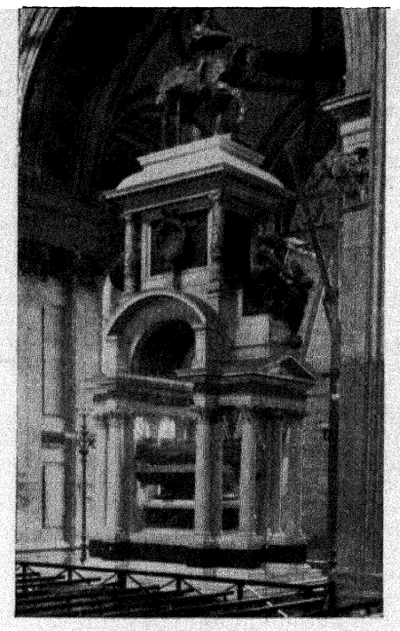
W. Hamo Thornycroft (b. 1850; A.R.A., 1881; R.A., 1888) became a great influence for good in the British school. His tendency towards the Greek has been a wholesome reminder of the danger of the over-enthusiasm for naturalism, and yet was never forced to conventionalism. Alike in ideal work, in monumental sculpture and in portraiture, his art is marked by refined taste and scholarship and a noble sense of beauty. It is strong, yet without undue display of power. In him we have to appreciate an unaffected sympathy with grandeur and style, and in all, a big, broad rendering of the human form, with something of the movement of the Greek sculptors and not a little of their repose, yet individual and unmistakably belonging to the British order of mind. In his largest monumental group, however, the "National Memorial to W. E. Gladstone," erected in the Strand, London, there is little trace of the Classic. In this work, as in the bronze statue of Bishop Creighton in St Paul's Cathedral, there is a modern feeling entirely responsive to the feeling of the people. Mr Thornycroft's seated marble statue of Lord Tennyson (1909) in Trinity College, Cambridge, is one of his finest portrait figures, full of dignity and excellent in likeness—a worthy memorial of the poet.

J. Havard Thomas began in 1872 to exhibit portrait sculpture, and soon turned his attention to ideal work, but he did not attract widespread attention until 1886, when he produced "The Slave Girl." This marble nude was a curious contrast to most Slave Girls by other sculptors—that by Hiram Powers, for example. Somewhat stunted in form, she is nevertheless full of very human grace and well-felt realism, and is a good example of the artist's carving. Mr Thomas, indeed, is one of the few to carve his own marbles, often without taking the intermediate step of making a clay model. This of course cannot be the case with his large sculpture, such as his great statue of "The Rt. Hon. W. E. Forster" at Bradford, and his "Samuel Morley, M.P.," and "Edmund Burke, M.P.," both at Bristol; but the beautiful small heads of peasants and children—such as the Donatellesque "Pepinella"—of Capri, where he lived for years from 1889 onwards, are mostly carved direct from life. The beauty of his chisel work can be seen to perfection in the exquisite bust of Mrs Wertheimer in the Tate Gallery; the marble seems to turn to flesh under his chisel and to palpitate with life: it is, perhaps, too much like flesh. This is very far from the "Classic," with over-attention to which Mr Thomas has curiously and quite inaccurately been reproached. It is true that his much discussed statue "Lycidas" appears to be a distant echo of Myron; it is in truth archaistic, but with an aim altogether different from that of the Greek. It is Classic in a sense, full of life and wonderfully modelled, but the attainment of perfection of human beauty was not the intention of the sculptor, and yet it appears to the unobserving as but a *rifacimento*. There is a vivid sense of style in Mr Thomas's work, and sometimes a search for beauty in subjects which to the common eye may suggest the ugly. But Mr Thomas must be recognized as an artist of great power and originality and to the last degree conscientious. Sculptural subtleties he loves, and he works in a low key, quiet and unobtrusive, and severe though he is, he is a poet in sentiment with extreme refinement of taste. His reliefs are fine in rhythm, and by their accentuated definition, allied with delicacy, extremely telling.

From the year 1873 Edwin Roscoe Mullins (d. 1905) produced numerous busts and statues, and his work was in the main ideal and decorative. His best figure is probably that of "Cain—My Punishment is Greater than I can Bear," executed in 1896; his latest work, "The Sisters" (1905), shows considerable grace. Mullins' work in architectural embellishment was good in style, appropriate and effective.

Joseph Swynnerton (d. 1910) was a sculptor who spent a good deal of his time in Rome and worked under her influence. His colossal fountain of flowers, zephyrs and splashing nymphs is, on the contrary, rather rococo in style, with charming passages. On the other hand, "Love's Chalice" is Classic in feeling. Generally speaking, Swynnerton's work has an appearance of strength, without commonness or lack of effect.

E. Onslow Ford (1852–1901; A.R.A., 1888; R.A., 1895) was lost to British art before he had passed middle age. His seated statue of "Henry Irving as Hamlet" is a well-conceived piece of realism, with expression subtly marked, and verging upon the theatrical—which is precisely what an actor's character-portrait should be. Compared with this work, the later seated statue, that of "Huxley," keen and refined, is more strictly sculpturesque—for in it there is no "subject," and there are no ornaments to divert the attention and suggest a false appearance of decoration. The statue of "Gordon" mounted on a camel—reminding us too vividly of the "Arab Chief" by Barye—is more open to criticism on the score of the elaborateness of the ornamental details, which almost reach the boundary of what is allowable in sculpture. It is erected at Chatham, and a replica has been set up (1902) in Khartum. A finer memorial is that to the honour of "Shelley." It is, however, better in its parts than in its entirety, because the decorative scheme injures, rather than helps, the sculptural dignity of the drowned poet's exquisitely-rendered figure. Of Onslow Ford's other memorials, that of Queen Victoria at Manchester is perhaps the most discussed and the least to be admired, for although the conception is dignified and characteristic, it does not rank by any means with the best of which the artist was capable. As a truthful portraitist Onslow Ford had few rivals. The sitter is before the spectator, without undue flattery, yet without ever showing the commoner side of the model. Flesh, bone, hair, clothing, are all in their true relation, and the whole is admirably realized. Idealism, or at least poetic realism, Onslow Ford cultivated in a series of small works. Of his last figure, "Glory to the Dead," it may be said that, although statuesque, it carries realism rather far in treatment. It may be objected that in funerary art, so to call it, the nude was never resorted to by the Greeks in such a relation; but Onslow Ford felt that he was working, not for ancient Greeks, but for modern Englishmen, and that sentiment, and not

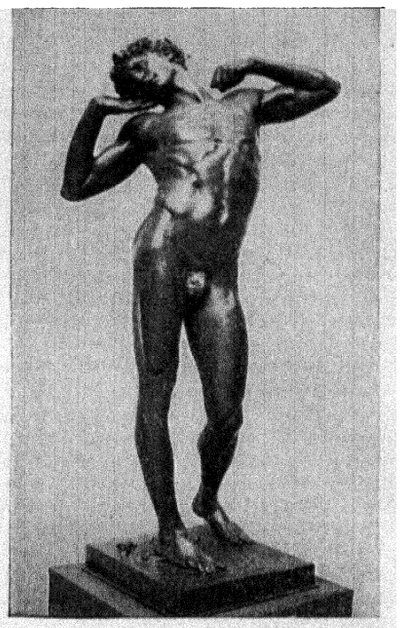


(*Photo, London Stereoscopic Co.*)

ALFRED STEVENS—The Wellington Monument, St. Paul's Cathedral, London.

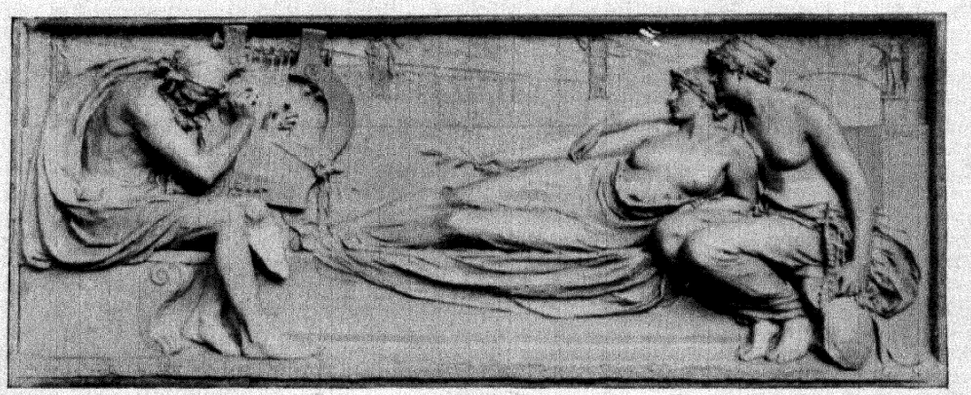


SIR GEORGE FRAMPTON, R.A.—The Dr. Barnardo Memorial.



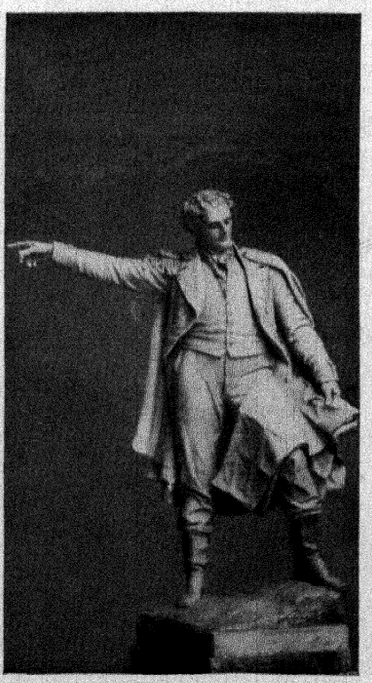
(*Photo, Mansell & Co.*)

LORD LEIGHTON, P.R.A.—The Sluggard.



(*Photo, Frederick Hollyer.*)

HARRY BATES, A.R.A.—Homer.



H. H. ARMSTEAD, R.A.—Lieutenant Waghorn

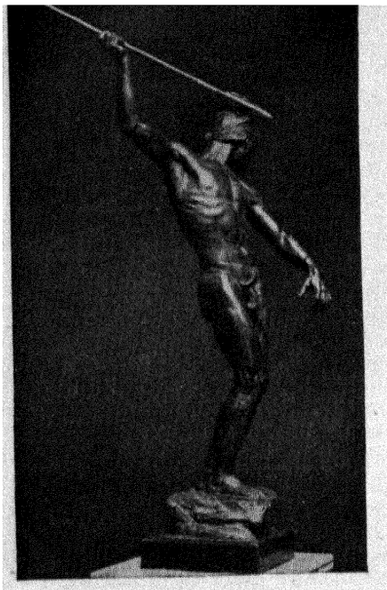


G. F. WATTS, R.A.—Hugh Lupus.

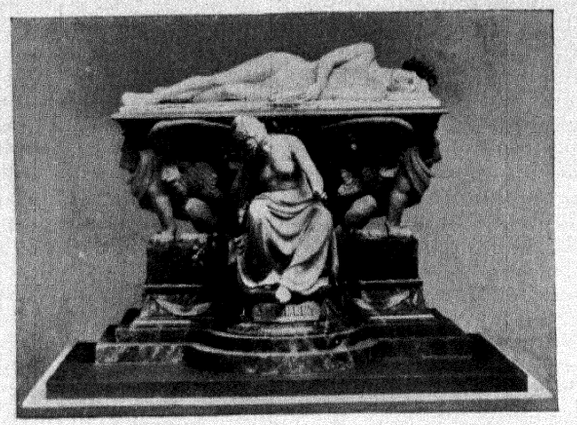


A. GILBERT, M.V.O.—Icarus.

SCULPTURE



F. W. POMEROY, A.R.A.—The Spearman.



E. ONSLOW FORD, R.A.—Shelley Memorial.



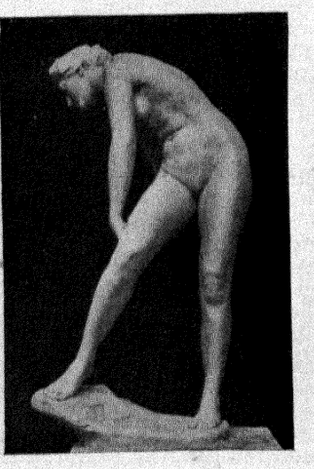
W. HAMO THORNYCROFT, R.A.—
Teucer.



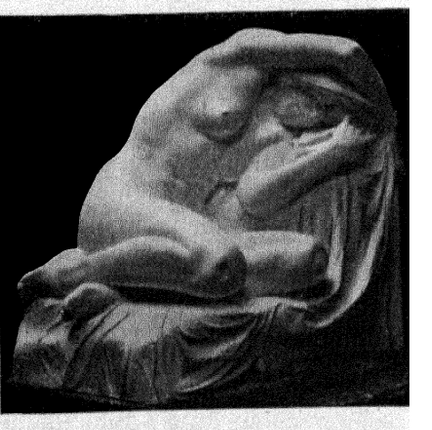
ALFRED DRURY, A.R.A.—
Innocence.



F. DERWENT WOOD, A.R.A.—
Psyche.



BERTRAM MACKENNAL, A.R.A.—
Diana Wounded.



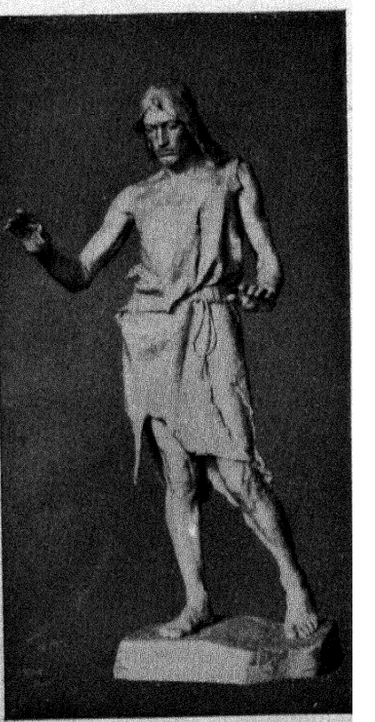
ALBERT TOFT—
Antigone.



HAVARD THOMAS—Lycidas.



W. HAMO THORNYCROFT, R.A.—Dean Colet.



W. GOSCOMBE JOHN, R.A.—
St John the Baptist.

animal anatomy; his range is considerable, and he is as easy with a rhinoceros as with a cart-horse or a hunter.

Conrad Dressler is best known for his busts of distinguished men, but his statue of "A Girl Tying up her Sandal," and his two large marble panels for St George's Hall, Liverpool, assured him his position. There is a cleverness, a daring, in his marked style, vigour of treatment, and a tendency towards emphasis, especially in his decorative work, much of which is designed for execution in Della Robbia ware. Since his return to pure sculpture he has executed some important work, including a bronze "Bacchante."

In the work of Harry Bates (1850–1899; A.R.A., 1892), especially in the reliefs, with its balance and dignity, its rhythmical line and fine expression, is to be seen a flexibility which few Englishmen had shown up to that time. Style and a genuinely modern treatment of classic form, which is not weakened by touches of naturalism, were also to be recognized. Nor—in his "Homer," for example—does the background detract from the main subject: Homer and Humanity in front; and behind, a vision of the Parthenon and Pallas Athene, and the great Sun of Art rising with the dawn of Poetry. "Psyche" is more delicate in thought and treatment, but it has little of the originality or force of the "Homer," or of the classic style seen in the head called "Rhodope." The serene and reposeful statue of "Pandora," about to open her ivory casket, successfully achieves the purity of style at which the sculptor aimed. "Hounds in Leash" (the bronze of which belongs to the earl of Wemyss) is a vigorous group which was undertaken by Bates in response to the criticism that he could design no figures but such as are at rest. The plastic group is in the Tate Gallery, where it figures along with the "Pandora." In "Endymion" the sculptor seems to have united in some degree the sculptural ideas expressed in the "Homer" and the central relief of "Psyche": there is in it a good deal of the grace of the one and of the decorative force of the other, together with a lofty sense of beauty. The portrait-busts of Harry Bates are good pieces of realism—strong, yet delicate in technique, and excellent in character.

Sir George Frampton (b. 1860; A.R.A., 1894; R.A., 1902; knighted, 1908), pupil of the Royal Academy, the Lambeth Schools, and Mercié in Paris, is a particularly versatile and original artist, thoroughly in the "new movement" which he has done so much to direct. Highly accomplished, he is at home in every branch of his art, and covers the whole field. He first exhibited "Socrates Teaching" (1884), and followed this with "The Songster" (1887), "An Act of Mercy" (1888), "In Silence Prayeth She," "The Angel of Death" (1889), "Caprice" (1891), and in 1892 "The Children of the Wolf"—his last ideal statue of the kind. It was followed by "Mysteriarch," heralding a class of work with which the artist has since identified himself; for being in open rebellion against "white sculpture," he thenceforward devoted himself to colour. "Mother and Child" is an experiment in polychromatic figure-work. The half-length figure called "Lamia," with ivory face, head, and neck, and in a quaint head-and-neck dress of bronze jewelled, is a further departure from the true reserve of sculpture, but beautiful and delightful in feeling. The statue of "Dame Alice Owen," in bronze and marble, and "King Edward VI." are original, notwithstanding the pseudo-medieval taste of their conception. Frampton is happiest in distinctly decorative sculpture. His prolific and inventive fancy has expressed itself in such works as the bronze "The Steamship" and "The Sailing Ship" for Lloyd's Registry in London, and in the memorial "Monument to Charles Mitchell," at Newcastle-on-Tyne. Herein a new note is sounded, and we have some of the most striking features of Frampton's design. That is to say, he seeks to escape from the purely architectural forms, pediments and mouldings, introducing his own inventions of curved lines, and frequently substituting tree-forms for columns or pilasters, with roots for bases, trunks for pillars, and branches and foliage for capitals. Besides these should be mentioned "The Vision," the seven heroines from the *Morte d'Arthur*, "My Thoughts are my Children," "Music" and "Dancing," and memorials and busts of "Charles Keene," "R. Stuart Poole," "Leigh Hunt," "Passmore Edwards," "Dr Garnett," a colossal statue of "Queen Victoria" erected in Calcutta, and another, an extremely successful work, for Leeds. His group of "Maternity" (1905) and the full-length seated statue of the marquess of Salisbury (1907) have added to his reputation. There are always charm of arrangement, delicacy of workmanship, and daintiness of feeling, as well as considerable power of design, simplicity, and breadth in his work. Sir George Frampton has also produced a number of fine medals.

W. S. Frith, one of the most successful teachers of sculptors in England, is chiefly remarkable for the decorative quality of his work. As in the monument to "Wheatstone, Inventor of the Telegraph," or again, the standard lamps at the Astor Estate Office on the Thames Embankment, the sculptor shows charm of thought and spirit of design, vigour, and richness of effect. His ideal statuary and portraiture are not his chief work, however; his decorative sculpture for ecclesiastical and secular buildings is vast in extent and has had good influence on the younger school. One of his chief works is the "Bishop Ellicott's Memorial," a tomb with recumbent figure, a design of considerable imagination.

Henry A. Pegram (b. 1862; A.R.A., 1904), a pupil of Hamo Thornycroft and of the Royal Academy, attracted early attention with "Death Liberating a Prisoner," and by the two high reliefs "Ignis Fatuus" (acquired for the Chantrey Collection) and "The Doom of Medusa." These were followed by "Eve," "Sibylla Fatidica," "The Last Song," "The Bather," "Labour," and "Fortune," by decorative work for the exterior of the Imperial Institute, and later by the great candelabra which flank the interior western end of St Paul's cathedral. "Into the Silent Land" (1905) is a group typical of the funerary sculpture on which his chisel was engaged in later years. His portraiture is also noteworthy, and his work generally is usually sculpturesque, with movement and life.

A. G. Walker has produced notable work in the class of pure sculpture, including the relief representing "The Last Plague: The Death of the Firstborn," "Adam and Eve: And They were Afraid" and "The Thorn" (exhibited in bronze in 1910), graceful and quaintly charming, with elegance in the pose and in the action. His chief decorative work includes the sculptural figures in Stamford Hill Church.

The name of Captain Adrian Jones was for many years chiefly associated with the spirited work called "Duncan's Horses," a group displaying great knowledge of equine anatomy, form and action; since then his equestrian statue of "The Duke of Cambridge," erected in Whitehall, London, outside the War Office, has been recognized as a vigorous performance. His most important work is the monumental quadriga designed to crown Burton's great Arch at Hyde Park Corner, London.

W. Reynolds-Stephens (b. 1862), more devoted to goldsmith's figure-work than to larger and more searching sculpture, must be considered less as a statuary than as "a poet who sings in metal." A relief, after Sir L. Alma-Tadema's "Women of Amphissa" (1889), was followed by a "Wall Fountain," "Truth and Justice," and the "Sleeping Beauty," a bas-relief, full of thought, invention, and dainty conceits. In the highly decorated "Launcelot and the Nestling," "Guinevere and the Nestling," and similar works, the artist makes use of various coloured metals, ivory, gems and the like, with pretty symbolism. Apart from his choice of material, there is a delicate languor about the lines of his figures and reliefs, which display a charming feeling and refined taste. By two striking works he has re-entered the field of pure sculpture—the dramatic and somewhat too anecdotal "A Royal Game" and "The Scout in War," exhibited in 1908, an equestrian group of great refinement and excellence.

Alfred Drury (b. 1857; A.R.A., 1900) was a pupil of Dalou, whose assistant for a time he became. The first result was the curious echo of the master's style, "The Triumph of Silenus" (1885). "The Genius of Sculpture" and "The First Reflection" (bought by the queen of Saxony) and "The Evening Prayer" (1890, Manchester Corporation Gallery) were followed by the statue of "Circe" (1893), which, through its grace, elegance of line, and symbolical realization of the subject, achieved a great popular success and was acquired by Leeds. The bronze head of "St Agnes" (1894) is one of the first examples of Mr Drury's later style, belonging to the higher order of conception which, generally speaking, he has since maintained. This may be seen also in "Griselda" (bought for the Chantrey Collection), "The Age of Innocence," and other busts symbolical of childhood, and in the series of "The Months," at Barrow Court. For the decoration of the City Square at Leeds Drury executed the statue of Dr Priestly, consisting of the colossal figure entitled "Even." His colossal groups for the decoration of the War Office, the monumental panels in high relief for the piers of Lambeth Bridge, and the decorative sculpture for the façade of the new Victoria and Albert Museum, all in London, are works of considerable importance. Among the latter are the figures of "Inspiration" and "Knowledge," executed in 1907. Drury's quiet, suave, and contemplative art lends itself well as decorative sculpture to architectural embellishment. His portraiture is also good, reticent, and full of character, and as a manipulator of clay he represents the highest contemporary standard of English sculptors.

Frederick W. Pomeroy (A.R.A., 1906), pupil of the Lambeth and Royal Academy Schools, and of Mercié, is of equal taste and ability. After 1888, when he exhibited the bronze statuette "Giotto," he produced many ideal works—"Love, the Conqueror" (Walker Art Gallery, Liverpool), "Pleasures are like Poppies Spread," "Boy Piping," "Dionysos," and "The Nymph of Loch Awe" (both in the Tate Gallery), "A Nymph Finding the Head of Orpheus," "Undine," "Pensée," and the clever study of the nude called "The Potter." "Perseus" is an inspiration from Benvenuto Cellini, but "The Spearman" is an original and powerful work. "Feroniae" (1909) is a nude statue, in bronze, remarkable for grace and sculptural animation. In ideal portraiture he has produced the statues of "Admiral Blake," "Dean Hook" (a colossal work for Leeds), "Oliver Cromwell" (also colossal, for St Ives, Huntingdonshire), "Robert Burns" for Paisley, as well as "R. P. Bonington" (1910), "Monsignor Nugent of Liverpool" (1905), an impressive group, and similar work, together with the life-size panel of "Archbishop Temple," in bronze, for St Paul's cathedral. In true portraiture, Pomeroy executed the Liberal Memorial Statue of Mr Gladstone, in the lobby of the Houses of Parliament, and the recumbent effigy of the Duke of Westminster, for Chester cathedral. His work is strong and sculpturesque, and his statues "stand" well. He sees nature in a big broad way, and his decoration is effective and well designed.

Albert Toft became known by his statue of "Lilith" (1889), and

emphasized the impression then created by "Fate-Led" (1892, Walker Art Gallery), "Age and the Angel of Death," "In the Sere and Yellow Leaf" (a remarkable study of old age), "The Goblet of Life," and "Hagar." "The Spirit of Contemplation" and "The Cup of Immortality" are more complete and display dignity and refinement. His memorials of the Boer War, at Cardiff and Birmingham, in design and silhouette, are among the most striking in the country. In "Mother and Child" (1903) and "Maternity" (1905) he has greatly raised the high-water mark of his achievement. Toft's busts, such as those of W. E. Gladstone and Philip Bailey, as well as his statue of Sir Charles Mark Palmer, at Jarrow, and similar works, have force and breadth of character; and in his ideal work there is an effort, well sustained and successful, after dignity, harmony, evenness of balance, and relation of the whole.

Professor Edouard Lantéri, a naturalized Englishman, to whom British sculpture owes much, employed his own striking gifts to teach rather than to produce. But "The Fencing Master," "The Duet," and "A Garden Decoration" have exercised influence on the younger school through their fine sculptural qualities of vitality, richness, joyousness, sensuousness, and movement. His portrait busts are full of life and have that refinement and elegance pushed to the utmost length, which are characteristic of all his work; in his nude figure called "Pax" we have much of the severity, dignity, and placid repose of the Greek.

W. Birnie Rhind, R.S.A., has produced little work so important as the elaborate decorations for the doorway of the Scottish National Portrait Gallery, but some of his statues and busts—"King James V. of Scotland," "Lord Salisbury," and others—show the influence of the modern school.

W. Goscombe John (b. 1860; A.R.A., 1899, R.A., 1909) achieved an early reputation with a figure of "St John the Baptist," an austere creation of real importance. His other chief works are "Morpheus," "A Girl Binding her Hair," "A Boy at Play" (Tate Gallery), "The Glamour of the Rose," and "The Elf"—a weird creation of true comedy. In these are shown a love of the purity and refinement of nature, realized with delicacy and a feeling for beauty. In portraiture Mr John is not less successful. The colossal seated statue of "The Duke of Devonshire" at Eastbourne has been acknowledged by the best critics in France and England to be one of the finest things of its kind, good in design and quiet suggestion of power. Among his chief memorials are the tomb of the marquess of Salisbury in Westminster Abbey, the "Memorial of the King's Regiment" at Liverpool, the equestrian statue of "Viscount Tredegar" at Cardiff, the "Maharajah of Balrampur" at Lucknow, and the monument to Sir Arthur Sullivan in the Embankment Gardens, London. These all sustain the reputation of the sculptor who has from the first been loyally encouraged by his fellow-countrymen of Wales. The striking frieze "The Battle of Trafalgar," for the pedestal of the statue of Viscount Tredegar (1910), is a remarkable performance.

Bertram Mackennal (A.R.A., 1909), the son of a Scottish sculptor settled in Australia, acknowledges no school, but was chiefly influenced by study in Paris. In his early ideal works, such as "Circe" and "For She Sitteth on a Seat in the High Places of the City," there are boldness and a sense of drama, with a keen appreciation of elegance of form, not without severity and power of design. But they give little hint of the excellence that was to follow and to bring him to the very front rank of British sculptors, so that in 1910 he was selected to design the coinage of the new reign. His great pediment in the Local Government Offices in Whitehall is perhaps the finest work of its kind in the Kingdom. "Diana," 1908, bought for the Chantrey Collection in the same year, is a marble nude of extraordinary grace, beauty, and refinement; and his small "Earth and the Elements," similarly acquired in the preceding year for the Chantrey Collection, reveals a poetic beauty rare in these days. "The Mother" (1910) belongs to this group. The bronze statue of "The Dancer" (1904) is a work not less subtle, in which the learnedness of the sculptor is evident to every discerning eye, and "War," a colossal female bust, reveals a power, amounting almost to ferocity, not disclosed in the other works. Among Mackennal's other important statuary are the War Memorial at Islington and statues of Queen Victoria for India, Australia, and Blackburn; in all of these the sculpture is marked by good style, with movement, vigour, grace and nervousness of treatment.

G. Herbert Hampton made his first appearance in the Paris Salon with "The Mother of Evil," and then the statues of "David" and Apollo" and "The Broken Vow," "A Mother and Child," "Narcissus," "Orpheus" and other works were seen in the London galleries. Portraiture of merit has come from Mr Hampton, but his greatest success, perhaps, has been achieved in decorative sculpture.

F. E. Schenck (d. 1908) was similarly and more emphatically an architect's sculptor—one of those who have done much to embellish many of the numerous great buildings which during the last twenty years of the 19th and the opening decade of the present century sprang up all over Great Britain. The municipal buildings at Stafford and Oxford, the public library at Shoreditch, and the *Scotsman* offices in Edinburgh—involving groups of colossal figures bearing close relation to their architectural setting—are among the works which made his reputation. His defect was a "curliness" in his ornamental forms, which frequently detracts from the dignity and seriousness of his work.

J. Wenlock Robbins is another architectural sculptor of real power and individuality, whose work for the New General Hospital in Birmingham and for the Town Hall of Croydon is of a high order. His portraiture is also good, the colossal statue of "Queen Victoria" for Belfast being the most important of his achievements. Of ideal work, the statue called "Nydia" is the best known.

Henry C. Fehr (pupil at the Royal Academy and of T. Brock) contributed the group of "Perseus and Andromeda" to the Academy in 1893, when it was purchased for the Chantrey Collection (Tate Gallery). His subsequent ideal works, "Hypnos Bestowing Sleep upon the Earth," "The Spirit of the Waves," "St George and the Rescued Maiden," and "Ambition's Crown Fraught with Pain," confirmed the high opinion of his cleverness; but in some of them his exuberance tells somewhat against their general effect, in spite of their inherent grace and strength. On the other hand, the statue of "James Watt" for the City Square of Leeds exhibits those qualities needful for open-air portraiture; and his busts and statues have character and life. "Isabella and the Pot of Basil" is free from this defect, and is an original treatment of the subject; and "The Briton" (1908), though full of vigour and imagination, shows restraint.

George Wade is essentially a sculptor of busts and statues; the most noteworthy of his works are the memorial to Sir John Macdonald in Montreal, the seated figure for Madras of the native judge, Sir T. Aiyar Muthuswamy, and a number of ambitious monumental works.

Gilbert Bayes, at first a modeller in the flat of horses treated in a decorative manner, produced "Vanity," "A Knight-Errant," and similar picturesque *bibelöts* on a large scale; and later still, such work as "The Fountain of the Zodiac," showing a talent at once more serious, ordered and graceful. "The Coming of Spring" (1904) and "The Gallopers" (1905) are reliefs noteworthy for the intelligence and the sculptural appropriateness they display. The equestrian "Sigurd" (1909 and 1910) is full of fancy and illustrates the personal talent of the sculptor: the latter group was acquired for the Chantrey Collection. He is the designer of the great seal (1910).

W. R. Colton (b. 1867; A.R.A., 1903) is a sculptor of strong individuality, capable equally of deep feeling and dainty fancy. "The Girdle," "The Image-Finder," "The Crown of Love," "The Wavelet" and the "The Spring-tide of Life" revealed a sculptor of exceptional ability, whose love of truth and life has sometimes inspired him to place a touch of rather awkward realism in a graceful and charming composition; the result is something unusual, yet quite natural, and because it imparts to the work a flavour of quaintness and originality, it is not only unobjectionable but welcome. Later, Colton struck out another path especially in the monumental and statuary work executed in England and India. Among his principal efforts are the South African memorial to the Royal Artillery erected in the Mall, London, during the summer of 1910, the statue of the Maharajah of Mysore (1906) and a monumental "Tiger" (1909) in bronze - a work of considerable power. His vigour of design and sense of style made him a force in the younger school of sculptors. He has acted as professor of sculpture at the Royal Academy.

David McGill first attracted attention with the relief of "Hero and Leander," following it with a series of figures, of which the most striking is "The Bather," a work at once of vigour and of humour. His work is good in pose and line, refined in drawing and feeling, and excellent in style.

Charles J. Allen belongs to the same group. "Love and the Mermaid" (Walker Art Gallery, Liverpool), "A Dream of Love," "Rescued" and "Love's Tangles" (1908) are works of high merit, in every case good in treatment, free in modelling and pleasing in design. His important Queen Victoria memorial in Liverpool was unveiled in 1906, and the monument to "Rt. Hon. Samuel Smith, M.P.," and numerous busts have followed. "The Woman whom Thou gavest to be with me" is probably his completest ideal work.

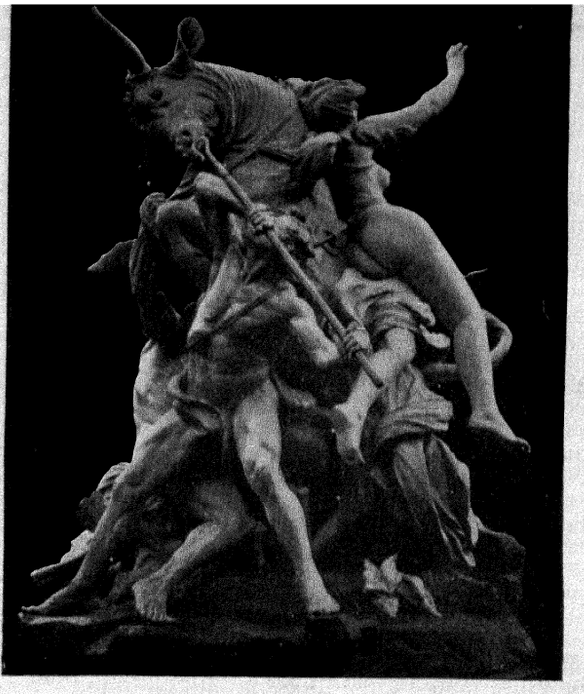
F. M. Taubman, who had both French and Belgian teaching, has produced a series of works which display his power of design and strength of technique. "The Angel of Sad Flowers," "Orpheus and Eurydice" and "Adam and Eve" reveal his strength in ideal work; and the statue of "Sir Sidney Waterlow" at Highgate is a good example of his monumental portraiture. In "The Sandal," a small nude kneeling figure, he has turned frankly to classic coldness, and even the purity of design and modelling cannot warm it into life.

J. Pittendrigh Macgillvray, R.S.A., belongs to the rather meagre Scottish group, of whom he is generally regarded as the chief. His chief work consists mainly of monuments and colossal memorials. The "Peter Low Memorial" in Glasgow cathedral, the "Robert Burns," the "Allan Family Memorial," the fine relief of "Rhythm" and the "National Gladstone Memorial" for Scotland are his leading works. With these should be considered the "Dean Montgomery Memorial" in St Mary's cathedral, Edinburgh, and the "John Knox Memorial" in St Giles's cathedral.

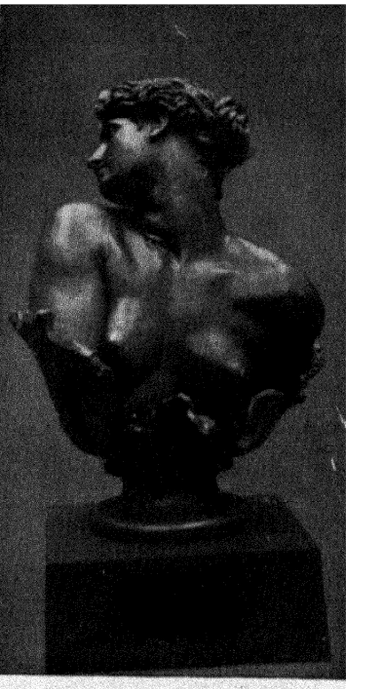
F. Derwent Wood (A.R.A., 1910) is a sculptor of exceptional ability. His varied training—at the Royal College of Art, the Slade School, the Royal Academy schools, and under M. Rodin and Mr Brock—gave him a wide outlook without impairing his individuality. His merit was recognized as soon as he quitted his masters, and he forthwith won the competition for a series of statues



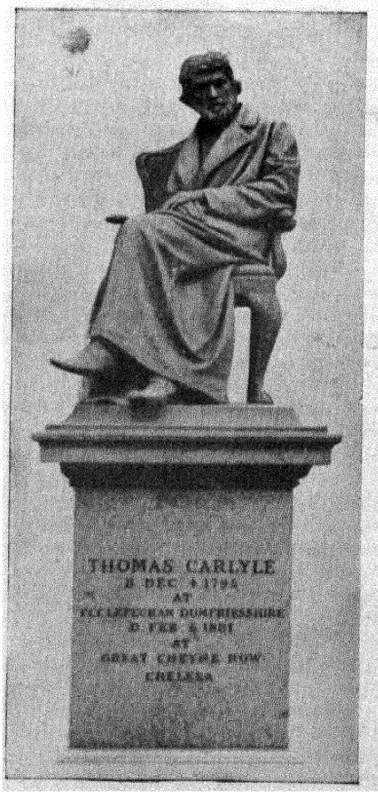
W. R. COLTON, A.R.A.—The Maharajah of Mysore.



SIR CHARLES LAWES-WITTEWRONGE—The Punishment of Dirce.



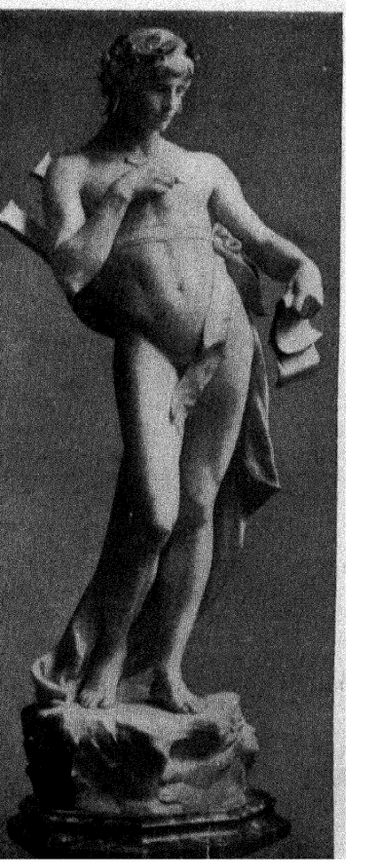
G. F. WATTS, R.A.—Clyti



SIR J. EDGAR BOEHM, R.A.—Carlyle.

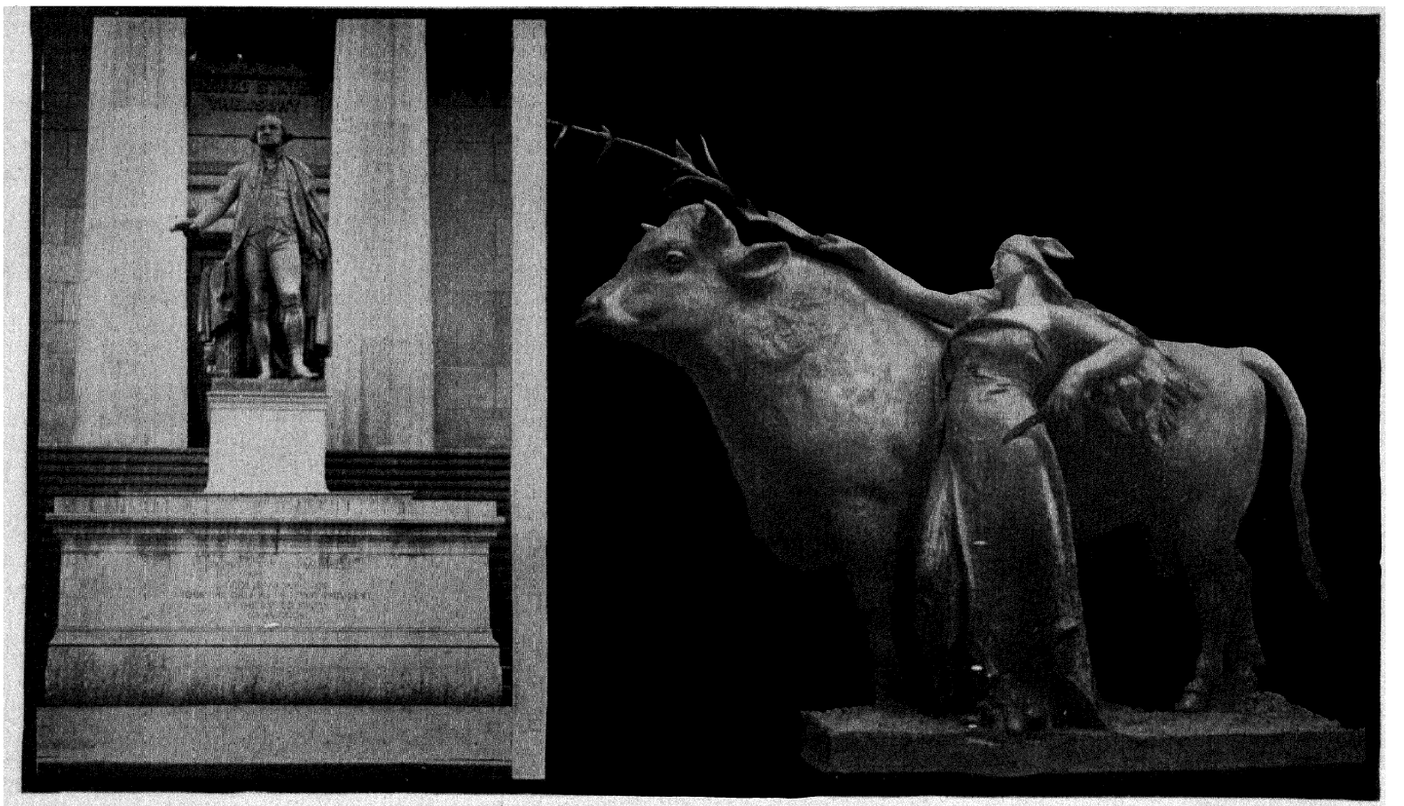


W. R. COLTON, A.R.A.—The Genius of Fire.



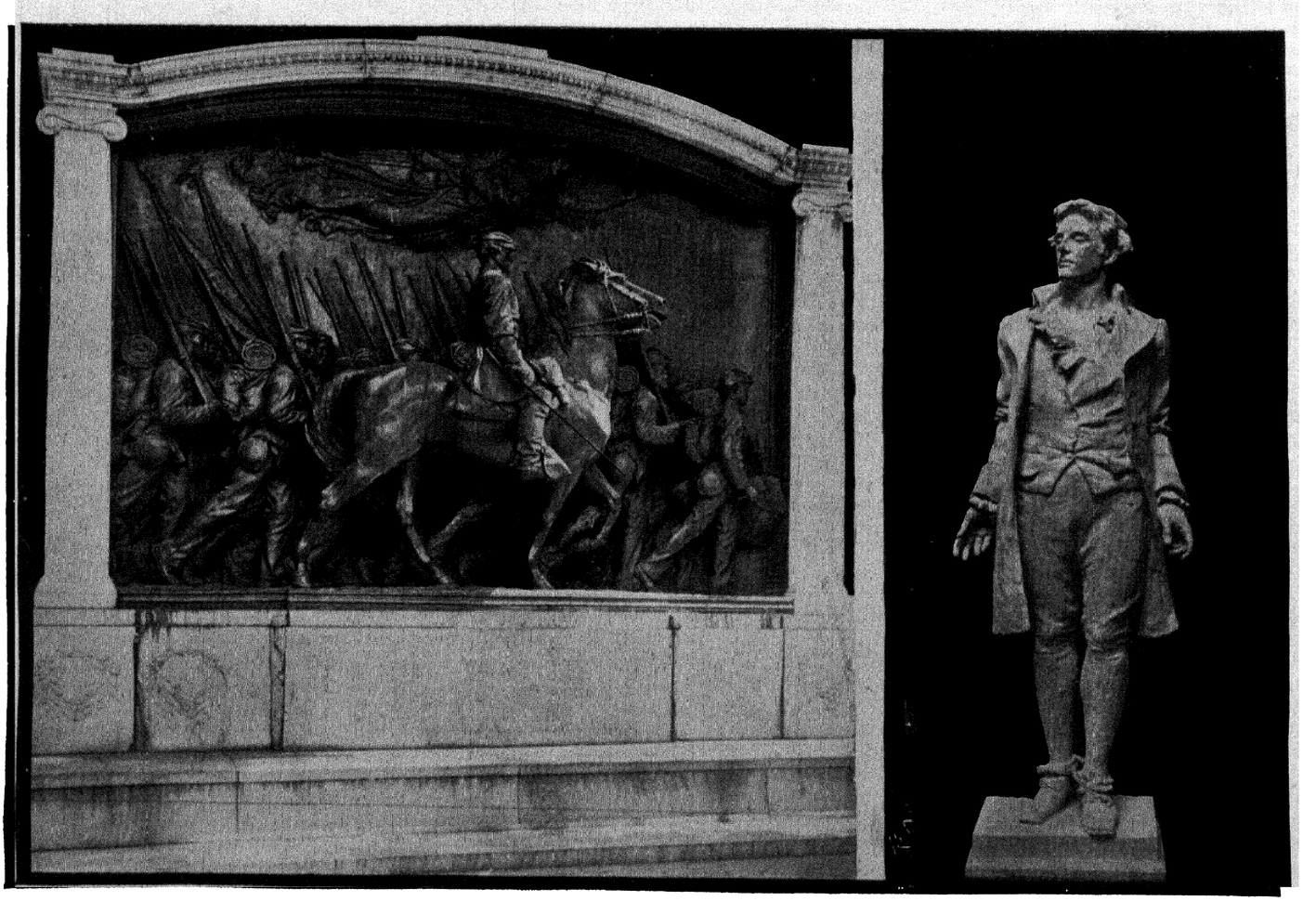
THOMAS BROCK, R.A.—Good

SCULPTURE



J. Q. A. WARD—George Washington.

D. C. FRENCH—Indian Corn; Bull by E. C. POTTER.



AUGUSTUS ST. GAUDENS—Robert Gould Shaw

FREDERICK MacMONNIES—Nathan Hale
(From cast at Theodore B. Starr, N. Y.)
Copyright by Frederick MacMonnies

representing the arts for the Kelvingrove art gallery at Glasgow. A great mural tomb followed, with "Love Sacred and Profane" as its *motif*, together with a series of other works of growing artistic importance. "Cain" (1905), a vigorous, dramatic, yet wholly sculpturesque figure, is in powerful contrast to the three works that appeared in successive years: "Abundance" (a group of a woman and two children) and the marble statues "Atalanta" and "Psyche"—all of them the type of grace in pose and of beauty of face and form. At the same time Derwent Wood produced the two boy figures on the piers to the southward of the Queen Victoria Memorial in front of Buckingham Palace. There is marked individuality in all he does, sculpturesque character, firmness and delicacy of handling, with a richness of style and appreciation of breadth and simplicity.

Paul Montford, the son of Horace Montford, after a brilliant academic career made his mark in decorative sculpture. It is not by such work as "Court Favourites" (1906) that he sustains his reputation, but rather by the sculptural embellishments wherewith the archway connecting the Local Government offices with the Home Office in Whitehall is enriched. "The Spinning Girl" is one of his best ideal figures, and the 18th century "Viscount Bolingbroke" and "The Storm Waves" are characteristic of his vigorous style and personal conception and execution.

John Tweed, who studied under Falguière and Rodin, was influenced more by the latter than by the former, and inclines rather to the impressionistic school than to the academic. His statue of Cecil Rhodes has power and emphasis—it impresses rather than attracts. The statues of Queen Victoria at Aden, of van Riebeck at Cape Town, and the Wilson Memorial in Rhodesia are among his chief works. He was selected to "complete" Alfred Stevens's Wellington Memorial in St Paul's cathedral. Basil Gotto has not less force, and he is more exuberant in his realization of life—an exuberance which does not always make for refinement. "Brother Ruffino" has dignity and strength, and the "Bacchus" of 1907 is realistic enough to repel those who ask for elegance even in an unrefined subject. The work, however, is ably treated.

Henry Poole belongs to the same vigorous school, and has a true sense of the monumental, as is evident in his colossal group of "The Mermaids"; while his "Naiad" (1909) shows an innate refinement.

S. Nicholson Babb, for some years an assistant of Mr Brock, has produced an ambitious "War Memorial" and many able groups and figures, among which "The Coming of Spring" (1910) reveals the modern French influence.

Albert H. Hodge stands by himself. As a sculptor-decorator with special views on relief-work in which he adheres to the sentiment and character of the architecture it is to embellish, he adopts a convention which gives the appearance of high relief to what is really low, by sharpness of edges and by a learned use of light and shade. His panels of "Science and Art" (1904) and "Commerce" (1906) are good illustrations of this original kind of architectonic work, while his large equestrian group of "Prosperity" applies the same principles to the round. These three works were modelled for the town of Hull.

A man of similar force is Joseph Epstein, who replaces refinement by vigour, archaic simplicity, and primitiveness of outlook, as though casting his vote in favour of the Garden of Eden as against the garden of the Tuileries. His work, in which he leans towards the modern German view, is mainly decoration for buildings; his most discussed productions are the statues (1907) on the topmost storey of the British Medical Association offices.

Richard Garbe, a sculptor of equal strength, was a pupil of the London County Council School of Arts and Crafts and began to exhibit in 1898. Rugged power both in subject and execution mark his productions. His ideal works, such as "The Egoist" (1906), "Man and the Ideal" (1907), "The Idealist" (1908) and "Undine" (1909), illustrate his range of thought and reveal his uncommon vigour which amounts, it might be said, to well-controlled, idealistic brutality; they are broad and impressive, and are conceived in a monumental spirit.

Charles L. Hartwell has grace and strength combined. The nude figure representing "The Rising Tide" (1906), reminding us a little of Leighton's work, and "The Bathers" (1907), are both works of refinement and elegance, and "Dawn" (1909) displays unusual charm and, like the others, offers a silhouette of much interest. While much poetry of expression and grace of composition distinguish his "Sirens" (1910), vigour is the note of the small group "A Foul in the Giants' Race," which was acquired by the Chantrey trustees in 1908.

Benjamin Clemens, pupil of Professor Lantéri and the Royal College of Art, is another member of this talented group. His life-size ideal figures, "Sappho" (1902), "Cain" (1904), "Eurydice" (1906), "Andromeda" (1907) and "Aurora" (1908), all made their mark when exhibited in the Royal Academy, and showed the sculptor to be possessed of the qualities of sensitiveness, elegance, and strength. The group of "Kephalos and Prokris" (1910) is his most important and most striking work.

Harold Parker came to England from Australia in 1896 at the age of twenty-three, and after studying under W. S. Frith, made many Academic successes, and in 1904 exhibited his plaster life-size statue of "Ariadne," which, translated into marble and re-exhibited in 1908, was bought by the trustees of the Chantrey Collection and is now in the Tate Gallery. His other more important works include "The Long, Long Dreams of Youth" (1905), "Narcissus" (1906), and "Prometheus" (1909). Without revealing any striking originality, Parker displays very considerable accomplishment and a good sense of the sculpturesque, and his busts are refined and good.

Oliver Wheatley, formerly assistant to Brock, and pupil of Aman-Jean, has done much decorative work. His life-size recumbent statue "Awakening" is among the best of his figures.

T. Tyrrell, who first attracted attention by his decorative figures on Professor Pite's house in Mortimer Street, London, has shown much graceful fancy in his "The Ideal," such as "The Whisper" (1906).

Reuben Sheppard has shown himself poetic and pleasing in symbolic suggestion in his striking half-length group "The Music of Death" (1907), and Oliver Sheppard, in his "Eve" of the same year, produced a graceful work.

The Irish sculptor, John Hughes, achieved a great success by his monument to Queen Victoria erected in Dublin. It is a fine combination of sculptural and architectural effect and richness of grouping, and although it reveals too great a love of ornament it is impressive alike in mass, design, silhouette, and general arrangement.

There should also be mentioned, among the younger sculptors, Mortimer Brown ("St John the Baptist"), David B. Brown ("The Spirit of Ivy"), Bertram Pegram ("Down to the Sea"), the Scotsmen, McFarlane Shannan ("The Arcadian Shepherd's Dream"), Kellock Brown, and J. Crosland McLure ("Leicester War Memorial"); Herbert Ward (bronzes of South African savages, "The Idol Maker" and the like), Alfred Turner, Charles Pibworth, and F. Arnold Wright.

The women sculptors include such accomplished amateurs as H.R.H. the duchess of Argyll ("A Crucifix"—the Colonial Memorial in St Paul's cathedral) and Countess Gleichen. The principal recent names are those of Mary Pownall (Mrs Bromet), ("A Harpy"), E. M. Rope ("Springtime," relief), Ruby Levick ("Fishermen hauling a Net"), Margaret Winser ("Mourners," a relief), Esther Moore ("At the Gates of the Past"), Edith Maryon ("The Poet of Umbria"), and Gwendolen Williams ("The Lorelei," 1907, and charming groups of children).

The sculptor-decorators make a group of workers of striking fancy and ability. Lynn Jenkins, whose frieze in bronze, ivory and mother-of-pearl at Lloyd's Registry is a remarkable achievement, is one of the leaders. He has latterly devoted himself to pure sculpture, such as the life-size bronze figure on a sarcophagus, "Destiny" (1909 and 1910) and bust portraits remarkable for exquisite feeling and delicacy of carving. Walter Crane designed for Manchester a mace that is remarkable for beauty of conception and felicity of symbolism. Alexander Fisher and Nelson Dawson should be included in the group. Other sculptors already mentioned, including Thornycroft, Gilbert, Frampton, Pomeroy, Colton and Toft, have all devoted themselves to sculptural decoration pure and simple, whether in metal, stone, or marble.

The painter-sculptors claim among them Alfred Stevens, Sir Edwin Landseer, Lord Leighton, J. M. Swan, W. Reynolds-Stephens, George Richmond, and G. F. Watts. George Richmond's real talent may be gauged by his "Monument to Bishop Blomfield" in St Paul's cathedral. His son, Sir William Richmond, K.C.B., has also practised in sculpture—the memorial tomb of Mr and Mrs Gladstone is his. Watts educated himself artistically on the Elgin Marbles, and he produced half a dozen pieces of sculpture which place him high among the world's finest sculptors of the 19th century. The recumbent effigy of "Bishop Lonsdale" in Lichfield cathedral was an epoch-marking work, not only in the technical matter of the bold treatment of the drapery, but in largeness and breadth and its noble sense of style, and the "Lord Lothian" in Bickling church is also very remarkable. The artist then produced the colossal equestrian group of "Hugh Lupus" for the duke of Westminster (Eaton Hall), a composition as imaginative and original as it is grand and sculpturesque. Then followed "Physical Energy," another equestrian group, which, after being about twenty years in progress, was cast in 1902; it was executed in duplicate; one copy has been set up in South Africa, to the memory of Cecil Rhodes, whose character it may be held to symbolize, and the other has been erected in Kensington Gardens, London, at the expense of the British government. In 1903 also, the statue of "Lord Tennyson" was completed. But the bust of "Clytie" is surpassed in bigness and classic purity of style and feeling by nothing ever produced in England; it is a complete and noble thing. There is no sculptor who has come nearer to obtaining the grandeur of form which is so wonderful in the Greek masterpieces. Simple in line, immense in character, full and rich in modelling, Watts's work is instinct with vigour, breadth and movement. It sets the true standard, and is a constant and a noble warning to sculptors of the younger school not to be led away by the dainty and fanciful, however alluring. Especially it warns them against what has become a feature with a certain section—the devotion to metal-working, enamelling, and the like, and the free introduction of these accessories into serious sculptural work. Irresistible in the hands of a great artist like Alfred Gilbert, such work, at all times attractive, is the goldsmith's and ironsmith's business rather than the sculptor's; and although it has coloured the work of some of the younger sculptors of the day, it is not likely to obtain any very wide hold, or

to exercise permanent influence for evil. The variety and independence of the British School are such that it is impossible to define any particular tendency in its practice other than towards an ever-increasing rise in the level of technical excellence and the power of design. There is, broadly speaking, a general stand against the "modernity" imported into sculpture by the younger members of the foreign schools, and a disinclination to bend the art to the illustration of everyday life and to the rendering of effects not hitherto considered to be the function of the plastic arts. (M. H. S.)

After 1870, when a great artistic movement marked the resuscitation of France after the Franco-German War, sculpture especially revived with exceptional vigour, and the last thirty years of the 19th century were a memorable epoch in its history. Not that many new and unexpected men of genius suddenly arose, for most of the artists who then came to the front had already distinguished themselves by equally noble work; but sculpture, like the other arts, benefited by the pause for thought, and by the ripe and manly tone stamped on the national mind by the discipline of events. Intense ardour animated the admirable group of French sculptors: the oldest still found some lofty expression; the men in their prime showed their powers with unwonted force and fire; and the younger generations grew up in rapid succession, a close phalanx of sculptors whose number is still increasing, for if we include only living artists, and those who have taken honours in the Salons, we find a list of seven hundred exhibitors. The first generation of survivors of the war, who led the way in the new period, still boasted of such men as Dumont (1801–1884), Cavelier (1814–1894), Bonnassieux (1810–1892), Jouffroy (1806–1882), Schoenewerck (1820–1885), Carrier-Belleuze (1824–1887), Aimé Millet (1819–1891) and Clésinger (1814–1883). These artists, born in the first quarter of the 19th century, were for the most part each the head of a studio, their teaching being carried on till the end of the century. Next to them followed their immediate pupils, already their rivals, and some indeed famous before the new era; such were Guillaume, Dubois and Frémiet; others, fresh from the Academy at Rome, at once rose to distinction, and all combined to form the remarkable group of artists to which the modern school of French sculpture owes its world-wide fame. At this time Eugène Guillaume (1822–1905) was exhibiting his "Roman Marriage," his "Bust of Mgr Darboy," his "Orpheus," and "Andromache," works of learned skill and severe distinction. Paul Dubois (1829–1905) executed his "Narcissus," and the "Tomb of General Lamoricière," on which the decorative figures of Charity, Faith, and Military Courage are popular favourites, full of grave and pathetic feeling. Chapu (1833–1891) executed his exquisite figure of "Youth" for the tomb of Henri Regnault, and that of "Thought" for the tomb of Daniel Stern, his monuments to Berryer and to Mgr Dupanloup. Barrias' (1841–1905) "First Interment" won him the medal of honour in 1878; besides his patriotic group of the "Defence of Paris." Falguière (1831–1900) produced a remarkable series of statues, characterized by their life-like power; some dignified or pathetic, as "St Vincent de Paul," "La Rochejacquelein," and "Cardinal Lavigerie"; some full of bold and dashing spirit, as his "Diana," his "Nereids," and "Hunting Nymphs." Mercié gave us "Gloria Victis," "Quand Même," and his monuments, among which that called "Memory" must be mentioned; his pediment for the Tuileries; his "Genius of Art," &c. Delaplanche (1836–1890) produced his "Mother's Teaching," "Music," "The Virgin with a Lily," and "Aurora"; and Allar "The Death of Alcestis." To these names must be added those of Degeorge, who, with Chapu, gave so powerful an impetus to the art of the medallist; of Gautherin, Hiolle, Thomas, Crauck, Lafrance, Maniglier and Moreau-Vauthier—one of the men who, with Gérôme (the painter) and Frémiet, revived the taste for coloured sculpture, a style first attempted long before by Simart; besides many more. These artists created a supremely healthy and vital school of sculpture, dignified and elegant, learned and varied, fresh and charming, and, above all, as single-hearted and as well trained as in any period of history.

Modern French sculpture.

To understand, however, the position of contemporary sculpture in France, it will be necessary to look back even further than 1870. It must be remembered that the whole history of French sculpture, as far back as the 17th century, is connected with the invasion of Italian influence in the 16th century, which remained paramount over French art for more than three hundred years. Statue-making, until then an art of expression—national, popular, human and Christian—lost its primitive character under the dilettante refinement of an aristocratic society closely gathered round a king who made art subservient to his splendour or his pleasure; it sank into superficial and conventional beauty, and became almost exclusively the interpreter of trivial ingenuity or flattering allegories derived from the dead fables of heathen mythology. The best that would be expected from this was choice elegance of line, a harmonious treatment of mass and composition, a loving study of the nude—in short, a purely plastic type of art. And sculpture had become the art of the nobility and of the court, having no hold, as it had in the past, on the great human family—the nation. Still, even at the high tide of Louis XIV.'s reign, some dissatisfaction became evident, even some rebellion, in the great though solitary spirit of Puget, who strove to animate the marble with the passions of humanity. In the next century he found followers—Falconet, Pigalle and Houdon, who also asserted their right to infuse life and passion and movement into their statues, seeking them in the despised province of stern reality. The great cataclysm of the Revolution, which might have been expected to break the bonds of thought, turned men's minds to contemplate the Antique, and though it certainly modified the style of sculpture, was far from changing the source of its inspiration, since it sent it once more to the Antique. Indeed, at the beginning of the 19th century, when the teaching of David was paramount in spite of Gros, who, then in the master's studio, was unconsciously sowing the seed of romanticism in painting, a robust individuality was developing among French sculptors—a spirit somewhat rugged, independent, and partly trained, beyond the academic pale, prepared to carry on the tradition of Puget, and quite simply, without any revolutionary airs of innovation, to shake off torpid conventionality. By the mere force of a strong plebeian temperament Rude quite naturally happened on a style of art—high art—at once expressive and popular. He was the first to raise the cry of liberty in sculpture, and he left successors who bravely worked out what he had begun. Barye and Carpeaux were both in 1875 on the threshold of an era to which they bequeathed a fruitful influence. Barye carried on Rude's tradition of expression, and transformed what had previously been mere decorative carving into a new style and branch of art now adopted by a whole phalanx of admirable artists: the sculpture, namely, of animals, the first glance that sculpture had till then bestowed on nature apart from man. Carpeaux, who was much younger, was in his day—as Puget had been—an exceptional personality; he carried on the slow revolt of two centuries which was to break the narrow mould of school-training and infuse a soul of more ardent vitality into sculptured forms.

The importance of these two great artists in relation to contemporary art was not fully seen till after their death. In point of fact Painting had until now amply filled the new part assigned to Art; its vehement efforts had strongly influenced public opinion; and as, in the early years of the 19th century, it had largely extended the field of human vision over the remote past and the domains of feeling, with the promise of surveying all nature, space and time, the spirit of the age asked no more, and did not expect sculpture, too, to abandon old-world myths. It must also be said that those sculptors who at that time carried on the classical tradition had renewed its youth by their learned and enthusiastic love of it; they had reverted to the past, but it was the past of the really great masters, either of antiquity or of the early Florentine school, no less enamoured of life, beauty and nature. Guillaume and Paul Dubois, Chapu and Falguière, Mercié, and Delaplanche were the rivals in sculpture of the great idealist painters—Puvis de Chavannes, Gustave Moreau, Ricard, Delaunay, Baudry, and Henner—who were working at the same time.



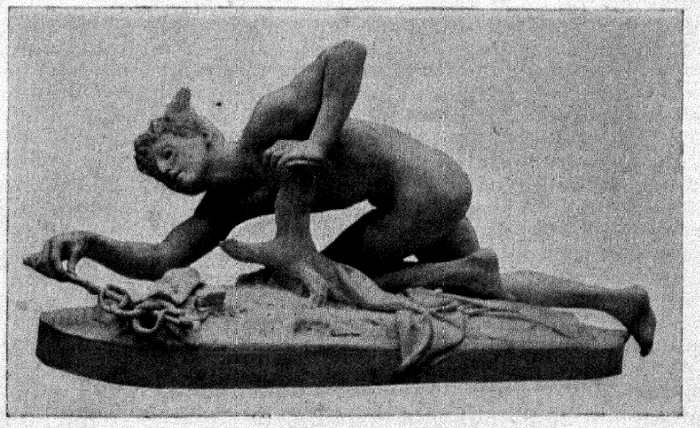
A. FALGUIERE—St. Vincent de Paul.



E. BARRIAS—The First Funeral.



E. DELAPLANCHE—The Virgin with the Lily.



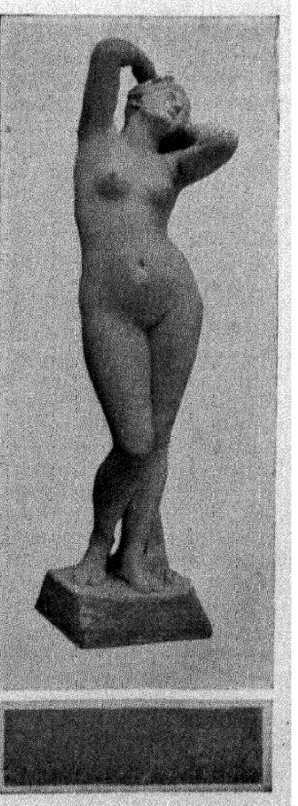
A. IDRAC—Mercury inventing the Caduceus.



JUSTE DECOUER—St. Sebastian.



L. GEROME—Bonaparte at Cairo.



L. MARQUESTE—Galatea.

SCULPTURE



L. LONGEPIED—Immortality.



FREMIET—The Bear Hunter.



E. GUILLAUME—The Roman Marriage.



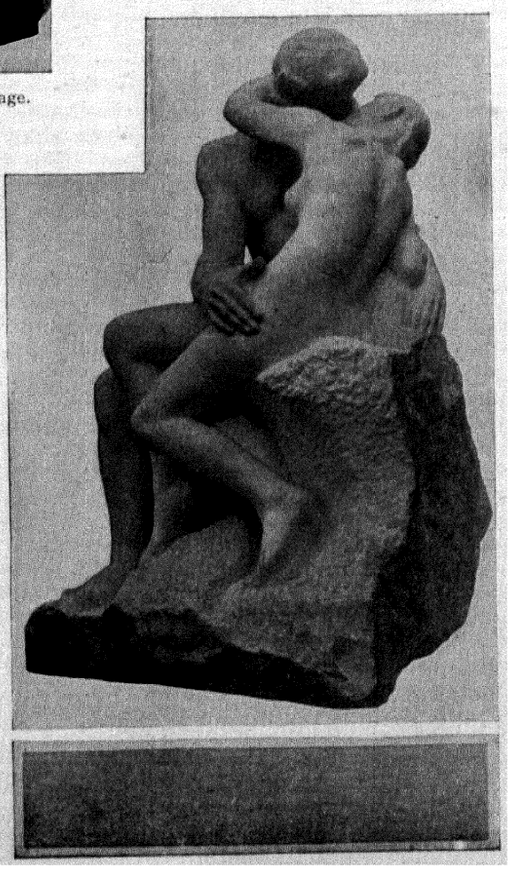
D. PUECH—The Siren.



R. DE SAINT-MARCEAUX—Genius guarding the Secret of the Tomb.



A. MERCIÉ—Souvenir.



A. RODIN—The Kiss.

This it is which accounts for the fact that romanticism then found so little acceptance among sculptors. But in the next generation the sowers of the seed might see their harvest. The pupils of Rude, of Barye and of Carpeaux, allied by school sympathies—the little drawing-school conducted by Lecoq de Boisbaudran, which, in despite of the studios of the Beaux Arts, created a group of independent and highly original artists—formed the centre of a distinct force which increased day by day. Young men, fresh from Rome, persistently kept up the spirit of the Antique. A galaxy of learned and refined artists was represented by such men as Hiolle (1833–1887) ("Arion," "Orpheus"), Idrac 1840–1884) ("Mercury inventing the Caduceus," "Salammbô"), Marqueste ("Galatea," "Eros," "Perseus beheading the Gorgon," "The Rape of Europa"), and Coutan ("Eros," "A Woman carrying Loaves," "A Sergeant-at-Arms," &c.), Lanson ("The Iron Age"), Longepied (1849–1888) ("Immortality"), Peinte ("Orpheus charming Cerberus to Sleep"), Gustave Michel ("In a Dream," "Meditation"), Carlès ("Innocence," "Abel"), A. Boucher ("Earth," "Au but"), besides Carlier, Léonard and Turcan (1846–1895)—soon to be followed by another generation: Puech ("The Siren," "The Muse of André Chénier"), Verlet ("The Monument to Maupassant," "Orpheus"), Larche ("The Brook and the Meadow," "Violets"), Sicard ("Hagar and Ishmael"), and Daillon, Escoula, St Lami, and many more. In opposition to these there stood a group of sculptors, young and old, who sought their subjects in mythology, legend, history or poetry, or merely in the scenes of daily life, and aimed at presenting the ideal of their time under its external aspects, but more especially the deepest emotions of the modern mind. It was Frémiet, with his striking and vivid conceptions, who led the advance with new and dramatic subjects: primeval man and the fierce beasts with which he disputed his rule ("A She-Bear and a Man of the Stone Age," "An Oran-utan and a Savage," "Gorillas"), or embodiments of the heroes of the past ("Joan of Arc," "Saint Louis," "Saint George," "Louis of Orleans," &c.); then followed Just Becquet (1829–1907), the excellent artist who represented the stricken figures of "Ishmael" and "Saint Sebastian"; Christophe (1827–1892), with his symbolical presentments of "The Human Comedy," "Fortune" and "The Supreme Kiss"; Aubé ("Monument to Gambetta," "Dante," "Bailly," &c.); A. Legros, the naturalized English painter and sculptor, who executed some fine fountains for the duke of Portland; Injalbert, returned from Rome ("Hippomène," "Christ on the Cross," "The Herald"); and, younger than these, Desbois ("Leda"), Dampt ("A Grandmother's Kiss," "Melusine"), Alexandre Charpentier, Carriès, Baffier, Pierre Roche, Madame Marie Cazin and many more.

The disruption of the Salons in 1890 showed very plainly the bent of this group, who seceded to the Champ de Mars, where the leaders were Dalou and Rodin, and where Bartholomé made an unexpected and original appearance. Foreigners added a contingent of the highest merit, such as the American St Gaudens, and, more especially, the Belgian Constantin Meunier, affiliated to France by their early training, to say nothing of descent. Meunier especially, with his statues and statuettes of labouring figures—miners, puddlers, hammerers, glass-blowers, and the like—gave to his art a keynote new to France, which found a response even in academic circles. A broad democratic current was swaying public feeling. The questions which turn on the status of the working man had become the programme of every party, even of the most conservative. Art being the mirror of society, the novel, the drama and painting devoted themselves to the glorification of a new factor in modern life, namely, Labour. Sculpture now, in rivalry with painting, through which Millet had immortalized the peasant, and Courbet the working man, also sought inspiration from such themes; and at the same time the demands of the democratic movement called for monuments to the memory and deeds of great or useful men.

Sculpture, under this modern tendency, assumed an unexpected aspect; its highest expression is seen in the work of three men very dissimilar: Dalou, Rodin, and Bartholomé. In Belgium, as has been said, where modern social questions are strongly felt, Constantin Meunier had interpreted the democratic impulse in a very striking manner, under the influence, no doubt, of J. F. Millet. In France, Jules Dalou (1838–1902), with a broader view, aimed at creating an art which should represent the aspirations and dreams of this phase of society while adhering to the fine old traditions of the art of Louis XIV., stamped with magnificence and grandeur, but applied with graver, simpler and severer feeling to the glorification of the people. He revived the older style of sculpture, giving it greater power and truer dignity by a close study of life, supported by a scholarly and serious technique. In his "Triumph of the Republic," and the monument to "Alphand," to "Delacroix," to "Floquet," to "Victor Hugo," and others, he strove to create a style apart from life, to which he is alien and indifferent, but based on life, the outcome of the needs of society, the impersonation of its characteristics, the expression in eloquent form of its nature, spirit, and moral idiosyncrasy.

Treading the same path, though in a different step, is Auguste Rodin. He disregards every contingent fact; even when he takes his subject from legend or history, whether "Eve" or "St John the Baptist," "The Age of Bronze" or "The Burgesses of Calais," "Victor Hugo" or "Balzac," he avoids all the conventional details and attributes of his personages to embody the very essence of humanity as expressed in the quivering flesh. He, like Carpeaux, has gone back to Dante and to Michelangelo to force the "Gates of Hell"—the subject chosen for the entrance to the Musée des Arts Décoratifs—and to read the deepest mysteries of the human soul. His is the art of suffering, anguish and terror, of cruel and despairing pleasure—a wild cycle of proud and bitter melancholy. All the efforts made in the past to infuse life into Art, all that Puget, Falconet, Pigalle and Houdon tried to effect, and that Rude, Barye and Carpeaux strove for in their turn—all this was part of the endeavour of these their successors, but with a clearer purpose and more conscious aim. By good hap or providence they were greeted on their way by the voice of the most devoted apostle who was to preach the new doctrine, namely, Louis Courajod, the founder of the French sculpture gallery in the Louvre. From his professor's chair in the schools he cursed the Italian intruders of the 16th century for having debased French art with "noble attitudes," extravagant gestures and allegorical antics; and he carried his pupils and his hearers back to the great national period of French sculpture, which, in the dark medieval ages, had created the splendid stone images of the noble French cathedrals.

A marked individuality now appeared in protest against academic traditions—Albert Bartholomé. He, after beginning as a painter, was tempted by sculpture, more particularly, in the first instance, by a wish to execute a monument to a comrade he had loved. From this first effort, carried out in his studio, without any school training, but with a firm determination to master technical difficulties and fulfil his dream, followed a broader purpose to execute a great expressive and vitally human work which should appeal to the heart of the populace. From this arose the idea of a "Monument to the Dead" in Père Lachaise. Bartholomé had started without a guide, but he instinctively turned to the great tradition of Northern Christianity, which his mind subsequently associated with that of the antique race who had ever done most honour to Death, the people of Egypt.

Thus two currents contended, as it were, for the guidance of French sculpture, each claiming a descent from the historic past; one inheriting the classic tradition of the Renaissance, of Latin and Hellenic origin, to which the French school, since the time of Jean Goujon, has owed three centuries of glory. This is the pagan art of the South; its marks are balance, reasonableness and lucidity; it was the composer of apotheoses, the preserver of the ideal of beauty. The other, reverting, after centuries of resignation or of impotent rebellion, to the genuine French past which produced the noble works of the 11th, 12th

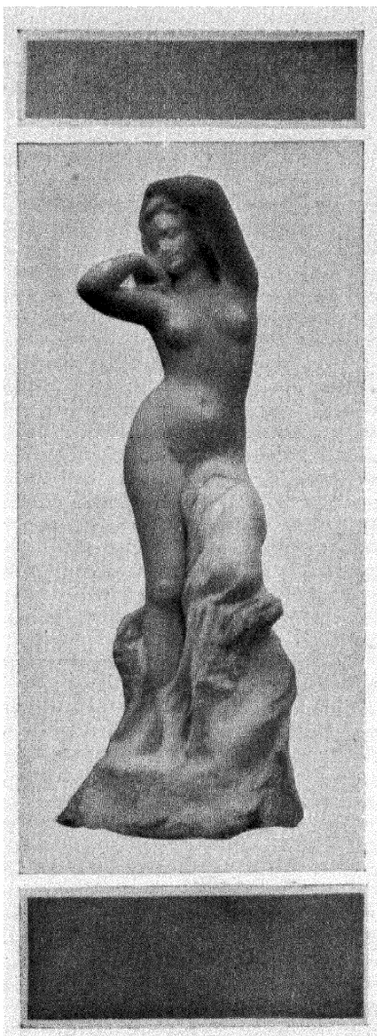
and 13th centuries—to the tradition of Flanders and of Burgundy, which was smothered in the 16th century by Italian art—to the Christian and naturalistic art of the North, which renounced the canons of antiquity, and expressed itself by methods essentially human and mutable, living and suffering—appeals to all mankind. The immediate result of this antagonism was no doubt a period of agitation. The outcome, on the whole, is confusion. Still, however vexatious the chaos of form and movement may be, it is Life, a true reflection of the tumult of modern thought in its complexity and bewilderment; it is the reawakening of sculpture.

Monumental and decorative statuary found an extended sphere through the founding or restoration of public buildings after the events of 1870. Memorial sculpture obtained constant employment on patriotic or republican monuments erected in various parts of France, and not yet complete. Illustrious masters have done themselves honour in such work. Dalou, Mercié, Barrias, Falguière, and many others less famous executed monuments to the glory of the Republic or in memory of the national defence, and figures of Joan of Arc as a symbol of patriotism, &c., as well as numberless statues erected in the market-places of humble towns, or even of villages, in commemoration of national or local celebrities: politicians, soldiers, savants and artists—Thiers, Gambetta, Jules Ferry, Carnot, Pasteur, Claude Bernard, Delacroix, Ingres, Corot, Millet, Victor Hugo, Lamartine and many more. The garden of the Luxembourg alone has become a sort of Elysian Fields, where almost every day some fresh statue rises up in memory of contemporary French poets. The funereal style of monument, in which French art was at all times conspicuously distinguished, was also revived in sympathy with that general sentiment which regards reverence for the dead as a religion, and gave rise, as we have seen, to some splendid work by Chapu (the monuments to Regnault, to Daniel Stern, of Mgr Dupanloup); by Paul Dubois (the monument to General Lamoricière); by Mercié (the tombs of Baudry, of Cabanel, of King Louis Philippe and his queen Marie Amélie); by Dalou (the monuments to Victor Noir, to Floquet and Blanqui); and by many more, with Bartholomé at their head. The cemetery of Père Lachaise is indeed one of the best spots to visit for a review of contemporary sculpture.

While man has been diligently studied in every class of sculpture, more particularly in portrait sculpture, which finds a more practical adaptation to daily uses by a bust or small statue, such as Théodore Rivière was the first to produce, by medallions, or by medals, closely related to statuary, nature now holds a place in the sculpture of animals—a place created, so to say, by Barye and carried on by Frémiet, Mêne, Cain, and, with even greater vigour and a closer study of character, by Gardet ("Panthers," in the Luxembourg, "Lions" and "Dogs," at Chantilly, &c.); Peter, Valton, Le Duc, Isidore Bonheur, Peyrol, Cordier, Surand, Virion, Mérite and others. Finally, the class of *la petite sculpture*—the statuette and small group—after long hesitation in the hands of the two men who first cultivated it, Frémiet and the painter Gérôme, made a sudden start into life, due in no small measure to the success attending the charming and pathetic statuettes of Théodore Rivière ("Salammbô and Malthô," "Ultimum feriens," "Charles VI. and Odette," "The Vow," "Fra Angelico," "The Shunammite Woman," &c.). Rivière was wont to use—as Gérôme did in his "Bellona," and subsequently in his small "Tamerlane"—materials of various colours, and even precious stones and metals, which he employed with great effect. A whole class of art was not, indeed, originated, but strongly vivified by this method of treatment. Claudius Marioton and Dampt, who always affected small and precious work, Agathon Léonard (*e.g.* a table decoration of "Dancers" in Sèvres china), Laporte Blairsy, Ferrary, Levasseur, Belloc, E. Lafont, &c., utilized every process and every kind of material—marble and metal, wood and ivory, enhanced by the most costly goldsmiths' work and gems.

It would seem now that sculpture, thus endowed with new ideas and the most various means of expression, and adapted to every comprehension and every situation, was fully on a level with the other graphic arts. What it had chiefly to fear was, in fact, the wealth of means at its disposal, and its competition or collaboration with other arts. And this the later generations seem to have understood—the men who were the outcome of the two conflicting traditions: order and moderation on one side; character, life, and emotion on the other. Though very variously inspired by the facts or ideals of contemporary life, such young artists as Jean Boucher ("Evening," "The Antique and the Modern"), Roger Bloche ("Childhood," "Cold"), Derré, Boverie, Hippolyte Lefebvre, Desruelles, Gaston Schnegg, Pierre Roche, Fix-Masseau, Couteilhas, and others seem to show that French sculpture is about to assume a solid position on a sound foundation, while not ceasing to keep in touch with the tastes, aspects and needs—in short, the ideal—of the day. Thus, while painting engaged the attention of the public by its new departures, its daring, and its very extravagance, sculpture, which by the conditions of its technique is less exposed to transient influences, has, since the close of the 19th century, developed normally but with renewed vigour. If the brilliancy of the school was not so conspicuous and its works gave rise to little discussion or speculation, it is not the less certain that at the beginning of the 20th century the younger generation offered the encouraging prospect of a compact group of sculptors who would probably leave works of permanent merit. Yet sculpture too had gone through a crisis, and been deeply stirred by the currents which so violently agitated all modern thought. We have already spoken of its "state of mind," torn between the noble traditions of a glorious past which link it to the antique, and the craving to render in its own medium, with greater freedom and fuller force of expression, all those unuttered meanings of the universe and of contemporary thought which the other arts—painting, literature, the drama, and even music—have striven to identify and to record. But the acute stage of tentative and incoherent effort seemed in 1910 to be past; inspiration had returned to its normal channel and purely plastic expression.

The powerful individuality which had the most vital influence on modern sculpture in France, and, it may be added, on many foreign schools, is that of Rodin. During the ten years which followed the Great Exhibition in Paris (1900) and the special display of his works, his reputation spread throughout the countries of the world and his fame was fully established. The state liberally contributed to his triumph by commissions and purchases, and in the Luxembourg Gallery may be seen about five and twenty of his finest works. His productiveness was unbroken, but it was chiefly evolved in relation to his first great conception, "The Gate of Hell"; its leading features were taken up again, modified, expanded, and added to by their creator. But besides the numberless embodiments of voluptuous, impassioned, or pathetic ideas—of which there is need to name only "Les ombres" (the Shades) and "Le penseur" (the Thinker), now placed in front of the steps of the Panthéon; several monuments, as for instance to Victor Hugo, to Whistler, and to Puvis de Chavannes; besides a large number of portrait-busts. Enthusiastic literary men, and the critics of the day who upheld Rodin in his struggles, more from an instinct of pugnacity and a love of paradox than from conviction and real comprehension of his prodigious and fertile genius, have tended to give him a poetic and prophetic aspect, and make him appear as a sort of Dante in sculpture. Though his art is vehement in expression, and he has revelled in the presentment of agonized suffering and the poignant melancholy of passion, it is by the methods of Michelangelo and essentially plastic treatment than power of modelling. His modelling is indeed the most wonderful that modern sculpture has to show, the most purely plastic technique, and this characteristic is always evident in his work, combined with reverence for the antique. Rodin made his home in the midst of Greek statues, a museum of the antique which he collected at Meudon; and some of his own late work, such as the male torsos which he exhibited at the Salon, has a direct relationship to the marbles of the Parthenon—the Ilyssus and the Theseus. It is the fuller understanding of these



G. MICHEL—Dreaming.



J. DALOU—The Triumph of the Republic.



P. AUBÉ—Bailly.



H. CHAPU—Youth (Monument to Henri Regnault).



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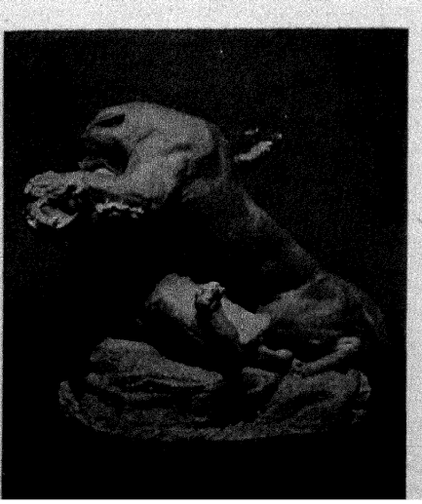
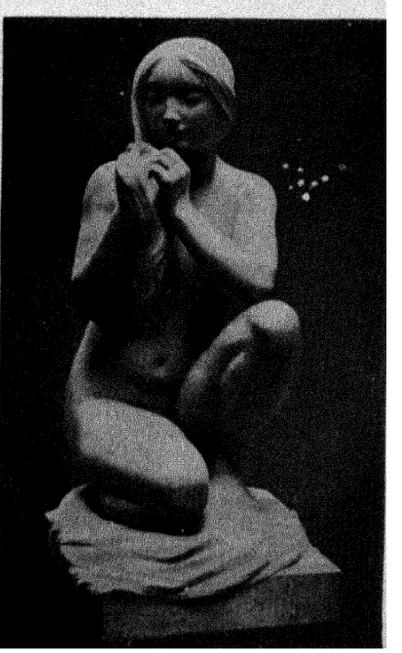


GARDET—Fighting Panthers.



BARTHOLOMÉ—Young Girl dressing her Hair

SCULPTURE



S. SINDING—The Captive Mother.
(Danish.)



(*Photo, W. Titzenthaler, Berlin.*)

REINHOLD BEGAS—Statue and Memorial of Emperor William I.
(German.)



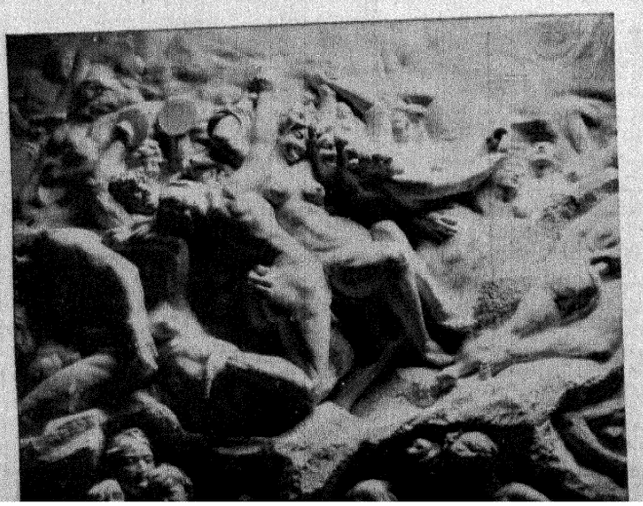
ETTORE XIMENES—Revolution.
(Italian.)



A. QUEROL—Memorial to Alphonso XII. (*From the Model.*)
(Spanish.)



M. ANTOKOLSKI—Satan.
(Russian.)





[illegible] LAMBEAUX—The Human [illegible]
(Belgian.)

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characteristics of Rodin's work, apart from some exaggeration of expression to which they have given rise, that has had the most valuable influence on the younger generation.

Nothing need be particularly noted as to the development of masters long since recognized, whatever branch of the school they belong to; such as Frémiet, Mercié, Marqueste, Injalbert, Saint-Marceaux and others already spoken of. The very distinct individuality of Bartholomé, after asserting itself in his crowning effort the "Monument to the Dead," found very delicate expression in numerous works on a more modest scale, nude figures, monumental groups, and portraits. His monument to Jean-Jacques Rousseau for the Panthéon (1909) is a fine example of his art.

We must not omit, after the elder generation, the name of Alfred Lenoir, who particularly distinguished himself in portrait-statues by dealing successfully with the difficult problem of modern dress, as in the monuments to Berlioz, to César Franck, to Marshal Canrobert, in the bust of M. Moreau, &c.; nor that of Gustave Michel, a spirit loftily inspired in his decorative compositions and figures for galleries, "Le rêve" (the Dream), "La pensée" (Thought)—both in the Luxembourg Gallery,—"Au soir de la vie" (in the Evening of Life), and "Automne." H. Gréber, after some realistic works, such as "Le Grisou" (Fire-damp) and portrait-statuettes, as the tiny full-length figures of "Frémiet" and of "Gévine," distinguished himself in the Salon of 1909 by a statue of "Narcissus" at the edge of a fountain-pool, very elegant and Italian in feeling. And among the younger men of the school we must name Verlet, Gasq Vermare, Ernest Dubois, and Larche, all employed on important works.

It must indeed be said that in France, apart from the select committees which have, with more or less success, peopled provincial towns with monumental statues, the government has always taken an interest in encouraging the art of sculpture. Any considerable work of that class could hardly be undertaken without its support. The former Council of Fine Arts in Paris foresaw the application of sculpture to the decoration of the park of Saint Cloud; the present council has encouraged a strong competition among our sculptors by decorating the squares of the Carrousel and of the Champ de Mars, by carrying on the decorative work in the Panthéon, &c. They have thus given commissions to a group of rising artists, who quickly made a distinguished reputation. The names of these younger sculptors have already been recorded here; in the ten years 1901-1910 they came into the front rank of their contemporaries by their conspicuous talent and the firm expression of their ideals. The first fact to be noted about them is their determination to be men of their time. Many artists before them were indeed possessed by this idea: Legros, Dalou, the Belgian sculptor Constantin Meunier, the American St Gaudens, and among their immediate precursors Alfred Lenoir. But now this purposeful bias is more strongly marked; the new men do not restrict themselves to the merely monumental or commemorative aspect, to the picturesque treatment of the miners or the tillers of the soil. Every type of the people, even of the middle-class citizen, is included in the programme. Alexandre Charpentier (d. 1909) was one of the earliest of these younger realists, and he gave it expression not only in sculpture proper, but in medal work, and bas-reliefs introduced into architecture, in decorative furniture and in every form of ornamental sculpture. Thus he produced the "Woman suckling her Infant" (1883) and a large bas-relief of "Bakers," executed in stone and placed in the square of St Germain des Prés, Paris; and, following in his footsteps, other artists gave expression to the same ideas. An instructive fact is that one of these men was a pupil of the École des Beaux Arts and of the academy at Rome. Hippolyte Lefebvre devoted himself to proving that the common aspects of modern life are not an insuperable problem for the sculptor's art; nay, that they actually afford him new subjects most suitable to his methods. He persisted in this purpose, and finally won the adhesion of his fellow-artists and the medal of honour for his "Jeunes aveugles" (Blind Boys), in the Luxembourg Gallery. We have also by him in this manner of the day, handled with truly synthetic breadth, "Summer," a youthful female figure in an ordinary walking dress carrying a parasol, her straw hat tilted over her eyes; "Winter," an old lady wrapped in furs, coming down snow-covered steps; "Spring," more accurately the "Age of Love," a group of six figures, and others. His comrade Roger Bloche has gone even further, asserting with no little pugnacity the same ideas in figures derived from the people, and in episodes of daily life, as in the "Accident," a recumbent figure surrounded by about twenty bystanders, drawn from every rank of society and rendered with that firm decision and breadth of treatment which alone constitute a work of art. This work earned him a first prize in the Salon of 1909. These awards are an unmistakable sign of official recognition of these tendencies, so long ignored and disapproved. Such encouragement has borne fruit. François Sicard and Henri Bouchard, who both had won the *prix de Rome*, started boldly on the new road, one in his monumental sculpture (a "Monument of the War of 1870" at Tours; "Monument to Barbey"; "Monument to Bertagna"; a pediment for a college for girls at Tours), the other in works recalling the feeling of Constantin Meunier by subjects of labour, in town or country, small figures in bronze, or large and important decorative groups, as "La Carrière" (the Quarry) and "Le Défrichement" (Turning the Sod), a group of six oxen led by two men. This was intended to decorate the Champ de Mars.

Meantime the study of beauty in the nude, far from being neglected, seemed to start on a new flight. Some students of the Roman school revived this tradition. Victor Ségoffin and Maximilien Landowski, each in his own nervous, vivid and characteristic manner, and, borne on an independent current, Louis Convers and Aimé Octobre show a feeling for grace and charm.

This is the normal and traditional heritage of the school; we see how strikingly it has renewed itself. In opposition to the followers of Rodin we find another group which represents an antagonistic school. Mademoiselle Camille Claudel, José de Charmoy and Henri Matisse typify the extremes of this manner; Emile Bourdelle, Aristide Maillot and Lucien Schnegg might be regarded as some of the artists who best deserved attention. With various characteristics and vehement or equable temperament they all reveal in the highest degree a fine sense of purely plastic qualities; in them we find no lapse into the pictorial, no purpose or *arrière-pensée* that is not of the essence of sculpture. Emile Bourdelle has given us busts of Beethoven, Carpeaux, Heracles (in the Luxembourg Gallery), Pallas Athena, and the large group of "Wrestlers of Tarn et Garonne" for completion in bronze. Maillot for his part prefers to work in marble and stone with large surfaces, after the tradition of the ancients; he exhibited in the autumn Salons several heads of girls and of old women, a figure of a youth in bronze (1909) and a stooping nude female figure in plaster. Lucien Schnegg's (d. 1909) reputation would have been assured by one bust only from his hand, that, namely, of his pupil "Mademoiselle Jane Poupelet." This in marble is now in the Luxembourg Gallery, and is a masterpiece for grace and dignity in the best spirit of the antique.

Besides these there should be named Jean Boucher, who has executed a monument to Renan, the "Evening of Life" and "Ancient and Modern"; E. Derré, an inventive decorator, with social tendencies and grateful emotional feeling; Max Blondat, lively and witty, as is seen in a fountain with frogs entitled "Jeunesse" (exhibited in the Royal Academy, 1910) and "Love" (in the Luxembourg Gallery); Abbal, Pierre Roche, who loves to handle very various materials—marble, stone and lead; Moreau-Vauthier, D. Poisson, Fix-Masseau, Gaudissard, David, Jacquot, Despiau, known by some fine busts, Drivier, Niclausse and Michel Cazin.

Sculpture on a small scale was effectively carried on by L. Dejean, Vallgren, Carabin, who carves in wood, Cavaillon and Féomont-Meurice. The sculpture of animals, since G. Gardet and P. Péter, has been brilliantly executed by Paul Jouve, Christophe, Navellier, Bigot, Perrault-Harry, Marie Gautier, Berthier and others. (L. Be.)

Modern Belgian sculpture.

The inevitable reaction in Belgium following upon the long period of dry and lifeless academic sculpture is difficult to trace to any particular pioneer or leader. Nevertheless the three men who certainly mark this period of revolt are Guillaume Geefs, De Bay and Simonis. There is, however, very little to be remembered of these men except that they were the best of their time. Geef's work was marred greatly by his frivolous and unessential details and poverty of thought, together with a frigid coldness of expression in his modelling. In his statue of General Belliard at Brussels, however, he shows the tendency to search for a broader and truer interpretation that warrants his being mentioned as belonging to the movement against the academic school. De Bay was a sculptor of a more artistic temperament, and though some of his works are charming and sympathetic when judged by the standard of his own day, few show evidence of advanced ideas. The work of Simonis is very different. Beyond the mere endeavour to grasp something more true, his work is fresher and perhaps more honest, more bold and gifted with more life. Such qualities are shown in his "Young Girl," in the museum at Brussels, and "Godefroid de Bouillon," in the Place Royale. Besides these three sculptors there was no man of note to strengthen the revival of sculptural art until Paul de Vigne (1843–1901). His early work bears the unmistakable influence of the Italian Renaissance, but after studying in Paris and in Rome he became a follower of the true classic ideal, not of the so-called classicism of Canova and his followers. He was a prolific artist, and from his numerous works it is difficult to pronounce one as his masterpiece. Perhaps that most generally considered his best is the sepulchral marble figure of "Immortality" in the museum at Brussels. Almost its equal in beauty and truthful rendering are his two bronze groups, "The Triumph of Art," on the façade of the Palais des Beaux Arts at Brussels, and the monument to Breydel and De Koninck at Bruges. Among his other works are "Fra Angelico of Fiesole,"

the bust of Professor Moke, at Antwerp, "Heliotrope" in the museum at Ghent, "Portrait of M. Charles van Hutten," the Wilson monument in the Musée Communal, Brussels, the statue of "Marnix de Sainte Aldegonde" in Brussels, the monument erected at Courtrai to Mgr de Hearne, the monument of Meddepenningen at Ghent, and the monument of the Gevaert family in the Communal Cemetery at Evere.

The art of Charles van der Stappen (b. 1843) is decorative in character, mostly applied to architecture, though he proved himself a versatile sculptor, producing many statues, reliefs, groups, monumental works, and statuettes. His works include a silver centrepiece executed for the town of Brussels, the statue of William the Silent in the Square du Petit Sablon, Brussels, a bust for the monument of Edouard Agneesens in the cemetery of St Josse-ten-noode, St Michael in the Gothic hall of the Hôtel de Ville, Brussels, the monument to Baron Coppens near Sheel, the Alexandre Gendebien monument at Brussels, statues for the Alhambra theatre and Caryatids for the architect De Curtis' house in the same city, and the group of tired workmen, called "The Builders of Cities."

The work of Thomas Vinçotte is characterized chiefly by its vigour and vitality. Vinçotte is classed by some authorities as belonging to the classic group, but his work is less graceful than that of de Vigne and more vigorous and life-like than Van der Stappen's. There is perhaps more movement in his work than in that of any of his contemporaries. The many portraits he executed reveal the ability of grasping the essentials of portraiture as well as the discrimination necessary to discard everything that does not render the work alike and characteristic. Among his works are a statue of Giotto in the Brussels Museum, "Music," on the façade of the Palais des Beaux Arts, the Godecharles monument in the Park, the bronze group of the "Horsebreaker" in the Avenue Louise, and the statue "Agneessens" in the Boulevard du Midi, all of them in Brussels. There is also a bronze group of horses and Tritons for the park of the Château d'Ardenne.

Few men have exercised such influence upon Belgian sculpture as Jef Lambeaux (1852–1908), the Flemish artist. He was born at Antwerp of poor and obscure parents. At an early age he showed great aptitude for drawing, and after a very meagre education he was apprenticed to a wood carver. While there he studied at the academy schools. At sixteen he completed his course and undertook his first important commission, that for two reliefs for the tympana of the French theatre. He was successful for a time in producing statuettes, but after a while his success waned and he was obliged to abandon sculpture and to take any work he could get. After a period devoted to odd employments—sometimes painting, sometimes modelling—he again saved money to enable him to produce some good works. The first of these, "The Kiss," was finished in 1880. It had a great success and was bought by the Antwerp Museum. This discovery of a sculptor of talent led the town of Antwerp to find the means for sending Lambeaux to Italy. After studying in Florence he returned to produce "La Folle Chanson," which by some is considered his masterpiece. The group of "Intoxication" produced later is less satisfactory. The figures show a curious and unpleasant development which the sculptor's previous work scarcely hinted at. A work which may be placed with his "Folle Chanson" is the "Fountain of Brabo" in front of the Hôtel de Ville at Antwerp. This in fact is declared by many critics to be Lambeaux's *chef-d'œuvre*; it is certainly his most imposing monument. Other works of his are "The Robber of the Eagle's Nest," the wonderful colossal relief, "The Passions of Humanity," "The Wrestlers" and "The Orgy."

Less bold and energetic than Lambeaux's is the work of Julien Dillens (b. 1849). Though it does not possess that sense of life and the directness which is found in his brother sculptor, his standard of excellence was steadier. He will be remembered as one of Belgium's finest decorative sculptors, for his best work has been done in architectural enrichment. His pediment for the Hospice des Trois Alliés at Uccle is a successful treatment of the difficult dress of modern times. Dillen's masterpiece is without doubt the group of "Justice" in the Palais de Justice at Brussels. He is responsible for many other important works, the chief of which are the busts of De Pède and Rubens in the Brussels Museum, a statue of Van Orley in one of the squares of Brussels, "The Lansquenets," on the summit of the Royal Palace (before its reconstruction), a statue of Jean de Nivelles on the front of the Palais de Justice at Nivelles, and the marble statues of St Victor and St Louis at Epernay.

There is yet another artist who ranks as one of the greatest sculptors of Flanders. This is Jules Lagaë (b. 1862). He was a pupil of Jef Lambeaux. His work does not call for further distinction from that of Dillens and Lambeaux, than that it is what may be termed "delicate" and possessed a distinctive charm of spontaneous freshness. His "Mother and Child," shown at Florence in 1891, is a good example of the first quality, while "The Kiss," a terra-cotta bust, shows his spontaneity.

In the Walloon provinces two sculptors have done much for the renaissance of the art, Achille Chainaye and Jean Marie Gaspar. Achille Chainaye (b. 1862) is not a prolific sculptor, but all his work is inspired, it would seem, by similar motives and ideas to those which inspired the early sculptors of Florence. The scarcity of his works may be accounted for by the fact that his productions were received with ridicule and derision. Meeting with scant success, he abandoned sculpture and devoted himself to journalism.

The work of Jean Marie Gaspar (b. 1864) shows the inspiration of a whole gamut of emotions, but hardly the continuity of purpose necessary to carry to completion half of his conceptions. He studied under Lambeaux, and, while still in his master's studio, he produced a wonderful group, "The Abduction," two men on furious, plunging horses wrestling for the possession of a struggling woman. This group was shown at the Paris Exposition of 1889, and brought immediate fame to the then unknown sculptor. Of his other finished works may be cited "The Brave," an Indian on horseback; "Adolescents," a charming group of two nude children embracing; "The Young Girl on a Rock," and the "Panther," destined for the botanical gardens at Brussels.

From the death in 1904 of Constantin Meunier (b. 1831) up to the year 1910 no man had advanced beyond the standard set up by that great sculptor. At the outset of his career Meunier had, like all pioneers, to contend with the hostility and derision of the public and of the press. His work touched a hitherto unawakened note. His sympathies lay all with the people who, obscure and unsung, work for the enrichment of the nation. Thus we find his energies and love of work wrapped around the iron foundry, the mine, the field and the factory. His art is not the art of the pseudo-classic, nor is he influenced by the masters of the Renaissance. His work is free and straightforward, true almost to brutality, but withal inspired by a love of doing homage to the workers of the people. He studied in the studio of Fraikin. But it is unlikely that he was much influenced by him, and he soon forsook sculpture for painting. He was for some years one of the group of independent painters, which included De Groux, Dubois, Boulanger, and Baron. When these artists fell apart, Meunier stood alone, painting where no painter had before ventured or given a thought, working amongst the machinery, the pits, and the great factory yards. He continued for twenty-five years to paint in this manner, ignoring public ridicule and neglect. Then Meunier suddenly returned to his old love and produced some small statuettes. One of these—a puddler seated in an attitude of weariness, hard and rough and muscular, clad in little beyond his leathern apron—attracted much attention at the exhibition of the "Society of the XX." at Brussels. The subject and the treatment, so different to the recognized precepts of the schools, created a vast amount of discussion. From that time Meunier continued on the road he had taken, and produced works which gained to him new believers and new friends. Among his chief productions are "Fire-damp," in the Brussels Museum, "The Mower," in the Jardin Botanique at Brussels, "The Glebe," and "Puddlers at the Furnace," both in the Luxembourg Museum, "The Hammerman," the statues on the façade of Notre Dame de la Chapelle, and the monument to Father Damien at Louvain.

Jacques de Lalaing is the author of the masterly monument erected at Evere to the English officers and men who fell at Waterloo, an elaborate work full of imagination and sculptural force and originality. His statue to Robert Cavelier de la Salle, at Chicago, is also a noteworthy performance, and important decorative works by him are to be seen embellishing public gardens in Brussels. Among the leading sculptors of to-day is to be reckoned Charles Samuel, who leans towards the traditions of yesterday.

Modern Italian sculpture.

Canova so dominated the world of sculpture at the beginning of the 19th century that the pseudo-classic style which he introduced remained typical of all the Italian sculpture of note until Bartolini led the movement which ultimately crushed it. In Rome Canova completely overshadowed all other sculptors except perhaps Thorwaldsen, the Danish sculptor, who resided for some time in that city. It is true that Pompeo Marchesi (1789–1858) at the outset of his career enjoyed great popularity, but at the time of his death he was well-nigh forgotten. The interval between the death of Canova and the rise of Bartolini and the new school was filled in by men of mediocre talent, in whose work the influence of the leader of classicism is strongly marked. Francesco Carradori (1747–1824), Camillo Pacetti (1758–1826), Rinaldo Rinaldi (b. 1793) and Giuseppe Fabris (b. 1800) were all followers of Canova, the last three being pupils of that master.

Lorenzo Bartolini (1777–1850) became the leader of the movement towards naturalism. This was nothing more nor less than the servile copying of form—both in natural forms and in dress. Nevertheless Bartolini must be remembered as the pioneer of a different kind of naturalism which was of far greater importance than the manner of treating forms and texture. His true originality lay in his representations of character. In place of the classic subjects invariably treated

in his time, he applied himself to the study of actual life. Instead of the expressionless faces of the pseudo-classic, he gave vitality and energy.

A sculptor who was much talked of in his day was Pietro Tenerani (1789–1869), a native of Torano near Carrara. He worked for some time as assistant to Thorwaldsen. Later these two sculptors jointly accepted a commission for the monument of Eugène Beauharnais, and as Thorwaldsen wished to suppress the younger man's name, they quarrelled and finally separated. Tenerani visited Munich and Berlin, where he enjoyed the patronage of Frederick William IV. During the disturbances of 1848 and 1849 he was obliged to leave Rome with his family, in consequence of his sympathy with the Papists and his friendship for Count Pellegrino Rossi, who was assassinated in 1848. Amongst Tenerani's works are a statue of Count Rossi, a monument to Pius VIII. in the sacristy of St Peter's, "The Angel of Resurrection" in the Friedenskirche at Potsdam, a low relief in the church at Castle-Ashby, Northamptonshire, and "The Descent from the Cross," in the Torlonia chapel in St John Lateran. The last-named reveals the close study of nature so characteristic of his work.

The most distinguished Piedmontese sculptor of this period was Marochetti, who is referred to above in connexion with the British school.

Although Vincenzio Vela (1820–1891) was Swiss by birth, he was Italian both by adoption and in his sympathies. In 1838 he won the prize offered by the government to the students of the Lombard-Venetian provinces of Austria, and became known by his statue of Spartacus. His chief works are a statue of Bishop Luini at Lugano; Desolation, at the Villa Gabrina, Lugano; William Tell, at Lugano; the Alfieri and statues of Dr Gallo at the university, and of Cesare Balbo, all at Turin; the statues of Tommaso Grossi and Gabrio Piola at the Brera, Milan; Dante and Giotto at Padua; Joachim Murat at the Certosa, Bologna; and Cavour at Genoa. His masterpiece is the seated figure of Napoleon at Versailles.

After Bartolini, sculpture in Italy slowly developed along the lines of "naturalism" suggested by that leader. Perhaps the greatest activity and advance are to be recorded around Naples, a city till then of subordinate importance in art. Tommaso Solari (b. 1820), who may be regarded as one of the group belonging to Naples, produced work which is hardly distinguishable from that of Vela. His statue of Carlo Poerio, which occupies an important position in Naples, is characteristic of his work. He was followed by several sculptors whose works betray but little originality except in some cases in the forcing of qualities they wished to accentuate, and the selection of daring or dramatic subjects – qualities which reveal the true character of the Neapolitan. The work of Raffaele Belliazzi, another Neapolitan (b. 1835), like that of Solari, is full of conscientious study, but his naturalism shows no genius. Among his works are "The Sleeping Boy," in the Gallery of Modern Art, Rome; "A Woman and Child," and two terra-cotta busts at Capodimonte. Emilio Franceschi (1839–1890) and Achille D'Orsi (b. 1845) both belonged to the Neapolitan group of sculptors. Though the former was not a native of Naples, he resided there from 1869 until his death. But while Franceschi was influenced to a very large extent by the Neapolitan school, D'Orsi broke away from it and created a distinctive style of his own. He studied in Rome, and in 1876 returned to Naples, where he produced "Il Cabalista," followed by "The Parasites," the latter establishing his fame by its singularity both of subject and treatment. It represents two gluttons in a state of extreme intoxication. The group is remarkable as showing D'Orsi's powers of characterization.

A man of perhaps greater original thought was Francesco Jerace, who seems to have been entirely free from the "academic" smallness which characterized the followers of the naturalistic movement. He was born at Polistena in Calabria in 1853. His work bears the impress of his personality and his rather marked aloofness from his contemporaries. He is the author of the monument to Mary Somerville, the English mathematician, which is in the Protestant cemetery at Naples; Vittoria Colonna, exhibited at the Brera, Milan, in 1894; and the Beethoven exhibited at Venice, 1895. At Bergamo there is a statue of the musician Donizetti, which was placed there in 1897.

Vincenzo Gemito was born at Naples in 1852 of parents in a very humble position. He picked up a living in various occupations until, at the age of fourteen, he entered the studio of Emanuele Caggiano (1866). He worked hard and to some purpose, for two years after he modelled "The Gamester," which is at Capodimonte. This work shows evidence of astounding precocity. His work is realistic, but forcible and more alive than that of many sculptors of his day. Gemito was supremely confident of his powers, and in a manner this was justified by his early recognition both amongst critics and the public. He designed a statue of Charles V. for the façade of the Royal Palace at Naples. A small figure of a water-carrier upon a fountain is now in the Gallery of Modern Art at Rome; in the same gallery are his statuette of Meissonier and a terra-cotta figure of Brutus.

A sculptor of quite a different class of subject is Cos[illegible] Barbella, born at Chieti in 1853, who gave his entire atten[illegible] pastoral subjects, dealing with the costumes, types and occup[illegible]s of the folk among whom his early life was spent. In the Royal Villa at Monza is a replica of his three peasant girls – a group in terra-cotta. In the national gallery at Rome there are a group of "The Departure of the Conscript," "The Conscript's Return," and another called "April."

For some years the activity amongst what may be called the Sicilian group of sculptors was headed by Benedetto Civiletti (b. Palermo, 1846). Civiletti was a pupil of Dupré, but his work bears little impress of his master's influence; it is characterized mostly by its force and meaning of gesture and facial expression. His statue of "The Youth Dante" at the moment of the first meeting with Beatrice, and his seated figure of "The Young Caesar" are both works which successfully show his power of pose and facial expression. He is the author also of the famous Canaris group, "Christ in Gethsemane," "The Dead Christ," a group of the siege of Missolonghi, and a group of seventeen life-size figures representing the last stand of the Italians at the massacre of Dogali.

The family of Ximenes of Palermo is noted on account of the three of its members who each became well known in the world of art: Empedocle, the painter, Eduardo, the writer, and Ettore, the sculptor. Ettore was a pupil of Morelli. His earliest work of note was a boy balancing himself upon a ball which he called "Equilibrium." He also produced "La Rixe," "Le marmiton," "Cuore del Re," "The Death of Ciceruacchio," "Achilles," and many others. His statue of "Revolution" is one of his best works.

Giulio Monteverde's work is conspicuous for its gaiety and sparkle, but though he has had some influence upon the recent sculptors of Italy, his work follows the naturalistic precepts laid down by his predecessors. A group of his own children, full of vivacious merriment, is in the Palazzo Bianco at Genoa; a "Madonna and Child" is in the Camposanto, and a statue of Victor Emmanuel stands in the square in the centre of Bologna.

Ettore Ferrari of Rome (b. 1849) is another sculptor whose work shows remarkable care and love of what is called finish. He has produced the statues "Porcari," the medieval revolutionist, "Ovid," "Jacopo Ortis," "A Roman Slave," "Giordano Bruno," in the Campo di Fiori, and "Abraham Lincoln," in the New York Museum.

To the Roman group of sculptors also belongs Ercole Rosa (b. 1846). That he was a man of considerable talent is shown by his group of the Cairoli at Rome and his monument of Victor Emmanuel near the cathedral at Milan. Emilio Gallori, who studied at the Florence academy, is the author of the colossal statue of St Peter on the façade of the cathedral at Florence. He won the competition for, and executed, the Garibaldi monument at Rome.

A sculptor who is looked upon as the leader of the Venetian school is Antonio dal Zotto (b. 1841), a follower of Ferrari, at whose hands he received much of his training. He won the *prix de Rome* offered by the academy, and in Rome he met and became a friend of Tenerani. Being a man of independent views, however, he was but little affected by Tenerani's work. He was then twenty-five years old, and after spending two years in Rome and in other centres of artistic interest, he returned to Venice, where he produced a statue of St Anthony of Padua, one of Petrarch and another of Galileo. In 1880 he completed his statue of Titian for the master's birthplace, Pieve di Cadore, and in 1883 he finished the figure of Goldoni in Venice. He is author also of a statue of Victor Emmanuel and a monument of Tartini the violinist, the former in the memorial tower on the battlefield of S. Martino near Brescia, the latter in a public square at Pirano.

Turin boasts many sculptors who are known throughout the country. Chief of these is Odoardo Tabacchi (b. 1831). He is the joint author with Antonio Tantardini of the Cavour monument at Milan. He has modelled several subjects of a lighter type, such as "The Bather," exhibited in Milan in 1894. Lorenzo Bistolfi, a younger man, conquered recognition chiefly by his composition of "Grief Comforted by Memory." Amongst other Turin sculptors must be mentioned Luigi Belli, author of the Raphael monument at Urbino, and Davide Calandra, whose "L'Aratro" is in the national gallery at Rome.

Modern Austrian sculpture.

As everywhere in western and central Europe, national sculpture in Austria during the first half of the 19th century was altogether influenced by the classicism of the Italian Canova—in Austria perhaps more than in other countries, since two of Canova's most important works came to Vienna in the early years of the century: the famous tomb of Marie Christine in the Augustinerkirche,

which was ordered by Duke Albrecht of Saxony, in 1805, at the price of 20,000 ducats; and the Theseus group, bought by the emperor Francis, in Rome, which is now in the Vienna Museum. Canova's pupil, Pompeo Marchesi, was the author of the emperor Francis monument, unveiled in 1846, in the inner court of the Hofburg.

The first national sculptor of note was the Tirolese Franz Zauner (1746–1822), who was knighted in 1807 (the year in which his Kaiser-Joseph monument was unveiled) and became director of the Vienna gallery and academy. Among his works are the tomb of Leopold II. in the Augustinerkirche; the tomb of General Laudon at Hadersdorf; the tomb of the poet Heinrich von Collin in the Karlskirche in Vienna; and a number of busts in the Empire style, which are by no means remarkable as expressions of artistic individuality. Leopold Kiesling (1770–1827), another Tirolese, whose first work on a large scale is the Mars, Venus and Cupid, in the Imperial gallery, was sent by his patron, Count Cobenzl, to Rome, where he was more attracted by Canova than by the antique or the late Renaissance. Joseph Klieber (1773–1850), also Tirolese, enjoyed the protection of Prince Johann Liechtenstein, who employed him in the plastic decoration of his town residence and country seats. His reputation as sculptor of colossal figures for imperial triumphal arches and lofty tombs was so widespread that he was given the commission for the catafalque of Louis XVIII. in Paris. Many middle-class houses of the Empire period in Vienna were decorated by him with reliefs of children. The elaborate relief figures on the Andreas Hofer monument in Innsbruck are the work of his hand. His followers were less favoured by powerful protection and were forced into a definite direction: among them must be mentioned Johann Martin Fischer (1740–1820), who succeeded Zauner as head of the academy. His best-known work is "The Muscle-man," which still serves as model to students.

Of the greatest importance for the development of Austrian sculpture in the second half of the 19th century was the influence of Joseph Daniel Boehm (1794–1865), director of the academy of coin-engravers, and discriminating collector of art treasures. He was the father of Sir Joseph Edgar Boehm, R.A. Emanuel von Max (1810–1900), who in conjunction with his brother Joseph modelled the Radetzky monument in Prague, wrote in his autobiography, concerning the year 1833 in Vienna: "Art, particularly sculpture, was at the lowest ebb. The appearance of a statuette or bust at an exhibition was considered an event." But a strong movement began towards the end of the 'fifties. Professor Franz Bauer, of the Vienna academy (1797–1872), exercised a most stimulating influence upon the rising generation. Among the earlier artists, whose life overlaps into the new era, were Anton Dietrich (1799–1872), who is best known by "The Three Magi," on the porch of the church of St John, and by a very beautiful ivory crucifix; and Johann Preleuthner (b. 1810).

The architectural rejuvenation of Vienna led to the rise of an original local school of sculpture. J. D. Boehm devoted himself almost entirely to goldsmith-work and medals, but with the aid of his great collections he taught the new generation and helped to develop original talent. Hans Gasser (1817–1868) owed him his introduction to society, for whom he produced many busts. He modelled the empress Elisabeth monument at the western railway station in Vienna, the Wieland monument in Weimar, and the famous "Donauweibchen" in the Vienna town park. His brother, Joseph Gasser von Wallhorn (b. 1816), was a sculptor of figures of saints, many of which decorate St Stephen's Cathedral and the Votive Church in Vienna. Anton Fernkorn (1813–1878), born at Erfurt, was Austrian by his art. He started as a metal worker, and studied in Munich, but not at the academy. His talent was only fully developed after he settled in Vienna, which city owes to him the bold equestrian bronze monuments of Archduke Charles (1859) and Prince Eugene of Savoy (1865). He became director of the imperial bronze foundry, in which post he was followed by his pupil Franz Poenninger. Johann Meixner (b. 1819 in Bohemia) is the creator of the marble figures on the Albrecht Fountain, one of the most famous and imposing monuments in Vienna. Vienna received a few of her most important monuments from the strong personality of the Westphalian Kaspar von Zumbusch (b. 1830), the Beethoven monument, and that of Maria Theresa, an imposing and skilfully designed work, which solves in admirable fashion the problem of placing a monument effectively between the heavy masses of the two imperial museums. Munich owns his monument of King Maximilian II. Zumbusch's fame did not quite overshadow that of Karl Kundmann (b. 1838), to whose vigorous art Vienna owes the Tegetthoff monument (based on the Duilius column), the Schubert statue, the seated figure of Grillparzer, and the awkwardly placed "Minerva" in front of the houses of parliament. Joseph V. Myslbeck (b. 1848) worked under Thomas Seidaus (1830–1890), and is the author of the equestrian figure of St Vaelav, of "The Crucified Saviour," and of the Sladkowsky tomb in Prague. The most successful of the younger school was Edmund Hellmer (b. 1850), who executed the group on the pediment of the houses of parliament; "Francis Joseph granting the Constitution"; the Turkish monument at St Stephen's; one of the wall fountains on the façade of the new Hofburg (Austria's land power) - the companion figure ("Sea Power") is by Rudolf Weyr (b. 1847);—the animated Bacchus frieze of the Court Theatre; the statue of Francis Joseph in the polytechnic institute; and the reliefs of the Grillparzer monument.

Like Hellmer and Weyr, Victor Tilgner (1844–1896) was a pupil of F. Bauer; but he owed his training rather to Joseph von Gasser and Daniel Boehm. He produced a vast number of portrait busts of his most prominent contemporaries in Vienna. Among his most notable monuments are those to Mozart and Makart in Vienna, the Werndl figure at Steyr, Bürgermeister Petersen in Hamburg, and a war memorial at Königgrätz, in addition to numerous monumental fountains. Artistically on a higher plane than Tilgner stands Arthur Strasser (b. 1854), who excelled in polychromatic work on a small scale. In the 'seventies his Japanese figures excited considerable interest and attracted Makart's attention. He excelled in Egyptian and Indian genre figures, such as a praying Hindu between two elephants. An Arab leaning against a Sphinx and a classic female figure with a funeral torch were strikingly decorative. His green patined bronze of "The Triumph of Antinous" with a team of lions was awarded a first modal at the Paris Exhibition of 1900.

Vincenz Pilz (b. 1816) was the sculptor of the quadrigas and caryatids on the Vienna houses of parliament, and of the Kolnitz and Türck monuments. Contemporary with him were Karl Costenoble (b. 1837), Alois Düll (b. 1843), Otto König (b. 1838), Anton Schmidgruber (b. 1837), the craftsman Franz Schönthaler, Johann Silbernagel (b. 1839)—the author of the Liebenberg monument in Vienna, and Anton Wagner (1834 1900), whose "Goose Girl" is one of the monumental features of the streets of Vienna. Classic form was represented by Johannes Benk, who did good work in groups for pediments. One of his latest productions is the Amerling monument in the Vienna town park. Theodor Friedel (1842–1899) excelled in decorative work on a large scale. His are "The Horse Tamers" in front of the Hof-Stallgebäude.

Edmund Hofmann von Aspernburg (b. 1847) is the sculptor of the Friedrich Schmidt monument, of the bronze centaurs in front of the Vienna Academy of Fine Arts, and of the monument of Archduke Karl Ludwig. The works of Stefan Schwartz (b. 1851) are remarkable for their vigour. He excelled in a new technique of embossing portrait plaques in silver direct from life. He counts also among the best Viennese medallists, almost equalling Heinrich Natter (1844–1892). Hermann Klotz (b. 1850) became professor of sculpture in wood. The very talented statuette-maker Ludwig Dürnbauer (1860–1895) died almost at the beginning of what promised to be a brilliant career. Other distinguished sculptors of statuettes and works on a small scale were Hans Rathausky (b. 1858) and Johann Scherpe (b. 1855), who was entrusted with the execution of the Anzengruber monument. They all were pupils of Kundmann, as was also the animal sculptor Lax. Karl Schwerzek is the author of the Lenau and Anastasias Grün busts in Vienna, and Franz Vogl (b. 1861) of the poet Raimund's monument. Among Zumbusch's pupils were Anton Brenck, the creator of the emperor Joseph II. monuments in Brünn and Reichenberg; Emanuel Pendl, whose colossal marble statue of "Justice" is placed in the law courts in Vienna; and Hans Bitterlich (b. 1860), whose bust of Exner in the Vienna university is one of the most remarkable pieces of realistic portraiture in that city. Another work of his is the Gutenberg monument. Othmar Schimkowitz is remarkable for a strikingly original style.

In the other provinces under the Austrian emperor's rule, the best-known sculptors are the Carniole Marcell Guiçki (1830–1894), Lewandowski, Buracz, and the Tirolese Gurschner, who follows the modern French style of statuette sculptors.

In the art of the medallist, Professor Karl Radnitzky the elder (b. 1818) led the way after J. D. Boehm; but he was surpassed by his pupil Joseph Tautenhayn (b. 1837), whose large shield "Struggle between the Centaurs and Lapithae" was the cause of his appointment as professor. More important still is Anton Scharff (b. 1845), a real master of the delicate art of the medallist.

Spanish 19th-century sculptors.

At the beginning of the 19th century the art of sculpture was practically dead in Spain—or at least was mainly confined to the mechanical production of images of saints. But towards the middle of the century the two brothers Agapito and Venancio Vallmitjana, of Barcelona, encouraged by the enthusiasm with which some of their works had been received by local connoisseurs, took part

in the Paris *Figaro* competition for the figure which decorates the entrance to the offices of that journal, and carried off the second prize. They afterwards obtained the first prize in other competitions at Madrid and other Spanish centres. Their chief works are: "Beauty dominating Strength," "St Vincent de Paul," the large statue erected at Valencia to Don Jaime Conquistador, and groups of Queen Isabella with the Prince of the Asturias, and Queen Marie Christine with Alfonso XIII.

Another sculptor of distinction is Andres Aleu, professor of the Barcelona School of Fine Arts, whose principal works are "The St George and the Dragon" on the façade of the Barcelona Chamber of Deputies, and Marshal Concha, the equestrian statue in Madrid. Kosendo Novas, of Catalan birth, like most modern Spanish sculptors of eminence, is best known by his masterpiece, "The dead Torero." Manuel Oms, another Barcelona sculptor who leans to the naturalistic school, is the author of the monument to Isabella the Catholic, erected at the end of the Paseo de la Castellana in Madrid in 1883. Antonio Fabrés, who at the beginning of his career was an eminent sculptor, devoted himself subsequently to painting. Agustin Querol, and Mariano Benlliure, of Valencia, were for many years the official favourites of the Spanish government, who entrusted them with numerous important commissions, though their work was neither lofty in conception nor particularly remarkable as regards execution, and occasionally, as in Querol's monument of Alfonso XII.—especially in the completed sketch of it—baroque in the extreme. Indeed, the genius of the Spanish race at all times, and particularly in the 19th century, found its expression in painting rather than in sculpture. Querol's group called "Tradition" is well imagined and expressive, and a good example of the best work achieved by a school in which freedom is the chief note.

Towards the end of the 19th and in the early years of the 20th centuries, Joseph Llimona y Brugena ("The Communion") and Blay, both of Catalan birth, were the most distinguished sculptors of Spain. The fame of Blay, who was a pupil of Chapu in Paris, has extended beyond the frontiers of his native country. His style has at the same time strength and delicacy. His chief works are the Miners' monument at Bilbao, and a group of an old man seated on a bench protecting a little girl from the cold. He also produced a great number of delicately wrought marble busts before his career was prematurely cut short. Joseph Llimona is the most personal and distinguished of all modern Spanish sculptors. His art ranges from the greatest delicacy to real power. At the International Exhibition at Barcelona in 1907 he was awarded the grand prize of honour for a group intended for the monument to Dr Robert in that city; and for a small marble figure of Pain, a work in which he has been thought to rival the Florentines of the best period. José Alcoverro, Pages y Serratora, José Gragera, Fuxa y Leal, Miguel Embil, and the brothers Osle are prominent members of the younger school and aim at giving "the personal note." The vigour displayed by them illustrates the revivification and rejuvenation of Spanish sculpture.

Russian sculpture has practically no past to record. In its beginnings Russian art was entirely ruled by the Church, whose laws were inspired by Byzantinism, and who forced all artists to submit to strictly fixed rules as regards form and formula. Before the 18th century, Russian sculpture was practically non-existent, except in the form of peasant wood-carving. The early stone idols (Kamenyia baby) and primitive bas-reliefs belong to the sphere of archaeology rather than of art. Real sculpture only appears at the end of the 18th century, when Peter the Great, to use his own expression, "opened a window upon Europe" and ordered, together with a radical change in Russian society, the introduction of western art in Russia.

Russian sculpture.

From all European countries artists streamed into Russia and helped to educate native talent, and at the same time the tsar sent young artists abroad to study in foreign art centres. Among the foreign artists of this period were Conrad Hausner, Egelgrener and Schpekle; among the Russians Koulomjin, Issaeiv and Woynow. About 1776 Falconet and his wife arrived in Russia; then Gillet, whose pupil Schubin ranks among Russia's most gifted artists. Among his best-known works is the monument of Catherine II. His fame was rivalled by that of Schedrine. Kozlovski is known by his Souvorine monument. Other early sculptors of distinction were Demouth-Malinowski, the sculptor of the Soussaniev monument; Pimenow, Martos, and the medallist Count Theodore Tolstoï, who is also known as an able illustrator. Orlovsky, Vitali and the whole preceding group represent the pseudo-classic character acquired at foreign academies. Among animal sculptors Baron Klodt is known by his horses which decorate the Anitschkine bridge at St Petersburg.

About the beginning of the 19th century the sculptor Kamenski inaugurated a more realistic tendency by his work which was inspired by contemporary life. He entered the academy after having exhibited a series of sculptures among which the most interesting were "The First Step" and "Children in the Rain." His contemporary Tschigoloff began his career in brilliant fashion, but devoted himself subsequently to the execution of commissions which did not give full scope to his gifts.

The greatest talent of all was unquestionably Marc Antokolsky (1845–1902), a Jewish sculptor permitted to work outside the Pale, of whom the Paris correspondent of *The Times* wrote, about 1888, that French sculptors would benefit by studying under Antokolsky, and by learning from him the power of the inspiration drawn from the study of nature. The artist himself held his statue of Spinoza to be his finest achievement. "I have put into this statue," he wrote, "all that is best in me. In the hard moments of life I can find peace only before this work." Equally beautiful is "The Christian Martyr," in the creation of which Antokolsky definitely broke all the fetters of tradition and strove no longer to express linear beauty, but intense truth. The martyr is an ugly, deformed woman, tortured and suffering, but of such beautiful sentiment that under the influence of religious extasis her very soul seems to rise to the surface. Among his other works few are better known than "Mephistopheles" (which he wanted to call "The 19th Century") and the powerful "Ivan the Terrible," which the Russian critic Starsoff called "The Torturer Tortured." The whole strange psychology of this ruler, whose compeer in history can only be found perhaps in the person of Louis XI., is strikingly expressed by Antokolsky. Very beautiful is the statue of Peter the Great, which breathes strength, intelligence, genius and devouring activity. To the works already mentioned must he added the statues of Ermak and of Nestor. Antokolsky has left to the world a gallery of the most striking figures in Russian history, giving to each one among them his proper psychology. His technique is always marked by perfect sureness and frequently by dazzling bravura.

Antokolsky was twenty-one years of age when he left St Petersburg. The academy at that time was in a state of complete decadence, under the rule of worthy old professors who remained strangers to their pupils, just as their pupils remained strangers to them. When Professors Pimínoff and Raimers died, soon after, the academy seemed quite deserted; but just at that time a number of very gifted students began to work with energy, learning all they could from one another, fired by the same purpose and spirit. Antokolsky was in close touch with his friend, the painter Repin, with whom he worked much, and so failed to come under the influence of the idealist M. V. Praklow, who soon began to deliver certain lectures on art which excited keen interest among the young workers. Antokolsky tried the Berlin Academy of Fine Arts, but finding it ruled by the same routine, he returned before long to St Petersburg, where within a short time he executed the statue of "Ivan the Terrible" to which he owed his fame. This epoch became the starting-point of Russian sculpture, so that Antokolsky deserves an eminent position in the history of Russian art.

Among his pupils was his faithful follower and friend Ilia Ginsbourg (b. 1859), who devoted himself to genre scenes and portraits in the spirit of his master, but with a degree of sincerity and enthusiasm which save him from the reproach of plagiarism. Lancéré (1848–1887) is known by his military statuettes. Libérich (1828–1883) has left few remarkable works. Léopold Bernstamm always practised in Paris; among his works are a great number of portraits and a few monuments that are not without merit. Among contemporary sculptors, whose number is still restricted in Russia, and whose artistic merit remains stationary, without marked progress and with little evidence of evolution, are Beklemicheff, Bach, Brodsky, Mikechine, Tourgeneff, Auber and Bernstein. Prince Troubetzkoï, who is counted among the sculptors of Russia, though he was educated and worked in Italy, acquired some reputation by

his skill in the rapid execution of cleverly-wrought impressionist statuettes of figures and horses as well as busts. Their value lies in the vivid representation they give of Russian life and types. Among the most original modern Russian sculptors is Naoum Aronson (b. 1872), whose best-known work is his Beethoven monument at Bonn. At Godesberg is his Narcissus fountain, whilst other works of his are at the Berlin, St Petersburg and Dublin Museums.

(M. H. S.; P. G. K.)

United States.

The early names in American sculpture—Shem Drowne, the maker of weather-vanes; Patience Wright (1725–1785); William Rush (1765–1833), carver of figure-heads for ships and portraits; John Frazer (1790–1850), the stonecutter; and Hezekiah Augur (1791–1858)—have the interest of chronicle at least. Hiram Powers (1805–1873) had a certain technical skill, and his statues of the "Greek Slave" (carved in 1843 in Rome and now at Raby castle, Darlington, the seat of Lord Barnard, with a replica at the Corcoran Gallery, Washington, and others elsewhere) and "Eve before the Fall" were important agents in overcoming the Puritanic abhorrence of the nude. Horatio Greenough (1805–1852), Joel T. Hart (1810–1877), S. V. Clevenger (1812–1843) and Clark Mills (1815–1883) all received many commissions but made no additions to the advancement of a true art-spirit. Thomas Crawford (1814–1857) began the bas-reliefs for the bronze doors of the Capitol, and they were finished by William H. Rinehart (1825–1874), whose "Latona" has considerable grace. Henry Kirke Brown (1814–1886) achieved, among less noteworthy works, the heroic "Washington" in Union Square, New York City. It is one of the noblest of equestrian statues in America, both in breadth and certainty of handling and in actual majesty, and reflects unwonted credit on its period. Erastus D. Palmer (1817–1904) was the first to introduce the lyrical note into American sculpture; his statue, "The White Captive," and still more his relief, "Peace in Bondage," may be named in proof. There is undeniable skill, which yet lacks the highest qualities, in the work of Thomas Ball (b. 1819). William Wetmore Story (1819–1896), whose "Cleopatra," though cold, shows power; Randolph Rogers (1825–1892), best known for his blind "Nydia," and for his bronze doors of the Capitol at Washington; John Rogers (1829–1904), who struck out a new line in actuality, mainly of an anecdotal military kind; Harriet Hosmer (1830–1908), a classicist, whose recumbent "Beatrice Cenci" is perhaps her most graceful work; J. S. Hartley (b. 1845); Launt Thompson (1833–1894) are among the leaders of their day. The works of Olin L. Warner (1844–1896) and J. Q. A. Ward (1830–1910) reveal at times far greater originality than any of these. Warner's two graceful classical figures for a fountain in Portland, Oregon, and his admirable portrait statue of William Lloyd Garrison, reveal a nice discernment of the fitness of manner to matter. He was also successful in modelling medallions. Ward has a sturdiness, dignity, and individuality quite his own, and may be considered at the head of his own generation. In addition to these should be mentioned Larkin G. Meade (b. 1835), George Bissell (b. 1839), Franklin Simmons (b. 1839), Martin Milmore (1844–1883), Howard Roberts (1843–1900), Moses Ezekiel (b. 1844), all of whom are prominent in the history and development of sculpture in America. By their time the sculptors of America had wakened completely, artistically speaking, to a sense of their own nationality.

It was however later that came that inspired modernity, that sympathy with the present, which are in some senses vital to genuinely emotional art. American sculpture, like American painting, was awakened by French example. The leading spirit in the new movement was Augustus St Gaudens (*q.v.*), a great sculptor whose work is sufficiently dealt with in the separate article devoted to him. Two other Americans stand out, with St Gaudens, among their contemporaries, Daniel Chester French (*q.v.*) and Frederick MacMonnies (*q.v.*). French's "Gallaudet teaching a Deaf Mute" is an example of how a difficult subject can be turned into a triumph of grace. His "Death and the Young Sculptor" is a singularly beautiful rendering of the idea of the intervention of death. In collaboration with E. C. Potter he modelled various important groups, particularly "Indian Corn" and the equestrian "Washington," in Paris. The "Bacchante" of MacMonnies, instinct with Renaissance feeling, is a triumph of modelling and of joyous humour; while his statue of "Nathan Hale" in City Hall Park, New York, his "Horse Tamers," and his triumphal arch decorations for the Soldiers' and Sailors' Memorial at Brooklyn, show the artist's power in the treatment of a serious theme.

The strenuous achievements of George Grey Barnard have both high skill and deep sincerity. His "Two Natures," his "Brotherly Love," his "Pan" and the design for a monumental Norwegian stove are among the strongest efforts of modern American statuary. Ranking with him, though different in thought and method, stands Paul Wayland Bartlett. Success, too, artistically has been accorded to the fine works of John J. Boyle, William Couper, twenty years of whose life were passed in Florence, William O. Partridge, Hermon MacNeil and Lorado Taft. The beautiful busts of Herbert Adams; the thoroughly artistic miniature figures of Mrs Clio Hinton Bracken; the graceful figurines of Mrs Potter Vonnoh; Edwin F. Elwell's "Egypt" and "Orchid"; and the work of F. Wellington Ruckstuhl should also be mentioned; also J. Massey Rhind, a Scotsman by birth and artistic education, John Donoghue, Charles H. Niehaus, Roland H. Perry ("Fountain of Neptune"), Andrew O'Connor, Jerome Conner, John H. Roudebush, and Louis Potter. Equally noteworthy are Bela L. Pratt ("General Benjamin F. Butler" memorial), Cyrus E. Dallin (with Wild West subjects), Richard E. Brooks, Charles Grafly ("Fountain of Life"), Alexander S. Calder, Edmund A. Stewardson ("The Bather") and Douglas Tilden ("Mechanics' Fountain," San Francisco). The leading "animaliers" include Edward Kemeys (representing the southern states), Edward C. Potter, Phimister Proctor, Solon H. Borglum, Frederick G. Roth, and Frederic Remington. Among the women sculptors are Mrs Kitson, Mrs Hermon A. MacNeil, Miss Helen Mears, Miss Evelyn Longman, Miss Elise Ward, Miss Yandell and Miss Katherine Cohen.

(M. H. S.)

LITERATURE.—On the general history of sculpture, see Agincourt, *Histoire de l'art* (Paris, 1823); du Sommerard, *Les Arts au moyen âge* (Paris, 1839–1846); Cicognara, *Storia della scultura* (Prato, 1823–1844); Westmacott, *Handbook of Sculpture* (Edinburgh, 1864); Lubke, *History of Sculpture* (Eng. trans., London, 1872); Ruskin, *Aratra Pentelici* (six lectures on sculpture) (London, 1872); Viardot, *Les Merveilles de la sculpture* (Paris, 1869); Arsenne and Denis, *Manuel . . . du sculpteur* (Paris, 1858); Clarac, *Musée de sculpture* (Paris, 1826–1853); Demmin, *Encyclopédie des beaux-arts plastiques* (Paris, 1872–1875), vol. iii.

On Italian and Spanish sculpture, see Vasari, *Trattato della scultura* (Florence, 1568, vol. i.), and his *Vite dei pittori, &c.*, ed. Milanesi (Florence, 1880); Rumohr, *Italienische Forschungen* (Leipzig, 1827–1831); Dohme, *Kunst und Künstler Italiens* (Leipzig, 1879); Perkins, *Tuscan Sculptors* (London, 1865), *Italian Sculptors* (1868) and *Hand-book of Italian Sculpture* (1883); Robinson, *Italian Sculpture* (London, 1862); Gruner, *Marmor-Bildwerke der Pisaner* (Leipzig, 1858); Ferreri, *L' Arco di S. Agostino* (Pavia, 1832); Symonds, *Renaissance in Italy* (London, 1877), vol. iii.; Crowe and Cavalcaselle, *Hist. of Painting in Italy* (London, 1903) (new ed.), vol. i; Selvatico, *Arch. e scultura in Venezia* (Venice, 1847); Ricci, *Storia dell' arch. in Italia* (Modena, 1857–1860); Street (Arundel Society), *Sepulchral Monuments of Italy* (1878); Gozzini, *Monumenti sepolcrali della Toscana* (Florence, 1819); de Montault, *La Sculpture religieuse à Rome* (Rome, 1870), a French edition (with improved text) of Tosi and Becchio, *Monumenti sacri di Roma* (Rome, 1842); Cavallucci and Molinier, *Les Della Robbia* (Paris, 1884); Cicognara, *Monumenti di Venezia* (Venice, 1838–1840); Burges and Didron, *Iconographie des chapiteaux du palais ducal à Venise* (Paris, 1857) (see also Ruskin's *Stones of Venice*); Richter, "Sculpture of S. Mark's at Venice," *Macmillan's Mag.* (June 1880); Temanza, *Vite degli scultori veneziani* (Venice, 1778); Diedo and Zanotto, *Monumenti di Venezia* (Milan, 1839); Schulz, *Denkmäler der Kunst in Unter-Italien* (Dresden, 1860); Brinckmann, *Die Sculptur von B. Cellini* (Leipzig, 1867); Eug. Plon, *Cellini, sa vie, &c.* (Paris, 1882); John Addington Symonds, *The Autobiography of Benvenuto Cellini* (London, 1887); Moses and Cicognara, *Works of Canova* (London, 1824–1828); Piroli, Fontana and others, a series of engraved *Plates of Canova's Works*, s.l. et a.; Giulliot, *Les Artistes en Espagne* (Paris, 1870); Carderera y Solano, *Iconografia española, siglo XI-XVII* (Madrid, 1855–1864); *Monumentos arquitectonicos de España*, published by the Spanish government (1859), *passim*; Lord Balcarres, *The Evolution of Italian Sculpture* (London, 1910); L. J. Freeman, *Italian Sculpture of the Renaissance* (London, 1901); A. R. Willard, *Hist. of Modern Italian Art* (London, 1898). The recent literature on the subject is too copious to be catalogued here; every phase of the art has been critically dealt with and nearly every sculptor of importance has been made the subject of a biography; *e.g.* John Addington Symonds, *The Life of Michelangelo Buonarroti*, 2nd ed. (London, 1898); Sir Charles Holroyd, *Michael Angelo Buonarroti* (London, 1903); Lord Balcarres, *Donatello* (London, 1903); and G. H. Hill, *Pisanello* (London, 1905). For répertoires of sculptural works, see collections such as *Reale Galleria di Firenze*:

Statue (3 vols., 1817), and F. von Reber and A. Bayersdorfer, *Classical Sculpture Gallery* (4 vols., London, 1897–1900).

On French sculpture see Adams, *Recueil de sculptures gothiques* (Paris, 1858); Cerf, *Description de Notre Dame de Reims* (Reims, 1861); Émeric David, *L'Art statuaire* (Paris, 1805) and *Histoire de la sculpture française* (Paris, 1853); Guilhebaud, *L'Architecture et la sculpture du Ve au XVIe siècle* (Paris, 1851–1859); Ménard, *Sculpture antique et moderne* (Paris, 1867); Didron, *Annales archéologiques*, various articles; Félibien, *Histoire de l'art en France* (Paris, 1856); Lady Dilke (Mrs Pattison), *Renaissance of Art in France* (London, 1879); Montfaucon, *Monumens de la monarchie française* (Paris, 1729–1733); Jouy, *Sculptures modernes du Louvre* (Paris, 1855); Reveil, *Œuvre de Jean Goujon* (Paris, 1868); Lister, *Jean Goujon* (London, 1903); Viollet-le-Duc, *Dictionnaire de l'architecture* (Paris, 1869), art. "Sculpture," vol. viii. pp. 97-279; Claretie, *Peintres et sculpteurs contemporains* (Paris); Gonse, *La Sculpture française depuis le XIVe siècle* (Paris, 1895); W. C. Brownell, *French Art: Classic and Contemporary Painting and Sculpture* (London, 1901); Male, *L'Art religieux du XIIIe siècle en France* (Paris, 1902); Vitry and Brière, *Documents de sculpture française du moyen âge* (Paris, 1904); Lady Dilke, *French Architects and Sculptors of the XVIIIth Century* (London, 1900); Lanislas Lami, *Dictionnaire des sculpteurs de l'école française du moyen âge au règne de Louis XIV* (Paris, 1898), a useful book to consult for the sake of the bibliographical references to nearly every artist entered; L. Bénédite, *Les Sculpteurs français contemporains* (Paris, 1901); E. Guillaume, "La Sculpture française au XIXe siècle," *Gaz. des beaux-arts* (1900).

On German sculpture, see Foerster, *Denkmale deutscher Baukunst* (Leipzig, 1855). For an adequate but brief and concentrated account of recent work see A. Heilmeyer, *Die modern Plastik in Deutschland* (Bielefeld and Leipzig, 1903).

On Austrian sculpture, see Camillo List, *Bildhauer-Arbeiten in Oesterreich-Ungarn* (Vienna, 1901).

On Belgian sculpture, see Olivier Georges Destrée, *The Renaissance of Sculpture in Belgium* (London, 1895).

On Spanish sculpture, see Paul Laforid, *La Sculpture espagnole* (Paris, 1908).

On English sculpture, see Carter, *Specimens of Ancient Sculpture* (London, 1780); Aldis, *Sculpture of Worcester Cathedral* (London, 1874); Cockerell, *Iconography of Wells Cathedral* (Oxford, 1851); Stothard, *Monumental Effigies of Britain* (London, 1817); Westmacott, "Sculpture in Westminster Abbey," in *Old London* (pub. by Archaeological Institute, 1866), p. 159 seq.; G. G. Scott, *Gleanings from Westminster* (London, 1862); W. Bell Scott, *British School of Sculpture* (London, 1872); W. M. Rossetti, "British Sculpture," in *Fraser's Mag.* (April 1861). The subject of recent British sculpture has been curiously neglected, except in newspaper notices and occasional articles in the periodical press, such as Edmund Gosse's "Living English Sculptors" in the *Century Magazine* for July 1883. The only volume published is M. H. Spielmann's *British Sculpture and Sculptors of To-day* (London, 1901).

For American sculpture, see Henry T. Tuckerman, *Book of the Artists: American Artist Life* (New York, 1870, and later editions); Lorado Taft, *American Sculpture* (New York and London, 1903); William J. Clark, Jnr., *Great American Sculptures* (Philadelphia, 1877); Charles H. Caffin, *American Masters of Sculpture* (New York, 1903); Sadikichi Hartmann, *Modern American Sculpture* (New York).

SCURVY (*Scorbutus*), a constitutional disease, characterized by debility, morbid conditions of the blood, spongy gums, impairment of the nutritive functions, and the occurrence of haemorrhagic extravasations in the tissues of the body. In former times this disease was extremely common among sailors, and gave rise to a frightful amount of mortality. It is now, however, of rare occurrence at sea, the simple means of prevention being well understood. Scurvy has also frequently broken out among soldiers on campaign, in beleaguered cities, as well as among communities in times of scarcity, and in prisons, workhouses and other public institutions. In all such instances it has been found to depend closely upon the character of the food. The precise etiology is obscure, and the modern tendency is to suspect an unknown micro-organism; on the other hand, even among the more chemical school of pathologists, it is disputed whether the cause (or *conditio sine qua non*) is the *absence* of certain constituents in the food, or the *presence* of some actual poison. Sir Almroth Wright in 1895 published his conclusions that scurvy was due to an acid intoxication, while Torup of Christiania believes it to be a direct poisoning from damaged and badly preserved meat. Dr Jackson and Dr Harley support this latter view, contending that scurvy occurs when meat is eaten in this condition, even when lime juice and vegetables are given in conjunction with it. The palmy days of the disease were those when sailors and soldiers had to fare on salt meat and "hard tack," or were deprived of fresh vegetables; and the fact that scurvy has been practically abolished by the supply of these latter has led to the association of this factor with the disease as a *vera causa*. But how the defect in vegetable diet produces scurvy is not quite clear; nor how far other conditions may be involved.

The symptoms of scurvy come on gradually, and its onset is not marked by any special indications beyond a certain failure of strength, most manifest on making effort. Breathlessness and exhaustion are thus easily induced, and there exists a corresponding mental depression. The countenance acquires a sallow or dusky hue; the eyes are sunken; while pains in the muscles of the body and limbs are constantly present. The appetite and digestion may be unimpaired in the earlier stages and the tongue comparatively clean, but the gums are tender and the breath offensive almost from the first. These preliminary symptoms may continue for weeks, and in isolated cases may readily escape notice, but can scarcely fail to attract attention where they affect large numbers of men. In the further stages of the disease all these phenomena are aggravated in a high degree and the physical and mental prostration soon becomes extreme. The face looks haggard; the gums are livid, spongy, ulcerating and bleeding; the teeth are loosened and drop out; and the breath is excessively foetid. Extravasations of blood now take place in the skin and other textures. These may be small like the petechial spots of purpura (*q.v.*), but are often of large amount and cause swellings of the muscles in which they occur, having the appearance of extensive bruises and tending to become hard and brawny. These extravasations are most common in the muscles of the lower extremities; but they may be formed anywhere, and may easily be produced by very slight pressure upon the skin or by injuries to it. In addition, there are bleedings from mucous membranes, such as those of the nose, eyes and alimentary or respiratory tracts, while effusions of blood-stained fluid take place into the pleural, pericardial or peritoneal cavities. Painful, extensive and destructive ulcers are also apt to break out in the limbs. Peculiar disorders of vision have been noticed, particularly night-blindness (nyctalopia), but they are not invariably present, nor specially characteristic of the disease. The further progress of the malady is marked by profound exhaustion, with a tendency to syncope, and with various complications, such as diarrhoea and pulmonary or kidney troubles, any or all of which may bring about a fatal result. On the other hand, even in desperate cases, recovery may be hopefully anticipated when the appropriate remedy can be obtained. The composition of the blood is materially altered in scurvy, particularly as regards its albumen and its red corpuscles, which are diminished, while the fibrine is increased.

No disease is more amenable to treatment both as regards prevention and cure than scurvy, the single remedy of fresh vegetables or some equivalent securing both these ends. Potatoes, cabbages, onions, carrots, turnips, &c., and most fresh fruits, will be found of the greatest service for this purpose. Lime juice and lemon juice are recognized as equally efficacious, and even vinegar in the absence of these will be of some assistance. The regulated administration of lime juice in the British navy, which has been practised since 1795, has had the effect of virtually extinguishing scurvy in the service, while similar regulations introduced by the British Board of Trade in 1865 have had a like beneficial result as regards the mercantile marine. It is only when these regulations have not been fully carried out, or when the supply of lime juice has become exhausted, that scurvy among sailors has been noticed in recent times. Wright has proposed giving what he terms anti-scorbutic elements (Rochelle salt, calcium chloride or lactate of sodium) instead of raw materials such as lime juice and vegetables, as being more convenient to carry on voyages. Besides the administration of lime or lemon juice and the use of fresh meat, milk, cider, &c., which are valuable adjuvants, the local and constitutional conditions require the attention of the physician. The ulcers of the gums and limbs can be best treated by stimulating astringent applications; the hard swellings, which are apt to continue long, may be alleviated by fomentations and frictions; while the anaemia and debility are best overcome by the continued administration of iron tonics, aided by fresh air and other measures calculated to promote the general health.

Infantile Scurvy (*Scurvy Rickets, Barlow's disease*), a disease of childhood due to a morbid condition of the blood and tissues from defects of diet, was first observed in England in 1876 by Sir T. Smith, and later fully investigated by Sir Thomas Barlow. The chief symptoms are great and progressive anaemia, mental apathy, spongy gums, haemorrhages into various structures, particularly under the periosteum and muscles, with suggestive thickenings round the shafts of the long bones, producing a state of pseudo-paralysis.

SCUTAGE or ESCUAGE, the pecuniary commutation, under the feudal system, of the military service due from the holder of a knight's fee. Its name is derived from his shield (*scutum*). The term is sometimes loosely applied to other pecuniary levies on the basis of the knight's fee. It was supposed till recently

that scutage was first introduced in 1156 or on the occasion of Henry II.'s expedition against Toulouse in 1159; but it is now recognized that the institution existed already under Henry I. and Stephen, when it occurs as *scutagium*, *scuagium* or *escuagium*. Its introduction was probably hastened by the creation of fractions of knights' fees, the holders of which could only discharge their obligation in this fashion. The increasing use of mercenaries in the 12th century would also make a money payment of greater use to the crown. Levies of scutage were distinguished by the names of the campaigns for which they were raised, as "the scutage of Toulouse" (or "great scutage"), "the scutage of Ireland" and so forth. The amount demanded, from the fee was a marc (13s. 4d.), a pound or two marcs, but anything above a pound was deemed abnormal till John's reign, when levies of two marcs were made in most years without even the excuse of a war. The irritation caused by these exactions reached a climax in 1214, when three marcs were demanded, and this was prominent among the causes that led the barons to insist on the Great Charter (1215). By its provisions the crown was prohibited from levying any scutage save by "the common counsel of our realm." In the reissue of the Charter in 1217 it was provided, instead of this, that scutages should be levied as they had been under Henry II. In practice, however, under Henry III., scutages were usually of three marcs, but the assent of the barons was deemed requisite, and they were only levied on adequate occasions.

Meanwhile, a practice had arisen, possibly as early as Richard I.'s reign, of accepting from great barons special "fines" for permission not to serve in a campaign. This practice appears to have been based on the crown's right to decide whether personal service should be exacted or scutage accepted in lieu of it. A system of special composition thus arose which largely replaced the old one of scutage. As between the tenants-in-chief, however, and their under-tenants, the payment of scutage continued and was often stereotyped by the terms of charters of subinfeudation, which specified the quota of scutage due rather than the proportion of a knight's fee granted. For the purpose of recouping themselves by levying from their under-tenants the tenant-in-chief received from the crown writs *de scutagio habendo*. Under Edward I. the new system was so completely developed that the six levies of the reign, each as high as two pounds on the fee, applied only in practice to the under-tenants, their lords compounding with the crown by the payment of large sums, though their nominal assessment, somewhat mysteriously became much lower (see KNIGHT SERVICE). Scutage was rapidly becoming obsolescent as a source of revenue, Edward II. and Edward III. only imposing one levy each and relying on other modes of taxation, more uniform and direct. Its rapid decay was also hastened by the lengths to which subinfeudation had been carried, which led to constant dispute and litigation as to which of the holders in the descending chain of tenure was liable for the payment. Apart from its financial aspect it had possessed a legal importance as the test, according to Bracton, of tenure by knight-service, its payment, on however small a scale, proving the tenure to be "military" with all the consequences involved.

The best monograph on the subject (though not wholly free from error) is J. F. Baldwin's *The Scutage and Knight Service in England* (1897), a dissertation printed at the University of Chicago Press. Madox's *History of the Exchequer* was the standard authority formerly, and is still of use. The view now held was first set forth by J. H. Round in *Feudal England* (1895). In 1896 appeared the *Red Book of the Exchequer* (Rolls series), which, with the *Testa de Nevill* (Record Commission) and the Pipe Rolls (published by the Record Commission and the Pipe Roll Society), is the chief record authority on the subject; but many of the scutages are wrongly dated by the editor, whose conclusions have been severely criticized by J. H. Round in his *Studies on the Red Book of the Exchequer* (privately issued) and his *Commune of London and other Studies* (1899). Pollock and Maitland's *History of English Law* (1895) should be consulted. M'Kechnie's *Magna Carta* (1905) is of value; and Scargill Bird's "Scutage and Marshal's Rolls" in *Genealogist* (1884), vol. i., is important for the later records. (J. H. R.)

SCUTARI (Turkish, *Uskudar*, anc. *Chrysopolis*), a town of Turkey in Asia, on the E. shore of the Bosporus, opposite Constantinople of which it forms the 9th Cercle Municipale. Its painted wooden houses and white minarets piled upon the slopes of the shore and backed by the cypresses of the great cemetery farther inland present a very picturesque appearance from the sea. The town contains eight mosques, one of them, the Valideh Jami, built in 1547, of considerable beauty. Other remarkable buildings are the vast barracks of Selim III. and a hospital used during the Crimean War (see NIGHTINGALE, FLORENCE). The chief industry of Scutari is the manufacture of silk, muslin and cotton stuffs. The population is estimated at 105,500, of which two-thirds are Mahommedan. The most striking feature of Scutari is its immense cemetery, the largest and most beautiful of all the cemeteries in and around Constantinople; it extends over more than 3 m. of undulating plain behind the town. Between Scutari and Haidar Pasha the English army lay encamped during the Crimean War, and in a cemetery on the Bosporus are buried the 8000 English who died in hospital. At Haidar Pasha is the terminus of the Angora, Konia and Smyrna railways. Chrysopolis ("Golden City"), the ancient name of Scutari, most probably has reference to the fact that there the Persian tribute was collected, as at a later date the Athenians levied there a tenth on the ships passing from the Euxine. Scutari was formerly the post station for Asiatic couriers (Uskudar = courier), as also down to the introduction of steam the terminus of the caravan routes from Syria and Asia.

SCUTARI (anc. *Scodra*, Slav. *Skadar*, Albanian *Shkóder*, or with the definite article *Shkódr-a*), the capital of the vilayet of Scutari and principal city of Albania, European Turkey; on the south-eastern shore of Lake Scutari, near the confluence of the Drin and Boyana rivers, and 14 m. inland from the Adriatic Sea. Pop. (1905) about 32,000. The plain in which Scutari is built extends southwards to Alessio and northwards to the Montenegrin frontier. It is enclosed by lofty mountains on every side except where it adjoins the lake. It is very liable to be flooded, and this liability was greatly increased towards the close of the 19th century by the deflection of the Drin and its junction with the Boyana. Its bazaar and mosques give Scutari an oriental appearance, but the finest of its buildings are Italian—an old Venetian citadel on a high crag, and a Roman Catholic cathedral. The city is the seat of a Roman Catholic archbishop and a Jesuit college and seminary, which are subsidized by the Austrian government. The trade of Scutari tends to decline and to be diverted to Salonica and other ports connected with the main European railways. Grain, wool, hides and skins, tobacco and sumach are exported; arms and cotton stuffs are manufactured; and textiles, metals, provisions and hardware are imported. Large quantities of a kind of sardine, called *scoranze* by the Italians and *seraga* by the Albanians, are caught in the Boyana and cured for export or home consumption. The Boyana is navigable by small sea-going vessels as far as Oboti, 12 m. from its mouth; cargoes for Scutari are then transhipped into light river craft. The steamers of the Anglo-Montenegrin trading company ply on the lake.

Livy relates that Scodra was chosen as capital by the Illyrian king Gentius, who was here besieged in 168 B.C., and carried captive to Rome. In the 7th century Scutari fell into the hands of the Servians, from whom it was wrested by the Venetians, and finally, in 1479, the Turks acquired it by treaty.

LAKE SCUTARI is almost bisected by the line of the Montenegrin frontier. It occupies one of the depressions, known as *polyes*, which are common throughout the Illyrian Karst region. Its generally even margin is broken by the estuary of the river Moratcha, and by a long, narrow inlet which stretches towards the North Albanian Alps. The lake measures 135 sq. m.; its maximum depth was long considered to be no more than 23 ft. But a series of soundings taken in 1901 by Dr Jovan Cvijić revealed the existence of a series of deep holes near the south-western shore, one of which attains a depth of 144 ft. The surface is 20 ft. above sea-level. The principal affluent of Lake Scutari is the Moratcha, which enters it, after forming two small lakes, near the Montenegrin port of Plavnitza. It is drained by the Boyana, which issues from its south-eastern extremity and flows to the Adriatic. Lake Scutari abounds in aquatic birds and fish; its brilliantly clear water, its archipelago

of wooded islets, and its setting of rugged mountains, some of which are covered with snow during the greater part of the year, render it one of the most beautiful lakes in Europe.

SCUTTLE, a term formerly applied to a broad flat dish or platter; it represents the O. Eng. *scutel,* cognate with Ger. *Schüssel,* dish, derived from Lat. *scutella,* a square salver or tray, dim. of *scutra,* a platter, probably allied to *scutum,* the large oblong shield, as distinguished from the *clypeus,* the small round shield. The name survives in the coal-scuttle, styled "purdonium" in English auctioneers' catalogues, which now assumes various forms. "Scuttle" in this sense must be distinguished from the word meaning a small opening in the deck or side of a ship, either forming a hatchway or cut through the covering of the hatchway; from which to "scuttle" a ship means to cut a hole in the bottom so that she sinks. This word is an adaptation of O. Fr. *escoutille,* mod. *écoutille,* from Span. *escotilla,* dim. of *escoti,* a sloping cut in a garment about the neck. The Spanish word is cognate with Du. *schoot,* Ger. *Schoss,* lap, bosom, properly the flap or projecting edge of a garment about the neck, O. Eng. *sceat,* whence "sheet." The colloquial "scuttle," in the sense of hurrying away, is another form of "scuddle," frequentative of "scud," to run, which, like its variant "scoot," is another form of "shoot."

SCYLAX OF CARYANDA (in Caria), Greek historian, lived in the time of Darius Hystaspis (521–485 B.C.), who commissioned him to explore the course of the Indus. He started from Caspatyrus (Caspapyrus in Hecataeus; the site cannot be identified: see V. A. Smith, *Early Hist. of India,* 2nd ed., 1908, 34 note), and is said by Herodotus (iv. 44) to have reached the sea, whence he sailed west through the Indian Ocean to the Red Sea. Scylax wrote an account of his explorations, referred to by Aristotle (*Politics,* vii. 14), and probably also a history of the Carian hero Heracleides,[1] prince of Mylasae, who distinguished himself in the revolt against Darius (Herodotus v. 121). This work is the earliest known Greek history which centred round the achievements of a single individual. Suïdas (*s.v.*), who mentions the second work, confounds the older Scylax with a much later author, who wrote a refutation of the history of Polybius, and is presumably identical with Scylax of Halicarnassus, a statesman and astrologer, the friend of Panaetius spoken of by Cicero (*De div.* ii. 42). Neither of these, however, can be the author of the *Periplus* of the Mediterranean, which has come down to us under the name of Scylax of Caryanda. This work is little more than a sailor's handbook of places and distances all round the coast of the Mediterranean and its branches, and then along the outer Libyan coast as far as the Carthaginians traded. Internal evidence shows that it must have been written long after the time of Herodotus, about 350 B.C.

Editions by B. Fabricius (1878) and C. Müller in *Geographici Graeci minores,* i., where the subject is fully discussed; see also G. F. Unger, *Philologus,* xxxiii. (1874); B. G. Niebuhr, *Kleine Schriften,* i. (1828); and E. H. Bunbury, *History of Ancient Geography,* i.

SCYLLA AND CHARYBDIS. In Homer (*Od.* xii. 73, 235, 430) Scylla is a dreadful sea-monster, daughter of Crataeis, with six heads, twelve feet and a voice like the yelp of a puppy. She dwelt in a sea-cave looking to the west, far up the face of a huge cliff. Out of her cave she stuck her heads, fishing for marine creatures and snatching the seamen out of passing ships. Within a bowshot of this cliff was another lower cliff with a great fig-tree growing on it. Under this second rock dwelt Charybdis, who thrice a day sucked in and thrice spouted out the sea water. Between these rocks Odysseus sailed, and Scylla snatched six men out of his ship. In later classical times Scylla and Charybdis, whose position is not defined by Homer, were localized in the Straits of Messina—Scylla on the Italian, Charybdis on the Sicilian side (Strabo i. p. 24; vi. p. 268). The well-known line, *Incidis in Scyllam cupiens vitare Charybdim,* occurs in the *Alexandreis* of Gautier de Lille, a poet of the 12th century. In Ovid (*Metam.* xiv. 1-74) Scylla appears as a beautiful maiden beloved by the sea-god Glaucus and other deities, and changed by the jealous Circe (or other rival) into a sea-monster; afterwards she was transformed into a rock shunned by fishermen. According to a late legend (Servius on *Aeneid,* iii. 420), Charybdis was a voracious woman who robbed Heracles of his cattle and was therefore cast into the sea by Zeus, where she retained her old voracious nature. In later poetry and art Scylla was conceived of as a maiden above, with dogs' or wolves' heads growing out of her body, and the tail of a fish.

Another Scylla, confounded by Virgil (*Ecl.* vi. 74) with the sea-monster, was a daughter of Nisus (*q.v.*), king of Megara.

See O. Waser, *Skylla und Charybdis in der Literatur und Kunst der Griechen und Römer* (1894); and D. Jobst, *Skylla und Charybdis* (Würzburg, 1902), who endeavours to show that the Homeric description really referred, as the ancients assumed, to the Sicilian straits.

SCYMNUS of Chios, the name assigned to a Greek geographer of uncertain date, commonly taken to be the author of a fragmentary anonymous *Paraphrasis* in verse describing the northern coasts of the Mediterranean and the shores of the Black Sea, a work which in the first edition (Augsburg, 1600) was ascribed to Marcianus of Heraclea. Meineke showed that this piece cannot be by Scymnus. It is dedicated to a King Nicomedes, probably Nicomedes III. of Bithynia (91–76 B.C.), and so would date from the beginning of the 1st century B.C. Its most valuable portions relate to the Euxine regions and to the Hellenic colonies of those shores as well as of the coasts of Spain, Gaul and Italy.

See Meineke's edition (Berlin, 1846); C. Müller, *Geographi Graeci minores,* vol. i., where the poem is edited with sufficient prolegomena, (pp. lxxiv.–lxxvii); E. H. Bunbury, *Ancient Geography,* i. 99, 100, 102, 128, 183; ii. 26, 69–74.

SCYPHOMEDUSAE or ACALEPHAE, one of the two subdivisions of the Hydrozoa (*q.v.*), the other being the Hydromedusae (*q.v.*). The subclass Scyphomedusae contains a number of animals which in the adult condition are medusae or jelly-fishes (see MEDUSA), exclusively marine in habitat and found in all seas. They are chiefly pelagic organisms, floating at or near the surface of the water, but occur also at great depths, and are sometimes fixed and sessile in habit. Many species attain a large size and by their brilliant coloration are very conspicuous objects to the mariner or traveller. In spite of the soft nature of their bodies, a number of Scyphomedusae have been found fossil; see especially Maas (7 and 12).

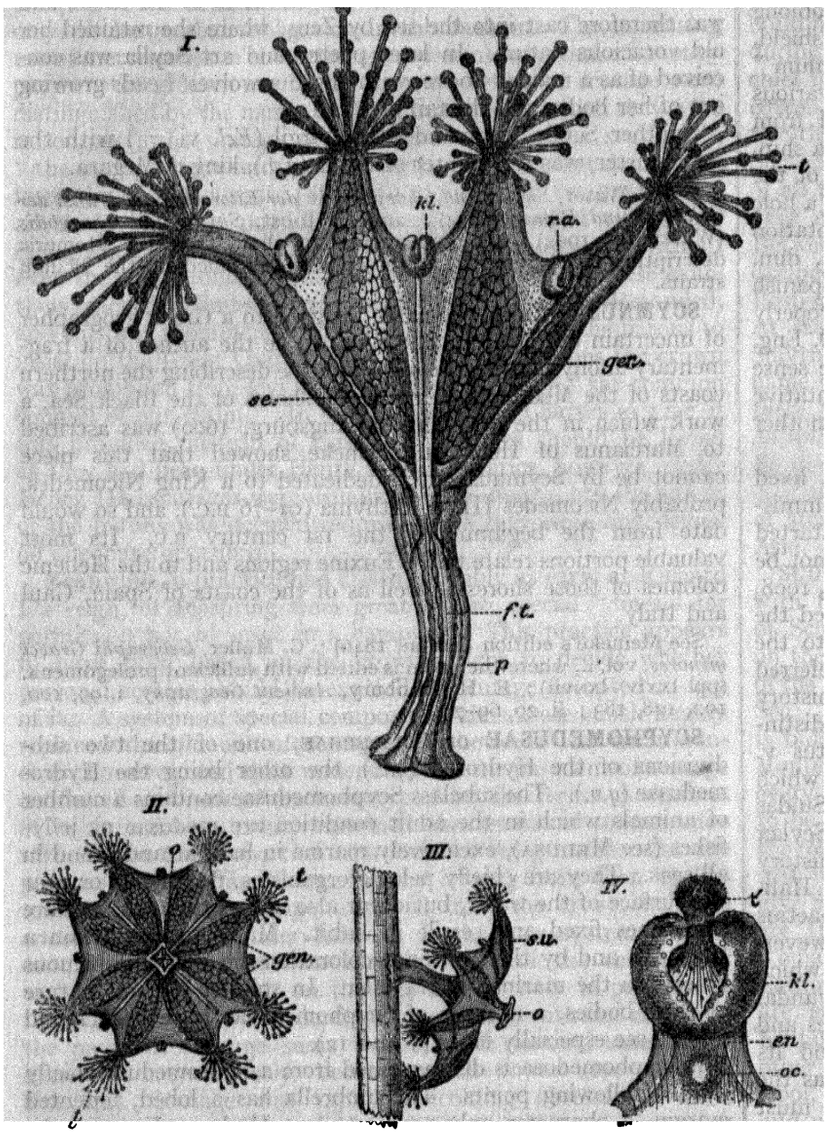
A scyphomedusa is distinguished from a hydromedusa chiefly by the following points. The umbrella has a lobed, indented margin, a character only seen amongst Hydromedusae in the order Narcomedusae, and it is without the characteristic velum of the Hydromedusae; hence the Scyphomedusae are sometimes termed Hydrozoa Acraspeda. The sense-organs are covered over by flaps of the umbrellar margin (hence "Steganophthalmata"), and are always tentaculocysts, that is to say, reduced and modified tentacles, which bear usually both ocelli and otocysts, and are hollow. The gonads are formed in the endoderm (hence "Entocarpeae"), and the generative products are shed into the gastric cavity and pass to the exterior by way of the mouth. The development from the egg may be direct, or may take place with an alternation of generations (metagenesis), in which a non-sexual individual, the so-called scyphistoma or scyphopolyp, produces by budding the sexual medusae.

Morphology of the Scyphomedusa.—As already stated, a medusa of this order may be free-swimming or sessile in habit. Intermediate between these two types are species which have the power of temporal fixation by the exumbral surface. Such forms when undisturbed fix themselves to the bottom and rest with their mouths and tentacles uppermost. If disturbed they swim about like other medusae until a favourable opportunity presents itself for resuming the sedentary habit. A well-known example of a permanently sessile form is *Lucernaria,* common on the Atlantic coasts of Europe, especially in *Zostera*-beds, attached to the weed. It resembles in general appearance a polyp, lacking even the characteristic medusan sense-organs, which are present,

[1] This Heracleides is noticed in an Egyptian papyrus containing a fragment of the historian Sosylus, which alludes, by way of comparison, to the tactical ability displayed by him at the battle of Artemisium (Wilcken in *Hermes,* xli., 1906, pp. 103 seq.).

however, in the allied genus *Haliclystus* (fig. 1), proving its medusan nature beyond all doubt.

The body-form of the Scyphomedusae varies from that of a conical or roughly cubical cap (fig. 4), to that of a shallow saucer or disk (fig. 2*a*). The tentacles vary in number from four, the primitive



From Bronn's *Tierreichs*, ii. 2, "Coelenterata," by Carl Chun, by permission of C. F. Winter.

FIG. 1.—*Haliclystus auricula*. (After H. J. Clark.)

I. From the side.
II. From above.
III. From the side, with the umbrella drawn back and the mouth thrust out.
IV. A tentaculocyst ("colleto-cystophore" or "marginal anchor") seen from the subumbral side.
p, Stalk.
su, Subumbrella.
t, Knobbed tentacles in eight clusters.
ra, Tentaculocysts, four perradial, four interradial.
t', Rudimentary tentacle of the tentaculocyst.
kl, Glandular cushion.
oc, Ocellus, and *en*, internal canal of the tentaculocyst.
o, Mouth.
se, Interradial septal ridges, passing into the taeniolae (*f.t*) in the stalk.
gen, The eight adradial gonads on the subumbral walls of the four radial pouches, representing primitively four horse-shoe-shaped gonads each divided into two by an interradial septum.

number, to a very large number, but in one suborder, the Rhizostomeae, tentacles are absent altogether (fig. 3, *a*). Typically the tentacles have the form of long flexible filaments, hollow or solid, implanted singly on the margin of the umbrella (fig. 3, *b*), but in some species they occur in groups or tufts (fig. 15), and in *Lucernaria* and its allies a bunch of small capitate tentacles is found on each of the eight adradial lappets of the margin (fig. 1). A true velum is absent, as already stated, but in *Charybdaea* (fig. 4) a structure is found termed a *velarium* (*Ve*), which is a flap hanging down from the margin of the umbrella, and which consists of a fold of the subumbral ectoderm containing endodermal canals. A true velum, such as is found in Hydromedusae, never contains endoderm.

The mouth may be a simple structure at the extremity of the manubrium, or may be four-cornered, with the corners drawn out into so-called oral arms, each of which bears on the inner side a groove continuing the angle of the mouth (fig. 2*a*). In some genera the oral arms are of great length, and in the suborder Rhizostomeae they undergo concrescence to form a proboscis (fig. 3, *a*), in such a way that the mouth becomes nearly obliterated, and is reduced to a system of fine canals opening to the exterior by small pores.

The mouth leads into the spacious stomach, which is typically four lobed (fig. 2*b*, *v*). On the floor of the stomach are borne the conspicuous gonads (*ov*), and also tentacle-like processes termed gastric filaments or *phacellae*, projecting into the cavity of the stomach. The gonads are folds of the endoderm containing generative cells, and are primitively four in number, situated interradially, but each gonad may be divided into two by the partition which separates two adjacent lobes of the stomach, that is to say, by one of the areas of concrescence between exumbral and subumbral endoderm, whence arises a condition with eight gonads which is by no means uncommon. As a rule these medusae are of separate sexes, but hermaphrodite forms are known, for example, the conspicuous British (east-Atlantic) medusa *Chrysaora* (fig. 3, *b*).

Immediately below each gonad the subumbral ectoderm is pushed in, as it were, to form a pit or deep cavity (fig. 2*a*,

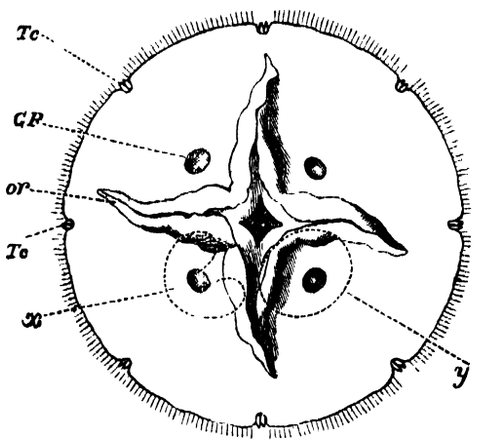


FIG. 2*a*.—Surface view of the Subumbrella or oral aspect of *Aurelia aurita*, to show the position of the openings of the subgenital pits, *GP*. In the centre is the mouth, with four perradial arms corresponding to its angles (compare fig. 11). The four sub-genital pits are seen to be interradial. *x* indicates the outline of the roof (aboral limit) of a subgenital pit; *y*, the outline of its floor or oral limit, in which is the opening.

x, *y*) opening by a wide aperture (*GP*). These cavities are known as the *infundibular* or *subgenital* cavities. They serve probably for the aëration of the gonads by admitting to their vicinity water with its dissolved oxygen; they never serve as genital ducts, since the generative products are always delivered into the stomach and pass out by the mouth. In some genera, for instance, *Cyanea* and its allies the gonad as a whole protrudes through the subgenital cavity as if it had undergone a hernia, and hangs down in the subumbral space as if suspended by a mesentery (fig. 15). Usually the four subgenital cavities are distinct from each other (so-called tetrademnic condition), but in many Rhizostomeae, for example, *Crambessa*, the subgenital cavities join together under the subumbral floor of the stomach (so-called monodemnic condition) and coalesce to form a so-called subgenital portico placed on the oral side of the stomach, opening by four interradial apertures between the oral arms, that is to say, by the four primitive apertures of the subgenital pits. In *Nausithoe* subgenital pits are absent altogether, and the same condition may be found in *Charybdaeidae*.

The gastrovascular system shows every degree of complexity from a very primitive to a highly elaborate type of structure. Taking as a starting-point the wide archenteric cavity which the medusa inherits primitively from the antecedent actinula-stage (see article MEDUSA), we find, in such a form as *Tessera*, four interradial areas of concrescence between the exumbral and subumbral layers of endoderm, four so-called septal nodes or "cathammata," subdividing the stomach into four wide, radially situated pouches which communicate with each other beyond the septal nodes by wide apertures constituting what is termed by courtesy a ring-canal. In other cases the areas of concrescence may extend as far as the margin of the umbrella, so that the lobes of the stomach are completely separated from one

another, as in *Charybdaea* (fig. 4), where there are four gastric pouches communicating with the central stomach by four so-called gastric ostia (fig. 4). A similar condition is seen in *Pelagia*, where the number of gastric pouches is increased to sixteen. In forms such as *Lucernaria* and *Charybdaea*, in which the umbrella is of deep form and the stomach-cavity consequently of great extent in the vertical direction, the concrescence-areas or septal nodes are drawn out into vertical partitions or *taeniolae* (fig. 4, *L.o.c.*), resembling in their anatomical relations the mesenteries of the Anthopolyp. The phacellae are carried on the edges of the taeniolae (fig. 4, *Gh*). Finally in the majority of Scyphomedusae the primitively simple concrescence-areas become increased in number and in extent, so that radial canals, ring-canals, &c., can be distinguished in addition to stomach-pouches. Thus in *Aurelia* (figs. 2*a* and 2*b*), to take a familiar example, the digestive tract begins with the mouth, of which the four corners are prolonged into the four long oral arms, perradial in position. The mouth leads into the spacious stomach containing the four conspicuous horse-shoe-shaped gonads (*ov*) marking four stomach-pouches, which, however, are interradial in position. From the stomach or its pouches arise sixteen radial canals, four perradial, four interradial and eight adradial (fig. 2*b*). The perradial and interradial canals consist of a main stem giving off branches, and both stem and branches reach to the marginal ring-canal, the main stem ending in one of the eight tentaculocysts, which are lodged in the notches between the lobes of the umbrellar margin. The adradial canals are unbranched and run to the middle point of one of the marginal lobes. The system of canals shows great variation even in the same species.

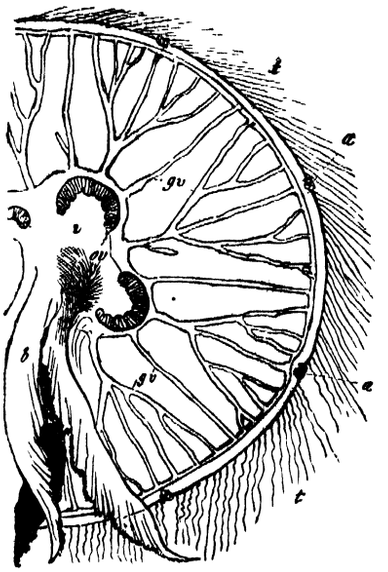


FIG. 2*b*.—Half of the lower surface of *Aurelia aurita*. The transparent tissues allow the enteric cavities and canals to be seen through them. (From Gegenbaur.)

a, Marginal lappets hiding tentaculocysts.
b, Oral arms.
t, tentacles.
v, Axial or gastric portion of the enteric cavity.
gv, Radiating and anastomosing canals of the enteric system.
ov, Ovaries. The gastral filaments near to these are not drawn.

The muscular system of the Scyphomedusae is developed on the subumbral surface as a system of circularly disposed fibres which by their contraction make the umbrella more concave and diminish its cavity. The circular muscles usually form two chief portions, a peripheral wreath-muscle (*Kranzmuskel*), subdivided into four, eight or sixteen areas, and an oral ring-muscle round the mouth. Endodermal muscles are found in the phacellae, and in such forms as *Lucernaria*, longitudinal (vertical) muscular tracts or bands are found in the taeniolae, which, according to some authorities, are of endodermal origin, but which, according to recent observations, are formed in the walls of the infundibular cavities, and are therefore of ectodermal origin.

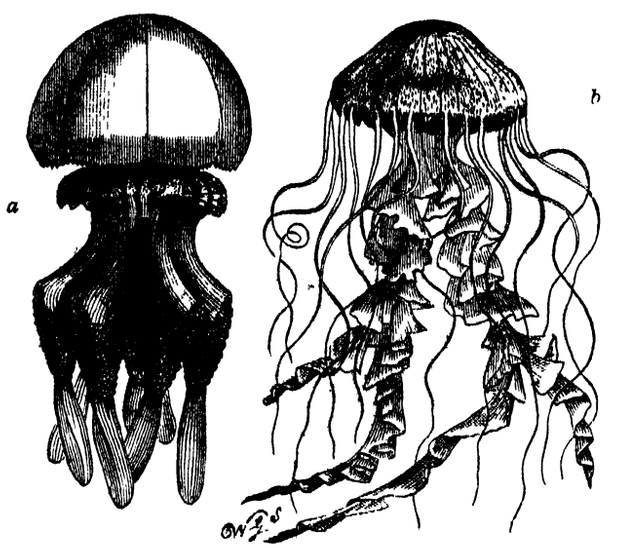


FIG. 3.—*Scyphomedusae. a, Rhizostoma pulmo; b, Chrysaora hysoscella.*

The nervous system consists as in Hydromedusae of a diffuse plexus beneath the ectoderm, concentrated in certain places to form a central nervous system. In these medusae, however, the central nervous system does not form continuous rings, but occurs as four or eight separate concentrations at the margin of the umbrella, centred each round one of the sense-organs (tentaculocysts). Each nerve-centre controls its own antimere or segment of the body, receiving sensory impressions from the tentaculocyst and innervating its special subdivision of the muscular system. The separate nerve-centres are, as a rule, placed in communication only by the general nerve-plexus, but in *Charybdaea* there is a zigzag marginal nerve connecting them up.

The sense-organs of the Scyphomedusae are on the whole of a very uniform type. They are always tentaculocysts, as already stated, and they always have a hollow axis, unlike the tentaculocysts of Hydromedusae, in which group these organs, when they do occur (as in Trachylinae) are always solid. Two types of tentaculocyst must be distinguished, the one occurring only in the order Stauromedusae, the other in all orders of the group. The second and commoner type is known as a *rhopalium* (fig. 6) and consists of a short, hollow rod, the wall of which is composed of the two body-layers, ectoderm and endoderm, enclosing a cavity continuous with that of the gastrovascular system. At the apex of the rhopalium the endoderm is greatly thickened and consists of concrement-cells secreting otoliths (*Con*). The more proximal portion of the rhopalium usually bears one or more ocelli (*oc*). The rhopalia are lodged in the notches between the marginal lobes of the umbrella, and each rhopalium is covered over by a little protecting flap or lappet. On the external (*i.e.* exumbral) face of the lappet there is frequently a patch of sensory ciliated epithelium regarded as olfactory in function and termed the olfactory pit (fig. 6, *A*). Each rhopalium is a centre round which, as already stated, nervous tissue is concentrated.

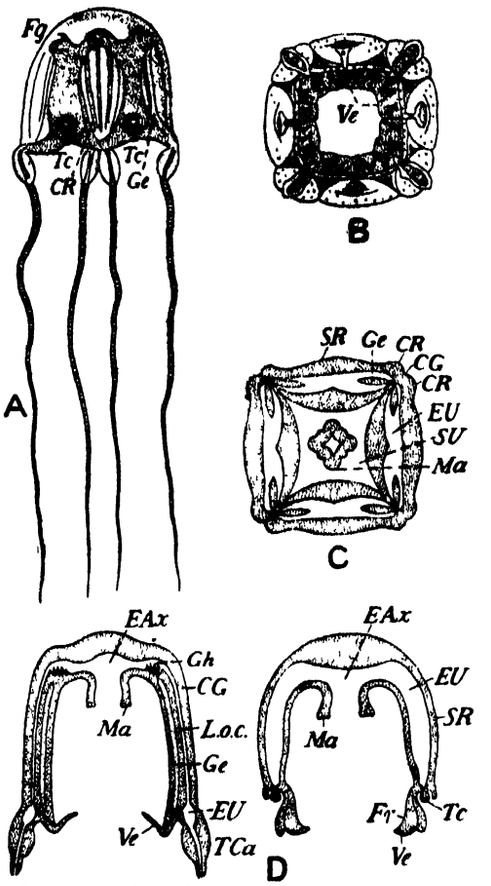


FIG. 4.—*Charybdaea marsupialis.* (After Claus.)

A, Natural size.
B, View of the margin of the umbrella, natural size.
C, Horizontal section through the umbrella and manubrium.
D, Vertical sections, to the left in the plane of an interradius, to the right in the plane of a perradius.
SU, Subumbrella.
Ma, Manubrium.
EAx, Axial enteron.
Gh and *Fg*, Gastral filaments (*phacellae*).
CG, Corner groove.
CR, Corner ridge.
SR, Side ridge.
L.o.c., Endoderm lamella (line of concrescence of the walls of the enteric cavity of the umbrella, whereby its single chamber is broken up into four pouches).
Ge, Line of attachment of a genital band and band in section.
EU, Enteric pouch of the umbrella, in the left-hand figure, points to the cavity uniting neighbouring pouches near the margin of the umbrella and giving origin to *TCa*, the tentacular canal.
Ve, Velarium.
Fr, Frenum of the velarium.
Tc, Tentaculocyst.

The *otoliths* vary considerably in number and size. In *Aurelia* there are found numerous otoliths arranged irregularly. In *Charybdaea* (fig. 7, *otol*) the otoliths are larger but fewer in number and have a definite arrangement. In *Nausithoë* a single large otolith is found.

The ocelli vary greatly both as regards number and complexity of structure. In some genera they are absent, as, for instance, in *Pelagia*, *Cyanea* and *Rhizostoma*. In *Aurelia* there are two on each rhopalium, a simple ocellus on the exumbral side, and a cupped ocellus on the subumbral side (not present in young individuals). In *Charybdaea* there are no less than six ocelli on each of the four rhopalia (fig. 7); on the exumbral aspect there are two median ocelli (oc^1, oc^2), a distal and a proximal, each of them a vesiculate ocellus with a lens, and on the sides of the rhopalium are two pairs of ocelli without lenses (*oc.l*); sometimes also an additional seventh ocellus occurs, a pit-like structure without a lens, either between the two median ocelli, or placed asymmetrically near the median proximal ocellus.

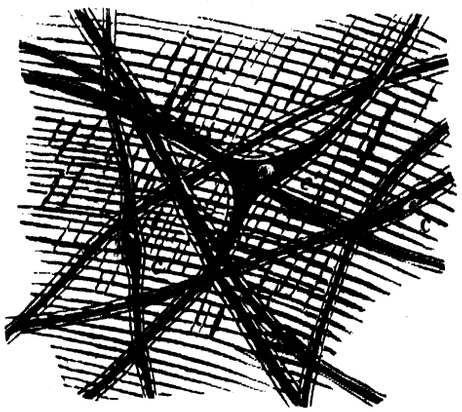


FIG. 5.—Scattered Nerve Ganglion Cells. *c*, From the subumbrella of *Aurelia aurita*. (After Schäfer.)

The ocelli consist, as in Hydromedusae, of two kinds of elements: (1) visual cells, sensory ectodermal cells, which may develop terminal visual cones; (2) pigment-cells, usually ectodermal, but in one known instance endodermal. The simplest type of ocellus is exemplified by the exumbral ocellus of *Aurelia*, a simple patch of pigment-cells interspersed with visual cells, the whole on a level with the remaining ectodermal epithelium. In the next stage of complication, seen in the supernumerary (seventh) ocellus of *Charybdaea*, the patch of pigmented and sensory epithelium is pushed in to form a little pit, in the interior of which the pigment-cells secrete a gelatinous substance forming a rudimentary vitreous body. As a further advance, the pit becomes widened out into a cup, as in the lateral ocelli of *Charybdaea*. The culminating stage of evolution is seen in the median ocelli of *Charybdaea* (fig. 8); the primitively open cup has now closed over to form a vesicle lying beneath the ectoderm; the outer wall of the vesicle becomes thickened to form a cellular lens (*l*), while the proximal wall consists of sensory and pigmented cells and forms a retina. In this way the ocellus becomes a true eye, very similar in plan to the eyes of Gastropods and other molluscs. The ectoderm continued over the optic vesicle forms a transparent cornea (fig. 8, *c*) (better perhaps termed a conjunctiva), below which the spherical lens projects into the optic vesicle, imbedded in the vitreous humour (*v.b*) which fills it; the retina (*r*) consists of visual cells with long cones (fig. 9) alternating with pigment-cells. The high development of the eyes of *Charybdaea* is very remarkable, and so is their close resemblance to the eyes found in other groups of the animal kingdom, with which they can have no genetic relation. Highly developed eyes, with ectodermal pigment and lens, are found also on the rhopalia of *Paraphyllina* (Maas [8]).

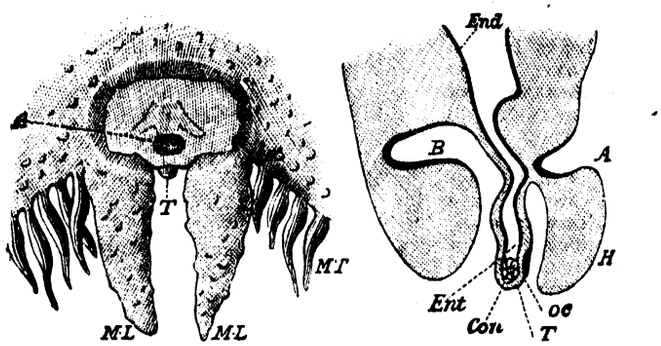


FIG. 6.—Tentaculocyst and Marginal Lappets of *Aurelia aurita*. (After Eimer.)

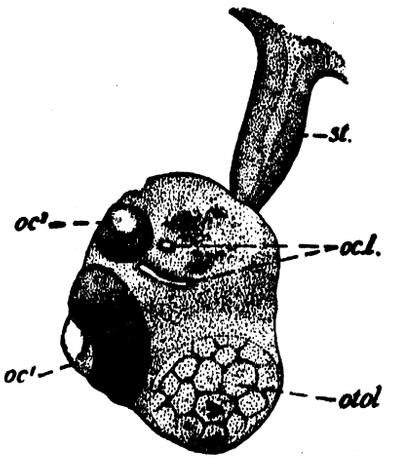
In the left-hand figure—
ML, Marginal lappets.
T, Tentaculocyst.
A Superior or aboral olfactory pit.
MT, Marginal tentacles of the disc. The view is from the aboral surface, magnified about 50 diameters.

In the right-hand figure—
A, Superior or aboral olfactory pit.
B, Inferior or adoral olfactory pit.
H, Bridge between the two marginal lappets forming the hood.
T, Tentaculocyst.
End, Endoderm.
Ent, Canal of the enteric system continued into the tentaculocyst. [(auditory).
Con, Endodermal concretion
oc, Ectodermal pigment (ocellus). The drawing represents a section, taken in a radial vertical plane so as to pass through the long axis of the tentaculocyst.

The subumbral ocellus of *Aurelia* is found to be of the inverted type, with the visual cones turned away from the light, as in *Tiaropsis* amongst Hydromedusae, and here also the pigment is furnished by the endoderm, forming a cup into which the ectodermal visual cells project (Schewiakoff [13]).

In the Stauromedusae tentaculocysts are either absent altogether, as in *Lucernaria*, or represented by peculiar structures termed "colletocystophores" or "marginal anchors" (fig. 1, IV.). Each such body has a basal hollow portion (*en*) surmounted by a glandular cushion (*kl*), from the centre of which projects a small, solid, club-shaped process or tentacle (*t'*). The basal portion bears an ocellus (*oc*) of simple structure. The distal club corresponds to the crystal-sac of an ordinary rhopalium, but bears a battery of nematocysts in place of the otoliths. These organs are said to be used for purposes of adherence rather than to have the function of sense-organs.

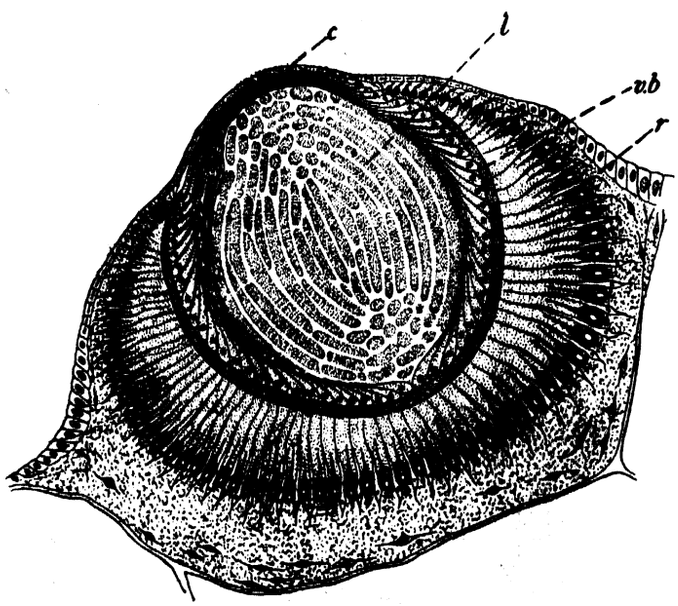
The histological structure of the Scyphomedusae is in the main similar to that of the Hydromedusae (*q.v.*), but the mesogloea is more abundantly developed in the free-swimming forms, and contains special mesogloeal corpuscles, derived by immigration from the ectoderm, and generally occurring in the form of stellate or bipolar cells.



After Wladimir Schewiakoff, simplified from a coloured plate in *Morphologisches Jahrbuch*, xv., 1889, by permission of Wilhelm Engelmann.

FIG. 7.—Tentaculocyst of *Charybdaea marsupialis*, seen from the right side.
st, Stalk.
oc^1, oc^2, Distal and proximal median ocelli.
oc.l, Lateral ocelli.
otol, Otoliths ("crystal-sac").

Development of the Scyphomedusae.—No adult Scyphomedusae are known to reproduce themselves by budding or by any method other than the sexual one. The course of the development in this group is best made clear by taking as a type *Aurelia*, which, together with certain other common genera, such as *Chrysaora* and *Cotylorhiza*, has been studied in detail. Unfortunately the statements concerning some points are very contradictory.

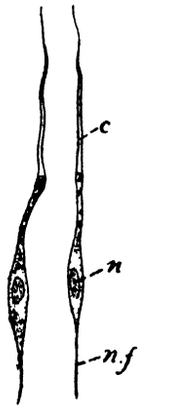


Combined from three figures by Wladimir Schewiakoff in *Morphologisches Jahrbuch* xv., 1889, by permission of Wilhelm Engelmann.

FIG. 8.—Vertical section of the Median Distal Ocellus (oc^1 of the preceding figure) of *Charybdaea*. *c*, Cornea; *l*, lens; *v.b.*, vitreous body; *r*, retina.

The ova pass out of the mouth and are fertilized externally. In some cases the ova, after leaving the mouth, are lodged in the oral arms, and undergo the earliest phases of their development in this situation, accumulating in the grooves that continue the angles of the mouth, and bulging the wall of the groove into sacs or pockets.

The ovum undergoes total cleavage, giving rise to a blastula which forms a gastrula (fig. 10, A) by invagination (see article HYDROZOA). This is a type of germ-layer formation never found in the Hydromedusae, though of universal occurrence in all groups of animals above the Coelentera. We may regard it as a form of unipolar immigration in which the immigrating cells pass into the interior in a connected epithelial layer, instead of going in singly and independently. The embryo is set free as a planula larva (fig. 10, B) in the gastrula stage, and the orifice of invagination or blastopore, which persists, is situated at the hinder pole. After a time the planula fixes itself by the anterior pole, with the blastopore uppermost. The larva after fixation changes into a polyp-like organism termed a scyphistoma or scyphopolyp (fig. 10, C, D). The body becomes in shape like a vase or urn attached by a narrow stalk, round which a chitinous membrane is secreted. From the edges of the vase the four primary tentacles grow out, each a slender filament with a solid endodermal axis. The tentacles border a broad, flattened peristome, from the centre of which arises the hypostome with the mouth at its extremity; the hypostome is at first low, but soon becomes a projecting, chimney-like tube. It has been sought to prove that the interior of the hypostome is lined by ectoderm, so as to form a stomodaeum or ectodermal oesophagus similar to that of the Anthozoa, but this has been disproved by the most recent investigations of Hein (4) and Friedemann (3), who have shown that the mouth at the extremity of the hypostome represents the persistent blastopore of the gastrula stage.



After W. Schewiakoff, simplified from a coloured plate in *Morphologisches Jahrbuch*, xv., 1889, by permission of Wilhelm Engelmann.

FIG. 9.—Sensory cells from the retina of *Charybdaea*, highly magnified. *c*, Visual cone; *n*, nucleus; *n.f*, nerve fibril.

The internal gastric cavity of the scyphistoma is not a simple space as in the hydropolyp, but is subdivided by four ridges or taeniolae, arising one in each interradius (fig. 11, B). Each taeniola is similar in its anatomical relations to the similarly named structures in *Haliclystus* (fig. 1), and becomes perforated in the same way at its outer side by a "septal ostium," forming as it were the rudiment of a ring-canal. Each taeniola bears a strongly developed longitudinal muscle-band, stated by Claus and Chun to be developed from the endoderm, like the retractor muscles of the anthopolyp, but by other investigators it is affirmed that each retractor muscle of the scyphistoma arises from the lining of a funnel-shaped ectodermal ingrowth ("Septaltrichter") growing down from the peristome inside each taeniola, in a manner similar to the infundibular cavities of *Lucernaria*, which in their turn are homologous with the subgenital cavities of other Scyphomedusae. It is asserted, however, by Friedemann (3), a recent investigator of the subject, that the infundibular cavities appear late in the scyphistoma and have no relation either to the septal muscles or to the subgenital cavities of the adult. The muscle-bands are very contractile, rendering the scyphistoma one of the most difficult of all organisms to preserve in an expanded condition. By their contraction the muscles of the taeniolae drag the hypostome down and so produce the appearances which have been interpreted as a stomodaeal invagination.

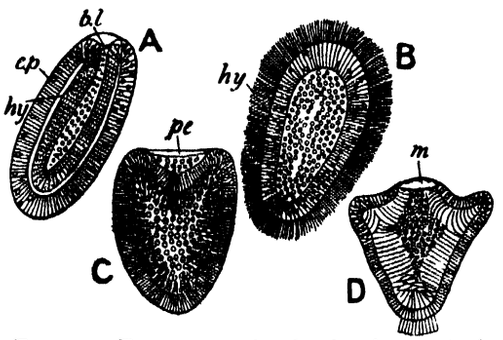


FIG. 10.—Four stages in the development of *Chrysaora*. From Balfour, after Claus.
A, Diblastula stage.
B, Stage after closure of blastopore.
C, Fixed larva.
D, Later stage with mouth, short tentacles, &c.
ep, Ectoderm.
hy, Endoderm.
pe, Stomodaeum.
m, Mouth.
bl, Blastopore.

As the scyphistoma grows the tentacles increase in number, four interradial and eight adradial being formed in addition to the four primary perradial tentacles (fig. 11, A, B, C). The animal may produce its like by lateral budding, or by budding from a basal stolon. The scyphistoma of *Nausithoë* forms a branching network which grows in the sponge *Esperella* and forms the colonial polypoid organism named by Schulze *Spongicola fistularis*, by Allman *Stephanoscyphus mirabilis*. Sooner or later, however, the scyphistoma produces free medusae by a process of transverse fission termed strobilization. In the simplest case one medusa, or at least one at a time, is produced in this way (monodisk strobilization); a circular furrow cuts off the upper, tentacle-bearing portion from the lower half of the scyphistoma (fig. 11, D, and fig. 12), and the upper part becomes detached and swims away, while the base regenerates a new crown. In most cases, however, many such furrows are formed (polydisk strobilization), so that the animal comes to resemble a pile of saucers one above the other (fig. 12). The uppermost saucers of the pile become detached successively and swim off. In this state the scyphistoma is termed a *strobila*.

The medusae produced by strobilization of the scyphistoma are of a peculiar type termed Ephyrae (fig. 11, E, F). As preparations for their formation the margin of the peristome of the scyphistoma grows out into eight lobes, four perradial, four interradial. The sixteen tentacles of the scyphistoma disappear, and in the place of the four perradial and four interradial tentacles, the eight tentaculocysts of the adult are formed as outgrowths of the subumbral margin, independently of the tentacles of the scyphistoma (Friedemann). The septal ostia become widened and the gastral cavity flattened, whereby the taeniolae become comparatively shallow columns, similar to the septal nodes or cathammata of other forms.[1]

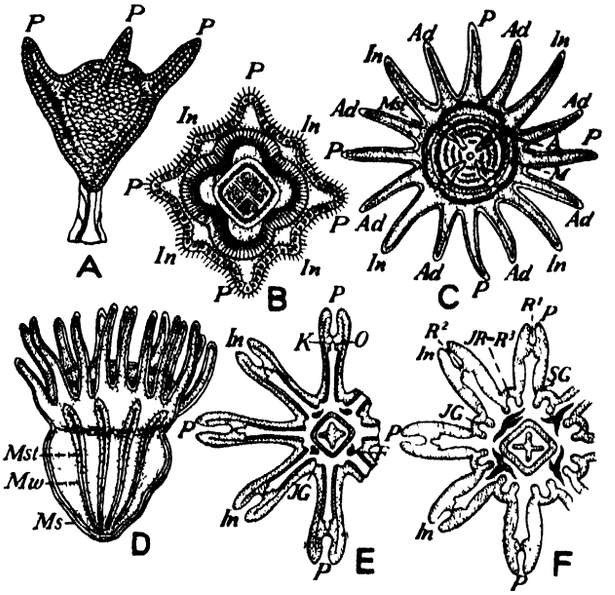


FIG. 11.—Later development of *Chrysaora* and *Aurelia*. (After Claus.)
A, Scyphistoma of *Chrysaora*, with four perradial tentacles and horny basal perisarc.
B, Oral surface of later stage of scyphistoma of *Aurelia*, with commencement of four interradial tentacles. The quadrangular mouth is seen in the centre; the outline of the stomach wall, seen by transparency around it, is nipped in four places interradially to form the four gastric ridges.
C, Oral surface of a sixteen-tentacled scyphistoma of *Aurelia*. The four gastric interradial ridges are seen through the mouth.
D, First constriction of the *Aurelia* scyphistoma to form the pile of ephyrae or young medusae. The single ephyra carries the sixteen scyphistoma tentacles, which will atrophy and disappear. The four longitudinal gastric ridges are seen by transparency.
E, Young ephyra just liberated, showing the eight bifurcate arms of the disk and the interradial single gastral filaments.
F, Ephyra developing into a medusa by the growth of the adradial regions. The gastral filaments have increased to three in each of the four sets.
A, Margin of the mouth.
Ad, Adradial radius.
F, Gastral filament.
In, Interradial radius.
JG, Adradial gastral canal.
JR=R^3, Adradial lobe of the disk.
K, Lappet of a perradial arm.
M, Stomach wall.
Mst, Muscle of the gastral ridge.
Mw, Gastral ridge.
Ms, Mesogloea.
O, Tentaculocyst.
P, Perradial radius.
R^2, Interradial radius.
R^3, Adradial radius.
SG, Commencement of lateral vessel.

The ephyra has a flat, disk-shaped body, with eight marginal lobes (four perradial, four interradial); a tentaculocyst is lodged in a deep notch at the apex of each lobe. Four groups of phacellae indicate the four interradii. The stomach has sixteen marginal pouches and the general anatomical structure recalls that of *Pelagia*. As the

[1] The four primitive interradial cathammata disappear in the fully formed ephyra and become replaced by sixteen subradial concrescence-areas without any ostia or ring-canal at the margin.

ephyra grows in size it gradually takes on the form and structure of the young medusa. The adradial regions grow (fig. 11, F) so as to change the star-like contour into one more evenly circular, the tentacles grow out, and the various parts become complicated and take on the structure of the adult medusa.

The course of development sketched out above is that which is typical of the higher forms of Scyphomedusae, and is by no means to be regarded as the most primitive type of development. The complicated alternation of generations seen in such a form as *Aurelia* does not occur in the more primitive genera. Thus in *Pelagia* the scyphistoma-stage is free-swimming and changes directly into the ephyra, which in its turn grows into the adult form. On the other hand, such a form as *Lucernaria* or *Haliclystus* may be regarded simply as a scyphistoma which has become adult and mature. The comparison of the metagenetic type of development, such as that of *Aurelia*, with the more primitive genera of Scyphomedusae, indicates clearly that the scyphistoma and ephyra are recapitulative larval stages which are represented by the adult forms of primitive genera, making such allowances as are necessary when comparing adult and larval forms. The metagenesis has arisen through the scyphistoma-larva acquiring the power of larval proliferation by budding. A similar origin for metagenesis has been discussed under the Hydromedusae (*q.v.*).

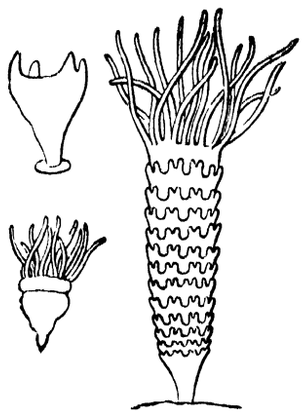


FIG. 12.—Development of *Aurelia*. Above to left, young scyphistoma with four perradial tentacles. Below to left, scyphistoma with sixteen tentacles and first constriction. To the right, strobila condition of the scyphistoma, consisting of thirteen metameric segments; the uppermost still possesses the sixteen tentacles of the scyphistoma; the remainder have no tentacles, but are ephyrae, each with eight bifid arms (processes of the disc). Each segment when detached becomes an ephyra, such as that drawn in fig. 11, E, F. (From Gegenbaur.)

The above comparison further indicates that the scyphistoma should not be regarded as a polyp but rather as a medusoid organism. The only certain criterion of a medusa-individual is the presence of definite sense-organs, but in cases where the organism is much reduced, this criterion may fail us, as it does in the genus *Lucernaria*. Nevertheless a comparison between *Lucernaria* and its close ally *Haliclystus* shows clearly that the absence of sense-organs in the former is the result of secondary reduction, so that a true medusa may lose its most characteristic feature. Hence the absence of sense-organs in the scyphistoma does not necessarily disprove its medusoid character, while its anatomical structure resembles that of a simple scyphomedusa, such as *Lucernaria*, rather than that of a polyp.

Affinities of the Scyphomedusae.—By some authorities the Scyphomedusae have been removed from the Hydrozoa and united with the Anthozoa in a common group termed Scyphozoa. The diagnostic features of the class Scyphozoa thus constituted are supposed to be (1) an ectodermal oesophagus or stomodaeum, (2) a gastric cavity subdivided by mesenteries, (3) gonads formed in the endoderm. It appears, however, that the first of these characters is non-existent, and that the so-called mesenteries are simply the concrescence-areas found in all medusae. There remains only the third feature, the endodermal gonads, as an argument for uniting the Scyphomedusae with the Anthozoa, against which must be set all the peculiarities of medusan organization in which the Scyphomedusae resemble the Hydromedusae. The fact that the Scyphomedusae have a number of well-marked peculiarities of form and structure is not incompatible with placing them in the Hydrozoa as a distinct sub-class, contrasting sharply in many ways with the Hydromedusae.

CLASSIFICATION OF THE SCYPHOMEDUSAE

ORDER I. Cubomedusae or Charybdaeida.—Medusae more or less cubical in form, with four perradial rhopalia alternating with four interradial tentacles or groups of tentacles; oral arms short; stomach a wide cavity bearing four interradial groups of phacellae and giving off four broad perradial pouches completely separated from each other by four interradial septa (*i.e.* ring-canal absent); gonads divided each into two by the septa, hence eight in number; subgenital pits small or absent.

This order stands very much apart from the other orders of the Scyphomedusae. It has been proposed by Maas to divide the entire subclass Acraspeda into A, Charybdaeida and B, Acraspeda typica. The Charybdaeida comprise three families:—

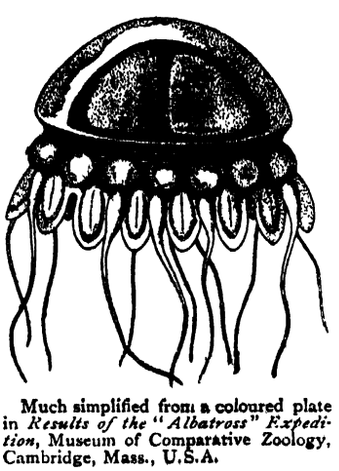
1. *Charybdaeidae.*—With four interradial tentacles. *Charybdaea marsupialis* (fig. 4) is a familiar Mediterranean medusa; the wonderful development of the sense-organs in this genus has already been described (figs. 7-9). The species of *Charybdaea* are stated to be quick and active in their movements and to be voracious feeders.
2. *Chirodropidae.*—With four interradial groups of tentacles. *Chirodropus*.
3. *Tripedaliidae.*—With four interradial groups of tentacles, three in each group. *Tripedalia*.

ORDER II. Stauromedusae or Lucernarida.—Medusae of deep pyramidal form, often sessile, attached by a stalk developed from the centre of the exumbral surface; rhopalia absent or represented by colletocystophores. Four families:—

1. *Lucernaridae.*—Sessile, stalked, with capitate tentacles arranged in groups on eight projecting marginal lobes. Eight gonads. *Lucernaria*, without, and *Haliclystus* (fig. 1) with colletocystophores, are two well-known genera.
2. *Tesseridae.*—Free, with eight or more tentacles, without tentaculocysts. *Tessera*, &c.
3. *Depastridae.*—Sessile, stalked, with eight shallow marginal lobes bearing one or more rows of tentacles; without tentaculocysts; with four gonads. *Depastrum* is a British genus.
4. *Stenoscyphidae.*—Sessile, with the margin undivided; with eight colletocystophores and eight adradial groups of capitate tentacles. *Stenoscyphus inabai*, from Japan.

ORDER III. Coronata.—Free medusae with rhopalia of the normal type; the exumbrella is divided by a circular, so-called *coronal groove*, into two parts, a central portion, which is conical, thimble-shaped, or domed in form, and a peripheral portion, the *pedal zone*, which bears the marginal lobes, tentacles and rhopalia; the pedal zone is subdivided into areas termed *pedalia*, from each of which arises a tentacle or rhopalium in the interspace between two adjacent lobes of the margin. The order contains the following families:—

1. *Periphyllidae.*—With sixteen marginal lobes, four rhopalia and twelve tentacles; the rhopalia are interradial. *Periphylla* (fig. 13), a widely distributed deep-sea genus.
2. *Paraphyllinidae.*—With sixteen marginal lobes, four rhopalia and twelve tentacles; the rhopalia are perradial in position, corresponding to the angles of the stomach. *Paraphyllina* recent; *Paraphyllites* fossil [see Maas (8 and 12)].
3. *Atorellidae.*—With twelve marginal lobes, six rhopalia and six tentacles. *Atorella*.
4. *Pericolpidae.*—With eight marginal lobes, four rhopalia and four tentacles. *Pericolpa*.
5. *Collaspidae* (*Atollidae*).—With sixteen or thirty-two rhopalia, marginal lobes and tentacles often very numerous. *Atolla* (fig. 14) is a well-known deep-sea genus.
6. *Ephyropsidae.*—With sixteen marginal lobes, eight rhopalia and eight tentacles. *Nausithoë*, a small medusa of world-wide distribution, is the type of the subfamily *Nausithoidae*; the subfamily *Linergidae* includes the genera *Linerges*, &c., medusae confined to tropical seas. By Maas and others the *Nausithoidae* and *Linergidae* are ranked as independent families.



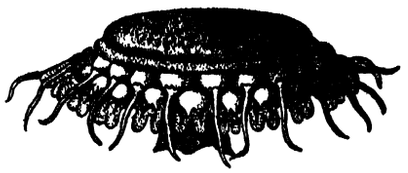
Much simplified from a coloured plate in *Results of the "Albatross" Expedition*, Museum of Comparative Zoology, Cambridge, Mass., U.S.A.

FIG. 13.—*Periphylla regina* from life, after O. Maas, about half life-size.

ORDER IV. Discophora.—Medusae with umbrella flattened or disk-like, without coronal groove; lips always prolonged into long oral arms. The most prolific and dominant group of the Scyphomedusae, containing two suborders; the Semaeostomae, in which the oral arms remain separate, and the Rhizostomeae, in

which the oral arms become fused together to form a proboscis. Nine families, three of Semaeostomeae, six of Rhizostomeae :—

1. *Pelagiidae.*—Semaeostomeae with wide gastric pouches not united by a ring-canal. *Pelagia*, an oceanic genus with direct development. *Chrysaora* (fig. 3*b*), a common British medusa, with a scyphistoma stage and alternation of generations. *Dactylometra*, a common American medusa of the Atlantic shores, differs from *Chrysaora* in small points.

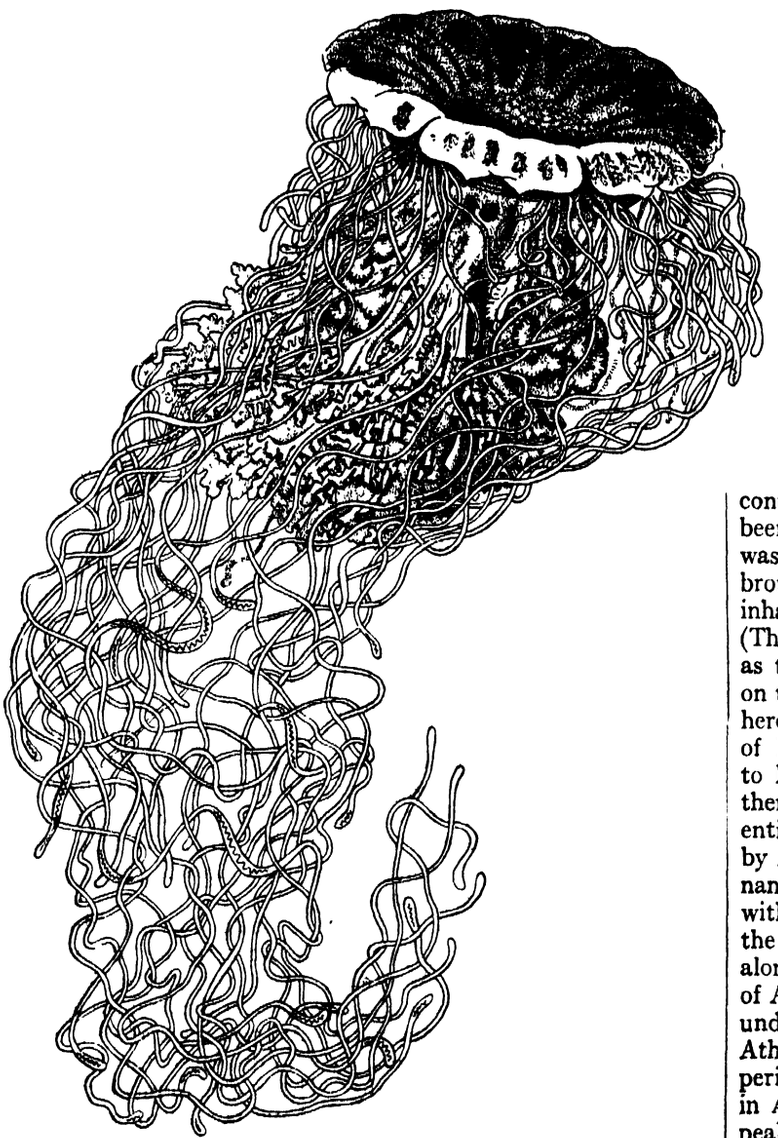


Modified from a coloured plate in Prince of Monaco's series.

FIG. 14.—*Atolla bairdi*. After O. Maas.

2. *Cyaneidae.* — Semaeostomeae with sixteen gastric pouches sending off canals to the margin not united by a ring-canal; tentacles in bunches on the margin. *Cyanea* (fig. 15), represented in the British fauna by two species.

3. *Ulmaridae.*—Semaeostomeae with gastric pouches relatively small, sending off branching canals to the margin, where they are united by a ring-canal. *Ulmaris*, from the South Atlantic, has only



(After E. Haeckel, from *System der Medusen*, by permission of Gustav Fischer.)

FIG. 15.—*Cyanea* (*Desmonema*) *anasethe*, about two-thirds life-size.

eight adradial tentacles. *Aurelia* (fig. 2), with numerous marginal tentacles, is one of the commonest and most familiar of jelly-fishes.

4. *Cassiopeidae.*—Rhizostomeae with subumbral musculature arranged in feather-like arcades (Arcadomyaria, Maas); oral arms pinnate. *Cassiopeia.*

5. *Cepheidae.*—Rhizostomeae with subumbral musculature in radial tracts (Radiomyaria, Maas); oral arms bifid. *Cephea*, *Cotylorhiza.*

6. *Rhizostomatidae* (*Pilemidae*).—Rhizostomeae with subumbral musculature in circular bands (Cyclomyaria); oral arms bifid or very complicated; sixteen radial canals. *Rhizostoma* (*Pilema*) is a very common genus (fig. 3*a*).

7, 8, 9. The families *Lychnorhizidae*, *Leptobrachidae* and *Catostylidae* resemble the preceding in the arrangement of the musculature. In *Lychnorhizidae* only eight of the sixteen radial canals reach the ring-canal; the genus *Crambessa* is the best-known representative of the family. In the other two families there are eight radial canals, and between them a network of canals with many openings into the ring-canal.

BIBLIOGRAPHY.—1. E. T. Browne, "Variation in *Aurelia aurita*," *Biometrika*, i. (1901), pp. 90-108, 3 figs.; 2. "Scyphomedusae," *Fauna and Geogr. Maldives and Laccadives*, ii., suppl. i. (1905), pp. 958-971, pl. xciv.; 3. O. Friedemann, "Untersuchungen uber die postembryonale Entwicklung von *Aurelia aurita*," *Zeitschr. f. wiss. Zool.* lxxi. (1902), pp. 227-266, pls. xii. xiii., 3 text-figs.; 4. W. Hein, "Untersuchungen uber die Entwicklung von *Aurelia aurita*," *Zeitschr. f. wiss. Zool.* lxvii. (1900), pp. 401-438, pls. xxiv. xxv., 5 text-figs.; 5. K. Kishinouye, "Some New Scyphomedusae of Japan," *Journ. Coll. Sci. Tokyo*, xvii., No. 7 (1902), 17 pp., 2 pls.; 6. O. Maas, "Die Medusen" (Albatross Expedition), *Mem. Mus. Comp. Zool. Harvard Coll.* xxiii. 1 (1897), 92 pp., 15 pls., with explanations; 7. "Über Medusen aus dem Solenhofer Schiefer und der unteren Kreide der Karpathen," *Palaeontographica*, xlviii. (1902), pp. 297-322, pls. xxii. xxiii., with explanations, and 9 text-figs.; 8. "Die Scyphomedusen der Siboga-Expedition," *Uitkomst. Siboga-Expeditie*, xi. (1903), 91 pp., 12 pls., with explanations; "Méduses," *Result. Camp. Sci. Albert, Monaco*, xxviii. (1904), 71 pp., 6 pls., with explanations; 10. "Médusen," in *Résultats du S.Y. Belgica* (1906), 32 pp., 3 pls.; 11. "Die arktischen Medusen," *Fauna Arctica*, iv. (1906), pp. 479-526; 12. O. Maas, "Über eine neue Medusengattung aus dem lithographischen Schiefer," *N.JB. Mineral Geol. Palaeontol.* (1906), ii. pp. 90-99, 4 text-figs.; 13. W. Schewiakoff, "Beiträge zur Kenntnis des Acalephenauges," *Morph. Jahrb.* xv. (1889), pp. 21-60, 3 pls.; 14. E. Vanhöffen, "Die Akalephen der Plankton-Expedition," *Ergebn. d. Plankt.-Exp.* ii. (1892), 28 pp., 5 pls.; 15. "Die acraspeden Medusen der deutschen Tiefsee-Expedition," *Deutsch. Tiefsee-Exped.* "*Valdivia*," iii. (1902), pp. 1-15, 8 pls. See also the general works cited in the article HYDROZOA and the bibliographies given in them. (E. A. M.)

SCYROS, a small rocky barren island in the Aegean Sea, off the coast of Thessaly, containing a town of the same name. In 469 B.C. it was conquered by the Athenians under Cimon, and it was probably about this time that the legends arose which connect it with the Attic hero Theseus, who was said to have been treacherously slain and buried there. A mythic claim was thus formed to justify the Athenian attack, and Cimon brought back the bones of Theseus to Athens in triumph. The inhabitants of Scyros before the Athenian conquest were Dolopes (Thuc. 1. 98); but other accounts speak of Pelasgians or Carians as the earliest inhabitants. There was a sanctuary of Achilles on the island, and numerous traditions connect Scyros with that hero. He was concealed, disguised as a woman, in the palace of Lycomedes, king of the island, when his mother wished to keep him back from the Trojan War; he was discovered there by Odysseus, and gladly accompanied him to Troy. An entirely different cycle of legends relate the conquest of Scyros by Achilles. The actual worship on the island of a hero or god named Achilles, and the probable kinship of its inhabitants with a Thessalian people, whose hero Achilles also was, form the historical foundation of the legends. Scyros was left, along with Lemnos and Imbros, to the Athenians by the peace of Antalcides (387 B.C.). It was taken by Philip, and continued under Macedonian rule till 196, when the Romans restored it to Athens, in whose possession it remained throughout the Roman period. It was sacked by an army of Goths, Heruli and Peucini, in A.D. 269. The ancient city was situated on a lofty rocky peak, on the north-eastern coast, where the modern town of St George now stands. A temple of Athena, the chief goddess of Sycros, was on the shore near the town. The island has a small stream, called in ancient times Cephissus.

SCYTHAE (Gr. Σκύθαι), in Herodotus (iv. 1-142) and Hippocrates (*De aere*, 24 sqq.), a definite nation giving its name to Scythia (*q.v.*); in later writers a general term for the inhabitants of that country without distinction of race.

SCYTHE, an implement for mowing grass or reaping corn or grain, consisting of a curved steel blade fastened to a long wooden handle with a slight double curve from which project two small pieces by which the handle is held. The handle is

technically known as the "snathe," "sned" or "snead" (*snædan* to cut, cf. Ger. *schneiden*). The word in O.E. is *siðe* or *siþe* M.E. *sithe*; the mis-spelling "scythe" is paralleled by "scent," and is possibly due to the Fr. *scier*, saw; the word means "an instrument for cutting," and is derived from the root *sak-*, seen in Lat. *secare*, to cut, "saw" and "sickle," the oldest of reaping implements, with deep curved blade and short handle. The same root is seen in "sedge," *i.e.* cutting or sword-grass, strictly applied to plants of the genus *Carex*, but loosely used of flags, rushes and other grasses growing in marshy places (see REAPING).

SCYTHIA (Gr. Σκυθία), originally (*e.g.* in Herodotus iv. 1-142), the country of the Scythae or the country over which the nomad Scythae were lords, that is, the steppe from the Carpathians to the Don. With the disappearance of the Scythae as an ethnic and political entity, the name of Scythia gives place in its original seat to that of Sarmatia, and is artificially applied by geographers, on the one hand, to the Dobrudzha, the lesser Scythia of Strabo, where it remained in official use until Byzantine times; on the other, to the unknown regions of northern Asia, the Eastern Scythia of Strabo, the "Scythia intra et extra Imaum" of Ptolemy: but throughout classical literature Scythia generally meant all regions to the north and north-east of the Black Sea, and a Scythian (*Scythes*) any barbarian coming from those parts. Herodotus (*l.c.*), to whom with Hippocrates (*De aere*, &c. 24 sqq.) we owe our earliest knowledge (Homer, *Il.* xiii. 5, speaks of "mare-milkers," and Hesiod, *ap.* Strabo vii. 3 (7) mentions Scythae) of the land and its inhabitants, tries to restrict this merely geographical usage and to confine the word Scyth to a certain race or at any rate to that race and its subjects, but even he seems to slip back into the wider use. Hence there is much doubt as to his exact meaning.

His account of the geography falls into two irreconcilable parts; one (iv. 99 sqq.), in connexion with the tale of the invasion of Darius, makes of Scythia a kind of chessboard 4000 stades square on which the combatants can make their moves quite unhindered by the great rivers: the other (16-20), founded on what he learned from Greeks of Olbia and supplemented by the tales of the 7th century traveller Aristeas of Proconnesus, is not very far removed from first-hand information and can be made more or less to tally with the lie of the land. In accordance with this we can give the relative positions of the various tribes, and an excursus on the rivers (47–57) lets us define their actual seats. In western Scythia, starting from Olbia and going northwards, we have Callippidae on the lower Hypanis (Bug), Alazones where the Tyras (Dniester) and Hypanis come near each other in their middle courses, and Aroteres ("Ploughmen") above them. These tribes raised wheat, presumably in the river valleys, and sold it for export; in the eastern half from west to east were Georgi (perhaps the same as Aroteres) between the Ingul and the Borysthenes (Dnieper), nomad Scyths and Royal Scyths between the Borysthenes and the Tanais (Don). Above all these stretched a row of non-Scythian tribes from west to east: on the Maris (Maros) in Transylvania the Agathyrsi; Neuri in Podolia and Kiev, Androphagi and Melanchlaeni in Poltava, (Ryazan) and Tambov. On the lower Don and Volga we have the Sauromatae, and on the middle course of the Volga the Budini with the great wooden town of Gelonus and its semi-Greek inhabitants. From this region started an important trade route eastward by the Thyssagetae among the southern Urals, the Iyrcae on the Tobol and Irtysh to the Kirgiz steppe, where dwelt other Scyths, regarded as colonists of those in Europe: then by the Argippaei in the Altai and the Issedones in the Tarym basin, to the one-eyed Arimaspi on the borders of China, who stole their gold from the watchful griffins, and who marched with goat-footed men and Hyperboreans reaching to the sea. To the south of Scythia the Crimean mountains were inhabited by a non-Sythic race, the Tauri. (See also articles on these tribes.)

Ethnology.—Herodotus expressly divides the Scythians into the Agriculturists, Callipidae, Alazones, Aroteres and Georgi in the western part of the country, and the Nomads with the Royal Scyths to the east. The latter claimed dominion over all the rest. The question arises whether we have to do with the various tribes of one race in different stages of civilization, or with a mixed population called by foreigners after the ruling tribe. The latter seems by far the more probable. The affinities of this tribe have been sought in various directions, and the evidence surgests that it was itself of mixed blood. We know that in the 2nd century A.D., when the steppes were dominated by the Sarmatae (*q.v.*), the majority of the barbarian names in the inscriptions of Olbia, Tanais, and Panticapaeum were Iranian, and can infer that the Sarmatae spoke an Iranian language. Pliny speaks of their descent from the Medes. Now the Sarmatae are represented as half-caste Scyths speaking a corrupt variety of Scythian. Presumably, therefore, the Scyths also spoke an Iranian dialect. But of the Scythic words preserved by Herodotus some are Iranian, others, especially the names of deities, have found no satisfactory explanation in any Indo-European language. Indeed they rather suggest a Ugrian origin. Nevertheless, the general opinion has been that the Scyths were Iranian. The present writer believes that they were a horde which came down from upper Asia, conquered an Iranian-speaking people, and in time adopted the speech of its subjects. The settled Scythians would be the remains of this Iranian population, or the different tribes of them may have been connected with their neighbours beyond Scythian dominion—Thracian Getae and Arimaspi, Slavonic Neuri, Finnish Androphagi and such like. The Cimmerians who preceded the Scythians used Iranian proper names, and probably represented this Iranian element in greater purity. Herodotus gives three legends of the origin of the Scyths (iv. 5-12); these, though they contradict each other, can be reconciled with the view stated above. Two of them seem to be the same story; one is very strongly Hellenized, the other, in more or less native shape, is shortly this. The tribe is autochthonous, claiming descent from a son of the river Borysthenes Targitaos, who lived a thousand years before. Of his three sons the youngest Colaxais is preferred by an ordeal of picking up certain objects which fell from heaven,—a plough, a yoke, an axe and a cup,—and becomes the ancestor of the ruling clan of Paralatae; from the other sons, Lipoxais and Harpoxais, are descended minor clans, and the name of the whole people is Scoloti, not Scythae, which is used by the Greeks alone. In this story the names make sense in Iranian, the tribes are not again mentioned except when this passage is copied, the objects are hardly such as would be held sacred by nomads, the form of ordeal is to be paralleled in Iranian legends, and the people say themselves that they are not really Scythae. Surely this is the national legend of the agricultural Scythians about Olbia, and the name Scoloti, by which careful modern writers designate the Royal Scyths, is the true designation of the subject race. The royal line of these is quite distinct from the true Royal Scyths, who, like most nomad conquerors, allowed their subjects to preserve their own organizations.

The third account fails chiefly in being too plausible, but there seems no reason to reject it as an artificial combination of unconnected facts. According to it the Scyths dwell in Asia, and were forced by the Massagetae over the Araxes (Volga ?) into the land of the Cimmerians. Aristeas says that the first impulse came from the Arimaspi, who displaced the Issedones, who in turn fell upon the Scyths. This comes to much the same thing, as the Massagetae seem to have contained an element which had come in from the land of the Issedones. The Scyths having fallen upon them from the north-east, the Cimmerians appear to have given way in two directions, towards the south-west, where the tombs of their kings were shown on the Tyras (Dniester) and one body joined with the Treres of Thrace in invading Asia Minor by the Hellespont; and towards the south-east where another body threatened the Assyrians, who called them Gimirrai (Hebrew Gomer; Gen. xi.). They were followed by the Scyths (Ashguzai, Heb. Ashkenaz) whom the Assyrians welcomed as allies and used against the Cimmerians, against the Medes and even against Egypt. Hence the references to the Scyths in the Hebrew prophets (Jer. iv. 3, vi. 7). This

is all put in the latter half of the 7th century B.C. Herodotus says that the Scyths ruled Media for twenty-eight years, and were then massacred or expelled. The Assyrian evidence is in the main a confirmation of Herodotus, though most writers think that the Scythians who troubled Asia were Sacae from the east of the Caspian (H. Winckler, *Altorientalische Forschungen*, p. 484 sqq.). If the Scyths came out of upper Asia, the Scythian colonists beyond the Iyrcae might be a division which had remained nearer the homeland, but in dealing with nomads we can suppose such a return as that of the Calmucks (Kalmuks) in the 18th century.

The physical features of the Scyths are not described by Herodotus, but Hippocrates (*l.c.*) draws a picture of them which makes them very similar to the Mongols as they appeared to the Franciscan missionaries in the 13th century. He says they are quite unlike any other race of men, and very like each other. The main point seems to be a tendency to slackness, fatness and excess of humours. The men are said to be in appearance very like eunuchs, and both sexes have a tendency to sexual indifference amounting in the men to impotence. When a man finds himself in this condition he assumes the women's dress and habits. Herodotus mentions the existence of this class, called Enarees, and says that they suffer from a sacred disease owing to the wrath of the goddess of Ascalon whose shrine they had plundered. Reinegg describes a similar state of things in the Nogai in the 18th century. The whole account suggests a Tatar clan in the last stage of degeneracy. Hippocrates says that this only applies to the ruling class, not to the slaves, but gives as the reason the want of exercise among the former. The skulls dug up in Scythic graves throw no light on the question, some being round and some long. The representations of nomads on objects of Greek art show people with full beards and shaggy hair, such as cannot be reconciled with Hippocrates; but the only reliefs which seem to be accurate belong to a late date when the ruling clan was Sarmatian rather than Scythic.

Customs.—Herodotus gives a good survey of the customs of the Scyths: it seems mostly to apply to the ruling race. Again the closest analogy is the state of the Mongols in the 13th century, but too much weight must not be put on this, as the natural conditions of steppe-ranging nomads dictated the greater part of them. Still the correspondence of religion and of funeral rites is very close. The Scyths lived upon the produce of their herds of cattle and horses, their main food being the flesh of the latter, either cooked in a cauldron or made into a kind of haggis, and the milk of mares from which they made cheese and kumiss (a fermented drink resembling buttermilk). This necessitated their constantly moving in search of fresh pasture, spending the spring and autumn upon the open steppe, the winter and summer by the rivers for the sake of moisture and shelter. The men journeyed on horseback, the women in wagons with felt tilts. These were drawn by their cattle, and were the homes of each family. Hence the Greek names, Abii, Hippemolgi, Hamaxobii. The women were kept in subjection, and were far from enjoying the liberty granted them among the Sarmatae, among whom they rode on horseback and engaged in war. Polygamy was practised, the son inheriting his father's wives. Both men and women avoided washing, but there was something of the nature of a vapour bath, with which Herodotus has confused a custom of using the smoke of hemp as a narcotic. The women daubed themselves with a kind of cosmetic paste. The dress of the men is well shown upon the Kul Oba and Chertomlyk vases, and upon other Greek works of art made for Scythic use. It must not be confused with the fanciful barbarian costumes that are so common upon the Attic pots. They wore coats confined by belts, trousers tucked into soft boots, and hoods or tall pointed caps. The women had flowing robes, tall pointed caps, and veils descending over most of the figure. Both sexes wore many stamped gold plates sewn upon their clothes in lines or *semés*. Their horses had severe bits, and were adorned with nose pieces, cheek pieces and saddle cloths. True stirrups were unknown. In war the nation was divided into three sub-kingdoms, and these into companies, each with its commander. The companies had yearly feasts, at which the commander honoured warriors who had slain one or more of the enemy. As evidence of such prowess, and as a token of his right to a share of any spoil, the warrior was accustomed to scalp his enemy and adorn his bridle with the trophy. In the case of a special enemy or an adversary overcome in a private dispute before the king, he would make a cup of the skull, mounting it in bull's hide or in gold. The tactics in war were the traditional nomad tactics of harassing the enemy on the march, constantly retreating before him and avoiding a general engagement. Their weapons consisted of bow and arrows, short swords, spears and axes. The government was a despotism, but a king who aroused the extreme dissatisfaction of his subjects was liable to be murdered.

Religion.—The religion of the Scyths was nature worship. Herodotus (iv. 59) gives a list of their gods, with the Greek deities corresponding, but we cannot tell what aspect of the Greek deity is in question. He says they chiefly reverence Tabiti (Hestia), next Papaeus and his wife Apia (Zeus and Ge), then Oitosyros (Apollo) and Argimpasa (Aphrodite Urania). These are common to all the Scythians, but Thamimasadas (Poseidon) is peculiar to the Royal Scyths.[1] They set up no images or altars or temples save to Ares only. To Ares they make a heap of faggots three stades square, with three sides steep and one inclined, and bring to it a hundred and fifty fresh loads of faggots every year. Upon the top is set up a sword which is the image of Ares; to this they sacrifice captives, pouring their blood over it. The account of the cult of Ares, for whom no Scythian name is given, appears to be an addition, and the mention of such masses of faggots suggests the wooded district of the agricultural Scythians, not the treeless steppe of the Royal tribe. The Scythian pantheon is not distinctive, and can be paralleled among the Tatars and among the Iranians. The Scyths had a method of divination with sticks, and the Enarees, who claimed to be soothsayers by grant of the goddess who had afflicted them, used another method by splitting bast fibres. They intervened in case of the king's falling sick, when it was assumed that some man had sworn by the king's hearth and broken his oath. If a man accused of this denies it, other diviners are called, and if these concur, he is beheaded and his sons slain and his goods given to the diviners. But if a majority of diviners decide against the accusers, the latter are set upon a wagon-load of brushwood and burned to death. The burial rites are the most fully described. Private persons were merely carried about among their friends, who held wakes in their honour, and then buried forty days after death. But the funerals of the kings were much more elaborate. They exhibit the extreme development of the principle of surrounding the dead man with everything in which he found pleasure during his life. The tombs of the kings were in the land of Gerrhus near the great bend of the Dnieper where the chief tumuli have been excavated. The body was embalmed and filled with aromatic herbs, and then brought to this region, passing through the lands of various tribes. The Royal Scyths who followed the body were accustomed to cut about their faces and arms, and each tribe that the cortège met upon its way had to join it and conform to this expression of grief. Arrived at the place of burial, the body was set in a square pit with spears marking out its sides and a roof of matting. Then one of the king's concubines and his cup-bearer, cook, groom, messenger and horses were strangled and laid by him, and round about offerings of all his goods and cups of gold—no silver or bronze. After this they raised a great mound, striving to make it as high as possible. A year later they strangled fifty youths of the dead man's servants (all Scyths born) and fifty of the best horses, stuffed them and mounted them in a circle about the tomb.

Tombs.—The description is generally borne out by the evidence of the tombs opened in the Scythic area. None agrees in every point, but almost every detail finds a close parallel in some tomb or other. The chief divergence is in the presence of silver and copper objects, but the great quantity of gold is the most striking fact, and to say that there was nothing but gold seems merely an exaggeration. Tombs to which the name Scythic is generally applied form a well-defined class. They are preceded over the whole area by a much simpler form of burial marked by the practice of staining the bones with red ochre, and the presence of one or two rude pots and nothing more: yet that some were tombs of great chiefs is shown by the great size of the barrows heaped over them. They have been referred to the Cimmerians, but for this there is no clear evidence. The Scythic tombs can be roughly dated by the objects of Greek art that they contain. They seem to begin about the 6th century B.C., and to continue till the 2nd century A.D.; that is, they cover the period of the Scythic domination according to the account accepted above, and that of the Sarmatian, and so suggest that, as far as the archaeological evidence goes, there was little more than a change of name and perhaps the substitution of one ruling clan for another—not a real change of population. The finest of the class were opened about the bend of the Dnieper, where we should put the land Gerrhus. Others are found to the south-west of the central area, and in the governments of Kiev and Poltava we have many tombs with Scythic characteristics, but a difference (*e.g.* the fewness of the horses) which makes us think of the settled tribes under Scythic domination. Others occur in the flat northern half of the Crimea, and even close to Kerch, where the famous Kul Oba seems to have held a Scythic chieftain who had adopted a veneer of Greek tastes, but remained a barbarian at heart. East of the Maeotis, especially along the river Kuban, are many groups of barrows showing the same culture as those of Gerrhus but in a purer form. Farther to the north and east the series seems to extend into Siberia, but in this region excavations have been few. Unfortunately very few of these barrows have come down to us unplundered, and we cannot find one complete example and take it as a type. Soon after

[1] The names are read in various ways; it is impossible to establish the correct forms.

they were heaped up, before the beams supporting the central chamber had rotted, thieves made a practice of driving a mine into the mound straight to where the valuables were deposited, and it is only by the collapse of this mine and the crushing of the robber after he had thrown everything into confusion that the treasures of the Chertomlyk barrow, on the whole the most typical, were preserved to us. This was 60 ft. high and 1100 ft. round; about it was a stone plinth, and it was approached by a kind of stone alley. A central shaft descended 35 ft. 6 in. below the surface of the earth, and from each corner of it at the bottom opened out side chambers. The north-west chamber communicated with a large irregular chamber into which the plunderer's mine opened. In the central pit all was in confusion, but here the king seems to have lain on a bier. His belongings, found piled up near the mine, seem to have included a combined bow-case and quiver and a sword sheath, each covered with plates of gold of Greek work, three swords with gold hafts, a hone with gold mounting, a whip, many other gold plates and a heap of arrow-heads. In the north-west chamber was a woman's skeleton, and she had her jewels, mostly of Greek work. She was attended by a man, and three other men were buried in the other chambers. They were supplied with simpler weapons and adornments, but even so their clothes had hundreds of stamped gold plates and strips of various shapes sewn on to them. By every skeleton were drinking vessels. Store of wine was contained in six amphorae, and in two bronze cauldrons were mutton-bones. The most wonderful object of all was a great two-handled vase standing 3 ft. high and made to hold kumiss. The greater part of its body is covered by a pattern of acanthus leaves, but on the shoulder is a frieze showing nomads breaking in wild mares, our chief authority for Scythian costume. To the west of the main shaft were three square pits with horses and their harness, and by them two pits with men's skeletons. In the heap itself was found an immense quantity of pieces of harness and what may be remains of a funeral car. The Greek work would seem to date the burial as of the 3rd century B.C.

At Alexandropol in the same district was an even more elaborate tomb, but its contents were in even greater confusion. Another tomb in this region, Melgunov's barrow, found as long ago as 1760, contained a dagger-sheath and pommel of Assyrian work and Greek things of the 6th century. In the Kul Oba tomb mentioned above the chamber was of stone and the contents, with one or two exceptions, of purely Greek workmanship, but the ideas underlying are the same—the king has his wife, his servant and his horse, his amphorae with wine, his cauldron with mutton-bones, his drinking vessels and his weapons, the latter being almost the only objects of barbarian style. One of the cups has a frieze with reliefs of natives supplementing that on the Chertomlyk vase.

East of the Maeotis on the Kuban we have many barrows; the most interesting are the groups called the Seven Brothers, and those of Karagodeuashkh, Kostromskaya, Ul and Kelermes, the latter remarkable for objects of Assyrian style, the others for the enormous slaughter of horses; on the Ul were four hundred in one grave.

Art.—Certain of the objects which occur in these Scythic graves are of special forms typical for the Scythic area. Most interesting of these is the dagger or sword, always very short, save in the latest graves, and distinguished by a heart-shaped guard marking the juncture of hilt and blade; its sheath is also characteristic, having a triangular projection on one side and usually a separate chape: these peculiar forms were necessitated by a special way of hanging the dagger from two straps that it might not interfere with a rider's movements. Just the same form of short sword was used in Persia and is shown on the sculptures at Persepolis. Another special type is the bow-case, made to take a short curved bow and to accommodate arrows as well. Further, there is the peculiar cauldron on one conical foot, round which the fire was built, the cylindrical hone pierced for suspension, and the cup with a rounded bottom. Assyrian and afterwards Greek craftsmen working for Scythic employers were compelled to decorate these outlandish forms, which they did according to their own fashion: but there was also a native style with conventionalized beast decoration, which was almost always employed for the adornment of bits and horses' gear, and very often for weapons. This style and the types of dagger, cauldron, bit and two-looped socketed axehead run right across from Hungary to the upper Yenisei, where a special Bronze Age culture seems to have developed them. But even here it seems impossible to deny some influence coming from the Aegean area, and Scythic beasts are very like certain products of Mycenaean and early Ionic art. Again, the Scythic style is interesting as being one element in the art of the barbarians who conquered the Roman Empire and the zoomorphic decoration of the early middle ages.

The dominance from the Yenisei to the Carpathians of a distinct style of art which, whatever its original elements may have been, seems to have taken shape as far east as the Yenisei basin is an additional argument in favour of a certain movement of population from the far north-east towards the south Russian steppes. It would correspond in time with the movement of the Scyths of which Herodotus speaks, and it may be inferred that immigrants coming from those regions were rather allied to the Tatar family of nations than to the Iranian. Similar movements from the same regions appear also to have penetrated Iran itself: hence the resemblance between the dress and daggers of certain classes of warriors on the sculptures of Persepolis and those shown on the Kul Oba vase. An Iranian origin would not account for the presence of analogous types on the Yenisei.

History.—To sum up the history of Scythia, the oldest inhabitants of whom we hear in Scythia were the Cimmerii; the nature of the country makes it probable that some of them were nomads, while others no doubt tilled some land in the river valleys and in the Crimea, where they left their name to ferries, earthworks and the Cimmerian Bosporus. They were probably of Iranian race: among the Persians Herodotus describes a similar mixture of nomadic and settled tribes. In the 7th century B.C. these Cimmerians were attacked and partly driven out by a horde of newcomers from upper Asia called Scythae; these imposed their name and their yoke upon all that were left in the Euxine steppes, but probably their coming did not really change the basis of the population, which remained Iranian. The newcomers adopted the language of the conquered, but brought with them new customs and a new artistic taste, probably largely borrowed from the metal-working tribes of Siberia. About the same time similar peoples harassed the northern frontier of Iran, where they were called Saka (Sacae), and in later times Saka and Scyths, whether they were originally the same or not, were regarded as synonymous. It is difficult always to judge whether given information applies to the Sacae or the Scyths.

About 512 B.C. Darius, having conquered Thrace, made an invasion of Scythia, which, according to the account of Herodotus, he crossed as far as the Oarus, a river identified with the Volga, burned the town of Gelonus and returned in sixty days. In this march he was much harassed by the nomads, with whom he could not come to close quarters, but no mention is made of his having any difficulty with the rivers (he gets his water from wells), and no reason for his proceedings is advanced except a desire to avenge legendary attacks of Scyths upon Asia. After losing many men the Great King comes back to the place where he crossed the Danube, finds the Ionians still guarding the bridge in spite of the attempts of the Scyths to make them desert, and safely re-enters his own dominions. Ctesias says that the whole campaign only took fifteen days and that Darius did not get beyond the Tyras (Dniester). This is also the view of the reasonable Strabo; but it does not account for the genesis of the other story. It seems best to believe that Darius made an incursion in order to secure the frontier of the Danube, suffered serious reverses and retired with loss, and that this offered too good a chance to be missed for a moral tale about the discomfiture of the Great King by a few poor savages. The Greeks had been trading with the Scyths ever since their coming, and at Olbia there were other tales of their history. We can make a list of Scythian kings—Spargapeithes, Lycus, Gnurus, Saulius (whose brother, the famous Anacharsis (*q.v.*), travelled over all the world in search of wisdom, was reckoned a sage among the Greeks and was slain among his own people because they did not like his foreign ways), and Idanthyrsus, the head king at the time of Darius, probably the father of Ariapeithes. This latter had three wives, a Greek woman from Istrus, Opoea a Scythian, and a Thracian daughter to the great chief Teres. Scyles, his son by the Greek mother, affected Greek ways, had a house in Olbia, and even took part in Bacchic rites. When this came to the knowledge of his subjects he was murdered, and Octamasadas, his son by the third wife, reigned in his stead. Herodotus adduces this to show how much the Scyths hated foreign customs, but with the things found in the graves it rather proves how strong was the attraction exercised upon the nomads by the higher culture of their neighbours. Octamasadas died shortly before the time of Herodotus. We cannot place Ariantas, who made a kind of census of the nation by exacting an arrow-head from each warrior and cast a great cauldron out of the bronze, nor Taxacis and Scopasis, the under-kings in the time of Idanthyrsus. After the retreat of Darius the Scythians made a raid as far as Abydos, and even sent envoys to King Cleomenes III. of Sparta to arrange that they should attack the Persian Empire from the Phasis while the Spartans

should march up from Ephesus. The chief result of the embassy was that Cleomenes took to the Scythian habit of drinking his wine neat and went mad therefrom (Herodotus vi. 84). Henceforward the Scyths appear as a declining power: by the middle of the 4th century their eastern neighbours the Sarmatae have crossed the Tanais (Don) and the pressure of the Scyths is felt on the Danube. Here Philip II. of Macedon defeated and slew their king Ateas in 339 B.C., and from this time on the representatives of the old Scythic power are petty chieftains in the western part of the country about Olbia, where they could still be dangerous, and about Tomi. Towards the second half of the 2nd century B.C. this kingdom seems to have become the nucleus of a great state under Scilurus, whose name appears on coins of Olbia, and who at the same time threatened Chersonese in the Crimea. Here, however, he was opposed by the might of Mithradates VI. of Pontus and his power was broken. Henceforward the name "Scythian" is purely geographical. Meanwhile Scythia had become the land of the Sarmatae (*q.v.*). These, as has been seen, spoke a cognate dialect, and the tombs which belong to their period show exactly the same culture with Greek and Siberian elements. It is probable that the Iranian element was stronger among the Sarmatae, whose power extended as the ruling clan of the Scyths became extinct; but it is quite likely that they in their turn were officered by some new horde from upper Asia. Like the Scyths they were pressed towards the west by yet newer swarms, and with the coming of the Huns Scythia enters upon a new cycle, though still keeping its old name in the Byzantine historians.

AUTHORITIES.—(1) Ancient: Herodotus iv. 1-142 (editions of Blakesley, Rawlinson, Macan); Hippocrates, *De Aere*, &c., c. 24 sqq.; for geography alone: Strabo vii. cc. 3, 4; xi. cc. 1, 2, 6; Pliny iv. 75 sqq.; Ptolemy, *Sarmatia*; Diodorus Sic. ii. 2, 43-47; and Justin i. cc. 1, 8; ii. 1, 4, do not seem to add anything of which we can be certain. (2) Modern: E. H. Minns, *Scythians and Greeks* (Cambridge, 1909), gives a summary of various opinions and a survey of the subject from all points of view. See also for ethnological questions, Mongolian hypothesis: K. Neumann, *Die Hellenen im Skythenlande* (Berlin, 1855). Iranian hypothesis: K. Mullenhoff, "Über Herkunft und Sprache der Pontischen Skythen und Sarmaten," in *Monatsber. d. Berl. Ak.* (1866), reprinted in *Deutsche Altertumskunde*, vol. iii. For the archaeology: Kondakoff, Tolstoi and Reinach, *Antiquités de la Russie Méridionale* (Paris, 1892); more fully in *Antiquités de la Russie d'Hérodote* and *Compte rendu de la commission archéologique de St-Pétersbourg, passim.* (E. H. M.)

SEA (in O. Eng. *sae*, a common Teutonic word; cf. Ger. *See*, Dutch *Zee*, &c.; the ultimate source is uncertain), in its widest sense that part of the surface of the globe which consists of salt water, in distinction from dry land. The greater divisions of "the sea," in this sense, are called oceans, and are dealt with under the heading OCEAN AND OCEANOGRAPHY, the latter being the term now generally applied to the scientific study of the sea. The word "sea," however, is also used, in a restricted sense, in application to specific parts of the great oceans, more or less clearly defined by a partial land-boundary. Such are the Mediterranean Sea and the Caribbean Sea, connected with the Atlantic Ocean; the Arabian Sea, a division of the Indian Ocean, and the China and Japan Seas of the western Pacific Ocean. Subdivisions of great seas are similarly defined (*e.g.* the Adriatic Sea), and a few large bodies of salt water entirely land-locked are also called seas—*e.g.* the Caspian Sea, the Sea of Aral, the Dead Sea. *Sea-level* is the assumed mean level of the sea, serving as a datum from which to calculate the elevation of land in surveying (*q.v.*).

SEA, COMMAND OF THE, a technical term of naval warfare, which indicates a definite strategical condition. (For its difference from "sea-power," see the separate article on that subject.) The term has been substituted sometimes for the much older "Dominion of the sea" or "Sovereignty of the sea," a legal term expressing a claim, if not a right. It has also been sometimes treated as though it were identical with the rhetorical expression, "Empire of the sea." Captain A. T. Mahan, instead of it, uses the term "Control of the sea," which has the merit of precision, and is not likely to be misunderstood or mixed up with a form of words meaning something different. The expression "Command of the sea," however, in its proper and strategic sense, is so firmly fixed in the language that it would be a hopeless task to try to expel it; and as, no doubt, writers will continue to use it, it must be explained and illustrated. Not only does it differ in meaning from "Dominion or Sovereignty of the Sea," it is not even truly derived therefrom, as can be briefly shown. "It has become an uncontested principle of modern international law that the sea, as a general rule, cannot be subjected to appropriation" (W. E. Hall, *Treatise on International Law*, 4th ed., 1895, p. 146). This, however, is quite modern. Great Britain did not admit the principle till 1805; the Russians did not admit it till 1824; and the Americans, and then only tacitly, not till 1894. Most European nations at some time or other have claimed and have exercised rights over some part of the sea, though far outside the now well-recognized "three miles' limit." Venice claimed the Adriatic, and exacted a heavy toll from vessels navigating its northern waters. Genoa and France each claimed portions of the western Mediterranean. Denmark and Sweden claimed to share the Baltic between them. Spain claimed dominion over the Pacific and the Gulf of Mexico, and Portugal over the Indian Ocean and all the Atlantic south of Morocco (Hall, pp. 148–9). The claim which has made the greatest noise in the world is that once maintained by the kings of England to the seas surrounding the British Isles. Like other institutions, the English sovereignty of the sea was, and was admitted to be, beneficent for a long period. Then came the time when it ought to have been abandoned as obsolete; but it was not, and so it led to war. The general conviction of the maritime nations was that the Lord of the Sea would provide for the police of the waters over which he exercised dominion. In rude ages when men, like the ancients, readily "turned themselves to piracy," this was of immense importance to trade; and, far from the right of dominion being disputed by foreigners, it was insisted upon by them and declared to carry with it certain duties. In 1299, not only English merchants, but also "the maritime people of Genoa, Catalonia, Spain, Germany, Zealand, Holland, Frisia, Denmark, Norway and several other places of the empire" declared that the kings of England had from time immemorial been in "peaceable possession of the sovereign lordship of the seas of England," and had done what was "needful for the maintenance of peace, right and equity between people of all sorts, whether subjects of another kingdom or not, who pass through those seas" (J. K. Laughton, "Sovereignty of the Sea," *Fortnightly Review*, August 1866). The English sovereignty was not exercised as giving authority to exact toll. All that was demanded in return for keeping the sea safe for peaceful traffic was a salute, enforced no doubt as a formal admission of the right which permitted the (on the whole, at any rate) effective police of the waters to be maintained. The Dutch in the 17th century objected to the demand for this salute. It was insisted upon. War ensued; but in the end the Dutch acknowledged by solemn treaties their obligation to render the salute. The time for exacting it, however, was really past. S. R. Gardiner ("The First Dutch War," *Navy Records*, vol. xiii., 1899) maintains that though the "question of the flag" was the occasion, it was not the cause of the war. There was not much, if any, piracy in the English Channel which the king of England was specially called upon to suppress, and if there had been the merchant vessels of the age were generally able to defend themselves, while if they were not their governments possessed force enough to give them the necessary protection. Great Britain gave up her claim to exact the salute in 1805.

Different from sovereignty or dominion, &c.

The necessity of the foregoing short account of the "Sovereignty or Dominion of the Seas" will be apparent as soon as we come to the consideration of the first struggle, or rather series of struggles, for the command of the sea. Gaining this was the result of England's wars with the Dutch in the 17th century. At the time of the first Dutch war, 1652–54, and probably of the later wars also, many people, and especially seamen, believed that the conflict was due to a determination on her part to retain, and on that of the Dutch to put an end to, the English sovereignty or dominion. The obstinacy of the

Attempts to gain command.

Dutch in objecting to pay the old-established mark of respect to the English flag was quite reason enough in the eyes of most Englishmen, and probably of most Dutchmen also, to justify hostilities which other reasons may have rendered inevitable. The remarkable thing about the Dutch wars is that in reality what England gained was the possibility of securing an absolute command of the sea. She came out of the struggle a great, and in a fair way of becoming the greatest, naval power. It is this which prompted Vice-Admiral P. H. Colomb to hold that there are various kinds of command, such as "absolute or assured," "temporary," "with definite ulterior purpose," &c. An explanation that would make all these terms intelligible would be voluminous and is unnecessary here. It will be enough to say that the absolute command—of which, as Colomb tells us, the Anglo-Dutch wars were the most complete example—is nothing but an attribute of the nation whose power on the sea is paramount. It exists and may be visible in time of peace. The command which, as said above, expresses a definite strategical condition is existent only in time of war. It can be easily seen that the former is essential to an empire like the British, the parts of which are bound together by maritime communications. Inability to keep these communications open can have only one result, viz. the loss of the parts with which communication cannot be maintained. Experience of war as well as reason will have made it evident that inability to keep open sea-communications cannot be limited to any single line, because the inability must be due either to incapacity in the direction of hostilities or insufficiency of force. If Great Britain has not force enough to keep open all the communications of her widely extended empire, or if—having force enough—she is too foolish to employ it properly, she does not hold the command of the sea, and the empire must fall if seriously attacked.

Strategic command.

The strategic command of the sea in a particular war or campaign has equal concern for all maritime belligerents. Before seeing what it is, it will be well to learn on high authority what it is not. Mahan says that command, or, to use his own term, "control of the sea, however real, does not imply that an enemy's single ships or small squadrons cannot steal out of port, cannot cross more or less frequented tracts of ocean, make harassing descents upon unprotected points of a long coast-line, or enter blockaded harbours. On the contrary, history has shown that such evasions are always possible, to some extent, to the weaker party, however great the inequality of naval strength" (*Influence of Sea-Power on History*, London, 1890, p. 14). The Anglo-French command of the sea in 1854–1856, complete as it was, did not enable the Allies to intercept the Russian ships in the north-western Pacific, nor did that held by the Federals in the American Civil War put an early stop to the cruises of the Confederate vessels. What the term really does imply is the power possessed from the first, or gained during hostilities, by one belligerent of carrying out considerable over-sea expeditions at will. In the Russian war just mentioned the Allies had such overwhelmingly superior sea-power that the Russians abandoned to them without a struggle the command of the sea; and the landing in South Africa (1899–1902), more than six thousand miles away, of a large British army without even a threat of interruption on the voyage is another instance of unchallenged command. In wars between great powers and also between secondary powers, if nearly equally matched, this absence of challenge is rare. The rule is that the command of the sea has to be won after hostilities begin. To win it the enemy's naval force must be neutralized. It may be driven into his ports and there blockaded or "masked," and thus rendered virtually innocuous; or it must be defeated and destroyed. The latter is the preferable, because the more effective plan. As was perceptible in the Spanish-American War of 1898, as long as one belligerent's fleet is intact or at large the other is reluctant to carry out any considerable expedition over-sea. In fact, the command of the sea has not been secured whilst the enemy continues to have a "fleet in being" (see SEA-POWER).

Various instances.

In 1782 a greatly superior Franco-Spanish fleet was covering the siege of Gibraltar. Had this fleet succeeded in preventing the revictualling of the fortress the garrison would have been starved into surrender. A British fleet under Lord Howe, though much weaker in numbers, had not been defeated and was still at large. Howe, in spite of the odds against him, managed to get his supply-ships in to the anchorage and to fight a partial action, in which he did the allies as much damage as he received. There has never been a display of higher tactical skill than this operation of Howe's, though, curiously enough, he owes his fame much more to his less meritorious performance on the 1st of June. The revictualling of Gibraltar surpassed even Suffren's feat of the capture of Trincomalee in the same year. In 1798 the French, assuming that a temporary superiority in the Mediterranean had given them a free hand on the water, sent a great expedition to Egypt. Though the army which was carried succeeded in landing there, the covering fleet was destroyed by Nelson at the Nile, and the army itself was eventually forced to surrender. The French had not perceived that, except for a short time and for minor operations, you cannot separate the command of the Mediterranean or of any particular area of water from that of the sea in general. Local command of the sea may enable a belligerent to make a hasty raid, seize a relatively insignificant post or cut out a vessel; but it will not ensure his being able to effect anything requiring considerable time for its execution, or, in other words, anything likely to have an important influence on the course of the war. If Great Britain has not naval force enough to retain command of the Mediterranean she will certainly not have force enough to retain command of the English Channel. It can be easily shown why it should be so. In war danger comes less from conditions of locality than from the enemy's power to hurt. Taking up a weak position when confronting an enemy may help him in the exercise of his power, but it does not constitute it. A maritime enemy's power to hurt resides in his fleet. If that can be neutralized his power disappears. It is in the highest degree improbable that Great Britain could attain this end by splitting up her fleet into fragments so as to have a part of it in nearly every quarter in which the enemy may try to do her mischief. The most promising plan—as experience has often proved—is to meet the enemy when he shows himself with a force sufficiently strong to defeat him. The proper station of the British fleet in war should, accordingly, be the nearest possible point to the enemy's force. This was the fundamental principle of Nelson's strategy, and it is as valid now as ever it was. If Great Britain succeeds in getting into close proximity to the hostile fleet with an adequate force of her own, her foe cannot obtain command of the sea, or of any part of it, whether that part be the Mediterranean or the English Channel, at any rate until he has defeated her. If he is strong enough to defeat her fleet he obtains the command of the sea in general; and it is for him to decide whether he shall show the effectiveness of that command in the Mediterranean or in the English Channel.

Seeking the enemy's fleet.

In smaller operations.

In the smaller operations of war temporary command of a particular area of water may suffice for the success of an expedition, or at least will permit the execution of the preliminary movements. When the main fleet of a country is at a distance—which it ought not to be except with the object of nearing the opposing fleet—a small hostile expedition may slip across, say the English Channel, throw shells into a coast town or burn a village, and get home again unmolested. Its action would have no sort of influence on the course of the campaign, and would, therefore, be useless. It would also most likely lead to reprisals; and, if this process were repeated, the war would probably degenerate into the antiquated system of "cross-raiding," discarded centuries ago, not at all for reasons of humanity, but because it became certain that war could be more effectually waged in other ways. The power in command of the sea may resort to raiding to expedite the formal submission of an already defeated enemy, as Russia did when at war with Sweden in 1719; but in such a case the other side cannot retaliate. Temporary command of local waters will also permit of operations rather more considerable than mere raiding attacks; but the

duration of these operations must be adjusted to the time available. If the duration of the temporary command is insufficient the operation must fail. It must fail even if the earlier steps have been taken successfully. The command of the English Channel, which Napoleon wished to obtain when maturing his invasion project, was only temporary. It is possible that a reminiscence of what had happened in Egypt caused him to falter at the last; and that, quite independently of the proceedings of Villeneuve, he hesitated to risk a second battle of the Nile and the loss of a second army. It may have been this which justified his later statement that he did not really mean to invade England. In any case, the British practice of fixing the station of their fleet wherever that of the enemy was, would have seriously shortened the duration of his command of the English Channel, even if it had allowed it to be won at all. Moreover, attempts to carry out a great operation of war against time as well as against the efforts of the enemy to prevent it are in the highest degree perilous.

In war the British navy has three prominent duties to discharge. It has to protect the maritime trade, to keep open the communications between the different parts of the empire and to prevent invasion. If Great Britain commands the sea these duties will be discharged effectually. As long as she does that, the career of cruisers sent to prey on her commerce will be precarious, because command of the sea carries with it the necessity of possessing an ample cruiser force. As long as the condition mentioned is satisfied her ocean communications will be kept open, because an inferior enemy, who cannot obtain the command required, will be too much occupied in seeing to his own safety to be able to interfere seriously with that of any part of the British empire. This being so, it is evident that the greater operation of invasion cannot be attempted, much less carried to a successful termination, by the side which cannot make head against the opposing fleet. Command of the sea is the indispensable preliminary condition of a successful military expedition sent across the water. It enables the nation which possesses it to attack its foes where it pleases and where they seem to be most vulnerable. At the same time it gives to its possessor security against serious counter-attacks, and affords to his maritime commerce the most efficient protection that can be devised. It is, in fact, the main object of naval warfare.

Authorities for the above may be given as naval histories in general, placing in the first rank the well-known works of Captain A. T. Mahan, U.S.N. The book which must be specially referred to is Vice-Admiral P. H. Colomb's *Naval Warfare* (3rd ed., London, 1900). See also the article NAVY. (C. A. G. B.)

SEABURY, SAMUEL (1729–1796), American Protestant Episcopal bishop, was born on the 30th of November 1729, in Ledyard, Groton, Connecticut. His father, Samuel Seabury (1706–1764), originally a Congregationalist minister in Groton, was ordained deacon and priest in the Church of England in 1731, and was a rector in New London, Conn., from 1732 to 1743, and in Hempstead, Long Island, from 1743 until his death. The son graduated at Yale in 1748; studied theology with his father; studied medicine at Edinburgh in 1752–1753; was ordained deacon by the bishop of Lincoln and priest by the bishop of Carlisle in 1753; was missionary in New Brunswick, New Jersey, in 1754–1757, and was rector in Jamaica, New York, in 1757–1766, and of St Peter's, Westchester, New York, in 1766–1775. He was one of the signers of the White Plains protest of April 1775 against "all unlawful congresses and committees," in many other ways proved himself a devoted loyalist, and wrote the *Free Thoughts on the Proceedings of the Continental Congress* (1774) by "A. W. Farmer" (*i.e.* a Westchester farmer), which was followed by a second "Farmer's Letter," *The Congress Canvassed* (1774), answered by Alexander Hamilton in *A Full Vindication of the Measures of the Congress, from the Calumnies of their Enemies*. A third "Farmer's Letter" replied to Hamilton's *View of the Controversy between Great Britain and her Colonies*, in a broader and abler treatment than in the previous pamphlets. To this third pamphlet Hamilton replied with *The Farmer Refuted* (1775). These three "Farmer's Letters"—a fourth was advertised but apparently was never published—were forcible presentations of the pro-British claim, written in a plain, hard-headed style; their authorship was long in question, but it is certain that Seabury claimed them in England in 1783 when he was seeking episcopal consecration. At the same time he claimed the authorship of a letter, not signed by the Westchester farmer, which under the title *An Alarm to the Legislature of the Province of New York* (1775) discussed the power of this the only legal political body in the colony. He was arrested in November 1775 by a mob of lawless Whigs, and was kept in prison in Connecticut for six weeks; his parochial labours were broken up, and after some time in Long Island he took refuge in New York City, where he was appointed in 1778 chaplain to the king's American regiment. On the 25th of March 1783 he was chosen their bishop by ten episcopal clergymen of Connecticut, meeting in Woodbury; as he could not take the British oath of allegiance, Seabury was shut out from consecration by the English bishops, and he was consecrated by Scotch bishops at Aberdeen on the 14th of November 1784. He returned to Connecticut in 1785 and made New Haven his home, becoming rector of St James's Church there. The validity of his consecration was at first questioned by many, but was recognized by the General Convention of his church in 1789. In 1790 he took charge of the diocese of Rhode Island also. In 1792 he joined with Bishops William White and Samuel Provoost, who had received English consecration in 1787, and James Madison (1749–1812), who had received English consecration in 1790, in the consecration of Bishop Thomas J. Claggett of Maryland in 1792, thus uniting the Scotch and the English successions. He died in New London on the 25th of February 1796. He was a great organizer and a strict churchman: it is noteworthy that after his consecration he used the signature "Samuel Bp. Connect." Seabury's "Farmer's Letters" rank him as the most vigorous American loyalist controversialist and as one of the greatest masters of style of his period.

His son Charles (1770–1844) was rector in various Long Island churches; and Charles's son Samuel (1801–1872), who graduated at Columbia in 1823, was rector of the Church of the Annunciation in New York in 1838–1868, and from 1862 professor of Biblical learning and the Interpretation of Scriptures in the General Theological Seminary. William Jones Seabury (b. 1837), son of the last named, was rector of the Church of the Annunciation from 1868 to 1898, professor of ecclesiastical polity and law in the General Theological Seminary from 1873, and published a *Manual for Choristers* (1878), *Lectures on Apostolic Succession* (1893) and *An Introduction to the Study of Ecclesiastical Polity* (1894).

See E. Edwards Beardsley, *Life and Correspondence of the Rt. Rev. Samuel Seabury* (Boston, 1881).

SEADIAH (or SAADIA; in Arabic Sa'id) **BEN JOSEPH** (892–942) was born in A.D. 892 at Dilaz in the Fayyum, whence he is often called al-Fayyūmī. Although he is justly regarded as the greatest figure in the literary and political history of medieval Judaism, nothing certain is known of his father or of his early life. Even the names of his teachers, generally recorded in the case of Jewish scholars, are unknown, with the exception of a certain Abū Kathīr, who is himself obscure, and left no writings. Saadia's literary work is in fact the more remarkable since it suddenly appears at a time when learning seemed to be dead both in East and West. Since the completion of the Talmud very little of any literary importance, if we except certain midrashim, had been produced among the orthodox (Rabbanite) Jews, although the Babylonian schools at Sura and Pumbeditha continued to enjoy a somewhat intermittent prosperity. On the other hand, learning was cultivated among the Qaraites (*q.v.*; see also HEBREW LITERATURE), a sect of Jews who rejected the oral tradition, restricting their practice to the ordinances of scripture (*miqrā*). It even seemed for a time as if conservative heresy would prevail against progressive orthodoxy. In Saadia, however, the Rabbanites found a powerful champion. Almost his first work, written at the age of twenty-three, was an attack on the teaching of 'Anan, the founder of Qaraism, who lived in the 8th century. This, like most of Saadia's polemical writings, is no longer extant,

but we can gather something of its contents from references in the author's other works, and from the statements of his opponents. The controversy turned largely on the calendar, which of course involved the dates of festivals, and, since the Rabbanite calendar had come down from ancient times, opened up the whole question of oral tradition and the authority of the Talmud. The conflict raged for many years, the chief representative of the other side being Solomon ben Yeruḥam, a virulent if not successful opponent. It was not, however, the only controversy in which Saadia was engaged. In 922 Ben Meir, a person of importance in Palestine, attempted to make alterations in the calendar, against the authority of the Babylonian schools. Saadia, who was then at Baghdad, warned him of his errors, refuted him in a work called *Sefer ha-Mō'adīm* (the Book of the Festivals), and finally procured his excommunication by David ben Zakkai, the exilarch or head of the Jewish community in Babylonia. The vigorous action of Saadia seems to have brought him more prominently to the notice of the exilarch, and that at a time of more than usual difficulty. The honourable rivalry of the two schools of Sura and Pumbeditha, as the recognized authorities in matters of religion, had degenerated into jealousy and contention. The Gaon (*q.v.*) or President of Pumbeditha, taking advantage of his own position and of a vacancy in the Gaonate of Sura, wished to abolish the rival school. The exilarch, however, no doubt in recognition of his recent services, appointed Saadia as Gaon of Sura, although it was against the usual custom to appoint a person who was not a member of the school. Unfortunately this step did not lead to peace. Pumbeditha was jealous: the exilarch was weak and not very scrupulous. Money had to be raised not only for the support of the schools, but also to buy immunity from the government, and Saadia was not the man to connive at the corruption and oppression practised by the exilarch to raise it. Within two years matters had come to a crisis, and the exilarch dismissed Saadia, while Saadia retorted by declaring the exilarch deposed (930). After three years of contention David succeeded in sufficiently bribing the new and needy Caliph (Qāhir, 932–934; see CALIPHATE, § 19), who definitely forbade Saadia to act as Gaon. The next four years, spent in retirement at Baghdad, were devoted to literary labours, which had no doubt been impossible during the previous years of trouble, and in fact it was at this time that most of Saadia's work was produced. Eventually a reconciliation was effected with David, favoured probably by the new Caliph Radi (934–940; see CALIPHATE, § 20), and Saadia was reinstated as Gaon of Sura in 938. Under his rule the school attained the highest reputation among the Jewish communities of East and West—but it was not of long duration. His health had been impaired by the strenuous life he had led, and in his later years he suffered from melancholia. In 942 he died, two years after the exilarch.

That some of the many works of Saadia, in spite of their merits, have been neglected, and others partly or entirely lost, is not as surprising as it appears at first sight. They were for the most part written in Arabic, the vernacular of the Jews in the East, so that after the break-up of the Babylonian schools in the middle of the 11th century, they would only be studied in Spain, the new centre of Jewish learning, and in Egypt. After the expulsion of the Jews from Spain, Arabic practically ceased to be used by them for literary purposes, and in the rest of Europe (except perhaps in S. Italy) it was never understood. Even some Hebrew works, of great interest to us now, must have been regarded at the time as of purely temporary value, such as *e.g.* the *Sefer ha-Mō'adīm*, fragments of which have only recently been recovered in the Geniza at Cairo. The anti-Qaraite works[1] against 'Anan, Ibn Sākawaihī and Ben Zūṭā, the *Kitāb at-tamyīz*, *Kitāb al-Shara'ī*, *Kitāb al-'Ibbur* (calendar) and a book on anthropomorphisms, all in Arabic, are now lost and only known from quotations. So also are the refutation of the sceptic Ḥīvī of Balkh, and the *Sefer 'Orayōth* (on prohibited marriage, against Qaraites). Of the *Sefer ha-Mō'adīm* and *Sefer ha-Galūī* (against David ben Zakkai), both in Hebrew, some fragments have been recovered recently.

Closely allied to his polemical writings are his *exegetical* works. He translated most of the Bible into Arabic, and commented on at least some of the books. The memorial edition[2] contains (1) the version of the Pentateuch (1893), (3) of Isaiah (1896), (5) of Job (1899), (6) of Proverbs (1894), the last three with commentary. The translation of the 5 Meghilloth, and of Daniel (with commentary), usually ascribed to Saadia, is not really by him, but a genuine translation of Daniel, with commentary, exists in manuscript. There is also ascribed to him a midrashic work on the Decalogue. These all, no doubt, exhibit the defects necessary to the time in which their author lived. But it must be remembered that Saadia was a pioneer. Ḥayyūj, the father of Hebrew grammar, was not yet born, nor had the scientific and comparative study of the language begun. In this respect Saadia contributed little to the subject. Moreover, he shows a tendency, common at all times and perhaps due to a particular theory of inspiration, to get more out of the text than it contains, and to interpret it in accordance with preconceived philosophical opinions. At the same time both translations and commentaries are remarkable for their great learning, sound sense and an honest endeavour to arrive at the true meaning of the original. They were thus admirably suited for their purpose, which was, like the earlier Targums and the later work of Moses Mendelssohn, to render the sacred text more intelligible to the faithful generally and to check the growth of error.

The *grammatical* work called *Agron*, a sort of dictionary, is now lost, as are also the *Kutub al-Lughah* and perhaps other treatises on Hebrew grammar. The explanation of the 70 (really 90) hapaxlegomena in the Bible is still extant, and a poem on the number of letters in the Bible.

On *Talmudic* subjects again little is preserved beyond the *Kitāb al-Mawārīth*, which was published as vol. ix. of the *Œuvres complètes*, together with the short treatise in Hebrew on the 13 *Middōth* or canons of exegesis of R. Ishmael and some *Responsa* mostly in Hebrew. The translation of the Mishna, the introduction to the Talmud and other works of the kind are known only by repute.

Of the *Siddur* or arrangement of the liturgy by Saadia, a large part exists in a single manuscript at Oxford, and several fragments have been recovered from the Cairo Geniza. Numerous other liturgical poems, or parts of them, have been obtained from the same source, and several have been published in periodicals. His *Azharōth*, a poetical enumeration of the 613 precepts, in Hebrew, is included in vol. ix. of the *Œuvres complètes*.

His *philosophical* works are (1) a commentary on the *Sefer Yeẓīra*, a mystical treatise ascribed to the patriarch Abraham, which, as the foundation of the Kabbala, had great influence on Jewish thought, and was the subject of numerous commentaries; (2) the *Kitāb al-Amānāt w'al-I'tiqādāt* (*Book of Beliefs and Convictions*), written in 933, called, in the Hebrew translation by Judah ibn Tibbon, *Emūnōth we-Dē'ōth*. Its system is based on reason in conjunction with revelation, the two being not opposed, but mutually complementary. It is thus concerned, as the title implies, with the rational foundation of the faith, and deals with creation, the nature of God, revelation, free will, the soul, the future life and the doctrine of the Messiah. It shows a thorough knowledge of Aristotle, on whom much of the argument is based, and incidentally refutes the views of Christians, Moslems, Brahmins and sceptics such as Ḥivī. From its nature, however, the work, although of great interest and value, never had the same wider influence as that of Ibn Gabirol (*q.v.*). The Arabic text was published by S. Landauer (Leiden, 1880), the Hebrew version at Constantinople in 1562 and frequently since.

BIBLIOGRAPHY.—Grätz, *Geschichte der Juden*, vol. 5 (ed. 3), cap. 10; Steinschneider, *Arab. Literatur der Juden* (Frankft. a. M., 1902), p. 46 ff.; W. Bacher's art. "Saadia ben Joseph," in the *Jewish Encyclopaedia*; M. Friedländer in the *Jewish Quarterly Review*, v. 177 ff.; S. Poznański, *ibid.* vol. x. 238 ff.; J. Guttmann, *Die Religionsphilosophie des Saadias* (Göttingen, 1882); W. Engelkemper, "Die

[1] An excellent account of these is given by Poznański in the *Jewish Quarterly Review*, x. 238 ff.

[2] *Œuvres complètes de R. Saadia*, ed. by J. Derenbourg (Paris, 1893 ff.).

religionsphilosophische Lehre Saadja Gaons," in Baeumker's *Beiträge*, iv. 4 (Münster, 1903) (containing a German translation of part iii. of the *Kitāb al-Amānāt*); A. Harkavy, *Studien*, v. (St Petersburg, 1891) (in Hebrew); S. Schechter, *Saadyana* (Cambridge, 1903) (texts from the Geniza, repr. from the *Jewish Quarterly Review*). (A. Cy.)

SEAFIELD, EARLS OF. The 1st earl of Seafield, in the Scottish peerage, was James Ogilvy (1663–1730), son and heir of James Ogilvy, 3rd earl of Findlater. Although in the convention parliament of 1689 he had spoken for James II., he took the oath of allegiance to William and Mary, and after filling some minor official positions he was made secretary of state in 1696, and lord chancellor in 1702. In 1707 he was made chief baron in the court of exchequer. In 1701 he was created earl of Seafield, and in 1711 succeeded to his father's earldom of Findlater. When his great grandson, James, 7th earl of Findlater and 4th earl of Seafield died in October 1811 the earldom of Findlater became dormant or extinct, while the earldom of Seafield passed to a cousin, Lewis Alexander Grant (1767–1840), who was descended from Margaret, a daughter of the 2nd earl. He took the name of Grant-Ogilvy and was succeeded as 6th earl by his brother, Francis William Ogilvy-Grant (1778–1853), whose descendant, James Ogilvie-Grant (b. 1876) became the 11th earl in 1888. The earl of Seafield is a peer of the United Kingdom as Baron Strathspey.

SEAFORD, an urban district and watering-place in the Eastbourne parliamentary division of Sussex, England, 58 m. S. by E. from London by the London, Brighton & South Coast railway. Pop. (1901) 3355. In recent years there has been a considerable increase in the number of visitors. The climate is bracing, and the town is sheltered by high cliffs. There are golf links on the neighbouring downs. The church of St Leonard is Norman of various dates, but received large additions in the Perpendicular period. In former days the river Ouse entered the English Channel here, and the natural harbour so formed accounts for the origin of Seaford (Sefford, Safford, Seford), probably in Roman times. In the "Domesday of Cinque Ports" (which existed in the reign of Edward III., but was lost before 1728), it stood first among the members of Hastings, and was doubtless of considerable importance until about the end of the 14th century, when its rapid decline began owing to the constant alteration of the sea-coast and the decay of the harbour. In the 16th century the town was finally deserted by the Ouse, which now runs into the sea at Newhaven, 2 m. westward, and no revival of its prosperity occurred until the early 19th century, when it began to be frequented as a watering-place. Fishing has always been the chief industry.

Seaford is not mentioned in Domesday Book, but evidently pertained to the lordship of the 1st Earl Warenne and his descendants, who were succeeded in 1347 by the earls of Arundel. It was probably a mesne borough in the 12th century, growing up under the protection of the earls of Warenne, and was certainly called a borough in 1236. Bailiffs are mentioned in the 14th century, but the town was not incorporated until 1544, when notwithstanding its decayed condition Henry VIII. annexed it to Hastings by charter, and incorporated it under the title of bailiff and commonalty, presumably as a reward for assisting the head port to provide its proportion of ships to the crown. The corporation was dissolved by an act of 1883. The town returned two representatives to parliament from 1298 to 1399, and again from 1640 until 1832, when it was disfranchised. In the 13th century the earls of Warenne held a market or fair, or both, apparently by prescriptive right. In 1792 the fair-days were Whit-Monday and the 10th of August, and the market-days Wednesdays and Saturdays, but no market or fair now exists.

SEAFORTH, EARL OF, a Scottish title held by the family of Mackenzie from 1623 to 1716, and again from 1771 to 1781. The Mackenzies trace their descent to one Colin of Kintail (d. 1278), and their name is a variant of Mackenneth. Kenneth, the twelfth head of the clan, was made Lord Mackenzie of Kintail in 1609, and his son Colin, who succeeded his father as 2nd Lord Mackenzie in March 1611, was created earl of Seaforth in 1623. Colin's successor was his half-brother George (d. 1651), who became the 2nd earl in 1633. George was alternately a royalist and a covenanter between 1636 and 1646, and was afterwards in Holland with Charles II., who made him secretary of state for Scotland. His grandson, Kenneth, the 4th earl, followed James II. to France and was with the dethroned king in Ireland. Sent by James in 1690 to head a rising in Scotland, he was captured and imprisoned, but in 1697 he was released and he died in Paris in January 1701. His successor was his son William, who joined the Jacobite standard at Braemar in 1715, and then, having raised 3000 men, was present at the battle of Sheriffmuir and was appointed lieutenant-general of the northern counties. He also took part in the Jacobite enterprise of 1719, being wounded at Glenshiel. In 1716 he was attainted and his titles and estates forfeited; before his death in January 1740, he had been relieved of some of the penalties of his treason, although his titles were not restored. His son Kenneth (*c.* 1718–1761), who but for the attainder would have been the 6th earl, helped the English government during the rising of 1745, and was a member of parliament for some years. His son Kenneth (*c.* 1744–1781) was created earl of Seaforth in 1771, but his peerage became extinct when he died in August 1781, although there were still heirs to the older earldom, which was under attainder. This earl raised the regiment of Highlanders, the 78th, known later as the 2nd battalion of the Seaforth Highlanders.

SEAHAM HARBOUR, a seaport and urban district, in the South-eastern parliamentary division of Durham, England, 6 m. S. of Sunderland by a branch of the North-Eastern railway. Pop. (1901) 10,163. The harbour was built (1828) by the third marquis of Londonderry to facilitate the export of coal from the mines on his adjacent property. Besides the coal trade there are extensive bottle and chemical works.

SEA-HORSE. Sea-horses (*Hippocampina*) are small marine fishes which, with pipe-fishes (*Syngnathina*), form the Lophobranchiate division of the suborder Thoracostei. The gills of the members of this group are not arranged in leaf-like series as in other fishes, but form a convex mass composed of small rounded lobes attached to the branchial arches, as shown in the accompanying figure (fig. 1) of the head of a sea-horse, in which the

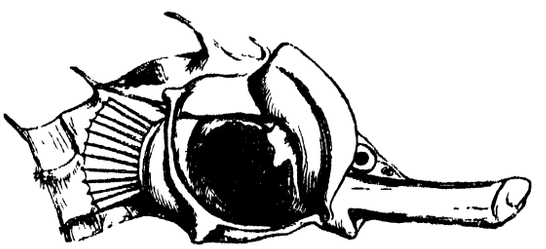


FIG. 1.—Gills of *Hippocampus abdominalis*.

gill-cover has been pushed aside to show the interior of the gill-cavity. Sea-horses differ from pipe-fishes by having a prehensile and invariably finless tail; it is long, slender, tapering, quadrangular in a transverse section, and, like the rest of the body, encased in a dermal skeleton, which consists of horny segments, allowing of ventral, and in a less degree of lateral, but not of dorsal, flexion. The typical sea-horse (*Hippocampus*) can coil up a great portion of its tail, and firmly attach itself by it to the stems of sea-weeds or similar objects. The body is compressed and more or less elevated, and the head terminates in a long tubiform snout, at the end of which is the small mouth. The configuration of the fore part of the body, as well as the peculiar manner in which the head is joined to the neck-like part of the trunk, bears a striking resemblance to a horse's head. Sea-horses are bad swimmers and are unable to resist currents. With the aid of their single dorsal fin, which is placed about the middle of the fish's body and can be put into a rapid undulatory motion, they shift from time to time to some object near them, remaining stationary among vegetation or coral where they find the requisite amount of food and sufficient cover. Their coloration and the tubercles or spines on the head and body, sometimes with the addition of skinny flaps and filaments, closely resemble their surroundings, and constitute the means by which these defenceless creatures escape detection by their enemies. These protective

structures are most developed in the Australian genus *Phyllopteryx*, one of the most singular types of littoral fishes.

Sea-horses belong to the tropics and do not extend so far north as pipe-fishes. They are abundant at suitable localities, chiefly on the coral-banks of the Indo-Pacific Ocean. Some forty species are known, of which the majority belong to the genus *Hippocampus* proper. They vary from 2 to 12 in. in length, but in China and

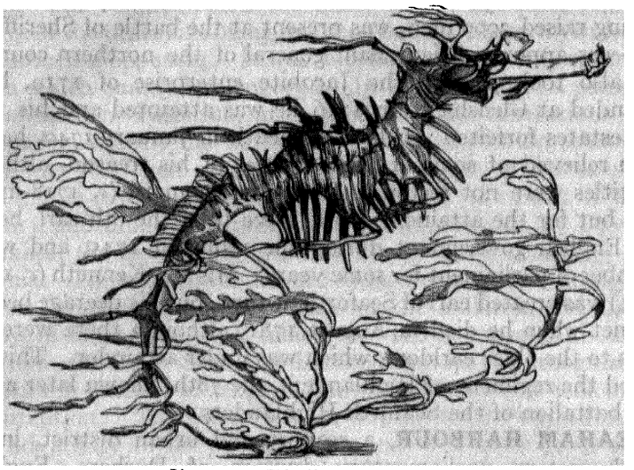


FIG. 2. *Phyllopteryx eques.*

Australia a genus (*Solenognathus*) occurs, the species of which attain to a length of nearly 2 ft., they, however, in form resemble pipe-fishes rather than sea-horses. The species which may be sometimes seen in European aquaria is *Hippocampus antiquorum*, common in the Mediterranean and on the coasts of Portugal and France. It is rare on the south coast of England, but it has often been captured on the Essex coast. About 1885, according to Dr J. Murie, two Leigh fishermen when shrimping at Harwich during the summer season succeeded in procuring altogether between 100 and 120 specimens. The food of the sea-horses consists probably of very small invertebrates and the fry of other fishes. Like the other Lophobranchiates, they take great care of their progeny. The male *Hippocampus* carries the ova in a sac on the lower side of the tail, in which they are hatched; in the other genera no closed pouch is developed, and the ova are embedded in the soft and thickened integument of either the abdomen or the tail.

All that is known of the habits of these interesting fishes will be found summarized in a valuable paper by T. Gill, "The Life History of the Sea-Horses (Hippocampidae)," in *Proc. U.S. Nat. Mus.* xxviii. (1905), p. 805.

SEA-KALE, *Crambe maritima*, a hardy perennial, a member of the natural order Cruciferae, which grows wild along the coasts of England, of Ireland and of the Scottish lowlands, along the western coasts of Europe, and on the Baltic, reappearing on the Black Sea.

In cultivation sea-kale prefers a light dry soil, and when manure is necessary it should consist of sea-weed or well-rotted dung, or a dressing of salt or of nitrate of soda may be given. When raised from seeds, they should be sown in March or April in rows 1 ft. asunder, the plants being thinned to 6 in. apart. In the following March these should be planted out in trenched well-prepared ground, 2 ft. asunder, in rows 2½ to 3 ft. apart. The top with the crown buds should be cut off before planting to prevent them from running to seed. In the spring of the second year the young shoots if blanched will be fit for use, and therefore the summer growth should be promoted by the use of water and liquid manure. Tolerably blanched stalks may be produced by plants only nine months old from the seed, and after two summers seedling plants will have acquired sufficient strength for general cropping. The seeds, instead of being sown in rows and transplanted, may be deposited in patches of three or four together, where they are to remain. In the autumn, after the leaves have been cleared off, the ground should be forked up, and 6 or 8 inches' depth of leaves or of light sandy soil laid over the plants, by either of which means they will be blanched, though not forced. The blanched sprouts should be cut for use whilst they are crisp, compact and from 3 to 6 in. in length, the stem being cut quite down to the base.

Sea-kale beds may be made from cuttings of the roots of very healthy plants, the extremities of the roots, technically called "thongs," being best adapted for this purpose. They should be taken up in autumn, cut into lengths of about 4 in., and laid in a heap of sand or earth till spring, when they should be planted out like the seedlings.

Forcing.—Sea-kale may be forced in the open beds by the aid of sea-kale pots or covers, which are contracted a little at top, with a movable lid. One of the earthenware covers, or an inverted flower-pot, is placed over each plant, or each patch of plants, and leaves of trees are closely packed round the pots, and raised to about 1 ft. above them. When fermentation commences, the temperature within should not exceed 60° F. If the crowns are thus covered up by about the end of October, the crop may be cut by about the third week of December, and by starting a batch at various times a supply may be kept up till the middle of May.

Strong plants may also be taken up and planted on hotbeds, the sashes being kept covered close; or they may be set thickly in boxes as recommended for rhubarb, and placed in any heated structure, or in the mushroom house; but, to have the shoots crisp and tender as well as blanched, light must be completely excluded. Besides the common purple-leaved, there is a green-leaved sort, which is said to blanch better.

SEAL, strictly speaking the name of the common European representative of that group of marine carnivorous mammals constituting the suborder Pinnipedia of the order Carnivora, but in a wider sense used to designate all the members of that group, except the walrus. The common seal (*Phoca vitulina*) is the typical representative not only of that group (see CARNIVORA), but also of the family *Phocidae* and the subfamily *Phocinae*, and it is to this latter group that the present article is restricted.

Although seals swim and dive with the greatest ease, often remaining as much as a quarter of an hour or more below the surface, and are dependent for their sustenance entirely on living prey captured in the water, all the species frequently resort to sandy beaches, rocks or ice-floes, either to sleep or to bask in the sun, and especially for the purpose of bringing forth their young. The latter appears to be the universal habit, and the young seals—of some species at least—take to the water at

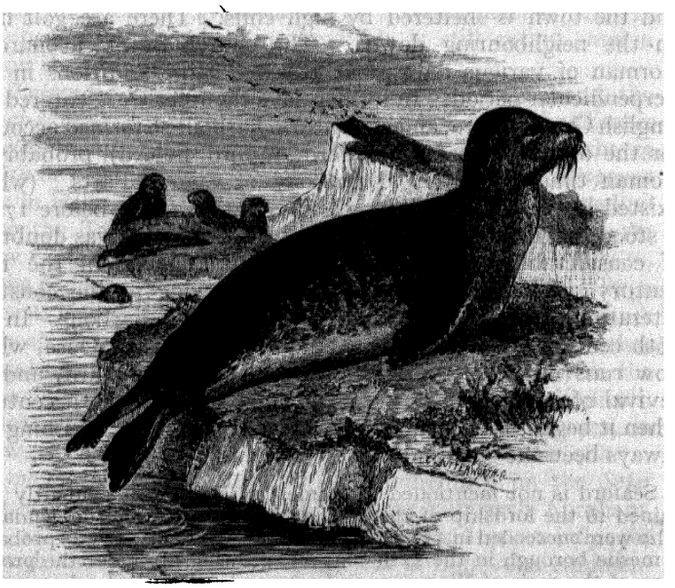


FIG. 1.—Common Seal (*Phoca vitulina*).

first very reluctantly, and have to be taught to swim by their parents. The number of young produced is usually one annually, though occasionally two. They are at first covered with a coat of very thick, soft, nearly white fur, and until this falls off they do not usually enter the water. This occurs in the Greenland seal (*Phoca groenlandica*) and the grey seal (*Halichoerus grypus*) when from two to three weeks old, but in the common seal the change takes place either *in utero* or at birth. The movements of the true seals upon the ground or ice are very different from those of the eared seals, or *Otariidae*, which walk and run upon all four feet, the body being raised as in the case of ordinary quadrupeds. The hind limbs (by which seals mainly propel themselves through the water) are on land perfectly passive, stretched backwards, with the soles of the feet applied to each other, and often raised to avoid contact with the ground. Sometimes the fore-limbs are equally passive, being placed close to the sides of the body; motion being then effected by a shuffling or wriggling action produced by the muscles of the trunk. When, however, there is necessity for more rapid progress, the animals

use the fore-paws, either alternately or simultaneously, pressing the palmar surface on the ground and lifting and dragging the body forwards in a succession of short jumps. In this way they can move so fast that a man has to step out beyond a walk to keep up with them; but such rapid action costs considerable effort, and they soon become exhausted. These various modes of progression appear to be common to all species so far as has been observed.

Most kinds of seals are gregarious and congregate, especially at the breeding season, in immense herds. Such is the habit of the Greenland seal, which resorts in the spring to the ice-floes of the North Sea, around Jan Mayen Island. Others, like the common seal of the British Islands, though having a wide geographical range, are never met with in such large numbers or far away from land. This species is stationary all the year round, but some have a regular season of migration, moving south in winter and north in summer. They are usually harmless, timid, inoffensive animals, though, being polygamous, the old males often fight desperately with each other, their skins being frequently found covered with wounds and scars. They are greatly attached to their young, and remarkably docile and easily trained when in captivity; indeed there is perhaps no wild animal which attaches itself so readily to the person by whom it is cared for and fed. They have much curiosity, and are strongly attracted by musical sounds. Their sense of smell is acute, and their voice varies from a harsh bark or grunt to a plaintive bleat. Seals feed chiefly on fish, of which they consume enormous quantities; some, however, subsist largely on crustaceans, especially species of *Gammarus*, which swarm in the northern seas, also on molluscs, sea-urchins and even occasionally sea-birds, which they seize when swimming or floating on the water.

Although the true seals do not possess the beautiful under-fur ("seal-skin" of the furriers) which makes the skin of the sea-bears or fur-seals so precious, their hides are still valuable as articles of commerce, and together with the oil yielded by their fat, subject them to a devastating persecution.

Two species of seal are met with regularly on the British coasts, the common seal and the grey seal. The former is a constant resident in all suitable localities round the Scottish, Irish and English coasts, from which it has not been driven away by man. Although the most secluded and out-of-the-way spots are selected as their habitual dwelling-places, there are few localities where these seals may not occasionally be seen. They frequent bays, inlets and estuaries, and

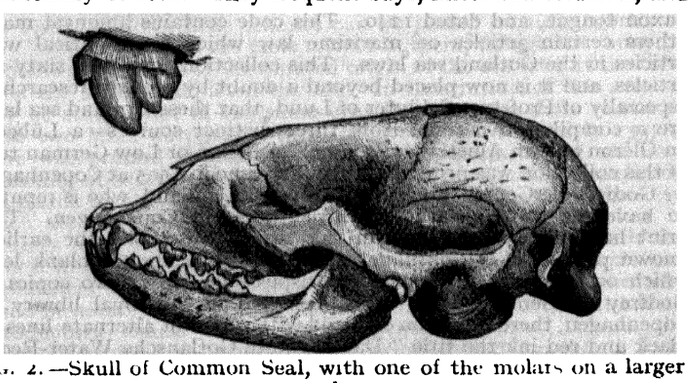


FIG. 2.—Skull of Common Seal, with one of the molars on a larger scale.

are seen on sandbanks or mud-flats left dry at low tide. Unlike some of their congeners, they are not found on the ice-floes of the open sea, nor, though gregarious, are very large numbers ever seen in one spot. The young are born at the end of May or beginning of June. They feed chiefly on fish, and the destruction they occasion among salmon is well known to Scottish fishermen. The common seal is found not only on the European and American coasts bordering the Atlantic, but also in the North Pacific. It is from 4 to 5 ft. in length, and variable in colour, though usually yellowish grey, with irregular spots of dark brown or black above and yellowish white beneath. According to Dr J. A. Allen, there is a marked difference between the dentition of the male and female of the common seal. In the latter sex the teeth are much smaller than those of the male, and are inserted more obliquely in the jaw; they also differ by the reduction in the size and number of the accessory cusps, which are almost invariably absent on the inner side.

The grey seal (*Halichoerus grypus*) is of considerably larger size, the males attaining when fully adult a length of 8 ft. from the nose to the end of the hind feet. The form of the skull and the simple characters of the molar teeth distinguish it generically from the common seal. It is of a yellowish grey colour, lighter beneath, and with dark grey spots or blotches, but, like most other seals, is liable to great variations of colour according to age. The grey seal appears to be restricted to the North Atlantic, having been rarely seen on the American coasts, but not farther south than Nova Scotia; it is chiefly met with on the coasts of Ireland, England, Scotland, Norway and Sweden, including the Baltic and Gulf of Bothnia, and Iceland, though it does not appear to range farther north. It is not migratory, and its favourite breeding-places are rocky islands, the young being born in the end of September or beginning of October.

As the grey seal is sometimes confused with the bearded seal (*Phoca barbata*), the following account, by T. Southwell, of the distinctions between the two may be quoted:—

"As to the external features by which the grey seal may at any age be distinguished from the bearded seal, which it most resembles, in the first place the abnormal season of reproduction in this species is unique; it is the only seal which has its young in the late autumn. The large size is not a very trustworthy distinction, as it varies considerably in individuals; but a marked feature is the great length of the claws in the fore-flipper, the first two digits of which are nearly of equal length and extend beyond the others; those on the hind-flippers are small and weak, the margin of the skin extending beyond them, and the outer toes on each foot the longest. The long, scimitar-shaped, flattened and crenulated lip-bristles do not differ greatly from those of other species, except from those of the bearded seal, the only species in which this curious impressed pattern is absent. The muzzle is broad and fleshy, and the upper lip and nose extend considerably beyond the lower jaw. Dr Edmondston calls special attention to this peculiarity, and states that in seizing its prey he has often seen it 'make a slight turn in the manner of a shark.' A captive young grey seal in taking fluid food always turned its head on one side and sucked it in through the side of the mouth. Another feature, which, so far as I know, is peculiar to this species, is the dog-like way in which, when on the alert, it carries its fore-flippers to the front.

"Dr Edmondston also mentions a curious disposal of the hair on the neck of the adult animals, which he attributes to there being four or five rings of hair a little longer than on the rest of the body, which, he says, give it the appearance when rearing its head somewhat out of the water, as if several small ropes encircled its neck. This is a sedentary species, seldom straying far from its chosen locality and rarely met with far from land.

"In the British seas the grey seal resorts to tide-washed rocks and lonely beaches, from Shetland and the Orkney Isles in the north to a few scattered localities along the east and south coasts, as far as Cornwall and even the Channel Islands; northward on the west coast to Wales, the outlying rocks in the Irish Sea and the Hebrides—a sufficiently comprehensive range, and in a few favoured spots it is still fairly numerous. It is seldom found far from land, and seems to be much attached to particular spots, to which it regularly returns as the state of the tide permits. In the breeding-season, which is the late autumn or early winter, its favourite resort is the inner recess of an ocean-cavern, often only to be approached under water; here, in October or November, it deposits its single young one on the small beach at the far end of the cave, beyond the reach of the tide, attending it assiduously for several weeks, until it has shed its infant-coat, which is at first beautifully long, soft and white, offering a great contrast to the young of the common seal. The young are suckled for six weeks before they take to the water, and during that time they are practically land animals. From this time till maturity several successive changes of pelage in each sex take place."

Other species of seals inhabiting the northern seas, of which stragglers have occasionally visited the British coasts, are the small ringed seal or "floe-rat" of the sealers (*Phoca hispida*), the Greenland or harp-seal (*Phoca groenlandica*), the hooded or bladder-nosed seal (*Cystophora cristata*) and the bearded seal (*Phoca barbata*).

See also SEAL-FISHERIES. (W. H. F.; R. L.*)

SEA LAWS, a title which came into use among writers on maritime law in the 16th century, and was applied by them to certain medieval collections of usages of the sea recognized as having the force of customary law, either by the judgments of a maritime court or by the resolutions of a congress of merchants and shipmasters. To the former class belong the sea laws of Oléron, embodying the usages of the mariners of the Atlantic; under the latter come the sea laws of Visby (Wisby), reflecting the customs of the mariners of the North Sea and of the Baltic.

The earliest collection of such usages received in England is described in the *Black Book of the Admiralty* as the "Laws of Oléron," whilst the earliest known text is contained in the *Liber memorandorum* of the corporation of the City of London, preserved in the archives of their Guildhall. These laws are in an early handwriting of the 14th century, and the title prefixed to them is *La Charte d'Oleroun des juggementz de la mier*. How and in what manner these "Judgments of the Sea" came to be collected is not altogether certain. Cleirac, a learned advocate in the parlement of Bordeaux, in the introduction to his work on *Les Us et coustumes de la mer* (Bordeaux, 1647), states that Eleanor of Aquitaine (*q.v.*), having observed during her visit to the Holy Land that the collection of customs of the

sea contained in *The Book of the Consulate of the Sea* (see CONSULATE OF THE SEA) was held in high repute in the Levant, directed on her return that a record should be made of the judgments of the maritime court of the island of Oléron (at that time a peculiar court of the duchy of Guienne), in order that they might serve as law amongst the mariners of the Western Sea. He states further that Richard I. of England, on his return from the Holy Land, brought back with him a roll of those judgments, which he published in England and ordained to be observed as law. Though R. G. Marsden doubts the story of Richard I. having brought back *La Leye Olyroun* to England, the general outline of Cleirac's account accords with a memorandum on the famous roll of 12 Edw. III., "De Superioritate Maris Angliae" (for many years preserved in the archives of the Tower of London, now deposited in the Public Record Office). According to this memorandum, the king's justiciaries were instructed to declare and uphold the laws and statutes made by the kings of England, in order to maintain peace and justice amongst the people of every nation passing through the sea of England.

The earliest version of these Oléron sea laws comprised certain customs of the sea which were observed in the wine and the oil trade, as carried on between the ports of Guienne and those of Brittany, Normandy, England and Flanders. No English translation seems to have been made before the *Rutter of the Sea*, printed in London by Thomas Petyt in 1536, in which they are styled "the Lawes of ye Vle of Auleron and ye Judgementes of ye See." French was, in fact, a tongue familiar to the English high court of admiralty down to the reign of Henry VI. A Flemish text, however, appears to have been made in the latter part of the 14th century, the *Purple Book of Bruges*, preserved in the archives of Bruges, in a handwriting somewhat later than that of the *Liber memorandorum*. Prefixed to this Flemish version is the title, "Dit es de Coppie van den Rollen van Oleron van den Vonnesse van der Zee." Certain changes, however, have been made in the *Purple Book of Bruges* in the names of the ports mentioned in the original Gascon text. For instance, Sluys is in several places substituted for Bordeaux, just as in the *Rutter of the Sea* London replaces Bordeaux. That these sea laws were administered in the Flemish maritime courts may be inferred from two facts. First, a Flemish translation of them was made for the use of the maritime tribunal of Damme, which was the chief Flemish entrepôt of the wine trade in the 13th century. The text of this translation has been published by Adriaen Verwer under the title of the *Judgments of Damme*. In the second place, there is preserved in the archives of the senate of Danzig, where there was a maritime court of old, an early manuscript of the 15th century, containing a Flemish reproduction of the Judgments of Oléron headed "Dit is Twater Recht in Vlaenderen." So far there can be no doubt that the Judgments of Oléron were received as sea laws in Flanders as well as in England in the 14th century. Further inquiry can trace them as they followed the course of the wine trade in the North Sea and the Baltic Sea. Boxhorn, in his *Chronyk van Zeelande*, has published a Dutch version of them, which van Leeuwen has reproduced in his *Batavia Illustrata*, under the title of the *Laws of West-Capell* in Zealand. Verwer has also published a Dutch text of them in his *Nederlant's See-Rechten*, accompanied by certain customs of Amsterdam, of which other MSS. exist, in which those customs are described as usages of Stavoren, or as usages of Enkhuizen, both ports of active commerce in the 15th century. Of these customs of Amsterdam, or, as they were more generally styled, "Ordinances of Amsterdam," further mention is made below.

A new and enlarged collection of sea laws, purporting to be an extract of the ancient laws of Oléron, made its appearance in the latter part of the 15th century in *Le Grant Routier de la mer*, printed at Poitiers in France by Jan de Marnef, at the sign of the Pelican. The title-page is without a date, but the dedication, which purports to be addressed by its author, Pierre Garcie, *alias* Ferrande, to his godson, is dated from St Gilles on the last day of May 1483. It contains forty-seven articles, of which the first twenty-two are identical with articles of the "Judgments of the Sea," in the *Liber memorandorum*, the remaining articles being evidently of more recent origin. A black-letter edition of this work in French, without a date, is preserved in the Bodleian Library at Oxford, and to the last article this colophon is appended: "Ces choses précédentes sont extraictes du très utille et profittable Roolle Doloyron par le dict Pierre Garcie alias Ferrande." An English translation is printed in the appendix to *A View of the Admiral Jurisdiction*, published in 1661 by Dr John Godolphin, in which the laws are described as "an Extract of the Ancient Laws of Oléron rendered into English out of Garsias alias Ferrand." Although this new text had the recommendation of an advocate who had filled the office of judge of the Admiralty Court during the Commonwealth and been appointed king's advocate-general by Charles II., it seems to have been superseded in a short time by Cleirac's *Us et coustumes de la mer*, to which was appended the following clause of authentication: "Tesmoin le Seel de l'Isle d'Oléron, estably aux contracts de la dite Isle, le jour du Mardy apres la Feste Sainct André l'an mille deux cens soixant-six." Cleirac does not inform us from what source or under what circumstances he procured his text, nor on what authority he has adopted in certain articles readings at variance with those of Garcie, whilst he retains the same number of articles, to wit, forty-seven. The clause of authentication cannot be accepted as a warranty above suspicion, as the identical clause of authentication with the same date is appended to the early Norman and Breton versions of the rolls, which contain only twenty-six articles. Cleirac's version, however, owing probably to the superior style in which it was edited, and to the importance of the other treatises on maritime matters which Cleirac had brought together for the first time in a single volume, seems to have obtained a preference in England over Garcie's text, as it was received in the High Court of Admiralty during the judgeship of Sir Leoline Jenkyns, and an English translation of it was introduced into the English translation of the *Black Book of the Admiralty* made by John Bedford, the deputy registrar of the High Court. It seems to have been Bedford's intention to print this translation under the title of "Sea Laws"; but the manuscript passed into the hands of Sir Leoline Jenkyns, who gave it to the College of Advocates in 1685. The *Black Book* itself, which was missing for a long time from the Admiralty registry, was discovered in the 19th century and replaced in the archives of the Admiralty Court. Of these two versions of the sea laws of Oléron the earlier obtained a world-wide reception, for it was translated into Castilian (*Fuero de Layron*) by order of King Alphonso X., and a Gascon text of it is still preserved in the archives of Leghorn, apparently in a handwriting of the 15th century, entitled "Asso es la copia deus Rolles de Leron de jucgemens de mar."

The parent stock of the Visby sea laws would appear to have been a code preserved in the chancery of Lübeck, drawn up in the Old Saxon tongue, and dated 1240. This code contains amongst many others certain articles on maritime law which are identical with articles in the Gotland sea laws. This collection comprises sixty-six articles, and it is now placed beyond a doubt by modern researches, especially of Professor Schlyter of Lund, that these Gotland sea laws are a compilation derived from three distinct sources—a Lübeck, an Oléron and an Amsterdam source. A Saxon or Low German text of this collection was printed for the first time in 1505 at Copenhagen by Godfrey de Gemen, a native of Gouda in Holland, who is reputed to have set up the earliest printing-press in Copenhagen. This print has no title-page, and in this respect resembles the earliest known print of *The Consulate of the Sea*; but upon a blank leaf, which occupies the place of a frontispiece in one of two copies of Godfrey de Gemen's text, both preserved in the royal library at Copenhagen, there has been inserted with a pen in alternate lines of black and red ink the title "Dat hogheste Gotlansche Water-Recht gedrucket to Koppenhaven Anno Domini M.D.V.," and there has also been inserted on the first page of the text the introductory title "Her beghynt dat hogheste Water-Recht" (here begins the supreme sea law). Professor Schlyter discovered a MS. (No. 3123) in the royal library at Copenhagen, which is written on parchment in a hand of the 15th century, and from which it seems probable that Godfrey de Gemen mainly derived his text, as it comprises the same number of articles, containing the same matter arranged in the same order, with this minor difference, that, whilst both the MS. and the print have the simple title "Water-Recht" prefixed to the first article, the MS. has also a similar title prefixed to the fifteenth. Further, as this article, together with those that follow it in the MS., appears to be in a handwriting different from that of the articles that precede, the fifteenth article may justly be considered as the first of a distinct series, more particularly as they are numbered in Roman characters, beginning with § I, and such characters are continued with a single interruption down to the end of the MS. Although, however, the numeration of the articles of this second series is continuous and the handwriting of the MS. from the fifteenth to the sixty-sixth article is unchanged, the text of the series is not continuous, as the fortieth article commences with an introductory clause—"This is the ordinance which the skippers and merchants have resolved amongst themselves as ship law." There is no difficulty in recognizing the first division of this second series of sea laws as a Low German version of the Judgments of Oléron, transmitted most probably through a Flemish text. This hypothesis would account for the substitution in several articles of Sluys for Bordeaux. On the other hand, the introductory clause which ushers in the fortieth article is identical with the title that is generally prefixed

to MSS. of the maritime Ordinances of Amsterdam, and the text of this and of the following articles down to the sixty-fifth inclusive is evidently of Dutch origin and more or less identical with Verwer's text of the usages of Amsterdam. M. Pardessus, in his valuable *Collection de lois maritimes*, published in Paris before Professor Schlyter made known the result of his researches, justly remarked that the provisions of several articles of this last division of the sea laws are inconsistent with the theory that they originated at Visby. It may be observed that the sixty-sixth article of the MS. is a Lübeck law identical with the first article of the first series, which is of Lübeck origin. No colophon is appended to this final article in the MS. Nevertheless, Godfrey de Gemen's edition of 1505, which breaks off in the middle of the sixty-sixth article of the MS., has the following colophon: "Here end the Gotland sea laws, which the community of merchants and skippers have ordained and made at Visby, that all men may regulate themselves by them. Printed at Copenhagen, A.D. M.D.V." The question naturally suggests itself, To what MS. was Godfrey de Gemen indebted for this colophon, or is the alternative more probable that he devised it? There is no known MS. of this collection of an earlier date to which an appeal can be made as an authority for this colophon; on the contrary, the only known MSS. of which the date is earlier than Godfrey de Gemen's print, both of which are in the library of the university of Copenhagen, are without this colophon, and one of them, which purports to have been completed at Nyköping on the Eve of the Visitation of the Virgin in 1494, concludes with a colophon which precludes all idea that anything has been omitted by the scribe, viz., "Here ends this book, and may God send us His grace, Amen." We are disposed to think that Gemen himself devised this colophon. He was engaged in printing for the first time other collections of laws for the Danish government, and, as Gotland was at that time a possession of Denmark, he may have thus distinguished the sea laws from another collection, namely, of land laws. Professor Schlyter, however, believes Gemen may have borrowed it from a MS. which is lost, or at all events is not known. There is some support to this view in the fact that in the archives of the guildhall of Lübeck there is preserved a MS. of 1533 which contains a Low German version of the same collection of sea laws, with a rubric prefixed to the first article announcing them to be "the water law or sea law, which is the oldest and highest law of Visby," and there are good reasons for supposing that the scribe of this MS. copied his text from a MS. other than the Copenhagen MS. The same observation will apply to a second MS. of a similar character preserved in the library of the gymnasium of Lübeck, which purports to have been written in 1537. But as regards the Visby sea laws little reliance can be placed on such rubrics or colophons as proofs of the facts recited in them, though they may be valuable as evidence of the reputed origin of the sea laws at the time when the scribe completed the MS. In illustration of this view it may be stated that in the same year in which the more recent of these two MSS. purports to have been completed—namely 1537—there was printed at Lübeck an enlarged edition of the sea laws consisting of seventy-two articles, being a Low German translation of a Dutch text, in which six additional Dutch laws had been inserted which are not found in the Copenhagen MS., nor have a place in Gemen's text, yet to this edition is prefixed the title, "This is the highest and oldest sea law, which the community of merchants and shipmasters have ordained and made at Visby, that all persons who would be secure may regulate themselves by it." Further, it has an introductory clause to its thirty-seventh article—"This is the ordinance which the community of skippers and merchants have resolved upon amongst themselves as ship law, which the men of Zeeland, Holland, Flanders hold, and with the law of Visby, which is the oldest ship law." At the end of the seventy-second article there follows this colophon: "Here ends the Gotland sea law, which the community of merchants and mariners have ordained and made at Visby, that each may regulate himself by it. All honour be to God, MDXXXVII." Each article of this edition has prefixed to it after its particular number the word "belevinge" (judgment). It would thus appear that the Visby sea laws have fared like the Oléron sea laws: they have gathered bulk with increasing years.

The question remains to be answered, How did this collection of sea laws acquire the title of the "Visby sea laws" outside the Baltic? for under such title they were received in Scotland in the 16th century, as may be inferred from extracts from them cited in Sir James Balfour's *System of the more Ancient Laws of Scotland*, which, although not printed till 1754, was completed before his death in 1583. The text of the Visby sea laws generally current in England is an English translation of a French text which Cleirac published in 1641 in his *Us et coustumes de la mer*, and is an abbreviated, and in many respects mutilated, version of the original sea laws. This inquiry, however, would open a new chapter on the subject of the northern sea laws, and the civilizing influence which the merchants of Visby exercised in the 13th century through their factories at Novgorod, linking thereby the trade of the Baltic to that of the Black Sea. (T. T.)

See Pardessus, *Collection de lois maritimes antérieures au XVIIIe siècle* (6 vols., Paris, 1828–1845); Schlyter, *Wisby Stadslag och Sjörätt*, being vol. viii. of the *Corpus juris Sueco-Gotorum antiqui* (Lund, 1853); and *The Black Book of the Admiralty*, ed. by Sir Travers Twiss (4 vols., London, 1871–1876). An exhaustively critical edition of the Rhodian sea law (given in vol. i. of Pardessus) by W. Ashburner, appeared in 1909 (Oxford, University Press). It contains valuable material not only on the Rhodian sea law, but on the various other sea laws in force on the Mediterranean coast.

SEAL-FISHERIES. Seals of all descriptions (see SEAL)—whether belonging to the typical family *Phocidae*, or true seals, or to the *Otariidae*, or sea-lions and sea-bears—are of great commercial value. Whereas, however, the true seals and the sea-lions are hunted only for the sake of their hides and blubber, the sea-bears are sought on account of their valuable "seal-skin" (see CARNIVORA; also FUR). Walruses (*Odobaenidae*) are hunted not only for their hides and blubber but also for the ivory of their tusks, which is, however, far less valuable than elephant-ivory. Among the more important species of sea-bears or fur-seals, which yield commercial "seal-skin," may be mentioned *Otaria* (*Arctocephalus*) *australis* of South America and the adjacent islands, including the Galapagos group and Tierra-del-Fuego; *O.* (*A.*) *antarctica* or *pusilla* of South Africa and the Crozets; *O.* (*A.*) *gazella* of Kerguelen Island; and *O.* (*A.*) *Forsteri* of the coasts of New Zealand and South-Western Australia. This group was widely distributed over the pelagic islands of the southern hemisphere, but is now practically extinct in the greater part of its habitat, although remnants of importance exist on Lobos Island in the mouth of the river Plata in Uruguay, and on the islands off Cape Horn, both of which now receive protection from government. A second group is represented by *Otaria* (*Callorhinus*) *ursina* of the Commander Islands and Pribiloff Islands in Bering Sea, Robben Island and the Kurile Islands, Sea of Okhotsk, and other parts of the North Pacific; the forms from the different islands having received distinct specific names.

Of the southern herds little authentic information exists, but the records for the northern herds are fairly complete. At the period of its maximum development, 1870 to 1880, the herd of the Pribiloff Islands numbered about 2½ million animals; that of the Commander Islands about one-half as many. The herd in the Sea of Okhotsk is one of minor importance, numbering in 1897 less than 1000 animals on Robben Island. All these herds became greatly reduced, and in 1896–1897 numbered in all not more than 600,000 animals. The typical adult male or bull (*sikatch*) of the second group attains maturity about the seventh year, and weighs from 400 to 500 lb. It is 6 ft. in length, with a girth of 4½ ft. The fur is blackish or dark brown, with long yellowish-white hairs, especially long and firm on the back of the neck, forming the so-called "wig" or mane. The animal stands erect and runs or "lollops" along the ground when on land. The adult female, or cow (*matka*), is much smaller, averaging about 80 lb in weight, with length and girth in proportion. The fur is of varying shades of brown; she bears her first young at the age of three years.

The breeding-grounds are boulder-strewn beaches or rocky hill slopes near the shore. On these the sea-bears congregate in close-set masses called "rookeries." The unit of rookery life is the family group, or "harem," each bull collecting as many females as he can control. The number ranges from 1 to 100 or more, averaging about 30. The bulls reach the islands early in May and take up their places. The cows begin to arrive the first week in June. The number on the rookeries from day to day grows steadily to a climax about the middle of July, when about one-half are present, the number actually on the ground diminishing to about one-fourth at and after the close of the breeding season with the end of July. The single young, or pup (*kotik*), weighing 10 to 12 lb and jet black in colour, is born within six to forty-eight hours after the arrival of the cow. Within a week the latter is served by the bull, and by the end of another week she goes to sea to feed, returning at gradually lengthening intervals through the summer to nourish her young, left in the meantime to care for itself on the rookeries. The bulls, having fasted since their arrival in May, go away in August to feed. The pups learn to swim at the age of a month or six weeks, and in November, with the approach of winter, swim away with their mothers to the south. The winter migration of the

Pribiloff seals extends as far south as the latitude of southern California, the return course following the coast. The Commander seals reach the latitude of southern Japan and return on their course. The fur-seals find their food, chiefly squid, Alaska pollack, and especially a small smelt-like fish (*Therobromus callorhini*), in deep water, and their feeding-grounds in Bering Sea and on the migrations lie mainly along the 100-fathom curve.

The Commander Islands were discovered by Vitus Bering in 1741, and our first knowledge of the northern fur-seal herds comes from the notes of Georg Wilhelm Steller, a German naturalist accompanying Bering's expedition. The Pribiloff Islands were discovered in 1786 and transferred with the territory of Alaska to the United States in 1867. Up to 1867 the catch taken by the Russian Company holding the Alaska monopoly was about 75,000 yearly. Between 1868 and 1897 the reported catch of seals from the Pribiloff herd on land was 2,440,213, and 651,282 were reported as taken by pelagic sealing; but the latter is certainly greatly under the truth. From 1867 to 1902 the fur-seal catch was worth, it has been estimated, about $35,000,000. From 1870 to 1890 the United States government leased the islands to the Alaska Commercial Company, and in 1890 the monopoly passed to the North American Commercial Company; this lease expired on the 1st of May 1910, and was not to be renewed. The catch was limited to 60,000 in 1890 and 1891; 7500 in 1892 and 1893; 20,000 in 1894; 15,000 in 1895; 20,000 in 1897; 30,000 in 1896, 1898–1903; and 15,000 in 1904, 1905 and 1906. The total number of skins shipped by the lessees from 1870 to 1906 was 2,135,248. From 1868 to 1906 the receipts from royalties on skins was $9,311,054·77, and the expenses of the United States were $1,353,015·53 (including $349,464·88 for agents, $254,051·49 for supplies to natives, $483,842·65 for Bering Sea awards and commission, and $41,000·31 for investigation of the fur-seal fisheries in 1898–1899); besides this, from 1890 to 1895 the government expended $1,410,722 for the policing of Bering Sea and the prevention of illegal pelagic hunting.

Land-killing and pelagic sealing.

The Russians worked out the principle, based on the polygamous habit of the animals, of affording absolute protection to the breeding female herd, and confining the killing to the superfluous males. The young males, or bachelors, "haul out" to rest and sleep on beaches adjacent to, but distinct from, the breeding-grounds. Here they are surrounded at night by the sealing gangs, rounded up in droves of from 1000 to 3000, and driven inland to the killing-grounds. The large droves are broken up into successive "pods," or groups, of from 20 to 50, of which the "killable" seals (animals of three years of age or approximating to such in size) are knocked down with clubs, those too large or too small being allowed to escape. The skins are removed, salted in kenches and, when cured, are exported. The two important processes in dressing the skins are the removal of the long hairs which grow out through the short thick fur, and the dyeing of the fur itself black.

The decline in the fur-seal herds of Bering Sea is due to the growth of a rival sealing industry—the hunting of the animals at sea with spear or shot-gun, known as pelagic sealing.[1] Stragglers from the migrating herd had from the earliest times been taken by the Indians of Cape Flattery and Vancouver Island, going out from the shore in their canoes, but the number so captured was small. In 1879, however, sailing vessels began to be used to carry the hunters and their canoes out to the main body of the herd, and to enable them to follow its movements. The industry developed rapidly, by 1892 employing a fleet of 122 sailing vessels, each with from five to twenty hunting crews. The catch at sea grew to a maximum in 1894 of 140,000 skins. The operations of the fleet gradually extended to cover the entire migration route of the herd, and in 1883 the sealers entered its summer feeding-grounds in Bering Sea. Pelagic hunting, necessarily indiscriminate, affected most seriously the herd of breeding females. Investigations carried on in Bering Sea in 1895 and 1896 show that from 62 to 84 % of the pelagic catch were of this class, the death of the female involving the death of her unborn offspring, as well as that of the unweaned young. From 1870 to 1902 the "pelagic" catch has been estimated (Jordan) as 1,000,000, nearly half the corresponding total for the land-catch.

The abuse of pelagic sealing naturally created much indignation in America. Under sanction of a claim made by Russia in 1821 to exclusive jurisdiction in Bering Sea (a claim decided by the Paris Tribunal of 1893 to be untenable), the United States in 1886 seized sealing vessels operating in that sea—among them Canadian vessels. This brought on a diplomatic discussion with the British government, which culminated in 1892 in a treaty by which it was agreed to submit to arbitration the claims of the United States to jurisdiction in Bering Sea in the interests of her fur-seal herd when beyond the ordinary territorial limits. The Tribunal of Arbitration met in Paris in 1893 (see BERING SEA ARBITRATION). Its decision was adverse to the contentions of the United States, and equally adverse to the life of the fur-seal herds. As agreed upon in such event, the tribunal formulated a set of rules for the regulation of pelagic sealing, with a view to the protection of the seals. These regulations provided for a close season in May, June and July, and a protected zone of 60 m. radius about the breeding islands. The regulations failed of their object, because the breeding females do not feed within the protected area, but far outside, and are therefore taken without restriction on the feeding-grounds in August and September, their young being left to starve.

In 1896 it was agreed between the United States and Great Britain that a new investigation of the facts of seal life should be made. At the close of this inquiry in 1897 the two Commissions met in Washington as a Joint Conference of Fur Seal Experts, and after a discussion of the results of their labours, a substantial agreement was reached on all essential facts. On the basis of this agreement the fur-seal question passed into the hands of a Joint High Commission, representing Great Britain, the United States and Canada, called at Quebec in September 1898 to consider a number of questions at issue between the United States and Canada. There the matter rested. Meanwhile the herds continued to decline, and the pelagic catch itself fell rapidly with the depleted herds.

The following is a summary of the fur skins from various sources over the period 1743 to 1897:—

From all sources prior to 1868	3,197,154
Land sealing, 1868–1897, Pribiloff herd	2,440,213
" " Commander herd	942,730
Pelagic sealing, 1868–1897, Pribiloff herd	651,282
" " Commander herd	312,247
Lobos Island skins	316,746
Cape Horn skins	122,390
Grand Total	7,982,768

For a full account of the fur-seals and the fur-seal industries, reference should be made to the reports of D'Arcy W. Thompson, Commissioner for Great Britain, and his associates, for 1896 and 1897 (*Parliamentary Papers*, "United States," No. 3 [1897], and No. 1 [1898]), and especially to the final report of David S. Jordan, Commissioner for the United States, and his associates, for the same years (Treasury Department Document No. 2017, *Fur Seals and Fur Seal Islands of North Pacific Ocean*, 4 vols. and atlas, Washington, 1898). Other papers of importance are: H. W. Elliott's "Monograph of the Seal Islands of Alaska," Bull. 147, *U.S. Fish Commission* (1882), and the report of C. H. Merriam and T. C. Mendenhall, the American Commissioners for 1891, *Proc. Paris Arbitration*, ii. 311-396.

SEALING WAX. In medieval times, when the principal use of sealing wax was for attaching the impression of seals to official documents, the composition used consisted of a mixture of Venice turpentine, beeswax and colouring matter, usually vermilion. The preparation now employed contains no wax. Fine red stationery sealing wax is composed of about seven parts by weight of shellac, four of Venice turpentine, and three to four of vermilion. The resins are melted together in an earthenware pot over a moderate fire, and the colouring matter is added slowly with careful stirring. The mass when taken from the fire is poured into oiled tin moulds the form of the sticks required, and when hard the sticks are polished by passing them rapidly over a charcoal fire, or through a spirit flame, which melts the superficial film. For the brightest qualities of sealing wax bleached lac is employed, and a proportion of perfuming matter—storax or balsam of Peru—is added. In the commoner qualities considerable admixtures of chalk, carbonate of magnesia, baryta white or other earthy matters are employed, and for the various colours appropriate mineral pigments. In inferior waxes ordinary resin takes the place of lac, and the dragon gum of Australia (from *Xanthorrhoea hastilis*) and other resins are similarly substituted. Such waxes, used for bottling, parcelling and other coarser applications, run thin when heated, and are comparatively brittle, whereas fine wax should soften slowly and is tenacious and adhesive.

[1] A temporary cause for the shrinkage of the herd was the ravages of the *Uncinaria*, a worm which attacked the infant seals; in 1906 it seemed no longer to be present.

SEALS. The idea of testifying the personal presence or the agency of an individual on some particular occasion, by affixing the impression of his seal (Lat. *sigillum*, O. Fr. *scel*) to the record or object connected with the transaction of the moment, can be traced back among the nations of the old world when advanced only a comparatively short way on the path of civilization. In the East the custom which has prevailed for centuries, and which is a practice at the present day, of using the seal as a stamp wherewith to print its device in ink or pigment in authentication of a document is parallel to our western habit of inscribing a signature for the same purpose. In the West, too, the impression of the seal has, at certain periods, had the same value as the signature; and at all times the connexion between the signature and the seal has been intimate in European practice (see AUTOGRAPHS and DIPLOMATIC). But the western method of obtaining the impression has differed from the eastern method. With us, the notion of a seal is an impression in relief, obtained from an incised design, either on a soft material such as wax or clay, or on a harder material such as lead, gold or silver. By common usage the word "seal" is employed as a term to describe both the implement for making the impression, and the impression itself; but properly it should be confined to the latter, the graven implement being technically called the matrix.

The earliest examples of seals, both matrices and impressions, are found among the antiquities of Egypt, Babylonia and Assyria. On the clay stoppers of wine jars of the remote age which goes by the name of the pre-dynastic period, and which preceded the historic period of the first Pharaohs, there are seal impressions which must have been produced from matrices, like those of Babylonia and Assyria, of the cylinder type, the impress of the design having been repeated as the cylinder was rolled along the surface of the moist clay. Two such engraved cylinders of this archaic period are in the British Museum collections. The cylinder, however, seems to have been generally superseded in Egypt by the engraved scarab, or beetle-shaped object, which, it may be assumed, was used at an early time, as it certainly was in later Egyptian history, for sealing purposes, although its proper function was that of an amulet. Still, the fashion for cylinders appears to have revived at intervals, for they are found in the 6th, the 12th and the 18th dynasties. Even in the 1st dynasty, about 4500 B.C., the Egyptian Pharaohs had their official sealers, or, to use a modern expression, keepers of the Royal Seal. Egyptian signet-rings, which were used for sealing, date back to the 12th dynasty.

Egyptian seals.

As already stated, the matrices of ancient Babylonian and Assyrian seals, usually cut on precious stones, are in cylinder form. The fine collection in the British Museum presents us with Babylonian specimens of even archaic times, followed by an historical series, the earliest of which is of nearly 4500 years B.C. The Assyrian series is not so full. The engraved subjects are chiefly mythological. Impressions are to be found on many of the cuneiform clay tablets. Early in the 7th century B.C. the cylinder seal gave place to the cone, the impression being henceforth obtained after the fashion followed to the present day.

Babylonian and Assyrian seals.

The Phoenicians, as was only to be expected of those traders and artisans of the ancient world, appear to have adopted both the cylinder of Assyria and the scarab of Egypt as patterns for their seals. Examples indeed are rare, but that these people were acquainted with both forms is certain. Phoenician names are found cut both on cylinder matrices and on scarabs by the Phoenician engravers employed in Assyria and Egypt; and, when the cone-shaped matrix superseded the cylinder in Western Asia, the Phoenicians conformed to the change.

Phoenician seals.

In Europe, the use of seals among the early Greeks is well known. Of the Mycenaean period numerous seal-impressions in clay have been found. Also from ancient times have survived the numerous engraved stones or pebbles, technically called gems, which served as matrices and in most instances were undoubtedly mounted as finger-rings or were furnished with swivels. At first being used in their natural forms, these pebbles or gems have been grouped as lenticular or bean-shaped, and glandular or of the sling-bolt pattern; later, from the 6th to the 4th century B.C., they were fashioned as scaraboids, that is, in the general form of the Egyptian scarab, but without the sculptured details of the beetle's body. To these, by a natural process, succeeded the matrix formed of only a thin slice of stone, which was more conveniently adapted for the bezel of the ring; and in this shape the engraved matrix passed on from the Greeks to the Romans. Signet-rings also with fixed metal bezels were in common use among the Greeks from about 600 B.C.

Greek seals.

But while the scarab met with little favour in Greece, where, as just stated, the scaraboid was preferred, among the Etruscans its adoption was complete, and with them it became the commonest form of the seal-matrix, dating from the latter part of the 6th century B.C., engraved chiefly with subjects derived from Greek art.

Etruscan seals.

Impressions of late Greek or Roman gems in clay have survived in a few instances. A series of impressions from Greek seals was found at Selinus in Sicily, dating before 249 B.C.; a small collection of sealed Greek documents on papyrus of the 4th and 3rd centuries B.C. has been discovered at Elephantine in Egypt. An interesting and very rare example of a Roman law deed sealed with gem impressions in clay is in the British Museum, recording the sale of a slave boy in A.D. 166.

It is not the object of this article to deal further with the history of antique seals (see NUMISMATICS; also GEMS, JEWELRY and RING), but to give some account of European seals of the middle ages, when the revival of their use for the authentication of documents resulted in their universal employment among all classes of society. Hence it is that we are in possession of the vast number of impressions still to be found in public museums and archives, and in private muniment rooms and antiquarian collections, either attached to the original charters or other deeds which they authenticated, or as independent specimens. Hence, too, have survived a fairly large number of matrices.

The connecting link between the general use of the signet, which was required by the Roman law for legal purposes, but which had died out by the 7th century, and the revival of seals in the middle ages is to be found in the chanceries of the Merovingian and Carolingian sovereigns, where the practice of affixing the royal seal to diplomas appears to have been generally maintained (see DIPLOMATIC). Naturally, surviving examples of such seals are rare, but they are sufficient in number to indicate the style adopted at different periods. The seal-ring of Childeric II. (d. 673) was found in his tomb, bearing a full-face bust and his name; and impressions of seals of later monarchs of the Merovingian line, engraved with their busts and names, have survived. Pippin the Short and the early Carolings made use of intaglios, both actual antiques and copies from them; their successors had seals of ordinary types usually showing their busts. One of the oldest matrices is an intaglio in rock crystal, now preserved at Aix-la-Chapelle, bearing a portrait head of Lothair II., king of Lorraine (A.D. 855–869), and the legend "Xpe [*Christe*] Adivva Hlotharium Reg." As time advanced there was a growing tendency to enlarge the royal seal. Under Hugh Capet there was (A.D. 989) a further development, the king being represented half-length with the royal insignia; and at last under Henry I. (A.D. 1031–1060) the royal seal of France was complete as the seal of majesty, bearing the full effigy of the king enthroned. In Germany, however, this full type had already been attained somewhat earlier in the seal of the emperor Henry II. (A.D. 1002–1024); and it had been used even earlier by Arnulf, count of Flanders, in 942. The royal seal thus developed as a seal of majesty became the type for subsequent seals of dignity of the monarchs of the middle ages and later, the inscription or legend giving the name and titles of the sovereign concerned.

Early medieval seals.

All the early royal seals which have been referred to were affixed to the face of the documents, that is, *en placard*; but in the 11th century the practice of appending the seal from thongs or cords came into vogue; by the 12th century it was universal.

Naturally, the introduction of the pendant seal invited an impression on the back as well as on the face of the disk of wax or other material employed. Hence arose the use of the counter-seal, which might be an impression from a matrix actually so called (*contrasigillum*), or that of a signet or private seal (*secretum*), such countersealing implying a personal corroboration of the sealing. The earliest seal of a sovereign of France to which a counterseal was added was that of Louis VII. (A.D. 1141), an equestrian effigy of the king as duke of Aquitaine being impressed on the reverse. When, in 1154, Aquitaine passed to the English crown, this counterseal disappeared, and eventually in subsequent reigns a fleur-de-lis or the shield of arms of France took its place. In the German royal seals the imperial eagle or the imperial shield of arms was the ordinary counterseal.

To turn to England: it appears that the kings of the Anglo-Saxon race, or at least some of them, imitated their Frankish neighbours in using signets or other seals. There are still extant an impression of the seal of Offa of Mercia (A.D. 790) bearing a portrait head; and one of the seal of Edgar (A.D. 960), an intaglio gem. The first royal seal of England which ranks as a "great seal" is that of Edward the Confessor, impressions of which are extant. This seal was furnished with a counterseal, the design being nearly identical with that of the obverse (fig. 1). William the Conqueror, as duke of Normandy, used an equestrian seal, representing him mounted and armed for battle. After the conquest of England, he added a seal of majesty, copied from the seal of Henry I. of France, as a counterseal. In subsequent reigns the order of the two seals was reversed, the seal of majesty becoming the obverse, and the reverse being the equestrian seal: a pattern which has been followed, almost uniformly, down to the present day.

Anglo-Saxon royal seals.

Great seals.



FIG. 1.—Seal of Edward the Confessor.

Besides the two royal seals of Anglo-Saxon kings noticed above there are extant a few other seals, and there is documentary evidence of yet others, which were used in England before the Norman Conquest; but the rarity of such examples is an indication that the employment of seals could not have been very common among our Anglo-Saxon forefathers. Berhtwald the thane, in 788, and Æthelwulf of Mercia, in 857, affixed their seals to certain documents. In the British Museum are the bronze matrices of seals of Æthilwald, bishop of Dunwich, about 800; of Ælfric, alderman of Hampshire, about 985; and the finely carved ivory double matrix of Godwin the thane (on the obverse) and of the nun Godcythe (on the reverse), of the beginning of the 11th century. In the Chapter Library of Durham there is the matrix of the monastic seal of about the year 970; and in the British Museum, appended to a later charter (Harl. 45 A. 36), is the impression of the seal of Wilton Abbey of about 974.

Anglo-Saxon private seals.

The official practice of the Frankish kings, which, as we have seen, was the means of handing down the Roman tradition of the use of the signet, was gradually imitated by high officers of state. In the 8th century the mayors of the palace are found affixing their personal seals to royal diplomas; and, once the idea was started, the multiplication of seals naturally followed. From the end of the 10th century there was a growing tendency to their general use. From the 12th to the 15th century inclusive, sealing was the ordinary process of authenticating legal documents; and during that period an infinite variety of seals was in existence. The royal seals of dignity or great seals we have already noticed. The sovereign also had his personal seals: his privy seal, his signet. The provinces, the public departments, the royal and public officers, the courts of law: all had their special seals. The numerous class of ecclesiastical seals comprised episcopal seals of all kinds, official and personal; seals of cathedrals and chapters; of courts and officials, &c. The monastic series is one of the largest, and, from an artistic point of view, one of the most important. The topographical or local series comprises the seals of cities, of towns and boroughs and of corporate bodies. Then comes the vast collections of personal seals. Equestrian seals of barons and knights; the seals of ladies of rank; the armorial seals of the gentry; and the endless examples, chiefly of private seals, with devices of all kinds, sacred and profane, ranging from the finely engraved work of art down to the roughly cut merchant's mark of the trader and the simple initial letter of the yeoman, typical of the time when everybody had his seal.

Medieval seals.

The ordinary shape of the medieval seal is round; but there are certain exceptions. Ladies' seals and some classes of ecclesiastical and monastic seals are of pointed oval form, which is best adapted to receive the standing figure of lady, bishop, abbot or saint: the common types in such classes. Fancifully shaped seals also occur, but they are comparatively rare.

Shapes.

In the middle ages the metal chiefly employed in the manufacture of matrices was bronze. Among the wealthy, silver was not uncommon; among the poor, lead was in general use. Matrices of steel and iron were made at a later time in the 16th and 17th centuries. In the 11th century a fairly large number of matrices were cut in ivory. The use of engraved gems in the early middle ages has already been noticed; but the taste for antique intaglios was not confined to any one period. In the later centuries also, particularly in the 14th century, they were set in seal matrices and finger rings. A fine Graeco-Roman gem, bearing a female head, full face and set in a medieval setting, does duty for the head of Mary Magdalen, as seen in the accompanying cut (fig. 2).

Matrices.



FIG. 2.—Antique gem used as a private seal.

The ordinary matrix of the middle ages was provided with a ridge on the back (or, in some instances, with a vertical handle), by which it could be held while being used for sealing, and which might be pierced for suspension. Sockets for the insertion of handles are of comparatively late make. The matrix was in most instances simple, the design giving a direct impression once and for all. But there are examples of elaborate matrices composed of several pieces, from the impressions of which the seal was built up in an ingenious fashion, both obverse and reverse being carved in hollow work, through which figures and subjects impressed on an inner layer of wax are to be seen. Such examples are the seal matrix of the Benedictine priory of St Mary and St Blaise of Boxgrave in Sussex, of the 13th century, now in the British Museum (fig. 3); and the matrix of Southwick Priory in Hampshire, of the same period (*Archaeologia*, xxiii. 374). The matrix of one of the seals of Canterbury Cathedral was also constructed in the same manner.



FIG. 3.—Seal of Boxgrave Priory: obverse.

It has usually been the custom to break up or deface the matrices of official seals when they have ceased to be valid, as, for example, at the commencement of a new reign. The seals of deceased bishops or abbots were solemnly broken in presence of the chapter or before the altar. But the legal maxim that corporations never die is well illustrated by the survival of the fine series, not complete, indeed, but very full, of the matrices of English corporations, beginning with the close of the 12th century. A fine example is the corporate seal of Rochester, of the 13th century, showing the keep and battlements of the castle (fig. 4) in high relief.

The common material for receiving the impressions from the matrices was beeswax, generally strengthened and hardened by admixture with other substances, such as resin, pitch and even hemp and hair. The employment of chalk as an ingredient in many seals of the 12th century has caused them to become extremely friable. It was a common practice to apply to such seals a coating of brown varnish. Besides the transparent yellowish-brown of the wax when used in its natural state, as it very frequently was used in the earlier middle ages, many other colours,

Waxen impressions.

especially red, dark green and dark brown, and even black, are found in medieval seals. Any attempt to classify examples by their colours fails, for, while at some periods the particular tints employed in certain chanceries may have been selected with a view to marking the character of the documents so sealed, such practice was not consistently followed

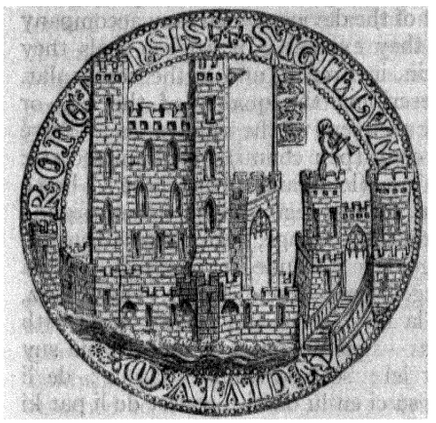


FIG. 4.—Corporate Seal of Rochester

For the protection of the impression, in the 12th and 13th centuries, when it was an ordinary custom to impress the seals on thick cakes of wax, the surrounding margin rising well above the field usually formed a suitable fender; at other times, as in the 14th and 15th centuries, a so-called wreath, or twisted shred of parchment, or plaited grass or reed, was imbedded in the wax round the impression. But the most common process was to sew up the seal in a bag or piece of cloth or canvas, with the mistaken notion that this would ensure the seal's integrity, the ordinary result being that, on the assumption that seals thus protected needed no further care, they have been in most instances either broken or crushed to powder. In later times, seals, especially great seals, have been frequently fitted in metal or wooden boxes.

The medieval seal may be said, in general, to be composed of two essential parts: the device, or type as it is sometimes called, and the inscription or legend. It is the existence of the legend, surrounding the device as with a border, that distinguishes it from the antique engraved gem, which rarely bore an inscription and then only its field. Such antique gems as were adopted for matrices in the middle ages were usually set in metal mounts, on which the legends were engraved. The first and obvious reason for an inscription on a seal was to ensure identification of the owner; and therefore the names of such owners appear in the earliest examples. Afterwards, when the use of seals became common, and when they were as often toys as signets, fanciful legends or mottoes appropriate to the devices naturally came into vogue. Examples of such mottoes will be given below.

Type and legend.

A few words may be said regarding the different kinds of types or devices appropriate to particular classes or groups of medieval seals; and, although these remarks have special reference to English seals, it may be noted that there is a common affinity between the several classes of seals of all countries of western Europe, and that what is said of the seal-devices of one country may be applied in general terms to those of the rest. The types of the great seals of sovereigns have already been mentioned: a seal of majesty on the obverse, an equestrian seal on the reverse. Other royal official seals usually bear on the obverse the king enthroned or mounted, and the royal arms on the reverse. Among other official seals a very interesting type is that of the Lord High Admiral in the 15th century, several matrices of the seals of holders of the dignity having survived and being exhibited in the British Museum. That of John Holland, earl of Huntingdon, Admiral of England, Ireland and Aquitaine, 1435–1442, is here given (fig. 5), having the usual device of a ship, on the mainsail of which are the earl's armorial bearings. In ecclesiastical seals generally, in the seals of religious foundations, cathedrals, monasteries, colleges and the like, sacred subjects naturally find a place among other designs. Such subjects as the Deity, the Trinity, the Annunciation, the Nativity, the Crucifixion, the Coronation of the Virgin, are not uncommon. Episcopal seals more generally show the prelate prominently as a standing figure, or, less conspicuously, as kneeling in prayer before the Deity or patron saint, the counter-seal also frequently represents him in the same posture of adoration. Chapter seals may bear the patron saint, or a representation, more or less conventional, of the cathedral, monastic seals may have figures of the Virgin Mary, or other patron saint, or of the founder, or of abbot or abbess, or the conventual building. If there be a counterseal, the figure of patron saint or founder may stand there, while the building occupies the obverse. Each abbot, too, would have his own seal of dignity, generally showing him standing. Local seals of town or borough may have the image of a patron saint, or armorial device, or castle or bridge or other building (see fig. 4), or the town itself. A seaport will be indicated by a ship on the waves. The baronial seal bears the armed and mounted knight. On ladies' seals the owner is often gracefully depicted standing and holding flower or bird, or with shields of arms. After the 14th century, the figures of ladies, other than queens, vanish from seals. Armorial devices of the greatly first appear on seals at the close of the 12th century; and from that time there is a gradual development of the heraldic seal, which in the 14th century was often a work of fine decorative sculpture. And, lastly, the devices on fancy seals are without end in their variety.



FIG. 5.—Seal of Lord High Admiral Huntingdon.

As in all other departments of medieval art, the engraving of seals in the middle ages passed through certain well marked developments and changes characteristic of different periods. Fine seal engraving is to be found in the productions of many of the continental nations, but in the best periods nothing can excel the work of English cutters. Beginning with the examples of the 11th and 12th centuries, we find the subjects generally of an archaic style, which is evidence of an early stage of the art. In the 13th century this undeveloped stage has passed, and a fine, but still restrained, quality of engraving ensues, which, like all the allied arts of that century, charms with its simple and unpretending precision. For example, in the great seals of Henry III., something of the antique stiffness remains, but the general effect and the finish of the details are admirable. We may refer also again to the Boxgrave seal (fig. 3) as a fine specimen of 13th century architectural carving. But the most beautiful seal of this period, and in many respects the most beautiful medieval seal in existence, is the monastic seal of Merton Priory, in Surrey, of the year 1241. An engraving of the obverse, the Virgin and Child, is here given (fig. 6). The Merton seal is the work of a master hand treating his subject with wonderful breadth and freedom. As the century advances, a more graceful movement in the figures is discernible. For instance, the great seal of Edward I. shows a departure from the severe simplicity of his predecessor in the addition of decorative architectural details, and in the easier action of the equestrian figure, which in this instance is of a strikingly fine type. Comparable with it is the remarkable baronial equestrian seal of Robert Fitz-Walter (fig. 7), 1298–1304, the silver matrix of which is in the British Museum collections.

Art.



FIG. 6.—Merton Priory.



FIG. 7.—Seal of Robert Fitz-Walter.

The work of the 14th century is marked by a great development in decoration. Where the artist of the former century would have secured his effect by simple, firm lines, the new school trusted to a more superficial style, in which ornament rather than

form is the leading motive. The new style is conspicuous in the great seals and other official seals of Edward III., as well as in other classes. The 14th century is also the period of enriched canopies, of niches and pinnacles and of other details of monumental sculpture reproduced in its seals. A very beautiful and typical example of the best work of this period is to be seen in the seal of Richard de Bury, bishop of Durham from 1333 to 1345 (fig. 8). It is to be remarked that the standing figure of the bishop in episcopal seals, of the abbot in monastic seals and of the lady in ladies' seals, which was so persistent from the 12th century onwards, proved to be the happy cause of the maintenance of the elegant oval shape in examples of these classes, wherein some of the best balanced designs are to be found.



FIG. 8.—Seal of Richard de Bury, late 14th century.

The 15th century brought with it to seal-engraving, as it did to other departments of medieval art, the elements of decadence. The execution becomes of a more mechanical type; the strength of the 13th century and the gracefulness of the 14th century have passed; and, while examples of great elaboration were still produced, the tendency grows to overload the decoration. This defect is noticeable, for example, in the elaborate great seals of the Henries of the 15th century, as compared with the finer types of their predecessors. As a good example of the middle of the century, the seal of King's College, Cambridge, of about the year 1443, is here given (fig. 9), showing the Virgin in glory in the centre, between St Nicholas and King Henry VI.



FIG. 9.—Seal of King's College, Cambridge.

With the rise of the period of the Renaissance, like other medieval arts, seal-engraving passed out of the range of the traditions of the middle ages and came under the influence of the derived classical or pseudo-classical sentiment. There is, therefore, no need to pursue the subject further.

We close this portion of the present article with specimens of the legends or mottoes which are to be found on the innumerable personal seals of the 13th, 14th and 15th centuries. They are of great variety, and many of them are very interesting, both on account of the devices which they accompany and the sentiments which they express. In English seals they are found composed in Latin, in French, and in the vernacular. First there are legends describing the quality of the seal or conveying a message to the recipient of the missive, as:—Privé su (suis); privé su et poi conu (peu connu); sigillum secreti; secreti nuntius; je su mute; lel (loial) ami muet; je su sel bon e leel; veici parti lel; clausa secreta tego; signo secreta signo; secreta gero; si frangis, revelo; frange, lege, tege; brusset, liset, et celet; accipe, frange, lege; claude, repone, tege; missa lege, lecta tege; tecta lege, lecta tege; briset, vaez, lisez, craez; tene fidem; tenet la foy; softe and fayre. Seals with love mottoes are numerous:—sigillum pacis et amoris; je suy damurs; je su seel damur lel; seel de saluz e damur; de li penset par ki me avet; jeo su ci en lu dami; penset de li par ki su ci; ase for the treweste; ami amet, car lel ami avet; amye amet, mon quer avet; mun quer avet, ben le gardé; mun cuer avet, ne le deceve; penset de moi, e je de vus; mon quer jolye a vos doin, amye; je suy flur de lel amur; love me and I the; if the liket, mi love holde; poi vaut vivre sans lel ami. The lion is a not uncommon device:—Je su lion bon par avisoun; sum leo, quovis eo, non nisi uera veho; je su rey des bestes; leo tegit secretum. A lion dormant:—Ci repose le lion; ici dort le lion fort; wake me no man. A lion dormant on a rose, the symbol of secrecy:—Ben pur celer, gis sur roser; ici repose liun en la rose; de su la rose le lion repose. Rustic life is represented by a squirrel: - I crake notis; I krak nots; I bite notes: by a hare, or a hare riding a dog:—Sohou, sohou; sohou, mutel; sohou, Robin; sohou, je le voi; sohou, je lai trouvé; je vois a bois; by a hare in a tree:—Sohou, scut, ware I cut: by a monkey riding a dog or goat:—Allone I ride, I hunt; allone I ride, have I no swayn: by a stag:—Alas, Bowles: by a dog:—hobbe, dogge, hobbe; garez ben le petit chen: by a hawk seizing a bird:—Alas, je su pris. And more than one example bears the motto: By the rood, women ar wood (mad).

Mottoes.

Bullae.—As stated above, metal seals, as well as seals in soft materials, have been employed in European countries under certain conditions. These are technically called "bullae" (Lat. *bulla*, a boss, or circular metal ornament), and necessarily they were in all cases suspended from the documents, and they bore a design on both obverse and reverse. In the southern countries of Europe, where wax would be affected by the warmth of the climate, it was natural that a harder material should also be used. Hence the leaden bulla was a recognized form of seal during the middle ages in the Peninsula, in southern France, in Italy, and in the Latin East. The best-known series is the papal series of leaden seals which have lent their name to the documents of the papal chancery which they authenticate, popularly known as papal "bulls." The earliest extant example of this series is of the year 746 (see DIPLOMATIC). Leaden seals were also used by the archbishops of Ravenna and other prelates of Italy; also to some extent by officials of a lower rank, and by certain communes. The official seals of the doges of Venice and of Genoa and of other dignitaries of those states were also of lead. The sovereigns of Spain, too, made use of the same material; and in the Byzantine empire leaden bullae seem to have been universally employed, not only by emperors and state officials but also by private persons. Even in the north, metal bullae were also occasionally in use. Certain Carolingian monarchs, probably copying the practice of the papal chancery, issued diplomas authenticated by leaden seals, examples of the reign of Charles the Bald being still extant. The fashion even spread to Britain, as is proved by the existence in the British Museum of a leaden bulla of Cœnwulf of Mercia, A.D. 800–810. In Germany, too, bishops occasionally made use of leaden seals. But, while lead was the ordinary material for the metal seal, a more precious substance was occasionally used. On special occasions golden bullae were issued by the Byzantine emperors, by the popes,

by the Carolings, although no actual examples of the last have survived, by the emperors of Germany, and by other sovereigns and rulers. Such specimens as have descended to us show that the golden bulla of the middle ages was usually hollow, being formed of two thin plates of metal stamped with the designs of obverse and reverse, soldered together at the edges and padded with wax or plaster. On rare occasions it was of solid gold. The popes attached golden bullae to their confirmations of the elections of the emperors in the 12th and 13th centuries; and they issued them on such occasions as when Leo X. conferred on Henry VIII. the title of Defender of the Faith, in 1521; on the coronation of Charles V., 1530; on the erection of the archbishopric of Lisbon into a patriarchate in 1716, &c.; and quite recently papal golden bullae have been conferred on royal personages. Comparatively few examples of golden bullae have survived. The value of the metal sufficiently accounts for their scarcity. Some examples are in the British Museum, viz. of Baldwin II. de Courtenay, formerly emperor of Constantinople, attached to a charter of 1269; of Edmund, king of Sicily, son of Henry III. of England; and of the emperor Frederick III., 1452–1493. In the Public Record Office, of Alfonso X. of Castile, ceding Gascony to Edward, son of Henry III. of England, 1254; of Clement VII. confirming to Henry VIII. the title of Defender of the Faith, 1524 (this example being the work of Benvenuto Cellini); and of Francis I. of France, ratifying the treaty with Henry VIII., 1527 (the counterpart with Henry's bulla being in Paris).

AUTHORITIES.—W. de G. Birch, *Catalogue of Seals in the British Museum* (6 vols., 1887–1900); A. Wyon, *The Great Seals of England* (1887); G. Pedrick, *Borough Seals of the Gothic Period* (1904); H. Laing, *Catalogue of Ancient Scottish Seals* (1858, 1866); Douet d'Arcq, *Collection de sceaux (Inventaires et documents des archives de l'Empire)* (3 vols., 1863–1868); G. Demay, *Inventaire des sceaux de la Flandre* (2 vols., 1873), *de l'Artois et de la Picardie* (1877), *de la Normandie* (1881); G. Schlumberger, *Sigillographie de l'empire byzantin* (1884); J. von Pflugk-Hartung, *Specimina selecta chartarum pontificum Romanorum* (for papal bullae) (1885–1887); *Catalogue of Engraved Gems in the Dept. of Greek and Roman Antiquities* (British Museum, 1888); F. H. Marshall, *Catalogue of the Finger-Rings, Greek, Etruscan, and Roman, in the British Museum* (1907); E. Babelon, *Histoire de la gravure sur gemmes en France* (1902). There are also numerous papers on seals in *Archaeologia* and in the *Proceedings* of the Society of Antiquaries, and in the archaeological journals. Handbooks on diplomatic devote some attention to seals, *e.g.* A. Giry, *Manuel de diplomatique* (1894); H. Bresslau, *Handbuch der Urkundenlehre für Deutschland und Italien* (1889). (E. M. T.)

SEALSFIELD, CHARLES, the pseudonym of KARL ANTON POSTL (1793–1864), German novelist, who was born on the 3rd of March 1793 at Poppitz near Znaim in Moravia. His schooling completed, he entered the Kreuzherrenorden in Prague, where he became a priest, but in the autumn of 1822 he fled to America, where he assumed the name of Charles Sealsfield. In 1826 he returned to Germany and published a book on America (*Die Vereinigten Staaten von Nordamerika*), which was followed by an outspoken criticism of Austria, written in English (*Austria as it is*, 1828) and published anonymously in London. Meanwhile he had returned to America, where he published his first novel, also in English, *Tokeah, or the White Rose* (1828). He now turned journalist, first in New York and subsequently in Paris and London, as correspondent for various journals. In 1832 he settled in Switzerland, and in 1860 purchased a small estate near Solothurn. Here he died on the 26th of May 1864. His will first revealed the fact that he was the former monk, Postl.

It is as a German novelist that he is best known. His *Tokeah* appeared in German under the title *Der Legitime und die Republikaner* (1838), and was followed by *Der Virey und die Aristokraten* (1835). *Lebensbilder aus beiden Hemisphären* (1835–1837), *Sturm-, Land- und Seebilder* (1838), *Das Kajütenbuch, oder Nationale Charakteristiken* (1842). Sealsfield occupies an important position in the development of the German historical novel at a period when Scott's influence was beginning to wane. He endeavoured to widen the scope of historical fiction, to describe great national and political movements, without forfeiting the sympathy of his readers for the individual characters of the story.

Sealsfield's *Gesammelte Werke* appeared in 18 vols. (1843–1846); his chief novels are also to be obtained in modern reprints. See Kertbény, *Erinnerungen an Sealsfield* (1864); L. Schmolle, *Charles Sealsfield* (1875); L. Hamburger, *Sealsfield-Postl, bisher unveröffentlichte Briefe* (1879); A. B. Faust, *Charles Sealsfield, der Dichter beider Hemisphären* (1896).

SEAMAN, OWEN (1861–), English humorist and author, was educated at Shrewsbury school and Clare College, Cambridge, where he took a first-class in the classical tripos in 1883; in the next year he became a master at Rossall school; and in 1890 he was appointed professor of literature at the Durham College of Science, Newcastle-on-Tyne. He was called to the bar at the Inner Temple in 1897. He was introduced to *Punch* in 1894, with his "Rhyme of the Kipperling," a parody of Rudyard Kipling's "Rhyme of the Three Sealers." He also wrote for *The National Observer* and *The World*. In 1894 he published a volume of parodies which is a classic of its kind, *Horace at Cambridge*, followed by *The Battle of the Bays* (1896), *In Cap and Bells* (1899), *Borrowed Plumes* (1902), *A Harvest of Chaff* (1904). He joined the staff of *Punch* in 1897, and shortly afterwards became assistant-editor, succeeding Sir F. C. Burnand as editor in 1906.

SEAMANSHIP, the general term for the art by which vessels of all classes and sizes are handled in all conditions of weather. It is commonly distinguished from "boatmanship," but the distinction is arbitrary. In ordinary speech it is frequently used as meaning the same thing as navigation (*q.v.*). But the two subjects are essentially different. Navigation is a science based on observation of the sun and stars in their apparent movements, on their bearings to one another, and the earth, and on time. It may be acquired from the study of books, and by a student who has never been in sight of the sea. Seamanship is an art. Its principles may be stated in literary form, but a mastery of it can only be acquired by actual practice on the sea. The art is far older than the science, but because of its practical character its history is much more difficult to trace. Navigation, being one form of the study of mathematics and astronomy, has been written about from the beginning. Seamanship has been practised in perfection by men who were perfectly illiterate for thousands of years before any treatise on it appeared. Seamen have at all times been, as Clarendon noted, a people apart. Till recently they have believed in practice only, and being jealous of, and hostile to, landsmen, have generally endeavoured to preserve their knowledge as an "art and mystery" to be handed down by oral instruction from master to apprentice. Sir Henry Manwayring, whose *Seaman's Dictionary* appeared in 1644, claimed that it was the first treatise on seamanship ever written. After explaining that a writer who had not acquired the art by practice could not expound it, he goes on: "And as for the professed Seamen, they either want ability and dexterity to express themselves, or (as they do generally) will, to instruct any Gentleman. If any will tell me why the vulgar sort of Seamen hate landmen so much, either he or I may give the reason why they are so unwilling to instruct them in their art, whence it is that so many gentlemen go long voyages, and return (in a manner) as ignorant and as unable to do their country service as when they went out." Though the *Seaman's Dictionary* did not appear in print till 1644, it is described on the title-page as having been presented to George Villiers, duke of Buckingham, the lord high admiral of Charles I., who was murdered in 1628. Manwayring's book is therefore probably, if not the first treatise on seamanship written in English, at least as old as its only rival the *Accidences, or the pathway to experience necessary for all young seamen*, published in 1626, by the famous Captain John Smith, of Virginia. On the continent of Europe, as in England, while works on navigation and gunnery were common, treatises on practical seamanship date from the 17th century. The books of Manwayring and Smith are rather glossaries of terms than expositions of principles.

We are therefore left with very few documents from which to learn what the seamanship of antiquity and the middle ages was. But such testimony as we have confirms the conclusion to be drawn from our general knowledge of the construction of their ships, and of the scientific learning of their times. The old seamen were coasters, who acted on the fisherman's adage—

"If you cannot steer by the compass, steer by the land," because they had no choice. War ship and merchant ship alike clung to the coast—or if they ventured out to sea, they did so for a voyage to be counted by the hour, as, for instance, from the south-west of Sicily to the opposite coast of Africa—or they relied on regular trade winds, like the seamen who sailed from the Red Sea to the coast of Malabar going and coming with the monsoons. In spite of exceptions, more apparent perhaps than real, such as the voyages of Irish anchorites to Iceland, and of the Norsemen to that island, and to Greenland, seamanship continued to be the art of the coaster till the close of the middle ages. Chaucer's sailor has hardly lost sight of the coast. Such treatises as were written for seamen were books of pilotage. Examples will be found at the end of the Hakluyt Society's edition of *Hues Tractatus de globis*. The warships, Phoenician, Greek, Roman, Norse, Byzantine and Italian throughout the middle ages, used sails only when not in action. They were rowed in battle, and the mast was lowered, or left on shore. Whenever they could they avoided passing the night at sea. Their galleys were beached or anchored close to the shore and the men landed. We know from Thucydides' narrative of the expedition to Syracuse, that the crews were landed even for their meals; from the chronicle of Ramon de Muntaner, we know that this was also the case with the best Mediterranean squadrons at the end of the 13th century. The Athenians, clinging to the coast, spent two months in going from Athens to Syracuse. Roger di Lauria, the admiral of Aragon, when coming from Sicily in circumstances of great urgency to Catalonia, went round by the coast of Africa and Spain. When under sail the ships of war and of commerce alike had, at the outside, very few sails, and generally only one great course (see SAILS) square and slung by the middle of the yard. It could be trained fore and aft by bowlines, so as to enable the vessel to sail on the wind. Under these restrictions seamanship was necessarily a limited art. From Marco Polo we learn that the seamen of the China Sea and of the Indian Ocean were coasters like their European contemporaries.

Though the art of seamanship is distinct both from the art of shipbuilding and the science of navigation, it has naturally developed with them. The discovery of the mariner's compass, the advance of astronomical knowledge, the invention of the rude early instruments of navigation, the astrolabe, the back staff, the quarter staff, loosened the dependence of the sailor on the shore. Thence came the need for larger ships, and they demanded a more developed rigging (*q.v.*). Modern seamanship begins with the voyage of Columbus. The previous and contemporary voyages of the Portuguese were coasting voyages round Africa. But Columbus struck across the ocean, and within thirty years Sebastian de Elcano, who accompanied Magellan, had sailed round the world.

Many of the seamen wrote treatises for the benefit of their fellow-seamen, but, like the *Brief Compendium* of the Spaniard Martin Cortes, or the *Seaman's Secrets* of the Englishman John Davis, and the so-called "Waggoners" (a corruption of the name of the Dutch author Waggenaer), they were devoted to navigation, or were "rutters," *i.e.* route books and sailing directions. A curious little volume named *Six Dialogues about Sea Service between a High Admiral and a Captain at Sea*, published in London in 1685, and written by Nathaniel Boteler, contains interesting details of the seamanship of the time, but is mainly concerned with naval organization. Such a well-known text-book as *The Mariners' Magazine*, of Captain Samuel Sturmy, reprinted in the 17th century, from which Swift took the sea phrases used in *Gulliver's Travels*, is devoted to "the doctrine of Triangles," "Navigation," "Dialling," "Gunnery," &c. Little attention is paid to pure seamanship, and the author practically confesses that his brother seamen regarded all book knowledge as superfluous if not actually injurious. The art continued in short to be purely empirical till the middle of the 18th century, and it suffered from adherence to rule of thumb and want of study of principles.

The first writer on seamanship who went beyond a glossary, and who looked at the way of a ship on the sea scientifically, was a Frenchman who was not a seaman—Pierre Bouguer, royal hydrographer for the ports of La Croisic and of Havre, member of the Academie Royale des Sciences, and of the British Royal Society. In 1757 he published his book *De la manœuvre des vaissaux, ou traité de méchanique et de dynamique, dans lequel on réduit à des solutions très simples les problèmes de marine les plus difficiles qui ont pour objet le mouvement du navire*. It is to be observed that Bouguer, even at this late date, notes the lack of treatises on seamanship as compared to the abundance of books on navigation. His treatment of the theme was too scientific to be intelligible by the average seafaring man, but his influence was gradually spread by his pupils, French and foreign. He is quoted as the dominant authority in the edition of *Falconer's Dictionary* issued by Dr Burney in 1830. Bouguer had an English follower—William Hutchinson—a merchant skipper and privateer captain, who was for some time dock master of Liverpool. In 1777 he printed, probably at Liverpool, *A Treatise on Practical Seamanship; with Hints and Remarks relating thereto: designed to contribute something towards fixing Rules upon Philosophical and Rational Principles; to make ships, and the Management of them; and also Navigation in general more perfect, and consequently less dangerous and destructive to Health, Lives, and Property*. Darcy Lever, whose *Young Officers' Sheet Anchor, or a Key to the leading of Rigging and to Practical Seamanship* appeared in 1835, says that Hutchinson's was then the best treatise which had appeared in English; but it suffers from a defect to which the writer confesses with perfect candour—his want of education. His early training as "cook, cabin boy, and beer drawer for the men" had not prepared him to write clearly. Darcy Lever was the standard authority of the middle of the 19th century, when the art of seamanship in sailing ships had reached its fullest development.

What that art was can now be learnt only by the study of books. Before Darcy Lever's book appeared, steam and the use of metal for the construction of ships had already been introduced. Since 1835 a revolution has been carried out in shipbuilding and seamanship greater than had taken place in all the previous centuries. Even as regards the sailing ship the change from wood and hemp to soft-steel and wire, together with the employment of small engines to help in hauling the yards in the larger vessels, has made a vast difference. As between the steamer and the sailing ship, the difference can hardly be said to be one of degree at all. A comparison of two incidents in the history of the British navy in the 19th century will serve to illustrate the unlikeness better than any generalities. They are the similar perils, and the very dissimilar escapes of the 74-gun ship "Magnificent" on the 16th of December 1812 in the Basque roads on the French coast, and of the cruiser "Calliope" at Apia in Samoa on the 16th of March 1888. Both were in danger of being driven on shore by storms of extreme violence. The "Magnificent" was saved by the resource of her captain, John Hayes, who, by making an unprecedented use of his masts and sails, tacked the ship when within her own breadth of a reef. Everything was done by his order and under his eye (see *Naval Chronicle*, vol. xxix. p. 19). Captain Kane of the "Calliope" steamed to sea by the power of the machines of his ship, which were out of his sight, below the water-line, and were handled by the engineers. The old seamanship was concerned not only with directing the course of the vessel, but with the actual control of the machinery of her motive power, for masts and sails are, after all, machines. The new seamanship directs the course. The motive power is exercised below, out of sight, and by men whose function is radically different from that of the members of the crew who are on deck.

The old seamanship did not retire before the new without a long resistance. Until very recently it continued to be an article of faith both in navies and in the merchant service, that the sailor could only be trained in a sailing vessel. Special vessels were maintained in navies to give the desired training to young seamen and officers. But the navies of the world have found that the brief period which can be spent by young men in a special masted ship did not give an equivalent for the old training. This was inevitable, if only because these ships were also provided with engines, and recourse was had to the machinery at all times of difficulty or peril—when entering and leaving harbour, when rounding awkward headlands or working off a lee-shore. The name of "seamanship" still continues to be applied to the art of handling ships under sail, and has never been made the subject of a treatise in so far as it means the management of a steamer. Perhaps it never can be. The art of constructing and managing machines is really "engineering." It is by "navigation" that the course of a ship is laid. The modern seaman who steers and guides a steamer from the upper deck, or the bridge, must be able to navigate, and must have such a knowledge of engineering as will tell him what he may expect from the machinery and what he must not ask it to do. But he cannot see his engines, and must perforce leave to the engineers the responsibility of handling them and the initiative in the face of sudden peril. There remain to the captain, and the officers who direct the course, the superior command and the functions of the pilot.

In addition to the books already mentioned see R. H. Dana,

Seaman's Manual; containing a treatise on Practical Seamanship (London, 1841); B. J. Totten, Lieut. U.S.N., *Naval Text-Book* (Boston, 1841); N. Tinmouth, *Inquiry relative to various important points of Seamanship* (London, 1845); A. H. Alston, Lieut. R.N., *Seamanship and its associated duties in the Royal Navy, with a treatise on Nautical Surveying* (London, 1860); R. Maxwell, *Seamanship and Navigation required for the examination of the Local Marine Board* (London, 1869). (D. H.)

SEAMEN, LAWS RELATING TO. In most legal systems legislation has interfered to protect the seaman from the consequences of that imprudence which is generally supposed to be one of his distinguishing characteristics. In the United Kingdom legislation has dealt with the interests of seamen with unusual fulness of detail, proving the care bestowed by a maritime power upon those to whom its commercial success is so largely due. How far this legislation has had the efficiency which was expected may be doubtful.

For legislative purposes seamen may be divided into three classes—seamen in the royal navy, merchant seamen, and fishermen.

Seamen in the Royal Navy.—It is still lawful to impress men for the naval service (see IMPRESSMENT), subject to certain exemptions (13 Geo. II. c. 17, 1740). Among persons exempt are seamen in the merchant service. In cases of emergency officers and men of the coastguard and revenue cruisers, seamen riggers and pensioners may be required to serve in the navy (Naval Volunteers Act 1853). There appears to be no other instance (now that balloting for the militia is suspended) where a subject may be forced into the service of the crown against his will. The navy is, however, at the present day wholly recruited by voluntary enlistment (see the Naval Enlistment Acts, 1835 to 1884). Special advantages are afforded by the Merchant Shipping Act 1894 to merchant seamen enlisting in the navy. They are enabled to leave their ship without punishment or forfeiture in order to join the naval service. The discipline of the navy is, unlike that of the army, for which an annual act is necessary, regulated by a permanent act of parliament, that now in force being the Naval Discipline Act 1866. In addition to numerous hospitals and infirmaries in the United Kingdom and abroad, the great charity of Greenwich Hospital is a mode of provision for old and disabled seamen in the navy. At present such seamen are out-pensioners only; the hospital has been for some years used as the Royal Naval College for officer students. The enactments of the Merchant Shipping Act 1854 as to savings banks are extended to seamen in the navy by the Merchant Shipping Act 1894, s. 148. Enlistment without the licence of the crown in the naval service of a foreign state at war with another foreign state that is at peace with the United Kingdom is an offence punishable under the Foreign Enlistment Act 1870. Any person buying from a seaman or enticing a seaman to sell government property is liable to penalties under the Seamen's Clothing Act 1869 (see NAVY).

Merchant Seamen.—Most of the acts dealing with this subject, commencing with 8 Eliz. c. 13, were repealed in 1854 and have since been consolidated and extended by the Merchant Shipping Acts 1894 and 1906,[1] the act of 1894 being the longest act on the statute roll. The main part of the legislation affecting seamen in the merchant service occurs in the second part of the act of 1894 and the fourth part of the act of 1906. The act of 1894 defines a seaman to be "every person (except masters, pilots, and apprentices duly indentured and registered) employed or engaged in any capacity on board any ship" (s. 742).

Engagement and discharge of Seamen.

The act of 1894 is largely a re-enactment of the previous acts of 1854, 1862 and 1876. The law as to the engagement and discharge of seamen has not been altered. These must take place before a superintendent only when the employment is on a foreign-going ship. If the ship is a home-trade ship, the signing on and discharge take place before a superintendent only if the master so desire. But if the signing on does not take place before a superintendent, the master must cause the agreement to be read and explained to the seaman, and the seaman must sign it in the presence of a witness; copies of all such agreements must be transmitted to the Board of Trade. A copy of every agreement with the crew must be posted in some part of the ship accessible to the crew. In any British possession abroad other than that in which the ship is registered, a seaman must be engaged before a superintendent or officer of customs, and at any port abroad where there is a British consular officer, before such officer. Before a seaman can be discharged at any place abroad, the master must obtain the sanction, endorsed on the agreement with the crew, of the like officials or, in their absence, of merchants there resident. A seaman discharged in a foreign country is entitled to be provided with adequate employment on some other British ship bound to the port in His Majesty's dominions at which he was originally shipped, or to a port in the United Kingdom agreed to by the seaman, or to be furnished with the means of returning to such port or of a passage home. The consul is charged with the duty of attending to the seamen's interests. It is a misdemeanour wrongfully to force a seaman on shore, or otherwise wrongfully leave him in any place before the completion of the voyage for which he was engaged, or the return of the ship to the United Kingdom. The only persons by whom seamen may be engaged or supplied in the United Kingdom are a superintendent, the master, the mate, a servant bona fide in the constant employ of the owner, and any person holding a licence from the Board of Trade.

At common law there was no obligation of the owner to provide a seaworthy ship, but by the act of 1870, now superseded by the act of 1894, part v., every person who sends or attempts to send, or is party to sending or attempting to send, a British ship to sea in such unseaworthy state that the life of any person is likely to be thereby endangered is guilty of a misdemeanour, unless he proves that he used all reasonable means to ensure her being sent to sea in a seaworthy state, or that her going to sea in such unseaworthy state was under the circumstances reasonable and justifiable. A master knowingly taking a British ship to sea in such unseaworthy state that the life of any person is likely to be thereby endangered is guilty of a misdemeanour. In every contract of service between the owner and the master or any seaman, and in every indenture of sea apprenticeship, an obligation is implied that the owner, master and agent shall use all reasonable means to ensure the seaworthiness of the ship. By the act of 1906 many of the provisions as to seaworthiness are applied to foreign ships, and they may be detained in a proper case. A return of certain particulars, such as lists of crews and of distressed seamen sent home from abroad, reports on discharge, births and deaths at sea, must be made to the registrar-general of shipping and seamen, an officer of the Board of Trade. The seaman is privileged in the matter of wills (see WILL), and is exempt from serving in the militia (42 Geo III. c. 90, s. 43). Assaults upon seamen with intent to prevent their working at their occupation are punishable summarily by the Offences against the Person Act 1861, s. 40. There are special enactments in favour of Lascars and foreign seamen on British ships, *e.g.* s. 125 of the act of 1894.

Duties of Masters and Seamen.

In addition to this legislation directly in his interest, the seaman is indirectly protected by the provisions of the Merchant Shipping Acts requiring the possession of certificates of competence by ships' officers, the periodical survey of ships by the Board of Trade, and the enactments against deck cargoes and overloading, as well as by other acts, such as the Chain Cables and Anchors Acts, enforcing a minimum strength of cables and anchors, and the Passenger Acts, under which a proper supply of life-boats and life-buoys must be provided. The duties of the seaman appear to be to obey the master in all lawful matters relating to the navigation of the ship and to resist enemies, to encourage him in which he may become entitled to prize money under 22 and 23 Car. II. c. 11 (see PRIZE). Any services beyond these would fall under the head of salvage service and be recompensed accordingly. There are certain offences for which the seaman is liable to be summarily punished under the act of 1894. They comprise desertion, neglect or refusal to join his ship or absence without leave, quitting the ship without leave before she is placed in security, wilful disobedience to a lawful command, either on one occasion or continued, assault upon a master or mate, combining to disobey lawful commands or to neglect duty, or to impede the navigation of the ship or the progress of the voyage, wilful damage to the ship, or embezzlement of or wilful damage to her stores or cargo and smuggling. The punishment varies from forfeiture of all or part of his wages to twelve weeks' imprisonment. Any offence committed on board is entered in the official log-book. Personation or forgery of a certificate of service or discharge is an offence punishable by summary jurisdiction by the Seamen's and Soldiers' False Characters Act 1906.

A master, seaman or apprentice, who by wilful breach of duty, or by neglect of duty, or by reason of drunkenness, does any act tending to the immediate loss, destruction or serious damage of the ship, or to immediately endanger the life or limb of any person belonging to or on board of the ship, or who by wilful breach of duty, &c., refuses or omits to do any lawful act proper and requisite to be done by him for preserving the ship from immediate loss, destruction, &c., is guilty of a misdemeanour. A seaman is also punishable at common law for piracy and by statute for piracy and offences against

[1] There are numerous Orders in Council dealing with seamen, especially as to the registration of fishing boats and the lights to be shown by them.

the Slave Trade Acts. A riotous assembly of seamen to prevent the loading or unloading of any ship or to prevent others from working is an offence under 33 Geo. III. c. 67. Deserters from Portuguese ships are punishable by 12 and 13 Vict. c. 25, and from any foreign ship by 15 and 16 Vict. c. 26, by virtue of conventions with Portugal and other foreign powers. The rating of seamen is now regulated by the Merchant Shipping Act 1894, s. 126. By that act a seaman is not entitled to the rating of "A.B." unless he has served four years before the mast, or three years or more in a registered decked fishing vessel and one year at sea in a trading vessel.

The act of 1894 enables contributions to seamen's refuges and hospitals to be charged upon the mercantile marine fund. There appears, however, to be no grant in support of seamen's hospitals out of any public funds. The principal seamen's hospital is that at Greenwich, established in 1821 and incorporated by 3 and 4 Will. IV. c. 9 under the name of "The Seaman's Hospital Society." Up to 1870 this hospital occupied the old "Dreadnought" at Greenwich, but in that year it obtained the infirmary of Greenwich Hospital from the Admiralty at a nominal rent, in return for which a certain number of beds is to be at the disposal of the Admiralty. This hospital with others is supported by voluntary contributions, including those of many foreign governments. At one time there was an enforced contribution of sixpence a month from the pay of masters and seamen towards the funds of Greenwich Hospital, levied under the powers of some of the Greenwich Hospital Acts. The payment of these contributions enabled them to receive annuities from the funds of the hospital. These "Greenwich Hospital sixpences," however, became the source of very considerable irritation and were discontinued. In their place a purely voluntary seamen's provident fund was established, its object being to persuade seamen to subscribe sixpence a month towards the seamen's hospital.

Remedies for wages.

The remedies of the seaman for wages are an ordinary action in the king's bench division or plaint in a county court, an action *in rem* or *in personam* in the admiralty division of the High Court (in Scotland in the Court of Session), a colonial court of admiralty, or a county court having admiralty jurisdiction, or summary proceedings before justices, naval courts, or superintendents of mercantile marine offices. The master has now the same remedies as the seaman for his wages, under which are included all disbursements made on account of the ship. At common law he had only a personal action against the owner. He has the additional advantage of being able to ensure his wages, which a seaman cannot do. A county court having admiralty jurisdiction may entertain claims for wages where the amount claimed does not exceed £150 [County Courts (Admiralty Jurisdiction) Act 1868, s. 3]. Wages cannot be attached. They may be forfeited or reduced by desertion, smuggling, and other kinds of misconduct. In *O'Neil* v. *Armstrong*, 1895, 2 K.B. 418, it was held by the court of appeal that a seaman, though he had not completed the voyage, could recover his full wages where war breaking out added a risk to the employment which was not in his contemplation at the time of his engagement. In actions in all courts of admiralty jurisdiction the seaman has a maritime lien on the ship and freight, ranking next after claims for salvage and damage. The amount recoverable summarily before justices is limited to £50. Orders may be enforced by distress of the ship and her tackle. Proceedings must be taken within six months. A naval court on a foreign station may determine questions as to wages without limit of amount.[1] As a rule a seaman cannot sue abroad for wages due for a voyage to terminate in the United Kingdom. The superintendent of a mercantile marine office has power to decide any question whatever between a master or owner and any of his crew which both parties in writing agree to submit to him. These summary remedies are all preserved by the act of 1894. The act further provides that, where a question as to wages is raised before a superintendent, if the amount in question does not exceed £5, the superintendent may adjudicate finally, unless he is of opinion that a court of law ought to decide it. The Merchant Seamen Act 1880, by a section not repealed by the act of 1894, and the Workmen's Compensation Act 1906, put seamen on a level with other workmen. A county court or court of summary jurisdiction (the latter limited to claims not exceeding £10) may under the act of 1875 determine all disputes between an employer and workman arising out of their relation as such. The jurisdiction of courts of summary jurisdiction is protected by the enactment of the act of 1894, that no proceeding for the recovery of wages under £50 is to be instituted in a superior court unless either the owner of the ship is bankrupt, or the ship is under arrest or sold by the authority of such court, or the justices refer the case to such court, or neither owner nor master is or resides within 20 m. of the place where the seaman is put ashore. Claims upon allotment notes may be brought in all county courts and before justices without any limit as to amount. In Scotland the sheriff court has concurrent jurisdiction with justices in claims for wages and upon allotment notes. The representatives of a deceased seaman may claim damages for his death in cases within the Fatal Accidents Acts 1846 and 1864. It has been held that the action lies where the deceased is a foreign seaman on a foreign ship (*Davidsson* v. *Hill*, 1901, 2 K.B. 606).

Where a seaman is discharged before a superintendent in the United Kingdom, his wages must be paid through or in the presence of the superintendent, and in the case of home-trade ships may be so paid if the master or owner so desire. The master must in every case deliver either to the superintendent or to the seaman a full account, in a form approved by the Board of Trade, of the wages and of all deductions therefrom; such deductions will only be allowed if they have been entered by the master during the voyage in a book kept for that purpose, together with a statement of the matters in respect of which they are made. Where a seaman is left abroad on the ground of his unfitness or inability to proceed on the voyage, the account of wages must be delivered to the superintendent, chief officer of customs, consular officer, or merchants, from whom the master obtains the certificate without which he may not leave the seaman behind. To protect seamen from crimps, advance notes, or documents authorizing or promising the future payment of money on account of a seaman's wages conditionally on his going to sea from any port of the United Kingdom, and made before those wages had been earned, were from 1880 to 1889 wholly void. No money paid in respect of any such document could be deducted from a seaman's wages. Since 1889 this restriction has been removed to the extent of one month's wages, provided that the agreement with the crew contains a stipulation for such advance, but this does not extend to cases where the seaman is going to sea from any port not in the United Kingdom. In such cases there is no limitation upon the right to make any agreement for advances or to make advances to any amount.

As under the former law, the scale of provisions as amended by the act of 1906 must be entered in the agreement with the crew, and compensation made for short or bad provisions, and means are provided whereby the crew can raise complaints. In addition, in the case of ships trading or going from any port in the United Kingdom through the Suez Canal or round the Cape of Good Hope or Cape Horn, the provisions and water are put under inspection by the Board of Trade, and if they are deficient, the ship may be detained until the defects are remedied. By the act of 1906 a certificated cook must be provided for foreign-bound ships. If a seaman receives hurt or injury in the service of the ship, the expense of medical attendance and maintenance, together with the cost of bringing him home, is to be borne by the owner of the ship, and cannot be deducted from wages.

Load line.

The safety of the crew is aimed at by provisions which are designed to prevent overloading and undermanning, and generally to prevent ships from being sent to sea in an unseaworthy state. The stringency of these provisions has been much increased. Life-saving appliances, according to a scale and rules prescribed by the Board of Trade, must be carried by every British ship. Except where the ship is under 80 tons register, employed solely in the coasting trade, or is employed solely in fishing, or is a pleasure yacht, the position of each deck above water must be marked by conspicuous lines, and the maximum load line in salt water, to which it shall be lawful to load the ship, must be marked at such level as may be approved by the Board of Trade below the deck line, and in accordance with tables and regulations prescribed by the Board of Trade. It is this load line which is commonly known as the Plimsoll mark. It is an offence to load a ship so as to submerge the load line, and a ship so loaded may be detained as unsafe. Dangerous goods, *e.g.* explosives, must not be shipped or carried without being distinctly marked as such. Timber must not be carried on deck in the winter months. In the carriage of grain cargoes, rules prescribed by the Board of Trade to prevent shifting must be complied with. The officers of the Board of Trade (subject to appeal to a court of survey from an order of final detention) have power to detain a ship which is, by reason of the defective condition of the hull, equipments or machinery, or of undermanning, overloading or improper loading, unfit to proceed to sea without serious danger to human life. Provision is made for the investigation of complaints by seamen that a ship is unfit to proceed to sea. The Public Health Act 1904 enables regulations to be made for carrying into effect international conventions as to insanitary vessels and conveyance of infection by vessels. By s. 11 of the Workmen's Compensation Act 1906, a ship may be detained by order of a court of record on allegation that a foreign owner is liable to pay compensation under the act.

Manning of British ships.

The manning of British merchant ships has received much consideration, but has hitherto been little affected by statute law. The effect of the acts is thus given in the report, issued in 1896, by a Board of Trade committee on the manning of merchant ships: "Since the final repeal of the Navigation Laws, which required that the master and three-fourths of the crew of every British ship should be British subjects, and reserved the coasting trade entirely to

[1] In the absence of appeal the order of a naval court is conclusive. *Hutton* v. *Ras S.S. Co.*, 1907, 1 K.B. 834. By s. 68 of the act of 1906 an appeal lies to the High Court of Justice.

British ships and British seamen, the whole world has been open as a recruiting ground to British shipowners, who have not been hampered in their selection by any restriction as to colour, language, qualification, age or strength. Except with regard to certificates, which must be held by masters, officers, and engineers in certain cases, and which, moreover, may be obtained by men of any nationality, there is at present practically no bar to the employment of any person of any nationality in any capacity whatsoever on board any British ship." The Merchant Shipping Act 1897 gave power to the Board of Trade to detain ships unseaworthy by reason of undermanning, but prescribed no rules for determining when a ship is to be deemed to be undermanned. Apart from that act the law does not interfere with the number or qualifications of the crew. Nearly one-fourth the seamen employed on British ships are foreigners. Another fourth are Lascars. The figures in 1904, as given by Mr Lloyd-George in introducing the bill of 1906 in the House of Commons, were 176,000 British subjects, 39,000 aliens, 42,000 Lascars. Aliens serving on British ships may by a regulation of the home secretary (29th of April 1904) be naturalized without fee. The act of 1906 (s. 12) provided that after the 31st of December 1907 no seaman may be shipped who does not possess a sufficient knowledge of the English language to understand necessary orders, with an exception in favour of Lascars and inhabitants of a British protectorate. Pilotage certificates are not to be granted unless to British masters and mates (s. 73).

Certificates of competency as masters, mates, and engineers are granted by the Board of Trade. Such certificates are for the following grades, viz. master or first mate, or second mate, or only mate of a foreign-going ship, master or mate of a home-trade passenger ship, first or second class engineer. By virtue of Orders in Council under section 102 of the act of 1894, certificates granted in many of the British colonies have the same force as if granted by the Board of Trade. The following are the requirements of the act as to the officers to be carried by ships:—*Masters*: A properly certificated master must be carried by every foreign-going ship and every home-trade passenger ship, whatever their tonnage. *Mates*: A mate, with the certificate of the grade of first or only mate, or master, must, in addition to the certificated master, be carried by every foreign-going ship of 100 tons or upwards, unless more than one mate is carried, in which case the first and second mates must have valid certificates appropriate to their several stations on such ship or of a higher grade; and a mate, with a certificate of the grade of first or only mate or master, must, in addition to the certificated master, be carried by every home-trade passenger ship of 100 tons or upwards. *Engineers*: Every foreign-going steamship of 100 nominal horse power or upwards must have two certificated engineers—the first possessing a first-class engineer's certificate, and the second possessing a second-class engineer's certificate, or a certificate of the higher grade. Every other foreign-going steamship, and every sea-going home-trade passenger steamship, is required to carry as the first or only engineer an engineer having a second-class certificate, or a certificate of the higher grade. Vessels in the home trade (*i.e.* United Kingdom and continent of Europe between the Elbe and Brest) are not required to carry certificated masters or officers unless they are passenger ships of 100 tons or upwards; and vessels in the foreign trade of less than 100 tons are not required to carry any mate.

Certificates of masters, mates and engineers.

In 1898 a slight attempt was made to encourage shipowners to carry apprentices. The Merchant Shipping Act of that year, which dealt with light dues, provided that "on proof to the satisfaction of the Board of Trade that a British ship has during any financial year carried, in accordance with the scale and regulations to be made by the Board of Trade, with the concurrence of the Treasury, boys between the ages of 15 and 19, there shall be paid to the owner of the ship, out of moneys to be provided by parliament, an allowance not exceeding one-fifth of the light dues paid during that year in respect of that ship. Provided that no such payment shall be made in respect of anybody unless he has enrolled himself in the Royal Naval Reserve, and entered into an obligation to present himself for service when called upon in accordance with rules to be issued by the Admiralty." This enactment was to continue until 1905 and does not seem to have been renewed. Some more efficient means will have to be devised if apprenticeship to the sea service is to be revived; at present it has practically ceased to exist, except in the case of boys who intend to become officers.

Apprenticeship.

Some only of the provisions of the acts apply to ships belonging to the general lighthouse authorities and pleasure yachts. But, with these exceptions, the whole of Part II. (Masters and Seamen) applies, unless the contract or subject-matter requires a different application, to all sea-going ships registered in the United Kingdom. Where a ship is a British ship, but not registered in the United Kingdom, the provisions of Part II. apply as follows:

British ships not registered in the U.K.

The provisions relating to the shipping and discharge of seamen in the United Kingdom and to volunteering into the navy apply in every case. The provisions relating to lists of the crew and to the property of deceased seamen and apprentices apply where the crew are discharged or the final port of destination of the ship is in the United Kingdom. All the provisions apply where the ship is employed in trading or going between any port in the United Kingdom and any port not situate in the British possession or country in which the ship is registered. The provisions relating to the rights of seamen in respect of wages, to the shipping and discharge of seamen in ports abroad, to leaving seamen abroad, and the relief of seamen in distress in ports abroad, to the provisions, health, and accommodation of seamen, to the power of seamen to make complaints, to the protection of seamen from imposition, and to discipline, apply in every case except where the ship is within the jurisdiction of the government of the British possession in which the ship is registered.

Fishermen.—The regulations respecting fishermen are contained chiefly in the Sea Fisheries Acts 1868 and 1883, and in the Merchant Shipping Act 1894, part iv. The Sea Fisheries Act of 1868 constituted a registry of fishing-boats, and that of 1883 gave powers of enforcing the provisions of the acts to sea fishery officers. The Merchant Shipping (Fishing-Boats) Act 1883 was passed in consequence of the occurrence of some cases of barbarous treatment of boys by the skippers of North Sea trawlers. It is now incorporated in the act of 1894.

This act provides, *inter alia*, that indentures of apprenticeship are to be in a certain form and entered into before a superintendent of a mercantile marine office, that no boy under thirteen is to be employed in sea-fishery, that agreements with seamen on a fishing-boat are to contain the same particulars as those with merchant seamen, that running agreements may be made in the case of short voyages, that reports of the names of the crew are to be sent to a superintendent of a mercantile marine office, and that accounts of wages and certificates of discharge are to be given to seamen. No fishing-boat is to go to sea without a duly certified skipper. Provision is also made for special reports of cases of death, injury, ill-treatment or punishment of any of the crew, and for inquiry into the cause of such death, &c. Disputes between skippers or owners and seamen are to be determined at request of any of the parties concerned by a superintendent. Fishermen are exempt from Trinity House dues. There are numerous police provisions contained in various acts of parliament dealing with the breach of fishery regulations. These provisions act as an indirect protection to honest fishermen in their employment. The rights of British fishermen in foreign waters and foreign fishermen in British waters are in many cases regulated by treaty, generally confirmed in the United Kingdom by act of parliament. A royal fund for widows and orphans of fishermen has been formed, the nucleus of the fund being part of the profits of the Fisheries Exhibition held in London in 1883. Special provisions as to fishermen in Scotland are contained in s. 389 of the act of 1894 and s. 83 of the act of 1906.

India and Colonies.—In India and in most British colonies there are laws affecting merchant seamen. In some cases such legislation is identical with the imperial act, but in most there are differences of more or less importance, and the colonial statutes should be consulted.

United States.—The law of the United States is in general accordance with that of England. The law relating to seamen in the navy will be found in the articles for the government of the navy (*Revised Statutes*, s. 1624). Legislation in the interests of merchant seamen dates from 1790. A list of the crew must be delivered to a collector of customs. The shipping articles are the same as those in use in the United Kingdom. For vessels in the coasting trade they are, with certain exceptions, to be in writing or in print. They must in the case of foreign-bound ships be signed before a shipping commissioner appointed by the circuit court or a collector of customs, or (if entered into abroad) a consular officer, where practicable, and must be acknowledged by his signature in a prescribed form. One-third of a seaman's wages earned up to that time is due at every port where the ship unlades and delivers her cargo before the voyage is ended. They must be fully paid in gold or its equivalent within twenty days of the discharge of the cargo. Advance notes can be made only in favour of the seaman himself or his wife or mother. There is a summary remedy for wages before a district court, a justice of the peace, or a commissioner of a district court. A shipping

commissioner may act as arbitrator by written consent of the parties. Seaworthiness is an implied condition of the hiring. There may be an examination of the ship on the complaint of the mate and a majority of the crew. The expenses of an unnecessary investigation are a charge upon the wages of those who complain. A seaman may not leave his ship without the consent of the master. For foreign-bound voyages a medicine-chest and antiscorbutics must be carried, also 60 gallons of water, 100 lb of salted meat, and 100 lb of wholesome bread for every person on board, and for every seaman at least one suit of woollen clothing, and fuel for the fire of the seaman's room. An assessment of forty cents per month per seaman is levied on every vessel arriving from a foreign port and on every registered coasting vessel in aid of the fund for the relief of sick and disabled seamen. In the navy a deduction of twenty cents per month from each man's pay is made for the same purpose. The offences and punishments are similar to those in the United Kingdom. There is also the additional offence of wearing a sheath knife on shipboard. As in England, consuls are required to provide for the passage home of destitute seamen (see Revised Statutes, §§ 4554–4591). A seamen's fund was constituted by the act of the 16th of July 1798, amended by subsequent legislation.

Continental European Countries.—The commercial codes contain provisions of a more or less detailed character. For France see §§ 250-272; Italy, §§ 343-380; Netherlands, §§ 394-452; Germany, Wendt, *Maritime Legislation* (1888). These enactments are in general accordance with British legislation. In Germany the law goes a little further than in the United Kingdom in enacting that copies of the part of the law affecting him must be handed to each seaman on his engagement at a seamen's office.

AUTHORITIES.—The works on merchant shippings, such as those of Abbott, Boyd, Kay, Maclachlan, Maude and Pollock, Temperley, and on admiralty law and practice, such as those of Roscoe and Williams and Bruce. Also E. S. Roscoe *Modern Legislation for Seamen and for Safety at Sea* (1885). (J. W.)

SEA-POWER. This term is used to indicate two distinct, though cognate, things. The affinity of these two and the indiscriminate manner in which the term has been applied to each have tended to obscure its real significance. The obscurity has been deepened by the frequency with which the term has been confounded with the old phrase, "Sovereignty of the sea," and the still current expression, "Command of the sea" (*vide* SEA, COMMAND OF). A discussion—etymological, or even archaeological in character—of the term must be undertaken as an introduction to the explanation of its now generally accepted meaning. It is one of those compound words in which a Teutonic and a Latin (or Romance) element are combined, and which are easily formed and become widely current when the sea is concerned. Of such are "sea-coast," "sea-forces" (the "land- and sea-forces" used to be a common designation of what we now call the "Army and Navy"); "sea-service," "sea-serpent" and "sea-officer" (now superseded by "naval officer"). The term in one form is as old as the 15th century. Edward III., in commemoration of the naval victory of Sluys, coined gold "nobles" which bore on one side his effigy "crowned, standing in a large ship, holding in one hand a sword and in the other a shield." An anonymous poet, who wrote in the reign of Henry VI., says of this coin:—

History of the term.

> "For four things our noble showeth to me,
> King, ship and sword, and *power of the sea.*"

Even in its present form the term is not of very recent date. Grote (*Hist. of Greece*, v. 67, published in 1849, but with preface dated 1848) speaks of "the conversion of Athens from a land-power into a sea-power." In a lecture published in 1883, but probably delivered earlier, the late Sir J. R. Seeley says that "commerce was swept out of the Mediterranean by the besom of the Turkish sea-power" (*Expansion of England*, p. 89). The term also occurred in the 9th edition of this *Encyclopaedia*, vol. xviii. p. 574, in the article "PERSIA," where we are told that Themistocles was "the founder of the Attic sea-power." The sense in which the term is used differs in these extracts. In the first it means what we generally call a "naval power"—that is to say, a state having a considerable navy in contradistinction to a "military power," a state with a considerable army but only a relatively small navy. In this sense there are many old uses of the phrase. In the last two extracts it means all the elements of the naval strength of the state referred to; and this is the meaning that is now generally, and is likely to be exclusively, attached to the term owing to the brilliant way in which it has been elucidated by Captain A. T. Mahan of the United States Navy.

The double use of the term is common in German, though in that language both parts of the compound now in use are Teutonic. One instance out of many may be cited from the historian Adolf Holm (*Griechische Geschichte*, Berlin, 1889). He says (ii. p. 37) that Athens, being in possession of a good naval port, could become "*eine bedeutende Seemacht*," *i.e.* an important naval power. He also says (ii. p. 91) that Gelon of Syracuse, besides a large army (*Heer*), had "*eine bedeutende Seemacht*," meaning a considerable navy. The term, in the first of the two senses, is old in German, as appears from the following, extracted from Zedler's *Grosses Universal Lexicon*, vol. xxxvi. (Leipzig and Halle, 1743); "Seemachten, Seepotenzen; Latin, *summae potestates mari potentes.*" "Seepotenzen" is probably quite obsolete now. It is interesting as showing that German no more abhors Teuto-Latin or Teuto-Romance compounds than English. We may note, as a proof of the indeterminate meaning of the expression until his own epoch-marking works had appeared, that Mahan himself in his earliest book, *Influence of Sea-power on History* (1890), used it in both senses. He says (p. 35), "The Spanish Netherlands ceased to be a sea-power." He alludes (p. 42) to the development of a nation as a "sea-power," and (p. 43) to the inferiority of the Confederate States "as a sea-power." Also (p. 225) he remarks of the war of the Spanish Succession that "before it England was one of the sea-powers, after it she was *the* sea-power without any second." In all these passages, as appears from the use of the indefinite article, what is meant is a naval power, or a state in possession of a strong navy. The other meaning of the term forms the general subject of Mahan's writings. In his earlier works Mahan writes "sea power" as two words; but in a published letter of the 19th February 1897 he joins them with a hyphen, and defends this formation of the term and the sense in which he uses it. We may regard him as the virtual inventor of the term in its more diffused meaning, for—even if it had been employed by earlier writers in that sense—it is he beyond all question who has given it general currency. He has made it impossible for any one to treat of sea-power without frequent reference to his writings and conclusions.

There is something more than mere literary interest in the fact that the term in another language was used more than two thousand years ago. Before Mahan no historian—not even one of those who specially devoted themselves to the narration of naval occurrences—had evinced a more correct appreciation of the general principles of naval warfare than Thucydides. He alludes several times to the importance of getting command of the sea. Great Britain would have been saved some disasters and been less often in peril had British writers—taken as guides by the public—possessed the same grasp of the true principles of defence as Thucydides exhibited. One passage in his history is worth quoting. Brief as it is, it shows that on the subject of sea-power he was a predecessor of Mahan. In a speech in favour of prosecuting the war, which he puts in the mouth of Pericles, these words occur: οἱ μὲν γὰρ οὐχ ἕξουσιν ἄλλην ἀντιλαβεῖν ἀμαχεί, ἡμῖν δέ ἐστι γῆ πολλὴ καὶ ἐν νήσοις καὶ κατ' ἤπειρον· μέγα γὰρ τὸ τῆς θαλάσσης κράτος. The last part of this extract, though often translated "command of the sea," or "dominion of the sea," really has the wider meaning of sea-power, the "power of the sea" of the old English poet above quoted. This wider meaning should be attached to certain passages in Herodotus (iii. 122 in two places; v. 83), which have been generally interpreted "commanding the sea," or by the mere titular and honorific "having the dominion of the sea." One editor of Herodotus, Ch. F. Baehr, did, however, see exactly what was meant, for, with reference to the allusion to Polycrates, he says, *classe maximum valuit.* This is perhaps as exact a definition of sea-power as could be given in a sentence.

Appreciation of sea-power by the ancients.

It is, however, impossible to give a definition which would be at the same time succinct and satisfactory. To say that "sea-power" means the sum total of the various elements that go to make up the naval strength of a state would be in reality to beg the question. Mahan lays down the "principal conditions affecting the sea-power of nations," but he does not attempt to give a concise definition of it. Yet no one who has studied his works will find it difficult to understand what it indicates. Our present task is, within the necessarily restricted limits of an article in an encyclopaedia, to put readers in possession of the means of doing this. The

Can only be explained historically.

best, indeed—as Mahan has shown us—the only effective way of attaining this object is to treat the matter historically. Whatever date we may agree to assign to the formation of the term itself, the idea—as we have seen—is as old as history. It is not intended to give a condensed history of sea-power, but rather an analysis of the idea and what it contains, illustrating this analysis with examples from history ancient and modern. It is important to know that it is not something which originated in the middle of the 17th century, and having seriously affected history in the 18th, ceased to have weight till Captain Mahan appeared to comment on it in the last decade of the 19th. With a few masterly touches Mahan, in his brief allusion to the second Punic war, has illustrated its importance in the struggle between Rome and Carthage. What has to be shown is that the principles which he has laid down in that case, and in cases much more modern, are true and have been true always and everywhere. Until this is perceived there is much history which cannot be understood, and yet it is essential to the welfare of Great Britain as a maritime power that she should understand it thoroughly. Her failure to understand it has more than once brought her, if not to the verge of destruction, at any rate within a short distance of serious disaster.

Early manifestations of sea-power.

The high antiquity of decisive naval campaigns is among the most interesting features of international conflicts. Notwithstanding the much greater frequency of land wars, the course of history has been profoundly changed more often by contests on the water. That this has not received the notice it deserved is true, and Mahan tells us why. "Historians generally," he says, "have been unfamiliar with the conditions of the sea, having as to it neither special interest nor special knowledge; and the profound determining influence of maritime strength on great issues has consequently been overlooked." Moralizing on that which might have been is admittedly a sterile process; but it is sometimes necessary to point, if only by way of illustration, to a possible alternative. As in modern times the fate of India and the fate of North America were determined by sea-power, so also at a very remote epoch sea-power decided whether or not Hellenic colonization was to take root in, and Hellenic culture to dominate, central and northern Italy as it dominated southern Italy, where traces of it are extant to this day. A moment's consideration will enable us to see how different the history of the world would have been had a Hellenized city grown and prospered on the Seven Hills. Before the Tarquins were driven out of Rome a Phocaean fleet was encountered (537 B.C.) off Corsica by a combined force of Etruscans and Phoenicians, and was so handled that the Phocaeans abandoned the island and settled on the coast of Lucania (Mommsen, *Hist. Rome*, English trans. i. p. 153). The enterprise of their navigators had built up for the Phoenician cities and their great off-shoot Carthage, a sea-power which enabled them to gain the practical sovereignty of the sea to the west of Sardinia and Sicily. The control of these waters was the object of prolonged and memorable struggles, for on it—as the result showed—depended the empire of the world. From very remote times the consolidation and expansion, from within outwards, of great continental states have had serious consequences for mankind when they were accompanied by the acquisition of a coast-line and the absorption of a maritime population. We shall find that the process loses none of its importance in recent years. "The ancient empires," says the historian of Greece, Ernst Curtius, "as long as no foreign elements had intruded into them, had an invincible horror of the water." When the condition, which Curtius notices in parentheses, arose the "horror" disappeared. There is something highly significant in the uniformity of the efforts of Assyria, Egypt, Babylon and Persia to get possession of the maritime resources of Phoenicia. Our own immediate posterity will perhaps have to reckon with the results of similar efforts in our own day. It is this which gives a living interest to even the very ancient history of sea-power, and makes the study of it of great practical importance to us now. We shall see, as we go on, how the phenomena connected with it reappear with striking regularity in successive periods. Looked at in this light the great conflicts of former ages are full of useful, indeed necessary, instruction.

Wars of the Greeks and Persians.

In the first and greatest of the contests waged by the nations of the East against Europe—the Persian wars—sea-power was the governing factor. Until Persia had expanded to the shores of the Levant the European Greeks had little to fear from the ambition of the great king. The conquest of Egypt by Cambyses had shown how formidable that ambition could be when supported by an efficient navy. With the aid of the naval forces of the Phoenician cities the Persian invasion of Greece was rendered comparatively easy. It was the naval contingents from Phoenicia which crushed the Ionian revolt. The expedition of Mardonius, and still more that of Datis and Artaphernes, had indicated the danger threatening Greece when the master of a great army was likewise the master of a great navy. Their defeat at Marathon was not likely to, and as a matter of fact did not, discourage the Persians from further attempts at aggression. As the advance of Cambyses into Egypt had been flanked by a fleet, so also was that of Xerxes into Greece. By the good fortune sometimes vouchsafed to a people, which, owing to its obstinate opposition to, or neglect of, a wise policy, scarcely deserves it, there appeared at Athens an influential citizen who understood all that was meant by the term sea-power. Themistocles saw more clearly than any of his contemporaries that, to enable Athens to play a leading part in the Hellenic world, she needed above all things a strong navy. "He had already in his eye the battle-field of the future." He felt sure that the Persians would come back, and come with such forces that resistance in the open field would be out of the question. One scene of action remained—the sea. Persuaded by him the Athenians increased their navy, so that of the 271 vessels comprising the Greek fleet at Artemisium, 147 had been provided by Athens, which also sent a large reinforcement after the first action. Though no one has ever surpassed Themistocles in the faculty of correctly estimating the importance of sea-power, it was understood by Xerxes as clearly as by him that the issue of the war depended upon naval operations. The arrangements made under the Persian monarch's direction, and his very personal movements, show that this was his view. He felt, and probably expressed the feeling, exactly as—in the war of American Independence—Washington did in the words, "Whatever efforts are made by the land armies, the navy must have the casting vote in the present contest." The decisive event was the naval action of Salamis. To have made certain of success, the Persians should have first obtained a command of the Aegean, as complete for all practical purposes as the French and English had of the sea generally in the war against Russia of 1854–56. The Persian sea-power was not equal to the task. The fleet of the great king was numerically stronger than that of the Greek allies; but it has been proved many times that naval efficiency does not depend on numerical superiority alone. The choice sections of the Persian fleet were the contingents of the Ionians and Phoenicians. The former were half-hearted or disaffected; while the latter were, at best, not superior in skill, experience, and valour to the Greek sailors. At Salamis Greece was saved not only from the ambition and vengeance of Xerxes, but also and for many centuries from oppression by an Oriental conqueror. Persia did not succeed against the Greeks, not because she had no sea-power, but because her sea-power, artificially built up, was inferior to that which was a natural element of the vitality of her foes. Ionia was lost and Greece in the end enslaved, because the quarrels of Greeks with Greeks led to the ruin of their naval states.

Peloponnesian war.

The Peloponnesian was largely a naval war. The confidence of the Athenians in their sea-power had a great deal to do with its outbreak. The immediate occasion of the hostilities, which in time involved so many states, was the opportunity offered by the conflict between Corinth and Corcyra of increasing the sea-power of Athens. Hitherto the Athenian naval predominance had been virtually confined to the Aegean Sea. The Corcyraean envoy, who pleaded for help at Athens, dwelt upon the advantage to be derived by the

Athenians from alliance with a naval state occupying an important situation "with respect to the western regions towards which the views of the Athenians had for some time been directed" (Thirlwall, *Hist. Greece*, iii. 96). It was the "weapon of her sea-power," to adopt Mahan's phrase, that enabled Athens to maintain the great conflict in which she was engaged. Repeated invasions of her territory, the ravages of disease among her people and the rising disaffection of her allies had been more than made up for by her predominance on the water. The scale of the subsequent Syracusan expedition showed how vigorous Athens still was down to the interruption of the war by the peace of Nicias. The great expedition just mentioned overtaxed her strength. Its failure brought about the ruin of the state. It was held by contemporaries, and has been held in our own day, that the Athenian defeat at Syracuse was due to the omission of the government at home to keep the force in Sicily properly supplied and reinforced. This explanation of failure is given in all ages, and should always be suspected. The friends of unsuccessful generals and admirals always offer it, being sure of the support of the political opponents of the administration. After the despatch of the supporting expedition under Demosthenes and Eurymedon no further great reinforcement, as Nicias admitted, was possible. The weakness of Athens was in the character of the men who swayed the popular assemblies and held high commands. A people which remembered the administration of a Pericles, and yet allowed a Cleon or an Alcibiades to direct its naval and military policy, courted defeat. Nicias, notwithstanding the possession of high qualities, lacked the supreme virtue of a commander—firm resolution. He dared not face the obloquy consequent on withdrawal from an enterprise on which the popular hopes had been fixed; and therefore he allowed a reverse to be converted into an overwhelming disaster. "The complete ruin of Athens had appeared, both to her enemies and to herself, impending and irreparable. But so astonishing, so rapid and so energetic had been her rally, that (a year after Syracuse) she was found again carrying on a terrible struggle" (Grote, *Hist. Greece*, v. p. 354). Nevertheless her sea-power had indeed been ruined at Syracuse. Now she could wage war only "with impaired resources and on a purely defensive system." Even before Arginusae, it was seen that "superiority of nautical skill had passed to the Peloponnesians and their allies" (*ibid.* p. 503).

Struggle between Rome and Carthage.

The great, occasionally interrupted, and prolonged contest between Rome and Carthage was a sustained effort on the part of one to gain and of the other to keep the control of the western Mediterranean. So completely had that control been exercised by Carthage, that she had anticipated the Spanish commercial policy in America. The Romans were precluded by treaties from trading with the Carthaginian territories in Hispania, Africa and Sardinia. Rome, as Mommsen tells us, "was from the first a maritime city and, in the period of its vigour, never was so foolish or so untrue to its ancient traditions as wholly to neglect its war marine and to desire to be a mere continental power." It may be that it was lust of wealth rather than lust of dominion that first prompted a trial of strength with Carthage. The vision of universal empire could hardly as yet have formed itself in the imagination of a single Roman. The area of Phoenician maritime commerce was vast enough both to excite jealousy and to offer vulnerable points to the cupidity of rivals. It is probable that the modern estimate of the sea-power of Carthage is much exaggerated. It was great by comparison, and of course overwhelmingly great when there were none but insignificant competitors to challenge it. Mommsen holds that, in the 4th and 5th centuries after the foundation of Rome, "the two main competitors for the dominion of the Western waters" were Carthage and Syracuse. "Carthage," he says, "had the preponderance, and Syracuse sank more and more into a second-rate naval power. The maritime importance of the Etruscans was wholly gone. . . . Rome itself was not exempt from the same fate; its own waters were likewise commanded by foreign fleets." The Romans were for a long time too much occupied at home to take much interest in Mediterranean matters. The position of the Carthaginians in the western basin of the Mediterranean was very like that of the Portuguese long afterwards in India. The latter kept within reach of the sea; "nor did their rule ever extend a day's march from their ships" (R. S. Whiteway, *Rise of the Portuguese Power in India*. Westminster, 1889, p. 12). "The Carthaginians in Spain," says Mommsen, "made no effort to acquire the interior from the warlike native nations; they were content with the possession of the mines and of stations for traffic and for shell and other fisheries." Allowance being made for the numbers of the classes engaged in administration, commerce and supervision, it is nearly certain that Carthage could not furnish the crews required by both a great war-navy and a great mercantile marine. No one is surprised on finding that the land-forces of Carthage were composed largely of alien mercenaries. We have several examples from which we can infer a parallel, if not an identical, condition of her maritime resources. How, then, was the great Carthaginian carrying-trade provided for? The experience of more than one country will enable us to answer this question. The ocean trade of those off-shoots or dependencies of the United Kingdom, viz. the United States, Australasia and India, is largely or chiefly conducted by shipping of the "old country." So that of Carthage was largely conducted by old Phoenicians. These may have obtained a "Carthaginian Register," or the contemporary equivalent; but they could not all have been purely Carthaginian or Liby-Phoenician. This must have been the case even more with the war-navy. British India for a considerable time possessed a real, and indeed highly efficient navy; but it was officered entirely and manned almost entirely by men from the old country. Moreover, it was small. The wealth of India would have sufficed to furnish a larger material element; but, as the country could not supply the *personnel*, it would have been absurd to speak of the sea-power of India apart from that of England. As soon as the Romans chose to make the most of their natural resources the maritime predominance of Carthage was doomed. The artificial basis of the latter's sea-power would not enable it to hold out against serious and persistent assaults. Unless this is perceived, it is impossible to understand the story of the Punic Wars. Judged by every visible sign of strength, Carthage, the richer, the more enterprising, ethnically the more predominant among her neighbours, and apparently the more nautical, seemed sure to win in the great struggle with Rome which, by the conditions of the case, was to be waged largely on the water. Yet those who had watched the struggles of the Punic city with the Sicilian Greeks, and especially that with Agathocles, must have seen reason to cherish doubts concerning her naval strength. It was an anticipation of the case of Spain in the age of Philip II. As the great Elizabethan seamen discerned the defects of the Spanish naval establishment, so men at Rome discerned those of the Carthaginian. Dates in connexion with this are of great significance. A comprehensive measure, with the object of "rescuing their marine from its condition of impotence" was taken by the Romans in the year 267 B.C. Four *quaestores classici*—in modern naval English we may perhaps call them port-admirals—were nominated, and one was stationed at each of four ports. The objects of the Roman Senate, so Mommsen tells us, were very obvious. They were "to recover their independence by sea, to cut off the maritime communications of Tarentum, to close the Adriatic against fleets coming from Epirus, and to emancipate themselves from Carthaginian supremacy." Four years afterwards the first Punic War began. It was, and had to be, largely a naval contest. The Romans waged it with varying fortune, but in the end triumphed by means of their sea-power. The victory of Catulus over the Carthaginian fleet off the Aegadian Islands decided the war and left to the Romans the possession of Sicily and the power of possessing themselves of Sardinia and Corsica. It would be an interesting and perhaps not barren investigation to inquire to what extent the decline of the mother states of Phoenicia, consequent on the campaigns of Alexander the Great, had helped to enfeeble the naval efficiency of the Carthaginian defences. One thing was certain. Carthage had

now met with a rival endowed with natural maritime resources greater than her own. That rival also contained citizens who understood the true importance of sea-power. "With a statesmanlike sagacity from which succeeding generations might have drawn a lesson, the leading men of the Roman Commonwealth perceived that all their coast fortifications and coast garrisons would prove inadequate unless the war-marine of the state were again placed on a footing that should command respect" (Mommsen, i. 427). It is a gloomy reflection that the leading men of the United Kingdom could not see this in 1860. A thorough comprehension of the events of the first Punic War enables us to solve what, until Mahan wrote, had been one of the standing enigmas of history, viz. Hannibal's invasion of Italy by land instead of by sea in the second Punic War. Mahan's masterly examination of this question has set at rest all doubts as to the reason of Hannibal's action (*Influence on Hist.* pp. 13-21). The naval predominance in the western basin of the Mediterranean acquired by Rome had never been lost. Though modern historians, even those belonging to a maritime country, may have failed to perceive it, the Carthaginians knew well enough that the Romans were too strong for them on the sea. Though other forces co-operated to bring about the defeat of Carthage in the second Punic War, the Roman navy, as Mahan demonstrates, was the most important. As a navy, he tells us in words like those already quoted, "acts on an element strange to most writers, as its members have been from time immemorial a strange race apart, without prophets of their own, neither themselves nor their calling understood, its immense determining influence on the history of that era, and consequently upon the history of the world, has been overlooked."

Expansion of Roman dominion furthered by sea-power.

The attainment of all but universal dominion by Rome was now only a question of time. "The annihilation of the Carthaginian fleet had made the Romans masters of the sea" (Schmitz, *Hist. Rome*, p. 256). A lodgment had already been gained in Illyricum, and countries farther east were before long to be reduced to submission. A glance at the map will show that to effect this the command of the eastern basin of the Mediterranean, like that of the western, must be secured by the Romans. The old historic navies of the Greek and Phoenician states had declined. One considerable naval force there was which, though it could not have prevented, was strong enough to have delayed the Roman progress eastwards. This force belonged to Rhodes, which in the years immediately following the close of the second Punic War reached its highest point as a naval power (C. Torr, *Rhodes in Ancient Times*, p. 40). Far from trying to obstruct the advance of the Romans the Rhodian fleet helped it. Hannibal, in his exile, saw the necessity of being strong on the sea if the East was to be saved from the grasp of his hereditary foe; but the resources of Antiochus, even with the mighty co-operation of Hannibal, were insufficient. In a later and more often quoted struggle between East and West—that which was decided at Actium—sea-power was again seen to "have the casting vote." When the whole of the Mediterranean coasts became part of a single state the importance of the navy was naturally diminished; but in the struggles within the declining empire it rose again at times. The contest of the Vandal Genseric with Majorian and the African expedition of Belisarius—not to mention others—were largely influenced by the naval operations (Gibbon, *Decline and Fall*, chaps. xxxvi., xli.).

Extension westward of Mahommedan conquest.

A decisive event, the Mahommedan conquest of northern Africa from Egypt westwards, is unintelligible until it is seen how great a part sea-power played in effecting it. Purely land expeditions, or expeditions but slightly supported from the sea, had ended in failure. The emperor at Constantinople still had at his disposal a fleet capable of keeping open the communications with his African province. It took the Saracens half a century (A.D. 647–698) to win "their way along the coast of Africa as far as the Pillars of Hercules" (Hallam, *Mid. Ages*, chap. vi.); and, as Gibbon tells us, it was not till the Commander of the Faithful had prepared a great expedition, this time by sea as well as by land, that the Saracenic dominion was definitely established. It has been generally assumed that the Arabian conquerors who, within a few years of his death, spread the faith of Mahomet over vast regions, belonged to an essentially non-maritime race; and little or no stress has been laid on the extent to which they relied on naval support in prosecuting their conquests. In parts of Arabia, however, maritime enterprise was far from non-existent; and when the Mahommedan empire had extended outwards from Mecca and Medina till it embraced the coasts of various seas, the consequences to the neighbouring states were as serious as the rule above mentioned would lead us to expect that they would be. "With the conquest of Syria and Egypt a long stretch of sea-board had come into the Saracenic power; and the creation and maintenance of a navy for the protection of the maritime ports as well as for meeting the enemy became a matter of vital importance. Great attention was paid to the manning and equipment of the fleet" (Amir Ali, Syed, *Short Hist. Saracens*, p. 442). At first the fleet was manned by sailors drawn from the Phoenician towns, where nautical energy was not yet quite extinct; and later the crews were recruited from Syria, Egypt and the coasts of Asia Minor. Ships were built at most of the Syrian and Egyptian ports, and "also at Obolla and Bushire on the Persian Gulf," whilst the mercantile marine and maritime trade were fostered and encouraged. The sea-power thus created was largely artificial. It drooped—as in similar cases—when the special encouragement was withdrawn. "In the days of Arabian energy," says Hallam, "Constantinople was twice, in 668 and 716, attacked by great naval armaments." The same authority believes that the abandonment of such maritime enterprises by the Saracens may be attributed to the removal of the capital from Damascus to Bagdad. The removal indicated a lessened interest in the affairs of the Mediterranean Sea, which was now left by the administration far behind. "The Greeks in their turn determined to dispute the command of the sea," with the result that in the middle of the 10th century their empire was far more secure from its enemies than under the first successors of Heraclius." Not only was the fall of the empire, by a rational reliance on sea-power, postponed for centuries, but also much that had been lost was regained. "At the close of the 10th century the emperors of Constantinople possessed the best and greatest part" of southern Italy, part of Sicily, the whole of what is now called the Balkan Peninsula, Asia Minor, with some parts of Syria and Armenia (Hallam, chap. vi.; Gibbon, chap. li.).

Sea-power and the Crusades.

Neglect of sea-power by those who can be reached by sea brings its own punishment. Whether neglected or not, if it is an artificial creation it is nearly sure to disappoint those who wield it when it encounters a rival power of natural growth. How was it possible for the Crusaders, in their various expeditions, to achieve even the transient success that occasionally crowned their efforts? How did the Christian kingdom of Jerusalem contrive to exist for more than three-quarters of a century? Why did the Crusades more and more become maritime expeditions? The answer to these questions is to be found in the decline of the Mahommedan naval defences and the rising enterprise of the seafaring people of the West. Venetians, Pisans and Genoese transported crusading forces, kept open the communications of the places held by the Christians and hampered the operations of the infidels. Even the great Saladin failed to discern the important alteration of conditions. This is evident when we look at the efforts of the Christians to regain the lost kingdom. Saladin "forgot that the safety of Phoenicia lay in immunity from naval incursions, and that no victory on land could ensure him against an influx from beyond the sea" (Amir Ali, Syed, pp. 359-360). Not only were the Crusaders helped by the fleets of the maritime republics of Italy, they also received reinforcements by sea from western Europe and England, on the "arrival of *Malik Ankiltar* [Richard Cœur de Lion] with twenty shiploads of fighting men and munitions of war."

Participation in the Crusades was not a solitary proof of the

importance of the naval states of Italy. That they had been able to act effectively in the Levant, may have been in some measure due to the weakening of the Mahommedans by the disintegration of the Seljukian power, the movements of the Moguls and the confusion consequent on the rise of the Ottomans. However that may have been, the naval strength of those Italian states was great absolutely as well as relatively. Sismondi, speaking of Venice, Pisa and Genoa, towards the end of the 11th century, says "these three cities had more vessels on the Mediterranean than the whole of Christendom besides" (*Ital. Republics*, English ed. p. 29). Dealing with a period two centuries later, he declares it "difficult to comprehend how two simple cities could put to sea such prodigious fleets as those of Pisa and Genoa." The difficulty disappears when we have Mahan's explanation. The maritime republics of Italy—like Athens and Rhodes in ancient, Catalonia in medieval and England and the Netherlands in more modern times—were "peculiarly well fitted, by situation and resources, for the control of the sea by both war and commerce." As far as the western Mediterranean was concerned, Genoa and Pisa had given early proofs of their maritime energy, and fixed themselves, in succession to the Saracens, in the Balearic Isles, Sardinia and Corsica. Sea-power was the Themistoclean instrument with which they made a small state into a great one.

Sea-power of Italian republics.

A fertile source of dispute between states is the acquisition of territory beyond sea. As others have done before and since, the maritime republics of Italy quarrelled over this. Sea-power seemed, like Saturn, to devour its own children. In 1284, in a great sea-fight off Meloria, the Pisans were defeated by the Genoese with heavy loss, which, as Sismondi states, "ruined the maritime power" of the former. From that time Genoa, transferring her activity to the Levant, became the rival of Venice. The fleets of the two cities in 1298 met near Cyprus in an encounter, said to be accidental, that began "a terrible war which for seven years stained the Mediterranean with blood and consumed immense wealth." In the next century the two republics, "irritated by commercial quarrels"—like the English and Dutch afterwards—were again at war in the Levant. Sometimes one side, sometimes the other was victorious; but the contest was exhausting to both, and especially to Venice. Within a quarter of a century they were at war again. Hostilities lasted till the Genoese met with the crushing defeat of Chioggia. "From this time," says Hallam, "Genoa never commanded the ocean with such navies as before; her commerce gradually went into decay; and the 15th century, the most splendid in the annals of Venice, is till recent times the most ignominious in those of Genoa." Venice seemed now to have no naval rival, and had no fear that any one could forbid the ceremony in which the Doge, standing in the bows of the *Bucentaur*, cast a ring into the Adriatic with the words, "*Desponsamus te, mare, in signum veri perpetuique dominii.*" The result of the combats at Chioggia, though fatal to it in the long run, did not at once destroy the naval importance of Genoa. A remarkable characteristic of sea-power is the delusive manner in which it appears to revive after a great defeat. The Persian navy occasionally made a brave show afterwards; but in reality it had received at Salamis a mortal wound. Athens seemed strong enough on the sea after the catastrophe of Syracuse; but, as already stated, her naval power had been given there a check from which it never completely recovered. The navy of Carthage had had similar experience; and, in later ages, the power of the Turks was broken at Lepanto and that of Spain at Gravelines notwithstanding deceptive appearances afterwards. Venice was soon confronted on the sea by a new rival. The Turkish naval historian, Haji Khalifeh (*Maritime Wars of the Turks*, Mitchell's trans. p. 12), tells us that, "After the taking of Constantinople, when they [the Ottomans] spread their conquests over land and sea, it became necessary to build ships and make armaments in order to subdue the fortresses and castles on the Rumelian and Anatolian shores, and in the islands of the Mediterranean." Mahommed II. established a great naval arsenal at Constantinople. In 1470 the Turks, "for the first time, equipped a fleet, with which they drove that of the Venetians out of the Grecian seas" (Sismondi, p. 256). The Turkish wars of Venice lasted a long time. In that which ended in 1503 the decline of the Venetian naval power was obvious. "The Mussulmans had made progress in naval discipline; the Venetian fleet could no longer cope with theirs." Henceforward it was as an allied contingent of other navies that that of Venice was regarded as important. Dyer (*Hist. Europe*, i. p. 85) quotes a striking passage from a letter of Aeneas Sylvius, afterwards Pope Pius II., in which the writer affirms that, "if the Venetians are defeated, Christendom will not control the sea any longer; for neither the Catalans nor the Genoese, without the Venetians, are equal to the Turks."

The last-named people, indeed, exemplified once more the rule that a military state expanding to the sea and absorbing older maritime populations becomes a serious menace to its neighbours. Even in the 15th century Mahommed II. had made an attack on southern Italy; but his sea-power was not equal to the undertaking. Suleymān the Magnificent directed the Ottoman forces towards the west. With admirable strategic insight he conquered Rhodes, and thus freed himself from the danger of a hostile force on his flank. "The centenary of the conquest of Constantinople was past, and the Turk had developed a great naval power besides annexing Egypt and Syria" (Seeley, *British Policy*, i. 143). The Turkish fleets, under such leaders as Khair-ad-din (Barbarossa), Piale and Dragut, seemed to command the Mediterranean, including its western basin; but the repulse at Malta in 1565 was a serious check, and the defeat at Lepanto in 1571 virtually put an end to the prospect of Turkish maritime dominion. The predominance of Portugal in the Indian Ocean in the early part of the 16th century had seriously diminished the Ottoman resources. The wealth derived from the trade in that ocean, the Persian Gulf and the Red Sea had supplied the Mahommedans with the sinews of war, and had enabled them to contend with success against the Christians in Europe. "The main artery had been cut when the Portuguese took up the challenge of the Mahommedan merchants of Calicut, and swept their ships from the ocean" (Whiteway, p. 2). The sea-power of Portugal wisely employed had exercised a great, though unperceived influence. Though enfeebled and diminishing, the Turkish navy was still able to act with some effect in the 17th century. Nevertheless, the sea-power of the Turks ceased to count as a factor of importance in the relations between great states.

Sea-power and progress of the Turks.

In the meantime the state which had a leading share in winning the victory of Lepanto had been growing up in the West. Before the union of its crown with that of Castile and the formation of the Spanish monarchy, Aragon had been expanding till it reached the sea. It was united with Catalonia in the 12th century, and it conquered Valencia in the 13th. Its long line of coast opened the way to an extensive and flourishing commerce; and an enterprising navy indemnified the nation for the scantiness of its territory at home by the important foreign conquests of Sardinia, Sicily, Naples and the Balearic Isles. Among the maritime states of the Mediterranean Catalonia had been conspicuous. She was to the Iberian Peninsula much what Phoenicia had been to Syria. The Catalan navy had disputed the empire of the Mediterranean with the fleets of Pisa and Genoa. The incorporation of Catalonia with Aragon added greatly to the strength of that kingdom. The Aragonese kings were wise enough to understand and liberal enough to foster the maritime interests of their new possessions (Prescott, *Ferdinand and Isabella*, Introd. sects. i., ii.). Their French and Italian neighbours were to feel, before long, the effect of this policy; and, when the Spanish monarchy had been consolidated, it was felt not only by them, but by others also. The more Spanish dominion was extended in Italy the more were the naval resources at the command of Spain augmented. Genoa became "Spain's water-gate to Italy. . . . Henceforth the Spanish crown found in the Dorias its admirals;

Spanish sea-power, Catalonia, &c.

their squadron was permanently hired to the kings of Spain." Spanish supremacy at sea was established at the expense of France (G. W. Prothero, in M. Hume's *Spain, 1479–1788*, p. 65). The acquisition of a vast domain in the New World had greatly developed the maritime activity of Castile, and Spain was as formidable on the ocean as in the Mediterranean. After Portugal had been annexed the naval forces of that country were added to the Spanish, and the great port of Lisbon became available as a place of equipment and as an additional base of operations for oceanic campaigns. The fusion of Spain and Portugal, says Seeley, "produced a single State of unlimited maritime dominion. . . . Henceforth the whole New World belonged exclusively to Spain." The story of the tremendous catastrophe—the defeat of the Armada—by which the decline of this dominion was heralded is well known. It is memorable, not only because of the harm it did to Spain, but also because it revealed the rise of another claimant to maritime pre-eminence —the English nation. The effects of the catastrophe were not at once visible. Spain still continued to look like the greatest power in the world; and, though the English seamen were seen to be something better than adventurous pirates—a character suggested by some of their contemporary exploits—few could have comprehended that they were engaged in building up what was to be a sea-power greater than any known to history.

They were carrying forward, not beginning, the building of this. "England," says Sir J. K. Laughton, "had always believed in her naval power, had always claimed the sovereignty of the Narrow Seas; and more than two hundred years before Elizabeth came to the throne, Edward III. had testified to his sense of its importance by ordering a gold coinage bearing a device showing the armed strength and sovereignty of England based on the sea" (*Armada*, Introd.). It is impossible to make intelligible the course of the many wars which the English waged with the French in the middle ages unless the true naval position of the former is rightly appreciated. Why were Crécy, Poitiers, Agincourt—not to mention other combats—fought, not on English, but on continental soil? Why, during the so-called "Hundred Years' War," was England in reality the invader and not the invaded? We of the present generation are at last aware of the significance of naval defence, and know that, if properly utilized, it is the best security against invasion that a sea-surrounded state can enjoy. It is not, however, commonly remembered that the same condition of security existed and was properly valued in medieval times. The battle of Sluys in 1340 rendered invasion of England as impracticable as did that of La Hogue in 1692, that of Quibéron Bay in 1759 and that of Trafalgar in 1805; and it permitted, as did those battles, the transport of troops to the continent to support Great Britain's allies in wars which, had she not been strong at sea, would have been waged on the soil of her country. Her early continental wars, therefore, are proofs of the long-established efficiency of her naval defences. Notwithstanding the greater attention now paid to naval affairs, it is doubtful if Great Britain even yet recognizes the extent to which her security depends upon a good fleet as fully as her ancestors did seven centuries ago. The narrative of pre-Elizabethan campaigns is interesting merely as a story; and, when told—as, for instance, D. Hannay has told it in the introductory chapters of his *Short History of the Royal Navy*—it will be found instructive and worthy of careful study at the present day. Each of the principal events in England's early naval campaigns may be taken as an illustration of the idea conveyed by the term "sea-power," and of the accuracy with which its meaning was apprehended at the time. To take a very early case, we may cite the defeat of Eustace the Monk (see DOVER: *Battle of*) by Hubert de Burgh in 1217. Reinforcements and supplies had been collected at Calais for conveyance to the army of Prince Louis of France and the rebel barons who had been defeated at Lincoln. The reinforcements tried to cross the Channel under the escort of a fleet commanded by Eustace. Hubert de Burgh, who had stoutly held Dover for King John, and was faithful to the young Henry III., heard of the enemy's movements. "If these people land," said he, "England is lost; let us therefore boldly meet them." He reasoned in almost the same words as Raleigh about four centuries afterwards, and undoubtedly "had grasped the true principles of the defence of England." He put to sea and defeated his opponent. The fleet on which Prince Louis and the rebellious barons had counted was destroyed; and with it their enterprise. "No more admirably planned, no more fruitful battle has been fought by Englishmen on water" (Hannay, p. 7). As introductory to a long series of naval operations undertaken with a like object it has deserved detailed mention here.

Early manifestations of British sea-power.

The 16th century was marked by a decided advance in both the development and the application of sea-power. Previously its operation had been confined to the Mediterranean or to coast waters outside it. Spanish or Basque seamen—by their proceedings in the English Channel—had proved the practicability of, rather than been engaged in, ocean warfare. The English, who withstood them, were accustomed to seas so rough, to seasons so uncertain and to weather so boisterous, that the ocean had few terrors for them. All that was wanting was a sufficient inducement to seek distant fields of action and a development of the naval art that would permit them to be reached. The discovery of the New World supplied the first; and consequently increased length of voyages and of absence from the coast led to the second. The world had been moving onwards in other things as well as in navigation. Intercommunication was becoming more and more frequent. What was done by one people was soon known to others. It is a mistake to suppose that, because the English had been behindhand in the exploration of remote regions, they were wanting in maritime enterprise. The career of the Cabots would of itself suffice to render such a supposition doubtful. The English had two good reasons for postponing voyages to and settlement in far-off lands. They had their hands full nearer home; and they thoroughly, and as it were by instinct, understood the conditions on which permanent expansion must rest. They wanted to make sure of the line of communications first. To effect this a sea-going marine of both war and commerce, and, for further expansion, stations on the way were essential. The chart of the world furnishes evidence of the wisdom and the thoroughness of their procedure. Taught by the experience of the Spaniards and the Portuguese, when unimpeded by the political circumstances of the time, and provided with suitable equipment, the English displayed their energy in distant seas. It now became simply a question of the efficiency of sea-power. If efficiency was not a quality of the English sea-power, then their efforts were bound to fail; and, more than this, the position of their country, challenging as it did what was believed to be the greatest of maritime states, would have been altogether precarious. The principal expeditions now undertaken were distinguished by a characteristic peculiar to the people, and not to be found in connexion with the exploring or colonizing activity of most other great nations even down to our own time. They were really unofficial speculations in which, if the government took part at all, it was for the sake of the profit expected, and almost, if not exactly, like any private adventurer. The participation of the government, nevertheless, had an aspect which it is worth while to note. It conveyed a hint—and quite consciously—to all whom it might concern that the speculations were "under-written" by the whole sea-power of England. The forces of more than one state had been used to protect its maritime trade from the assaults of enemies in the Mediterranean or in the Narrow Seas. They had been used to ward off invasion and to keep open communications across not very extensive areas of water. In the 16th century they were first relied upon to support distant commerce, whether carried on in a peaceful fashion or under aggressive forms. This, naturally enough, led to collisions. The contention waxed hot, and was virtually decided when the Armada shaped course to the northward after the fight off Gravelines.

Extending sphere of sea-power.

The expeditions against the Spanish Indies and, still more, those against Philip II.'s peninsular territory had helped to define

the limitations of sea-power. It became evident, and it was made still more evident in the next century, that for a great country to be strong it must not rely upon a navy alone. It must also have an adequate and properly organized mobile army. Notwithstanding the number of times that this lesson has been repeated Great Britain has been slow to learn it. It is doubtful if she has learned it even yet. English seamen in all ages seem to have mastered it fully; for they have always demanded—at any rate for upwards of three centuries—that expeditions against foreign territory oversea should be accompanied by a proper number of land-troops. On the other hand, the necessity of organizing the army of a maritime insular state and of training it with the object of rendering effective aid in operations of the kind in question, has rarely been perceived and acted upon by others. The result has been a long series of inglorious or disastrous affairs, like the West Indies voyage of 1595–1596, the Cadiz expedition of 1625 and that to the Île de Ré of 1627. Additions might be made to the list. The failures of joint expeditions have often been explained by alleging differences or quarrels between the naval and the military commanders. This way of explaining them, however, is nothing but the inveterate critical method of the streets by which cause is taken for effect and effect for cause. The differences and quarrels arose, no doubt; but they generally sprang out of the recriminations consequent on, not producing, the want of success. Another manifestation of the way in which sea-power works was first observed in the 17th century. It suggested the adoption of, and furnished the instrument for, carrying out a distinct maritime policy. What was practically a standing navy had come into existence. As regards England this phenomenon was now of respectable age. Long voyages and cruises of several ships in company had been frequent during the latter half of the 16th century and the early part of the 17th. Even the grandfathers of the men who sailed with Blake and Penn in 1652 could not have known a time when ships had never crossed the ocean, and squadrons kept together for months had never cruised. However imperfect it may have been, a system of provisioning ships and supplying them with stores, and of preserving discipline among their crews, had been developed, and had proved fairly satisfactory. The parliament and the Protector in turn found it necessary to keep a considerable number of ships in commission, and make them cruise and operate in company. It was not till well on in the reign of Queen Victoria that the man-of-war's man was finally differentiated from the merchant seaman; but, two centuries before, some of the distinctive marks of the former had already begun to be noticeable. There were seamen in the time of the Commonwealth who rarely, perhaps some who never, served afloat except in a man-of-war. Some of the interesting naval families which were settled at Portsmouth and the eastern ports, and which—from father to son—helped to recruit the ranks of bluejackets till a date later than that of the launch of the first ironclad, could carry back their professional genealogy to at least the days of Charles II., when, in all probability, it did not first start. Though landsmen continued even after the Civil War to be given naval appointments, and though a permanent corps, through the ranks of which every one must pass, had not been formally established, a body of real naval officers—men who could handle their ships, supervise the working of the armament and exercise military command—had been formed. A navy, accordingly, was now a weapon of undoubted keenness, capable of very effective use by any one who knew how to wield it. Having tasted the sweets of intercourse with the Indies, whether in the occupation of Portugal or of Spain, both English and Dutch were desirous of getting a larger share of them. English maritime commerce had increased and needed naval protection. If England was to maintain the international position to which, as no one denied, she was entitled, that commerce must be permitted to expand. The minds of men in western Europe, moreover, were set upon obtaining for their country territories in the New World, the amenities of which were now known. From the reign of James I. the Dutch had shown great jealousy of English maritime enterprise. Where it was possible, as in the East Indian Archipelago, they had destroyed it. Their naval resources were great enough to let them hold English shipping at their mercy, unless a grand effort were made to protect it. The Dutch conducted the carrying trade of most of the world, and the monopoly of this they were resolved to keep, while the English were resolved to share in it. The exclusion of the English from every trade-route, except such as ran by their own coast or crossed the Narrow Seas, seemed a by no means impossible contingency. There seemed also to be but one way of preventing it, viz. by war. The supposed unfriendliness of the Dutch, or at least of an important party amongst them, to the regicide government in England helped to force the conflict. The Navigation Act of 1651 was passed and regarded as a covert declaration of hostilities. So the first Dutch war began. It established England's claim to compete for the position of a great maritime commercial power.

Limitations of sea-power.

Appearance of standing navies.

Sea-power and territorial expansion in the "New World."

The rise of the sea-power of the Dutch, and the magnitude which it attained in a short time, and in the most adverse circumstances, have no parallel in history. The case of Athens was different, because the Athenian power had not so much been unconsciously developed out of a great maritime trade, as based on a military marine deliberately and persistently fostered during many years. Thirlwall believes that it was Solon who "laid the foundations of the Attic navy" (*Hist. Greece*, ii. p. 52), a century before Salamis. The great achievement of Themistocles was to convince his fellow-citizens that their navy ought to be increased. Perhaps the nearest parallel with the power of the Dutch was presented by that of Rhodes, which rested largely on a carrying trade. The Rhodian undertakings, however, were by comparison small and restricted in extent. Motley declares of the Seven United Provinces that they "commanded the ocean" (*United Netherlands*, ii. 132), and that it would be difficult to exaggerate the naval power of the young Commonwealth. Even in the days of Spain's greatness English seamen positively declined to admit that she was stronger than England on the sea; and the story of the Armada justified their view. The first two Dutch wars were, therefore, contests between the two foremost naval states of the world for what was primarily a maritime object. The identity of the cause of the first and of the second war will be discerned by any one who compares what has been said about the circumstances leading to the former, with Monk's remark as to the latter. He said that the English wanted a larger share of the trade enjoyed by the Dutch. It was quite in accordance with the spirit of the age that the Dutch should try to prevent, by force, this want from being satisfied. Anything like free and open competition was repugnant to the general feeling. The highroad to both individual wealth and national prosperity was believed to lie in securing a monopoly. Merchants or manufacturers who called for the abolition of monopolies granted to particular courtiers and favourites had not the smallest intention, on gaining their object, of throwing open to the enterprise of all what had been monopolized. It was to be kept for the exclusive benefit of some privileged or chartered company. It was the same in greater affairs. As Mahan says, "To secure to one's own people a disproportionate share of the benefits of sea commerce every effort was made to exclude others, either by the peaceful legislative methods of monopoly or prohibitory regulations, or, when these failed, by direct violence." The apparent wealth of Spain was believed to be due to the rigorous manner in which foreigners were excluded from trading with the Spanish oversea territories. The skill and enterprise of the Dutch having enabled them to force themselves into this trade, they were determined to keep it to themselves. The Dutch East India Company was a powerful body, and largely dictated the maritime policy of the country. We have thus come to an interesting point in the historical consideration of sea-power. The Elizabethan conflict with Spain had practically settled the question whether or not the

Sea-power of the Dutch.

expanding nations were to be allowed to extend their activities to territories in the New World. The first two Dutch Wars were to settle the question whether or not the ocean trade of the world was to be open to any people qualified to engage in it. We can see how largely these were maritime questions, how much depended on the solution found for them, and how plain it was that they must be settled by naval means.

Effect on ocean trade.

Mahan's great survey of sea-power opens in 1660, midway between the first and second Dutch Wars. "The sailing-ship era, with its distinctive features," he tells us, "had fairly begun." The art of war by sea, in its more important details, had been settled by the first war. From the beginning of the second the general features of ship design, the classification of ships, the armament of ships, and the handling of fleets, were to remain without essential alteration until the date of Navarino. Even the tactical methods, except where improved on occasions by individual genius, altered little. The great thing was to bring the whole broadside force to bear on an enemy. Whether this was to be impartially distributed throughout the hostile line or concentrated on one part of it depended on the character of particular admirals. It would have been strange if a period so long and so rich in incidents had afforded no materials for forming a judgment on the real significance of sea-power. The text, so to speak, chosen by Mahan is that, notwithstanding the changes wrought in naval *matériel* since about 1850, we can find in the history of the past instructive illustrations of the general principles of maritime war. These illustrations will prove of value not only "in those wider operations which embrace a whole theatre of war," but also, if rightly applied, "in the tactical use of the ships and weapons" of our own day. By a remarkable coincidence the same doctrine was being preached at the same time and quite independently by Vice-Admiral Philip Colomb in his work on *Naval Warfare*. As a prelude to the second Dutch War we find a repetition of a process which had been adopted somewhat earlier. That was the permanent conquest of trans-oceanic territory. Until the 17th century had well begun, naval, or combined naval and military, operations against the distant possessions of an enemy had been practically restricted to raiding or plundering attacks on commercial centres. The Portuguese territory in South America having come under Spanish dominion in consequence of the annexation of Portugal to Spain, the Dutch—as the power of the latter country declined—attempted to reduce part of that territory into permanent possession. This improvement on the practice of Drake and others was soon seen to be a game at which more than one could play. An expedition sent by Cromwell to the West Indies seized the Spanish island of Jamaica, which has remained in the hands of its conquerors to this day. In 1664 an English force occupied the Dutch North American settlements on the Hudson. Though the dispossessed rulers were not quite in a position to throw stones at sinners, this was rather a raid than an operation of recognized warfare, because it preceded the formal outbreak of hostilities. The conquered territory remained in English hands for more than a century, and thus testified to the efficacy of a sea-power which Europe had scarcely begun to recognize. Neither the second nor the third Dutch War can be counted amongst the occurrences to which Englishmen may look back with unalloyed satisfaction; but they, unquestionably, disclosed some interesting manifestations of sea-power. Much indignation has been expressed concerning the corruption and inefficiency of the English government of the day, and its failure to take proper measures for keeping up the navy as it should have been kept up. Some, perhaps a good deal, of this indignation was deserved; but it would have been nearly as well deserved by every other government of the day. Even in those homes of political virtue where the administrative machinery was worked by, or in the interest of speculating capitalists and privileged companies, the accumulating evidence of late years has proved that everything was not considered to be, and as a matter of fact was not, exactly as it ought to have been. Charles II. and his brother, the duke of York, have been held up to obloquy because they thought that the coast of England could be defended against a naval enemy better by fortifications than by a good fleet and, as Pepys noted, were "not ashamed of it." The truth is that neither the king nor the duke believed in the power of a navy to ward off attack from an island. This may have been due to want of intellectual capacity; but it would be going a long way to put it down to personal wickedness. They have had many imitators, some in our own day. The huge forts which stud the coast of the United Kingdom, and have been erected within living memory, are monuments, likely to last for many years, of the inability of people, whom no one could accuse of being vicious, to rate sea-power at its proper value. It is much more likely that it was owing to a reluctance to study questions of naval defence as industriously as they deserved, and to that moral timidity which so often tempts even men of proved physical courage to undertake the impossible task of making themselves absolutely safe against hostile efforts at every point.

Mahan's survey.

Charles II. has also been charged with indifference to the interests of his country, or worse, because during a great naval war he adopted the plan of trying to weaken the enemy by destroying his commerce. The king "took a fatal resolution of laying up his great ships and keeping only a few frigates on the cruise." It is expressly related that this was not Charles's own idea, but that it was urged upon him by advisers whose opinion probably seemed at the time as well worth listening to as that of others. Anyhow if the king erred, as he undoubtedly did, he erred in good company. Eighteen hundred years earlier the statesmen who conducted the great war against Carthage, and whose astuteness has been the theme of innumerable panegyrics since, took the same "fatal resolution." In the midst of the great struggle they "did away with the fleet. At the most they encouraged privateering; and with that view placed the war-vessels of the state at the disposal of captains who were ready to undertake a corsair warfare on their own account" (Mommsen, 1894, ii. 191). In much later times this method has had many respectable defenders. Mahan's works are, in a sense, a formal warning to his fellow-citizens not to adopt it. In France, within the last years of the 19th century, it found, and appears still to find, adherents enough to form a school. The reappearance of belief in demonstrated impossibilities is a recognized incident in human history; but it is usually confined to the emotional or the vulgar. It is serious and filled with menaces of disaster when it is held by men thought fit to administer the affairs of a nation or advise concerning its defence. The third Dutch War may not have settled directly the position of England in the maritime world; but it helped to place that country above all other maritime states—in the position, in fact, which Great Britain, the United Kingdom, the British Empire, whichever name may be given it, has retained up to the present. It also manifested in a very striking form the efficacy of sea-power. The United Provinces, though attacked by two of the greatest monarchies in the world, France and England, were not destroyed. Indeed, they preserved much of their political importance in the state system of Europe. The Republic "owed this astonishing result partly to the skill of one or two men, but mainly to its sea-power." The effort, however, had undermined its strength and helped forward its decline.

Misapplication.

The war, which was ended by the Peace of Ryswick in 1697, presents two features of exceptional interest: one was the havoc wrought on English commerce by the enemy; the other was Torrington's conduct at and after the engagement off Beachy Head. Mahan discusses the former with his usual lucidity. At no time has war against commerce been conducted on a larger scale and with greater results than during this period. England suffered "infinitely more than in any former war." Many of her merchants were ruined; and it is affirmed that the English shipping was reduced to the necessity of sailing under the Swedish and Danish flags. The explanation is that Louis XIV. made great efforts to keep up powerful fleets. The English navy was so fully occupied in watching these that no ships could be spared to protect England's maritime trade. This is only

another way of saying that her commerce had increased so largely that the navy was not strong enough to look after it as well as oppose the enemy's main force. Notwithstanding her losses she was on the winning side in the conflict. Much misery and ruin had been caused, but not enough to affect the issue of the war.

The "Fleet in being."

Torrington's proceedings in July 1690 were at the time the subject of much angry discussion. The debate, still meriting the epithet angry, has been renewed within the last few years. The matter has to be noticed here, because it involves the consideration of a question of naval strategy which must be understood by those who wish to know the real meaning of the term sea-power, and who ought to learn that it is not a thing to be idly risked or thrown away at the bidding of the ignorant and the irresponsible. Arthur Herbert, earl of Torrington—the later peerage is a viscountcy held by the Byng family—was in command of the allied English and Dutch fleet in the English Channel. "The disparity of force," says Mahan, "was still in favour of France in 1690, but it was not so great as the year before." We can measure the ability of the then English government for conducting a great war, when we know that, in its wisdom, it had still further weakened the fleet by dividing it. Vice-Admiral Killigrew had been sent to the Mediterranean with a squadron, and had neglected, and indeed refused when urged, to take the necessary steps to repair this error. The government having omitted, as governments sometimes do, to gain any trustworthy intelligence of the strength or movements of the enemy, Torrington suddenly found himself confronted by a considerably superior French fleet under Tourville, one of the greatest of French sea-officers. Since then the intentions of the French have been questioned; but it is beyond dispute that, in England at the time, Tourville's movements were believed to be preliminary to invasion. Whether Tourville deliberately meant his movement to cover an invasion or not, invasion would almost certainly have followed complete success on his part; otherwise, his victory would have been without any valuable result. Torrington saw that as long as he could keep his own fleet intact, he could, though much weaker than his opponent, prevent him from doing serious harm. Though personally not a believer in the imminence of invasion, the English admiral knew that "most men were in fear that the French would invade." His own view was "that whilst we had a fleet in being they would not dare to make an attempt." Of late years controversy has raged round this phrase, "a fleet in being," and the strategic principle which it expresses. Most seamen were at the time, have been since, and still are in agreement with Torrington. This might be supposed enough to settle the question. It has not been allowed, however, to remain one of purely naval strategy. It was made at the time a matter of party politics. This is why it is so necessary that in a notice of sea-power it should be discussed. Both as a strategist and as a tactician Torrington was immeasurably ahead of his contemporaries. The only English admirals who can be placed above him are Hawke and Nelson. He paid the penalty of his pre-eminence: he could not make ignorant men and dull men see the meaning or the advantages of his proceedings. Mahan, who is specially qualified to do him full justice, does not devote much space in his work to a consideration of Torrington's case, evidently because he had not sufficient materials before him on which to form a judgment. The admiral's character had been taken away already by Macaulay, who did have ample evidence before him; William III., with all his fine qualities, did not possess a military genius quite equal to that of Napoleon; and Napoleon, in naval strategy, was often wrong. William III. understood that subject even less than the French emperor did; and his favourites were still less capable of understanding it. Consequently Torrington's action has been put down to jealousy of the Dutch. There have been people who accused Nelson of being jealous of the naval reputation of Caracciolo! The explanation of Torrington's conduct is this: He had a fleet so much weaker than Tourville's that he could not fight a general action with the latter without a practical certainty of a crushing defeat. Such a result would have laid the kingdom open: a defeat of the allied fleet, says Mahan, "if sufficiently severe, might involve the fall of William's throne in England." Given certain movements of the French fleet, Torrington might have manœuvred to slip past it to the westward and join his force with that under Killigrew, which would make him strong enough to hazard a battle. This proved impracticable. There was then one course left—to retire before the French, but not to keep far from them. He knew that, though not strong enough to engage their whole otherwise unemployed fleet with any hope of success, he would be quite strong enough to fight and most likely beat it, when a part of it was trying either to deal with our ships to the westward or to cover the disembarkation of an invading army. He, therefore, proposed to keep his "fleet in being" in order to fall on the enemy when the latter would have two affairs at the same time on his hands. Vice-Admiral Colomb rose to a greater height than was usual even with him in his criticism of this campaign. What Torrington did was merely to reproduce on the sea what has been noticed dozens of times on shore, viz. the menace of the flanking enemy. In land warfare this is held to give exceptional opportunities for the display of good generalship, but, to quote Mahan over again, a navy "acts on an element strange to most writers, its members have been from time immemorial a strange race apart, without prophets of their own, neither themselves nor their calling understood." Whilst Torrington has had the support of seamen, his opponents have been landsmen. For the crime of being a good strategist he was brought before a court-martial, but acquitted. His sovereign, who had been given the crowns of three kingdoms to defend our laws, showed his respect for them by flouting a legally constituted tribunal and disregarding its solemn finding. The admiral who had saved his country was dismissed from the service. Still, the principle of the "fleet in being" lies at the bottom of all sound strategy.

Change in naval operations.

Admiral Colomb has pointed out a great change of plan in the later naval campaigns of the 17th century. Improvements in naval architecture, in the methods of preserving food, and in the arrangements for keeping the crews healthy, permitted fleets to be employed at a distance from their home ports for long continuous periods. The Dutch, as allies of the Spaniards, kept a fleet in the Mediterranean for many months. The great de Ruyter was mortally wounded in one of the battles there fought. In the War of the Spanish Succession the Anglo-Dutch fleet found its principal scene of action eastward of Gibraltar. This, as it were, set the fashion for future wars. It became a kind of tacitly accepted rule that the operation of British sea-power was to be felt in the enemy's, rather than in British waters. The hostile coast was regarded strategically as the British frontier, and the sea was looked upon as territory which the enemy must be prevented from invading. Acceptance of this principle led in time to the so-called "blockades" of Brest and Toulon. The name was misleading. As Nelson took care to explain, there was no desire to keep the enemy's fleet in; what was desired was to be near enough to attack it if it came out. The wisdom of the plan is undoubted. The hostile navy could be more easily watched and more easily followed if it put to sea. To carry out this plan a navy stronger in number of ships or in general efficiency than that of the enemy was necessary. With the exception of that of American Independence, which will, therefore, require special notice, England's subsequent great wars were conducted in accordance with the rule.

Rise of Russia's sea-power.

In the early part of the 18th century there was a remarkable manifestation of sea-power in the Baltic. Peter the Great, having created an efficient army, drove the Swedes from the coast provinces south of the Gulf of Finland. Like the earlier monarchies of which we have spoken, Russia, in the Baltic at least, now became a naval state. A large fleet was built, and, indeed, a considerable navy established. It was a purely artificial creation, and showed the merits and defects of its character. At first, and when under the eye of its creator, it was strong; when Peter was no more it

dwindled away and, when needed again, had to be created afresh. It enabled Peter the Great to conquer the neighbouring portion of Finland, to secure his coast territories and to dominate the Baltic. In this he was assisted by the exhaustion of Sweden consequent on her endeavours to retain, what was no longer possible, the position of a *quasi*-great power which she had held since the days of Gustavus Adolphus. Sweden had been further weakened, especially as a naval state, by almost incessant wars with Denmark, which prevented all hope of Scandinavian predominance in the Baltic, the control of which sea has in these days passed into the hands of another state possessing a quickly created navy—the modern German empire.

The War of the Spanish Succession left Great Britain a Mediterranean power, a position which, in spite of twice losing Minorca, she still holds. In the War of the Austrian Succession, "France was forced to give up her conquests for want of a navy, and England saved her position by her sea-power, though she had failed to use it to the best advantage" (Mahan, *Influence on Hist.* p. 280). This shows, as we shall find that a later war showed more plainly, that even the government of a thoroughly maritime country is not always sure of conducting its naval affairs wisely. The Seven Years' War included some brilliant displays of the efficacy of sea-power. It was this which put the British in possession of Canada, decided which European race was to rule in India, and led to a British occupation of Havana in one hemisphere and of Manila in the other. In the same war Great Britain learnt how, by a feeble use of sea-power, a valuable possession like Minorca may be lost. At the same time, the maritime trade and the general prosperity of the kingdom increased enormously. The result of the conflict made plain to all the paramount importance of having in the principal posts in the government men capable of understanding what war is and how it ought to be conducted.

Seven Years' War.

This lesson, as the sequel demonstrated, had not been learned when Great Britain became involved in a war with the insurgent colonies in North America. Mahan's comment is striking: "The magnificence of sea-power and its value had perhaps been more clearly shown by the uncontrolled sway and consequent exaltation of one belligerent; but the lesson thus given, if more striking, is less vividly interesting than the spectacle of that sea-power meeting a foe worthy of its steel, and excited to exertion by a strife which endangered not only its most valuable colonies, but even its own shores" (*Influence on Hist.* p. 338). Great Britain was, in fact, drawing too largely on the *prestige* acquired during the Seven Years' War, and was governed by men who did not understand the first principles of naval warfare, and would not listen to those who did. They quite ignored the teaching of the then comparatively recent wars which has been alluded to already—that the enemy's coast should be looked upon as the frontier. A century and a half earlier the Dutchman Grotius had written—

First American War.

"Quae meta Britannis
Litora sunt aliis."

Though ordinary prudence would have suggested ample preparation, British ministers allowed their country to remain unprepared. Instead of concentrating their efforts on the main objective, they frittered away force in attempts to relieve two beleaguered garrisons under the pretext of yielding to popular pressure, which is the official term for acting on the advice of irresponsible and uninstructed busybodies. "Depuis le début de la crise," says Captain Chevalier, "les ministres de la Grande-Bretagne s'étaient montrés inférieurs à leur tâche." An impressive result of this was the repeated appearance of powerful and indeed numerically superior hostile fleets in the English Channel. The war—notwithstanding that land operations constituted an important part of it, and in the end settled the issue—was essentially oceanic. Captain Mahan says it was "purely maritime." It may be true that, whatever the belligerent result, the political result, as regards the *status* of the insurgent colonies, would have been the same. It is in the highest degree probable, indeed it closely approaches to certainty, that a proper use of the British sea-power would have prevented independence from being conquered, as it were, at the point of the bayonet. There can be no surprise in store for the student acquainted with the vagaries of strategists who are influenced in war by political in preference to military requirements. Still, it is difficult to repress an emotion of astonishment on finding that a British government intentionally permitted de Grasse's fleet and the French army in its convoy to cross the Atlantic unmolested, for fear of postponing for a time the revictualling of the garrison beleaguered at Gibraltar. Washington's opinion as to the importance of the naval factor has been quoted already; and Mahan does not put the case too strongly when he declares that the success of the Americans was due to "sea-power being in the hands of the French and its improper distribution by the English authorities." England's navy, misdirected as it was, made a good fight of it, never allowed itself to be decisively beaten in a considerable battle, and won at least one great victory. At the point of contact with the enemy, however, it was not in general so conspicuously successful as it was in the Seven Years' War, or as it was to be in the great conflict with the French republic and empire. The truth is that its opponent, the French navy, was never so thoroughly a sea-going force as it was in the War of American Independence; and never so closely approached the British in sea experience as it did during that period. Great Britain met antagonists who were very nearly, but fortunately not quite, as familiar with the sea as she was; and she never found it so hard to beat them, or even to avoid being beaten by them. An Englishman would, naturally enough, start at the conclusion confronting him, if he were to speculate as to the result of more than one battle had the great Suffren's captains and crews been quite up to the level of those commanded by stout old Sir Edward Hughes. Suffren, it should be said, before going to the East Indies, had "thirty-eight years of almost uninterrupted sea-service" (Laughton, *Studies in Naval Hist.* p. 103). A glance at a chart of the world, with the scenes of the general actions of the war dotted on it, will show how notably oceanic the campaigns were. The hostile fleets met over and over again on the far side of the Atlantic and in distant Indian seas. The French navy had penetrated into the ocean as readily and as far as the British could do. Besides this, it should be remembered that it was not until the 12th of April 1782, when Rodney in one hemisphere and Suffren in the other showed them the way, that British officers were able to escape from the fetters imposed on them by the *Fighting Instructions*—a fact worth remembering in days in which it is sometimes proposed, by establishing schools of naval tactics on shore, to revive the pedantry which made a decisive success in battle nearly impossible.

The mighty conflict which raged between Great Britain on one side and France and her allies on the other, with little intermission, for more than twenty years, presents a different aspect from that of the war last mentioned. The victories which the British fleet was to gain were generally to be overwhelming; if not, they were looked upon as almost defeats. Whether the fleet opposed to the British was or was not the more numerous, the result was generally the same—the enemy was beaten. That there was a discoverable reason for this is certain. A great deal has been made of the disorganization in the French navy consequent on the confusion of the Revolution. That there was disorganization is undoubted; that it did impair discipline and, consequently, general efficiency will not be disputed; but that it was considerable enough to account by itself for the French naval defeats is altogether inadmissible. Revolutionary disorder had invaded the land-forces to a greater degree than it had invaded the sea-forces. The supersession, flight or guillotining of army officers had been beyond measure more frequent than was the case with the naval officers. In spite of all this the French armies were on the whole—even in the early days of the Revolution—extraordinarily successful. In 1792 "the most formidable invasion that ever threatened France," as Alison calls it, was repelled, though the invaders were the highly disciplined and veteran armies of Prussia and Austria. It was nearly two years

Wars of the French Revolution and Empire.

later that the French and British fleets came into serious conflict. The first great battle, "The Glorious First of June," though a tactical victory for Great Britain, was a strategical defeat. Villaret Joyeuse manœuvred so as to cover the arrival in France of a fleet of merchant vessels carrying sorely needed supplies of food, and in this he was completely successful. His plan involved the probability, almost the necessity of fighting a general action which he was not at all sure of winning. He was beaten, it is true; but the French made so good a fight of it that their defeat was not nearly so disastrous as the later defeats of the Nile or Trafalgar, and—at the most—not more disastrous than that of Dominica. Yet no one even alleges that there was disorder or disorganization in the French fleet at the date of any one of those affairs. Indeed, if the French navy was really disorganized in 1794, it would have been better for France—judging from the events of 1798 and 1805—if the disorganization had been allowed to continue. In point of organization the British navy was inferior, and in point of discipline not much superior to the French at the earliest date; at the later dates, and especially at the latest, owing to the all-pervading energy of Napoleon, the British was far behind its rival in organization, in "science," and in every branch of training that can be imparted without going to sea. Great Britain had the immense advantage of counting among her officers some very able men. Nelson, of course, stands so high that he holds a place entirely by himself. The other British chiefs, good as they were, were not conspicuously superior to the Hawkes and Rodneys of an earlier day. Howe was a great commander, but he did little more than just appear on the scene in the Revolutionary war. Almost the same may be said of Hood, of whom Nelson wrote, "He is the greatest sea-officer I ever knew" (Laughton, *Nelson's Lett. and Desp.* p. 71). There must have been something, therefore, beyond the meritorious qualities of the principal British officers which helped the navy so consistently to victory. The many triumphs won could not have been due in every case to the individual superiority of the British admiral or captain to his opponent. There must have been bad as well as good among the hundreds on the lists; and we cannot suppose that Providence had so arranged it that in every action in which a British officer of inferior ability commanded, a still more inferior French commander was opposed to him. The explanation of the nearly unbroken success is, that the British was a thoroughly sea-going navy, and became more and more so every month; while the French, since the close of the American War, had lost to a great extent its sea-going character and, because it had been shut up in its ports, became less and less sea-going as hostilities continued. The war had been for the British, in the words of Theodore Roosevelt, "a continuous course of victory won mainly by seamanship." The British navy, as regards sea experience, especially of the officers, was immensely superior to the French. This enabled the British government to carry into execution sound strategic plans, in accordance with which the coasts of France and its allied countries were regarded as the British frontier to be watched or patrolled by British fleets.

Importance of sea experience.

Before the long European war had been brought to a formal ending we received some rude rebuffs from another opponent of unsuspected vigour. In the quarrel with the United States, the so-called "War of 1812," the great sea-power of the British in the end asserted its influence, and the Americans suffered much more severely, even absolutely, than their enemy. At the same time the British might have learned, for the Americans did their best to teach it, that over-confidence in numerical strength and narrow professional self-satisfaction are nearly sure to lead to reverses in war, and not unlikely to end in grave disasters. The British had now to meet the *élite* of one of the finest communities of seamen ever known. Even in 1776 the Americans had a great maritime commerce, which, as Mahan says, "had come to be the wonder of the statesmen of the mother country." In the six-and-thirty years which had elapsed since then this commerce had further increased. There was no finer nursery of seamen than the then states of the American Union. Roosevelt says that "there was no better seaman in the world" than the American, who "had been bred to his work from infancy." A large proportion of the population "was engaged in sea-going pursuits of a nature strongly tending to develop a resolute and hardy character in the men that followed them" (*Naval War of 1812*, 3rd ed., pp. 29, 30). Having little or no naval protection, the American seaman had to defend himself in many circumstances, and was compelled to familiarize himself with the use of arms. The men who passed through this practical, and therefore supremely excellent, training school were numerous. Very many had been trained in English men-of-war, and some in French ships. The state navy which they were called on to man was small; and therefore its *personnel*, though without any regular or avowed selection, was virtually and in the highest sense a picked body. The lesson of the War of 1812 should be learned by Englishmen of the present day, when a long naval peace has generated a confidence in numerical superiority, in the mere possession of heavier *matériel*, and in the merits of a rigidly uniform system of training, such confidence, as experience has shown, being often the forerunner of misfortune. It is neither patriotic nor intelligent to minimize the American successes. Certainly they have been exaggerated by Americans and even by the British. To take the frigate actions alone, as being those which properly attracted most attention, the captures in action amounted to three on each side, the proportionate loss to the Americans, considering the smallness of their fleet, being immensely greater than to the British. We also see that no British frigate was taken after the first seven months of a war which lasted two and a half years. Attempts have been made to spread a belief that British reverses were due to nothing but the greater size and heavier guns of the enemy's ships. It is now established that the superiority in these details, which the Americans certainly enjoyed, was not great, and not of itself enough to account for their victories. Of course, if superiority in mere *matériel*, beyond a certain well-understood amount, is possessed by one of two combatants, his antagonist can hardly escape defeat; but it was never alleged that size of ship or calibre of guns—greater within reasonable limits than the British had—necessarily led to the defeat of British ships by the French or Spaniards. In the words of Admiral Jurien de la Gravière: "The ships of the United States constantly fought with the chances in their favour." All this is indisputable. Nevertheless in any future war British sea-power, great as it may be, should not receive shocks like those that it unquestionably did suffer in 1812.

Second American War.

We have now come to the end of the days of the naval wars of old time. The subsequent period has been illustrated repeatedly by manifestations of sea-power, often of great interest and importance, though rarely understood or even discerned by the nations whom they more particularly concerned. The British sea-power, notwithstanding the first year of the War of 1812, had come out of the great European conflict unshaken and indeed more pre-eminent than ever. The words used half a century before by a writer in the great French *Encyclopédie* seemed more exact than when first written. "*L'Empire des mers*," he says, is "le plus avantageux de tous les empires; les Phœniciens le possédoient autre fois et c'est aux Anglois que cette gloire appartient aujourd'hui sur toutes les puissances maritimes" (*Encyclopédie*, 7th January 1765, art. "Thalassarchie"). Vast outlying territories had been acquired or were more firmly held, and the communications of all the oversea dominions of the British crown were secured against all possibility of serious menace for many years to come. Her sea-power was so ubiquitous and all-pervading that, like the atmosphere, Great Britain rarely thought of it and rarely remembered its necessity or its existence. It was not till a late date that the greater part of the nation—for there still are some exceptions—perceived that it was the medium apart from which the British empire could no more live than it could have grown up. Forty years after the fall of Napoleon she found herself again at war with a great power. She had as her ally the owner of the greatest

navy in the world except her own. Her foe, as regards naval forces, came the next in order. Yet so overwhelming was the strength of Great Britain and France on the sea that Russia never attempted to employ her navy against them. Not to mention other expeditions, considerable enough in themselves, military operations on the largest scale were undertaken, carried on for many months, and brought to a successful termination on a scene so remote that it was two thousand miles from the country of one, and three thousand from that of the other partner in the alliance. "The stream of supplies and reinforcements, which in terms of modern war is called 'communications,'" was kept free from even the threat of molestation, not by visible measures, but by the undisputed efficacy of a real, though imperceptible sea-power. At the close of the Russian War there were, even in influential positions, men who, undismayed by the consequences of mimicking in free England the cast-iron methods of Frederick the Great, began to measure British requirements by standards borrowed from abroad and altogether inapplicable to British conditions. Because other countries wisely abstained from relying on that which they did not possess, or had only imperfectly and with elaborate art created, the mistress of the seas was led to proclaim her disbelief in the very force that had made and kept her dominion, and was urged to defend herself with fortifications by advisers who, like Charles II. and the duke of York two centuries before, were "not ashamed of it." It was long before the peril into which this brought the empire was perceived; but at last, and in no small degree owing to the teachings of Mahan, the people themselves took the matter in hand and insisted that a great maritime empire should have adequate means of defending all that made its existence possible.

Russian War, 1854-56.

In forms differing in appearance, but identical in essentials, the efficacy of sea-power was proved again in the American Civil War. If ever there were hostilities in which, to the unobservant or short-sighted, naval operations might at first seem destined to count for little they were these. The sequel, however, made it clear that they constituted one of the leading factors of the success of the victorious side. The belligerents, the Northern or Federal states and the Southern or Confederate states, had a common land frontier of great length. The capital of each section was within easy distance of this frontier, and the two were not far apart. In wealth, population and resources the Federals were enormously superior. They alone possessed a navy, though at first it was a small one. The one advantage on the Confederate side was the large proportion of military officers which belonged to it and their rare excellence as soldiers. In *physique* as well as in *moral* the army of one side differed little from that of the other; perhaps the Federal army was slightly superior in the first, and the Confederate, as being recruited from a dominant white race, in the second. Outnumbered, less well equipped, and more scantily supplied, the Confederates nevertheless kept up the war, with many brilliant successes on land, for four years. Had they been able to maintain their trade with neutral states they could have carried on the war longer, and—not improbably—have succeeded in the end. The Federal navy, which was largely increased, took away all chance of this. It established effective blockades of the Confederate ports, and severed their communications with the outside world. Indispensable articles of equipment could not be obtained, and the armies, consequently, became less and less able to cope with their abundantly furnished antagonists. By dominating the rivers the Federals cut the Confederacy asunder; and, by the power they possessed of moving troops by sea at will, perplexed and harassed the defence, and facilitated the occupation of important points. Meanwhile the Confederates could make no reply on the water except by capturing merchant vessels, by which the contest was embittered, but the course of the war remained absolutely unaffected. The great numbers of men under arms on shore, the terrific slaughter in many battles of a war in which tactical ability, even in a moderate degree, was curiously uncommon on both sides, and the varying fortunes of the belligerents, made the land campaigns far more interesting to the ordinary observer than the naval. It is not surprising, therefore, that peace had been re-established for several years before the American people could be made to see the great part taken by the navy in the restoration of the Union; and what the Americans had not seen was hidden from the sight of other nations.

Later manifestations of sea-power.

In several momentous wars in Europe waged since France and Great Britain made peace with Russia sea-power manifested itself but little. In the Russo-Turkish War the naval superiority of the Turks in the Black Sea, where the Russians at the time had no fleet, governed the plans, if not the course, of the campaign. The water being denied to them, the Russians were compelled to execute their plan of invading Turkey by land. An advance to the Bosporus through the northern part of Asia Minor was impracticable without help from a navy on the right flank. Consequently the only route was a land one across the Danube and the Balkans. The advantages, though not fully utilized, which the enforcement of this line of advance put into the hands of the Turks, and the difficulties and losses which it caused the Russians, exhibited in a striking manner what sea-power can effect even when its operation is scarcely observable.

Russo-Turkish War, 1877-78.

This was more conspicuous in a later series of hostilities. The civil war in Chile between Congressists and Balmacedists was specially interesting, because it threw into sharp relief the predominant influence, when a non-maritime enemy was to be attacked, of a navy followed up by an adequate land-force. At the beginning of the dispute the Balmacedists, or President's party, had practically all the army, and the Congressists, or Opposition party, nearly all the Chilean navy. Unable to remain in the principal province of the republic, and expelled from the waters of Valparaiso by the Balmacedist garrisons of the forts—the only and doubtful service which those works rendered to their own side—the Congressists went off with the ships to the northern provinces, where they counted many adherents. There they formed an army, and having money at command, and open sea communications, they were able to import equipment from abroad, and eventually to transport their land-force, secured from molestation on the voyage by the sea-power at their disposal, to the neighbourhood of Valparaiso, where it was landed and triumphantly ended the campaign.

Chilean Civil War, 1891.

It will have been noticed that, in its main outlines, this story repeated that of many earlier struggles. It was itself repeated, as regards its general features, by the story of the war between China and Japan in 1894–95. Every aspect of the war, says Colomb, is interesting to Great Britain, "as Japan is to China in a position similar to that which the British Islands occupy to the European continent" (*Naval Warfare*, 3rd ed. p. 436). It was additionally interesting because the sea-power of Japan was a novelty. Though a novelty, it was well known by British naval men to be superior in all essentials to that of China, a novelty itself. As is the rule when two belligerents are contending for something beyond a purely maritime object, the final decision was to be on land. Korea was the principal theatre of the land war; and, as far as access to it by sea was concerned, the chief bases of the two sides were about the same distance from it. It was possible for the Chinese to march there by land. The Japanese, coming from an island state, were obliged to cross the water, It will be seen at once that not only the success of the Japanese in the struggle, but also the possibility of its being carried on by them at all, depended on sea-power. The Japanese proved themselves decisively superior at sea. Their navy effectually cleared the way for one army which was landed in Korea, and for another which was landed in the Chinese province of Shantung. The Chinese land-forces were defeated. The navy of Japan being superior on the sea, was able to keep its sister service supplied or reinforced as required. It was not, however, the navy, but the army, which finally frustrated the Chinese efforts at defence, and really terminated the war. What the navy did

War between China and Japan, 1894-95.

was what, in accordance with the limitations of sea-power, may be expected of a navy. It made the transport of the army across the sea possible, and enabled it to do what of itself the army could not have done, viz. overcome the last resistance of the enemy.

Spanish-American War, 1898.

The issue of the Spanish-American War, at least as regards the defeat of Spain, was a foregone conclusion. That Spain, even without a serious insurrection on her hands, was unequal to the task of meeting so powerful an antagonist as the United States must have been evident even to Spaniards. However that may be, an early collapse of the Spanish defence was not anticipated, and however one-sided the war may have been seen to be, it furnished examples illustrating rules as old as naval warfare. Mahan says of it that, "while possessing, as every war does, characteristics of its own differentiating it from others, nevertheless in its broad analogies it falls into line with its predecessors, evidencing that unity of teaching which pervades the art from its beginnings unto this day" (*Lessons of the War with Spain*, p. 16). The Spaniards were defeated by the superiority of the American sea-power. "A million of the best soldiers," says Mahan, "would have been powerless in face of hostile control of the sea." That control was obtained and kept by the United States navy, thus permitting the unobstructed despatch of troops—and their subsequent reinforcement and supply—to Spanish territory, which was finally conquered, not by the navy, but by the army on shore. That it was the navy which made this final conquest possible happened, in this case, to be made specially evident by the action of the United States government, which stopped a military expedition on the point of starting for Cuba until the sea was cleared of all Spanish naval force worth attention.

It is unnecessary here to dwell on the results of sea-power in the war between Great Britain and the Boers, in which troops had to be transported by sea from England to South Africa, or in that between Russia and Japan, in which the culminating blow given by Japan was the defeat of the Russian fleet at the battle of Tsushima.

The events of the long period which we have been considering will have shown how sea-power operates, and what it effects. What it involves will have appeared from this narrative more clearly than would have been possible from any mere definition. Like many other things, sea-power is composed of several elements. To reach the highest degree of efficacy it should be based upon a population naturally maritime, and on an ocean commerce naturally developed rather than artificially enticed to extend itself. Its outward and visible sign is a navy, strong in the discipline, skill and courage of a numerous *personnel* habituated to the sea, in the number and quality of its ships, in the excellence of its *matériel*, and in the efficiency, scale, security and geographical position of its arsenals and bases. History has demonstrated that sea-power thus conditioned can gain any purely maritime object, can protect the trade and the communications of a widely extended empire, and while so doing can ward off from its shores a formidable invader. There are, however, limitations to be noted. Left to itself its operation is confined to the water, or at any rate to the inner edge of a narrow zone of coast. It prepares the way for the advance of an army, the work of which it is not intended and is unable to perform. Behind it, in the territory of which it guards the shores, there must be a land-force adjusted in organization, equipment and numbers to the circumstances of the country. The possession of a navy does not permit a sea-surrounded state to dispense with all fixed defences or fortification; but it does render it unnecessary and indeed absurd that they should be abundant or gigantic. The danger which always impends over the sea-power of any country is that, after being long unused, it may lose touch of the sea. The revolution in the constructive arts during the latter half of the 19th century, which has also been a period of but little-interrupted naval peace, and the universal adoption of mechanical appliances, both for ship-propulsion and for many minor services—mere *matériel* being thereby raised in the general estimation far above really more important matters—make the danger mentioned more menacing in the present age than it has ever been before.

The classic works on Sea-power are those of Captain A. T. Mahan: *Influence of Sea-power on History* (1890); *Influence of Sea-power on the French Revolution and Empire* (1892); *Nelson: the Embodiment of the Sea-power of Great Britain* (1897), &c. See also the bibliography of the article NAVY. (C. A. G. B.)

SEARCH, or VISIT AND SEARCH, a term used in international law and apparently derived in some confused way from the French word *visite*, which means search, combined with the English translation of the word *visite*. An attempt made by some writers to distinguish between visit and search only leads to misunderstanding. Search is the exact English equivalent of *visite*, and in the translation of the Declaration of London (Feb. 26, 1909) the translator has rightly rendered it as such (art. 63).

The right of search belongs to belligerents alone. Its object is to verify the nationality of the vessel and if neutral to ascertain whether it carries contraband. The consequence of resistance to search is capture and trial in a Prize Court. "Forcible resistance to the legitimate exercise of the right of stoppage, search and capture," says art. 63 of the Declaration of London, 1909, "involves in all cases the condemnation of the vessel. The cargo is liable to the same treatment as the cargo of an enemy vessel. Goods belonging to the master or owner of the vessel are treated as enemy goods." At the Hague Conference of 1907 the question of the liability to search of mail-ships gave rise to much discussion based on incidents arising out of the South African and Russo-Japanese Wars. It was ultimately decided that postal correspondence of neutrals and even of belligerents, and whether official or private, found on board a neutral or even an enemy ship should be "inviolable," and that though the ship should be detained, this correspondence had to be forwarded to its destination by the captor "with the least possible delay."[1] The only exception to this exemption is correspondence destined for or proceeding from a blockaded port. As regards the mail-ships themselves, apart from this inviolability of the correspondence, no exemption or privilege is extended beyond the injunction that they should not be searched, except when absolutely necessary, and then only "with as much consideration and expedition as possible," which might just as well be said of all ships stopped or searched on the high seas. (T. BA.)

SEA-SERPENT. The belief in enormous serpents, both terrestrial and marine, dates from very early times. Pliny (*H.N.* viii. 14), following Livy (*Epit.* xviii.), tells us of a land-serpent 120 ft. long, which Regulus and his army besieged with balistae, as though it had been a city, and this story is repeated by several other writers (Florus ii. 2; Val. Max. i. 8; Gellius vi. 3). The most prolific in accounts of the sea-serpent, however, are the early Norse writers, to whom the "Sö-Orm" was a subject both for prose and verse. Olaus Magnus (*Hist. gent. sept.* xxi. 24) describes it as 200 ft. long and 20 ft. round, and states that it not only ate calves, sheep and swine, but also "disturbs ships, rising up like a mast, and sometimes snaps some of the men from the deck," illustrating his account with a vivid representation of the animal in the very act. Pontoppidan, in his *Natural History* (Eng. trans., 1755, pp. 195 seq.), says that its existence was generally believed in by the sailors and fishermen of his time, and he recounts the means they adopted to escape it, as well as many details regarding its habits. The more circumstantial records of comparatively modern times may be conveniently grouped according to the causes which presumably gave rise to the phenomena described. (1) A number of porpoises swimming one behind another may, by their characteristic mode of half emerging from and then re-entering the water during respiration, produce the appearance of a single animal showing a succession of snake-like undulations. The figure given by Pontoppidan was very likely suggested by such an appearance, and a sketch of an animal seen off Llandudno by

[1] Convention relative to certain restrictions on the exercise of the right of capture in maritime war (art. 1).

several observers [1] looks as though it might have had a similar origin, notwithstanding that this hypothesis was rejected by them. (2) A flight of sea-fowl on one occasion recorded by Professor Aldis [2] produced the appearance of a snake swimming at the surface of the water. (3) A large mass of seaweed has on more than one occasion been cautiously approached and even harpooned under the impression that it was such a monster.[3] (4) A pair of basking sharks (*Selache maxima*) furnish an explanation of some of the recorded observations, as was first pointed out by Frank Buckland. These fish have a habit of swimming in pairs, one following the other with the dorsal fin and the upper lobe of the tail just appearing above the water, and, as each animal is fully 30 ft. long, the effect of a body of 60 or more ft. long moving through the water is readily produced. To this category belongs the famous serpent cast up on Stronsay, one of the Orkneys, of which an account was read to the Wernerian Society of Edinburgh [4]; some of its vertebrae were preserved in the Royal College of Surgeons of London, and identified as those of *Selache maxima* by both Home and Owen.[5] There is also evidence to show that specimens of *Carcharodon* must have existed more than 100 ft. long.[6] (5) Ribbon-fish (*Regalecus*), from their snake-like form and great length (sometimes as much as 20 ft.), have been suggested as the origin of so-called "sea-serpents," amongst others by Dr Andrew Wilson [7]; but Dr Günther,[8] from what is known regarding the habits of these fish, does not regard the theory as tenable. (6) A gigantic squid (*Architeuthis*) was most likely the foundation of the old Norse accounts,[9] and also of those which in the early part of the 19th century came so frequently from the United States as to gain for the animal the sobriquet of "American sea-serpent." [10] These stories were so circumstantial, so consistent, and vouched for by persons of such eminence, that no doubt was possible (notwithstanding the cavilling of Mitchell) [11] as to the existence of a strange marine monster of very definite character in those regions. The description commonly given of it has been summed up by Gosse [12] somewhat thus:—(i.) general form that of a serpent; (ii.) length averaging 60 ft.; (iii.) head flattened, eye generally not mentioned, some distinctly stating that it was not seen; (iv.) neck 12 to 16 in. in diameter; (v.) appendages on the head, neck or back (accounts here variable); (vi.) colour dark, lighter below; (vii.) swims at the surface, head thrown forward and slightly elevated; (viii.) progression steady and uniform, body straight but capable of being bent; (ix.) water spouting from it; (x.) in shape like a "nun buoy." The annexed figure (fig. 1) represents one which was seen from H.M.S. "Daedalus."[13] To show the reasonableness of this hypothesis, it may be added that gigantic Cephalopods are not unfrequent on the shores of Newfoundland,[14] and are occasionally met with on the coasts of Scandinavia,[15] Denmark and the British Isles,[16] and their extreme size seems to be above 60 ft., and, furthermore, that their mode of progression is by means of a jet of water forcibly expelled from the siphon, which would impart that equable motion to which several observers allude as being evidently not produced by any serpentine bending of the body. A very interesting account of a monster almost certainly originating in one of these squids is that of Hans Egede,[17] the well-known missionary to Greenland; the drawing by Bing, given in his work, is reproduced here (fig. 2), with a sketch of a squid in the act of rearing itself out from the water (fig. 3), an action which they have been observed in aquaria habitually to perform. Numerous other accounts seem to be explicable by this hypothesis,[18] among them may be mentioned that of a huge "snake" seen by certain of the crew of the "Pauline" in the South Atlantic Ocean, which was said to be coiled twice round a large sperm whale, and then towered up many feet into the air and finally dragged the whale to the bottom. It is now well-known that the sperm whale kills and devours *Architeuthis* and other large oceanic Cephalopods, and no one who has read Bullen's vivid description, in *The Cruise of the Cachalot*, of the struggle between a cachalot and a giant squid, can doubt that it was a combat of this kind which was thus erroneously described. The immensely long arms of *Architeuthis* would not unnaturally be mistaken for a snake by sailors, and instead of being dragged to the bottom the whale doubtless sounded of its own accord as whales usually do (see CUTTLE-FISH). (7) A sea-lion, or "Anson's seal" (*Morunga elephantina*), was suggested by Owen [19] as a possible explanation of the serpent seen from H.M.S. "Daedalus"; but as this was afterwards rejected by Captain M'Quahae,[20] who stated that it could not have been any animal of the seal kind, it seems better to refer the appearance to a squid. (8) A plesiosaurus, or some other of the huge marine reptiles usually believed to be extinct, might certainly have produced the



FIG. 1.—Sea-serpent, as seen from H.M.S. "Daedalus."



FIG. 2.—Sea-serpent, as observed by Hans Egede.



FIG. 3.—Squid, rearing itself out of the water.

[1] Mott, *Nature*, xxvii. pp. 293, 315, 338; also *Land and Water* (September 1872).

[2] *Nature*, ibid.; also Drew, in vol. xviii. p. 489; Bird, *tom. cit.* p. 519; Ingleby, *tom. cit.* p. 541.

[3] F. Smith, *Times* (February 1858); Herriman, quoted by Gosse, *op. cit. postea*, p. 338; Pringle, *Nature*, xviii. p. 519 (1878).

[4] *Mem. Wern. Soc. Edin.* vol. i. pp. 418-444, pls. ix.-xi. (1811).

[5] *Ann. Mag. Nat. Hist.* ser. 2, vol. ii. p. 461 (1848); for a criticism of these views, see Traill, *Proc. Roy. Soc. Edin.* vol. iii. p. 208 (1857).

[6] Owen, *Odontography*, p. 30.

[7] *Leisure Time Studies*, p. 115 (London, 1879), containing a readable essay on the subject; *Scotsman* (6th September 1878); *Nature, loc. cit.*

[8] *Study of Fishes*, p. 521 (Edinburgh, 1880).

[9] See note 2; also Deinbolt, quoted in *Zoologist*, p. 1604 (1847).

[10] Bigelow, *Amer. Journ. Sci.* vol. ii. pp. 147-165 (1820); Warburton, *ibid.* vol. xii. p. 375 (1823); *Zoologist*, p. 1714 (1847).

[11] *Amer. Journ. Sci.* vol. xv. p. 351 (1829).

[12] *Romance of Natural History*, p. 345 (London, 1859).

[13] M'Quahae, *Times* (October 1848); *Ill. Lond. News* (October 1848).

[14] A. E. Verrill, *Trans. Connect. Acad.* vol. v. part i. (1880), containing an account of all authenticated specimens of gigantic squids.

[15] Steenstrup, *Forhandl. Skand. Naturf., 7de Möde*, pp. 182-185 (Christiania, 1857).

[16] Saville Kent, *Proc. Zool. Soc. Lond.* p. 178 (1874); More, *Zoologist*, p. 4526 (1875); also *Ann. Mag. Nat. Hist.* ser. 4, vol. vi. p. 123.

[17] *Det gamle Grönlands nye Perlustration* (Copenhagen, 1741; Eng. trans., *A Description of Greenland*, London, 1745, pp. 86-89); also Paul Egede, *Efterretninger om Grönland*, Copenhagen, n.d., pp. 45, 46.

[18] L. de Ferry, quoted by Pontoppidan, *op. cit.*; Davidson and Sandford, quoted in *Zoologist*, p. 2459 (1849); Senior, *Graphic* (19th April 1879); Barnett, *Nature*, vol. xx. p. 289 (1879); Penny, *Ill. Lond. News*, vol. lxvii. p. 515 (20th November 1875).

[19] *Ann. Mag. Nat. Hist.* ser. 2, vol. ii. p. 461 (1848).

[20] *Times* (21st November 1848).

phenomena described, granting the possibility of one having survived to the present time. Newman [1] and Gosse [2] have both supported this theory, the former citing as evidence in its favour the report of a creature with the body of an alligator, a long neck and four paddles having been seen by Captain Hope of H.M.S. "Fly" in the Gulf of California.[3] (9) No satisfactory explanation has yet been given of certain descriptions of the sea-serpent. Perhaps the most remarkable of these is Lieutenant Hayne's [4] account of a creature seen from H.M. yacht "Osborne." Two different aspects were recorded—the first being a ridge, 30 ft. in length, of triangular fins, each rising 5 to 6 ft. above the water, while the second view showed a large round head 6 ft. in diameter, with huge flappers, which moved like those of a turtle.

A more recent record of the appearance of a mysterious sea-monster is that of Messrs Meade-Waldo and Nicoll, both fellows of the Zoological Society, in the *Proceedings* of that Society for 1906, p. 719. These two gentlemen on the 7th of December 1905 were on board the yacht "Valhalla" off the coast of Brazil when at 10·15 A.M. they saw, 100 yds. from the ship, a large fin projecting above the water to a height of 18 in. or 2 ft., and 6 ft. in length. Under the water to the rear of the fin was the shade of a considerable body. When Mr Meade-Waldo directed his field-glasses upon the object he saw a great head and neck rise out of the water in front of the fin. The neck appeared about the thickness of a man's body, and 7 to 8 ft. in length. The head was of the same thickness and had a very turtle-like appearance, eye and mouth being distinctly seen. The object was going very slowly and shortly disappeared from view. In this case as in others the objects seen were not sufficient to identify the nature of the animal. It is difficult to attribute such a head and neck to any known fish, and turtles have no dorsal fin. It would thus appear that, while, with very few exceptions, all the so-called "sea-serpents" can be explained by reference to some well-known animal or other natural object, there is still a residuum sufficient to prevent modern zoologists from denying the possibility that some such creature may after all exist.

Distinct in origin from the stories already touched on is the legend of the sea-serpent or *tinnīn* among the Arabs (Mas'ūdī i. 266 seq.; Kazwīnī i. 132 seq.; Damiri i. 186 seq.), which is described in such a way as to leave no doubt that the waterspout is the phenomenon on which the fable rests. The *tinnīn* is the Hebrew *tannīn* (E.V. "whale," "dragon"), which in Ps. cxlviii. 7 might in the context be appropriately rendered "waterspout."

In addition to the sources already cited, the reader may consult *Blackwood's Magazine*, vol. iii. (1818); Lee, *Sea Monsters Unmasked* (International Fisheries Exhibition *Handbook*, London, 1883); Cogswell, *Zoologist*, pp. 1841, 1911 (1847); and Hoyle, *Proc. Roy. Phys. Soc. Edin.* vol. ix. (W. E. Ho.; J. T. C.)

SEA-SICKNESS, the symptoms experienced by many persons when subjected to the pitching and rolling motion of a vessel at sea, of which depression, giddiness, nausea and vomiting are the most prominent. They generally show themselves soon after the vessel has begun to roll by the onset of giddiness and discomfort in the head, together with a sense of nausea and sinking at the stomach, which soon develops into intense sickness and vomiting. At first the contents of the stomach only are ejected; but thereafter bilious matter, and occasionally even blood, are brought up by the violence of the retching. The vomiting is liable to exacerbations according to the amount of oscillation of the ship; but seasons of rest, sometimes admitting of sleep, occasionally intervene. With the sickness there is great physical prostration, as shown in the pallor of the skin, cold sweats and feeble pulse, accompanied with mental depression and wretchedness. In almost all instances the attack has a favourable termination, except in the case of persons weakened by other diseases.

The conditions concerned in the production of the malady are apparently of complex character. In the first place, the rolling or heaving of the vessel disturbs that feeling of the relation of the body to surrounding objects upon which the sense of security rests. The nervous system being thus subjected to a succession of shocks fails to effect the necessary adjustments for equilibrium. Giddiness and with it nausea and vomiting follow, aided probably by the profound vaso-motor disturbance which produces such manifest depression of the circulation. The displacement of the abdominal viscera, especially the stomach, by the rolling of the vessel may possibly operate to some extent, but it can only be as an accessory cause. The same may be said of the influence of the changing impressions made upon the vision, since attacks of sea-sickness occur also in the dark, and in the case of blind persons. Other contributory causes may be mentioned, such as the feeling that sickness is certain to come, which may bring on the attack in some persons even before the vessel has begun to move; the sense of the body being in a yielding medium, the varied odours met with on board ship, and circumstances of a like nature tend also to precipitate or aggravate an attack.

No means has yet been discovered which can altogether prevent the occurrence of sea-sickness, nor is it likely any will be found, until the pitching movements of the vessel are done away with. Swinging couches or chambers have not proved of any practical utility. No doubt there is less risk of sickness in a large and well-ballasted vessel than in a small one; but, even though the rolling may be considerably modified, the ascending and descending movements which so readily produce nausea continue. None of the medicinal agents proposed possess infallible properties: a remedy which suits one person will often wholly fail with another. Nerve sedatives are among the most potent drugs which can be employed; and doses of bromide of potassium, bromural or chloral, appear to act usefully in the case of many persons. On the other hand, some high authorities have recommended the employment of nerve stimulants, such as a small cupful of very strong coffee, to be taken about two hours before sailing, which will frequently prevent or mitigate the sickness. When the vessel is in motion, or even before starting, the recumbent position with the head low and the eyes closed should be assumed by those at all likely to suffer, and, should the weather admit, on deck rather than below the body, especially the extremities, being well covered. Many persons, however, find comfort and relief from lying down in their berths with a hot bottle to the feet, by which means sleep may be obtained, and with it a temporary abatement of the giddiness and nausea. Should sickness supervene small quantities of some light food, such as thin arrowroot, gruel or soup, ought to be swallowed if possible, to lessen the sense of exhaustion. The vomiting may be mitigated by saline effervescing drinks, ice, chloroform, hydrocyanic acid or opium. Alcohol, although occasionally useful in great prostration, generally tends rather to aggravate the sickness. Dr Chapman, in accordance with his view that the cause of the sickness is an undue afflux of blood to the spinal cord, introduced a spinal ice-bag; but, like every other plan of treatment, it has only occasional success. Such remedies as nitrite of amyl and cocaine do not seem to yield any better results.

SEASON (O. Fr. *seson, seison,* mod. *saison,* Lat. *satio,* sowing time, the spring, from *serere,* to sow; in Late Lat. the word is found with its present meaning, the spring being considered as particularly *the* season of the year), a period of time, in particular, that of the four periods into which the year is divided by the changing of the temperature, rainfall, and growth and decay of vegetation due to the annual motion of the sun in declination. Divided strictly according to this motion the year falls into four nearly equal seasons, "spring" (*i.e.* the springing time, when vegetation rises or shoots), "summer" (O. Eng. *sumer,* cf. Dutch *zomer,* Ger. *Sommer,* probably connected with Skt. *sama,* year), "autumn" (Lat. *autumnus, auctumnus,* from *augere,* to increase, the period of ripening or fruiting) and "winter" (common Teutonic, possibly a nasalized form of root seen in "wet"). (See further CLIMATE, METEOROLOGY.)

SEATON, SIR JOHN COLBORNE, 1ST BARON (1778–1863), British field marshal, was born at Lyndhurst, Hants, on the 16th of February 1778 and entered the 20th (Lancashire Fusiliers) in 1794, winning thereafter every step in his regimental promotion without purchase. He first saw service in the Helder expedition of 1799, and as a captain he took part in Sir Ralph Abercromby's expedition to Egypt in 1801. He distinguished himself at Maida, and soon afterwards was brought under the notice of Sir John Moore, who obtained a majority for him and made him his military secretary. In this capacity he served through the Corunna campaign, and Sir John Moore's dying request that he should be given a lieutenant-colonelcy was at once complied with. In the summer of 1809 Lieut.-Colonel Colborne was again in the Peninsula, and before taking command of the 66th regiment, he witnessed the defeat of the Spaniards at Ocaña. With the 66th he was present at Busaco and shared in the defence of the

[1] *Zoologist*, p. 2395.
[2] *Op. cit.* p. 358.
[3] *Op. cit.* p. 2356 (1849).
[4] *Graphic* (30th June 1877).

lines of Torres Vedras, and next year, after temporarily commanding a brigade with distinction at the battle of Albuera, he was gazetted to command the famous 52nd Light Infantry (Oxfordshire and Bucks L.I.) with which corps he is most closely identified. He led it and was very severely wounded at Ciudad Rodrigo (1812), and only rejoined in July 1814. Shortly afterwards he was placed in temporary charge of a brigade of the Light Division which he commanded in the Pyrenees engagements and the battles of Orthes and Toulouse. At the peace he was made colonel, aide-de-camp to the Prince Regent and K.C.B. In 1815 Colborne and the 52nd at Waterloo played a brilliant part in the repulse of the Old Guard at the close of the day. Promoted major-general in 1825, Colborne was soon afterwards made lieutenant-governor of Guernsey. In 1830 he served as lieutenant-governor of Upper Canada. In 1838 at the moment of his vacating the post on promotion to lieutenant-general, the rebellion broke out, and he was ordered to assume the functions of governor-general and commander-in-chief. He quickly repressed the revolt, and in 1839, returning home, he was raised to the peerage as Baron Seaton of Seaton in Devonshire. From 1843 to 1849 he was high commissioner of the Ionian islands. In 1854 he was promoted full general, and from 1855 to 1860 he was commander-in-chief in Ireland. He died at Torquay on the 17th of April 1863.

See the *Life* by G. C. Moore Smith (1906).

SEATTLE, the county-seat of King county, Washington, U.S.A., and the largest city in the state, situated on a neck of land between Elliott Bay (an eastern arm of Admiralty Bay, Puget Sound) and the fresh-water Lake Washington; about 865 m. by water N. of San Francisco, about 185 m. by rail N. of Portland, Oregon, and about 28 m. N. of Tacoma. Pop. (1870) 1107; (1880) 3533; (1890) 42,837; (1900) 80,671; (1906, local estimate), 232,000. Of the population in 1900, 41,483 were of foreign parentage and 22,003 were foreign-born. The area of the city in 1910 was about 83·45 sq. m., of which 29.42 sq. m. were water surface, 23 sq. m. being salt water. Seattle is the terminus of the Northern Pacific, the Canadian Pacific (using the tracks of the Northern Pacific), the Great Northern, the Chicago, Milwaukee & Puget Sound (1909), the Oregon & Washington (1910; a joint extension to Puget Sound of the Southern Pacific and Union Pacific), the Chicago, Burlington & Quincy (using the tracks of the Northern Pacific), and the Columbia & Puget Sound railways. It is served by inter-urban electric lines to Tacoma and Everett; is the starting-point for steamers to Alaska and to Prince Rupert, British Columbia (Grand Trunk Pacific line), and for lines to Japan, China, Siberia, Hawaii, the Philippines, Australia, Mexico, South America and Pacific coast ports of the United States; and is a port of call for coasting vessels. The city has the excellent salt-water harbour of Elliott Bay to the W.; and to the E. there is a fresh-water harbour, Lake Washington, connected with Puget Sound by the Lake Washington Canal, an artificial improvement of the natural waterway by Lake Union, a great V-shaped body of water in the north-central part of the city, and by Salmon Bay, a narrow channel setting in from Puget Sound on the N.W. Crossing the S.W. part of the city is Duwamish river, which empties into Elliott Bay. At Bremerton, Kitsap county, about 15 m. W. by S. of Seattle, is the Puget Sound Navy Yard, protected by Fort Ward, with one dry dock (1910) 836 ft. long and 110 ft. wide, another 627 ft. long, and two docks 650 ft. long.

The surface of the city is hilly, the greatest height being 500 ft. above sea-level. The higher hills, the better residential parts of the city, are reached by cable railways or by electric railways following winding routes. Many of the higher hills, especially in the business district, have been removed by hydraulic power and large parts regraded. Lake Washington, to the E., is 22 m. long, and 1 to 4 m. wide, with an area of 50 sq. m., a shore line of 80 m. and a maximum depth of 225 ft.; its waters are deep and clear and never freeze. In the north-central part of the city is Green Lake, about 1 m. long and ½ m. wide. On Puget Sound and Lake Union and about these two lakes, both with well-wooded shores and both furnishing excellent boating and canoeing, are the principal parks of the city. In 1910 the total park acreage under the park commissioners was 1058 acres. Immediately S. of Green Lake is Woodland Park (179 acres) with athletic fields and a zoological collection. On the southern shore of Union Bay (a circular, nearly landlocked arm of Lake Washington) in the east-central part of the city is Washington Park (163 acres). Farther S. near Lake Washington are Madrona Park (9 acres), Frink Park (20 acres), which adjoins Leschi Park (4 acres), and Mount Baker Park (12 acres). Near Lake Union is Volunteer Park (48 acres) on Capitol Hill, containing a public observatory (460 ft. above sea-level) and a statue of W. H. Seward by Richard Brooks. Schmitz Park (30 acres) is woodland on the West Seattle peninsula, overlooking the Sound; and between Volunteer Park and Washington Park is Interlaken (46 acres). Kinnear Park (14 acres) is near the entrance to the harbour. Nearly all these parks command views of the Cascade and Olympic ranges. The city owns large areas which are to be improved as parks, including Ravenna Park, which has a noble native fir and cedar forest and sulphur springs. Private parks include the White City (on Lake Washington), Golden Gardens (50 acres) and, in West Seattle (annexed in 1907), Luna Park, an amusement place with a natatorium. North of the city on Lake Washington are the links of the Seattle Golf and Country Club. Practically a part of the city's park system and to be crossed by its boulevards are the campus of the university of Washington, and the fine grounds (605 acres given to the Federal government by the city) of Fort Lawton. On the campus of the university are a statue of Washington by Lorado Taft and a bust of J. J. Hill by Ben Frolick.

The principal public buildings are the county court house (on a commanding site), the county almshouse, the municipal building, a federal building, the Y.M.C.A. building, a Labor Temple, a Carnegie library (1905), with several branches throughout the city and about 128,000 volumes in 1910, and the buildings of the university of Washington. In Georgetown, immediately S. of the main part of Seattle and nearly hemmed in by parts of the city, is the county hospital. The city has many churches, including Chinese, Japanese, Finnish, Scandinavian, German and Russian. Seattle is the see of a Roman Catholic bishop, and St James Cathedral is the finest church in the city. The First Presbyterian Church has a large auditorium.

Of the many educational institutions, the most important is the university of Washington (see WASHINGTON), which was established here by the legislature of 1854-1855. Among the others are: the Washington Preparatory School for Girls; the Holy Names Academy and Normal School (under the Sisters of the Holy Names of Jesus and Mary); the College of Our Lady of Lourdes; Adelphis College; the Brothers' School; the Seattle College; three business colleges; the Seattle Art School, in connexion with which the Art Students' League of Seattle was formed in 1909; and a good public school system including six high schools in 1910, one of which has an excellent collection of the fauna and flora of the Pacific Coast. On Mercer Island in Lake Washington is the parental school of the municipal public school system. The city has a cosmopolitan press, including two Japanese dailies.

There are an associated charities organization and a "charities endorsement committee" (1903), which is under the auspices of three commercial associations. For children there are a receiving home (1896, under the Washington Children's Home Society); the Seattle Children's Home (1884, under the Ladies' Relief Society of Washington); and a children's orthopaedic hospital (1907). The Seattle Federation of Women's Clubs supports a Girls' Home and Training School (1909). Under Roman Catholic control are a Deaconess Home, the Mount Carmel Home (under the Missionary Sisters of the Sacred Heart of Jesus), and the House of the Good Shepherd (under the Sisters of the Good Shepherd). The Ladies' Hebrew Benevolent Society, the Ladies' Montefiore Aid Society and the Hebrew Benevolent Association are Jewish charities. Other charities are the Seattle Seamen's Friend Society, the Florence Crittenton Home, the Lebanon Rescue Mission, the Japanese Women's Home, the Seattle Fruit and Flower Mission, and the Kenny Home for Old Ladies (Presbyterian). The principal hospitals are the Pacific (1899), the Seattle General (1894, under the Deaconess Home Association), the Providence (1877, under the Sisters of Charity), the Minor, the Wayside Emergency (1900), the Municipal and the county.

The situation of Seattle makes it important commercially and industrially. For its manufactories electric power is derived

from Snoqualmie Falls (N.E. of Seattle) from Puyallup river (S.W.) and from Cedar river.

The total value of the factory product in 1905 (excluding Ballard) was $25,406,574 (nearly one-fifth of that of the state), or 65·8 % more than in 1900. The increase was particularly marked in the value of flour, $4,593,566, or 253·9 % more than in 1900. Other important manufactures in 1905 were: packed meats and slaughter house products ($3,419,085); malt liquors ($2,121,631); foundry and machine shop products ($1,771,571)—there is a large manufactory of nuts and bolts; lumber and timber ($1,519,247); confectionery ($821,123); canned and preserved fish ($610,356); and ships and boats. In what was formerly Ballard, now the 13th ward, on Salmon Bay, there are large mills for the manufacture of red cedar shingles.

Seattle is the most important seaport of the state, being the commercial and industrial centre for the customs district of Puget Sound. In 1909 the net tonnage of vessels entering the harbour (local figures) was 2,407,351 tons. The foreign exports in 1908 (Harbour Master's Report) were valued at $18,413,735, the foreign imports at $23,805,727. Its exports and imports make up the greater part of the commerce of the district, which has Port Townsend as its port of entry, and the city is rivalled only by San Francisco among the cities of the Pacific coast in the amount of its water-borne traffic. The chief exports are wheat, flour, timber, hay, potatoes, live stock, fruit, fish (salmon), oats, coal (from the mines E. of Lake Washington), hops, cotton (from the Southern States), dairy products and general merchandise; and the imports include silk, rice, coffee, tea, sugar, spices, indigo and other Oriental products. Practically all the gold from Alaska and the Yukon territory is received here, and nearly 80 % of the Alaskan trade is done through Seattle. The foreign trade is with China, Japan, Siberia, Hawaii, the Philippines, Australia, Mexico, South America and Europe. The Chamber of Commerce has an excellent commercial museum.

The city was chartered in 1880, and under the charter of 1896 (as amended since) elections are biennial. By an amendment of 1908 the initiative and referendum were introduced; an initiative petition must be signed by 10 % of the voters at the preceding municipal election; a petition for a referendum on any ordinance passed by the city council must be signed by 8 % of the voters at the preceding municipal election. The city council is composed of one councilman elected for a two-year term from each ward (in 1910 there were 14 wards), and two councilmen elected at large and serving for four years. The municipality owns the water-supply system with its source at Cedar Lake and Cedar river, 28 m. S.E., and an electric lighting plant (for which power is derived from the falls of the Cedar river), but most of the lighting is supplied by private companies. The city has undertaken the regrading necessitated by the hilly site of Seattle. In 1909 the assessed valuation of the city was $185,317,470 and the city's debt was $8,570,380 (bonded) and $8,933,973 (net debt for local improvements).

The first permanent settlement here was made in 1852 by settlers who a year before had established New York, a village at Alki Point, on the W. side of Elliott Bay and in the present city limits. The name Seattle was given to the settlement in honour of a Dwamish chief of that name, who died in 1866 and who was friendly to the whites. In 1853 a town plat was filed, King county was erected, and Seattle became the county seat. In 1855 Seattle had a population of 300. In January 1856 in an attempt to exterminate the whites the neighbouring Indians unsuccessfully attacked Seattle, which was defended by the U.S. sloop-of-war "Decatur." The first railway reached Seattle in 1884. In 1885–1886, when there were anti-Chinese riots here led by the Knights of Labour, martial law was declared by the governor and the Chinese were defended by local vigilance committees. A destructive fire in 1889 and the financial depression of 1893 checked the city's growth, which, however, received a new impulse from the discovery of gold in Alaska and the Yukon territory in 1897, as Seattle became the outfitting place for prospectors and the port to which gold was shipped. The town of South Seattle was annexed in 1905; and the city of South-east Seattle, the town of Ravenna, the town of South Park, the city of Columbia, the city of Ballard, the city of West Seattle, and Dunlap, Rainier Beach and Atlantic City were annexed in 1907. From the 1st of June to the 15th of October 1909 the Alaska-Yukon-Pacific Exposition was held in Seattle on grounds which now form part of the university campus, between Lake Union and Lake Washington; of the twelve central Exposition buildings some were afterwards turned over to the university. The purpose of the Exposition was to exploit Washington, the Yukon and the entire north-west on the Pacific slope.

SEA-URCHIN. These animals belong to the great group of Echinoderms (see ECHINODERMA) and to its class Echinoidea. Both the scientific and the English names denote their resemblance to the urchin or hedgehog, the resemblance lying in the prickles with which the skin is covered. The skin itself is stiffened by a deposit of calcite (crystalline carbonate of lime) in the form of plates. If the prickles be scraped away, these plates will be seen to form a hard shell or test, in which are two openings, for the mouth and the anus. According to the position of these openings the urchins are described as Regular or Irregular. In the Regular urchins, of which *Echinus esculentus*, the edible egg-urchin (fig. 1), and *Dorocidaris papillata*, the piper (fig. 2), are familiar examples, the test is spheroidal with the mouth at the lower pole and the anus at the upper. In the Irregular urchins, of which *Spatangus purpureus*, the purple heart-urchin (fig. 3), is a common type, the test has been drawn out into an oval or heart shape, with the mouth shifted towards the front end and the anus towards the hinder end.

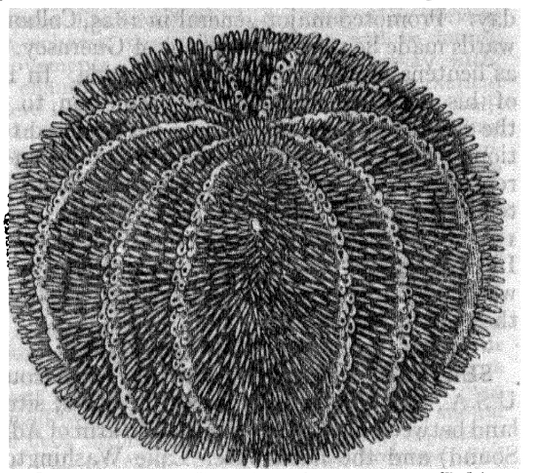


FIG. 1.—A Regular Sea-urchin, *Echinus esculentus*. The test is still covered with spines, between which the suckers of the podia are seen in ten rows.

The greater part of the test of a Regular urchin is divided, as a globe by meridians of longitude, into ten areas, each composed of two columns of plates. In five of these areas the plates are pierced by pairs of pores (fig. 2, *Ambulacrum*), and in life there issues from each pair a tubular process with a sucking disk at its end (fig. 1). Within the test these processes or podia are connected with five tubes arising from a tubular ring round the mouth and running upwards to the apex, where each passes out as a single process through a special plate at the end of the area to which it belongs. Since this terminal process is sometimes surrounded by pigment, as are organs susceptible to light, it has been regarded as an eye and the plate through which it passes called an ocular (fig. 2). From the ring-canal round the mouth a single tube passes straight through the body-cavity to the apex, where it opens through a sieve-like plate—the madreporite (fig. 2). Thus all this system of tubes is placed in connexion with the outer sea-water, and is filled with it. Within the test the bottom of each podium is swollen into a little bag—ampulla likewise full of water, and when the muscles with which it is provided pull the sides of the bag together, the water is squeezed into the podium and dilates it, so that it is stretched far out (see ECHINODERMA, fig. 12 D). The podium can then wave about and attach its sucker to any smooth object within reach. Each of these five areas, with the podia on each side of it extended and waving, looks like a garden avenue—Latin *ambulacrum*—and the areas are therefore called ambulacral areas, the plates composing them ambulacrals, and the whole system of water-vessels the ambulacral system. This system forms perhaps the most characteristic feature of all living Echinoderms, but it reaches its highest development in the urchins. The five areas alternating with the ambulacral areas are called interambulacral (fig. 2, *Interambulacrum*); their plates are not pierced by pores but are generally ornamented by large tubercles bearing big prickles (spines or radioles), between and around which are smaller prickles (fig. 2). The madreporite is one of five plates that surround the anal opening and alternate in position with the oculars. Each of these plates is pierced by a pore, connected on the inside with one of the five generative glands, and giving passage to the eggs or milt when they are ripe; hence these plates are called genitals (fig. 2). The five genitals and five oculars together form the apical system of plates (see ECHINODERMA, fig. 3, A.B.). From the mouth to the anus the gut follows a coiled course, first going round the cavity of the test in one direction and then turning back on itself, while the two limbs of the loop thus formed are themselves thrown into festoons attached by strands to the wall of the test. The lower coil, next the mouth, is the stomach

in which food accumulates, while the upper coil is the intestine proper. In *Echinus*, but not in the Cidarids, a narrow tube branches from the gut at the beginning of the first coil, runs alongside the stomach, and re-enters the gut at the end of the coil; this, which is called the siphon, permits a flow of water through the gut however full of food the stomach may be. Round the gullet is a jaw-apparatus, consisting essentially of five hard, pointed teeth, the ten jaw-pieces in which they are held, five struts between the pairs of jaws, and five cambered stays for the attachment of ligaments to keep the whole apparatus in position. The jaws are worked by muscles in such a way as to draw the teeth together or apart, inwards or outwards. This apparatus is often called "Aristotle's lantern," though it is extremely doubtful whether Aristotle (*Hist. Anim.* iv. 5) was alluding to this structure. The whole of it is covered by the membrane lining the body-cavity, and from the space thus enclosed there pass to the exterior five pairs of hollow branched appendages, the external gills; the five notches through which the gills passed can be seen in the dried test of an Echinus from which the mouth-membrane has been removed, but not in the test of the piper-urchin or other Cidarid, because there the gills are not developed.

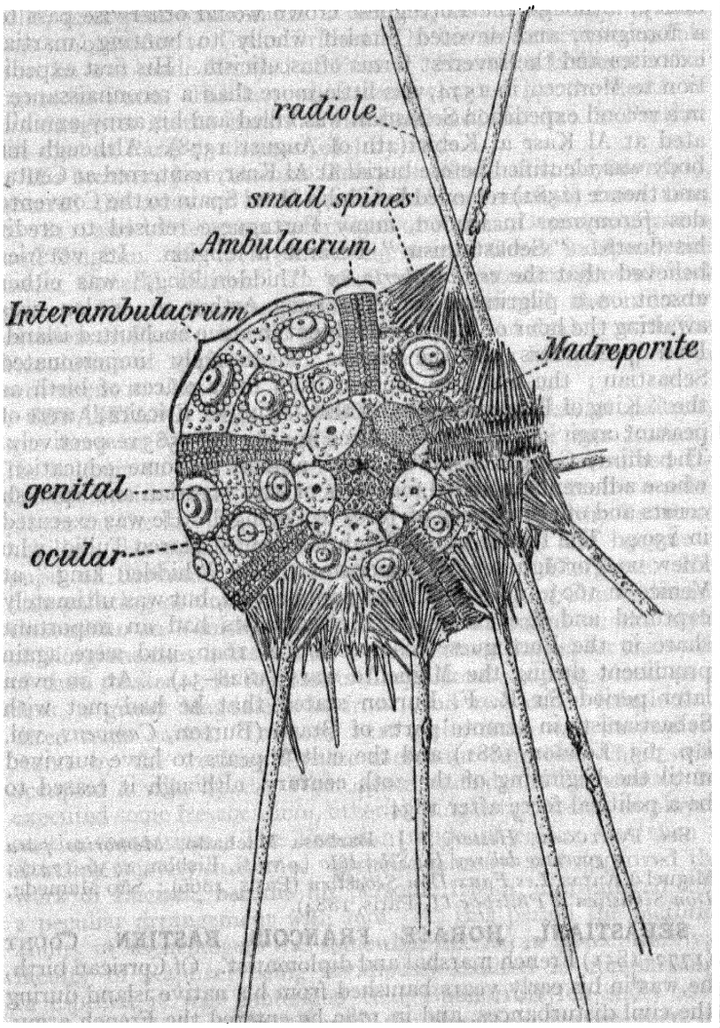


FIG. 2.—A Regular Sea-urchin, *Dorocidaris papillata*. The test seen from above, with most of the spines removed. Natural size.

The prickles that cover the test are better studied in the piper-urchin (fig. 2), where some of them are very large and, from their resemblance to the drones of a bagpipe, have suggested the name of the animal. Each of these large spines or radioles is attached to a rounded tubercle by an enclosing ligament and outer coat of muscles, the base of the radiole being hollowed to fit on the tubercle. Thus the radiole can be moved in any direction. The attachment of the larger radioles is protected by a ring of smaller ones. These and the other small spines protect the sea-urchin, as its prickles protect a hedgehog; the larger ones may also help the animal to move or to fix itself firmly against the shock of waves. Some urchins, especially the purple egg-urchin, bore holes even in very hard rocks, and by stretching out their radioles they can hold themselves immovably in their holes; how they bore the holes is not known with certainty. Besides radioles, small pincer-like appendages called pedicellariae are attached to the test by similar ball-and-socket joints. Each consists of a long stalk bearing three blades which can meet at their points; on the inner surface of each blade is a cushion of sensitive skin, and often a gland which secretes a poison. The pedicellariae were once supposed to be parasites, but they are really organs of the urchin of the same nature as the radioles, they are of four different forms, three of which undoubtedly serve for defence, while the shortest ones clean the test from impurities and sand-grains that fall between the radioles. Sea-urchins other than Cidarids bear on the test minute sensory organs called sphaeridia, each consisting of a small hard knob, supported by a stalk which may be partly calcified but always contains many nerve-fibres. It is generally supposed that they are sensitive to vibrations in the water, and to any change from the normal position which the animal may assume or be forced into. Such a regular urchin as has here been described lives with the mouth downwards, preferring a hard floor, on which it creeps by its podia and its radioles, constantly scraping the algae and seaweeds from the rock with its teeth and so feeding itself. If it does not bore a hole, or is not protected by long needle-like radioles, it may grasp bits of sea-weed or other objects with its pedicellariae and hide beneath them from the fish that seek it for food.

The Irregular urchins (fig. 3) have been modified for another way of life. Some of them live in mud or ooze, through which they creep. The mouth has moved forward, has lost its jaws and often has a lip, projecting so as to scoop up the mud. The prickles have become smaller, often almost silky, and are generally directed backwards so as not to oppose the passage of the body. The podia of the under surface still aid locomotion, but those of the upper surface, which are concentrated in five petal-shaped areas, act mainly as gills. These urchins often assume a heart shape, owing to the greater development and sinking in of the front petal. The sand-dollars and their allies, which live half-buried in sand without moving through it, retain a more or less circular outline, as well as the central position of the mouth, which has not lost its jaws; the anus, however, has moved to the side, while the podia of the upper surface are concentrated in petals and many of them modified into branched gills. The sand-dollars proper are very thin and flat, but the shield-urchins (*Clypeaster*, &c.) have the central region of the upper surface raised in a boss, which reaches above the sand, so that the animal can still breathe though the whole body is hidden. In many Irregular urchins the petals of the ambulacra are deeply sunk, and serve as a nursery for the young, which are covered by the spines of the parent.

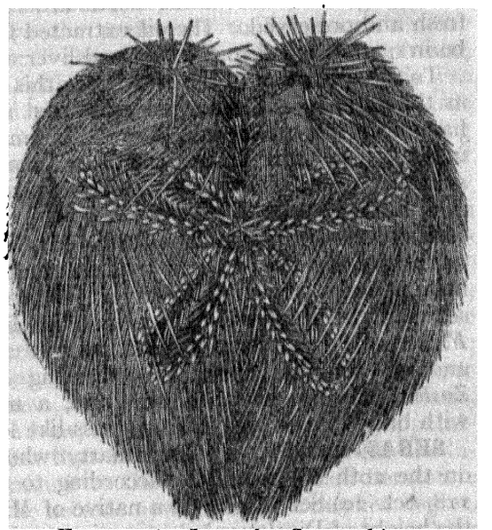


FIG. 3.—An Irregular Sea-urchin, *Spatangus purpureus*.

Sea-urchins live only in the sea, from between tide-marks down to all but the greatest depths. The abyssal forms have very thin tests, which are often flexible. Urchins eat all kinds of animal and vegetable food, and are themselves attacked by fish, by star-fish, and even by other urchins. The ripe egg-bunches are a favourite article of diet with dwellers round the Mediterranean; in other respects sea-urchins are of small importance to man, being neither useful nor harmful. In olden times the larger radioles were recommended to be powdered and taken as a remedy for the stone.

For details of classification, see under *Echinoidea*, in the article ECHINODERMA.

SEA-WOLF, also SEA-CAT and WOLF FISH (*Anarrhichas lupus*), a marine fish, the largest of the family *Blenniidae* or blennies. In spite of its large size, it has retained the bodily form and general external characteristics of the small blennies. Its body is long, subcylindrical in front, compressed in the caudal portion, smooth and slippery, the rudimentary scales being embedded and almost hidden in the skin. An even dorsal fin extends the whole length of the back, and a similar fin from the vent to the caudal fin, as in blennies. The pectorals are large and rounded, the pelvic fins entirely absent. Its dentition distinguishes the sea-wolf from all the other members of the family. Both jaws are armed in front with strong conical teeth, and on the sides with two series of large tubercular molars, a biserial band of similar molars occupying the middle of the palate. By these teeth the sea-wolf is able to crush the hard carapaces or shells of the crustaceans and molluscs on which it feeds, that it uses

the teeth as a weapon of defence and deserves the character of ferocity generally attributed to it would appear to be rather questionable. Sea-wolves are inhabitants of the northern seas of both hemispheres, one (*A. lupus*) being common on the coasts of Scandinavia and North Britain, and two in the seas round Iceland and Greenland. Two others occur in the corresponding latitudes of the North Pacific. They attain to a length exceeding 6 ft., and in the north are esteemed as food, both fresh and preserved. The oil extracted from the liver is said to be in quality equal to the best cod-liver oil.



Teeth of the lower and upper jaws of the Sea-wolf.

To the fishermen of the North Sea this fish is generally known as the cat-fish, and for some years past numbers of this species have been marketed. As it would be impossible to sell the fish in its natural state on account of its forbidding appearance, it is skinned and beheaded, and the flesh retailed under the name of rock-salmon.

SEAWRACK, the detached seaweeds thrown up, often in great quantities, by the sea and used for manure, also formerly for making kelp. It consists largely of species of *Fucus*—brown seaweeds with flat branched ribbon-like fronds, characterized in *F. serratus* by a saw-toothed margin and in *F. vesiculosus*, another common species, by bearing air-bladders. Also of *Zostera marina*, so-called sea-grass, a marine flowering plant with bright green long narrow grass-like leaves.

SEBASTIAN, ST, a Christian martyr whose festival is celebrated on the 20th of January. According to St Ambrose (in Psalm 118, oct. 20) Sebastian was a native of Milan, went to Rome at the height of Diocletian's persecution, and there suffered martyrdom. The *Acta* of St Sebastian, falsely attributed to the same St Ambrose, are far less sparing of details. They make him a citizen of Narbonne and captain of the first cohort under the emperors Diocletian and Maximian. Having secretly become a Christian, Sebastian was wont to encourage those of his brethren who in the hour of trial seemed wavering in their profession. This was conspicuously the case with the brothers Marcus and Marcellinus. He made many converts, several of whom suffered martyrdom. Diocletian, having been informed of this conduct, sent for him and earnestly remonstrated with him, but, finding him inflexible, ordered him to be bound to a stake and shot to death. After the archers had left him for dead, a devout woman, Irene, came by night to take his body away for burial, but, finding him still alive, carried him to her house, where his wounds were dressed. No sooner had he wholly recovered than he hastened to confront the emperor, reproaching him with his impiety; Diocletian ordered him to be instantly carried off and beaten to death with rods. The sentence was forthwith executed, his body being thrown into the *cloaca*, where, however, it was found by another pious matron, Lucina, whom Sebastian visited in a dream, directing her to bury him *ad Catacombas juxta vestigia apostolorum*. It was on this spot, on the Appian way, that was built the basilica of St Sebastian, which was a popular place of pilgrimage in the middle ages. The translation of his relics to Soissons in 826 made that town a new centre of his cult. St Sebastian is specially invoked against the plague. As a young and beautiful soldier, he is a favourite subject of sacred art, being most generally represented undraped, and severely though not mortally wounded with arrows.

See *Acta Sanctorum*, January, ii. 257-296; *Bibliotheca hagiographica Latina* (Brussels, 1899), n. 7543-7549; A. Bell, *Lives and Legends of the Evangelists, Apostles and other early Saints* (London, 1901), pp. 238-240. (H. De.)

SEBASTIAN, king of Portugal (Port. *Sebastião*) (1554–1578), the posthumous son of Prince John of Portugal and of his wife Joanna, daughter of the emperor Charles, was born in 1554, and became king in 1557, on the death of his grandfather John III. of Portugal. During his minority (1557–1568), his grandmother Queen Catherine and his great uncle the Cardinal Prince Henry acted jointly as regents. Sebastian's education was entrusted to a Jesuit, D. Luiz Conçalves da Camara and to D. Aleixo de Menezes, a veteran who had served under Albuquerque. He grew up resolved to emulate the medieval knights who had reconquered Portugal from the Moors. He was a mystic and a fanatic, whose sole ambition was to lead a crusade against the Mahommedans in north-west Africa. He entrusted the government to the Jesuits; refused either to summon the Cortes or to marry, although the Portuguese crown would otherwise pass to a foreigner, and devoted himself wholly to hunting, martial exercises and the severest forms of asceticism. His first expedition to Morocco, in 1574, was little more than a reconnaissance; in a second expedition Sebastian was killed and his army annihilated at Al Kasr al Kebir (4th of August 1578). Although his body was identified before burial at Al Kasr, reinterred at Ceuta, and thence (1582) removed by Philip II. of Spain to the Convento dos Jeronymos in Lisbon, many Portuguese refused to credit his death. "Sebastianism" became a religion. Its votaries believed that the *rei encuberto*, or "hidden king," was either absent on a pilgrimage, or, like King Arthur in Avalon, was awaiting the hour of his second advent in some enchanted island. Four pretenders to the throne successively impersonated Sebastian; the first two, known from their places of birth as the "King of Penamacor" and the "King of Ericeira," were of peasant origin; they were captured in 1584 and 1585 respectively. The third, Gabriel Espinosa, was a man of some education, whose adherents included members of the Austrian and Spanish courts and of the Society of Jesus in Portugal. He was executed in 1594. The fourth was a Calabrian named Marco Tullio, who knew no Portuguese; he impersonated the "hidden king" at Venice in 1603 and gained many supporters, but was ultimately captured and executed. The Sebastianists had an important share in the Portuguese insurrection of 1640, and were again prominent during the Miguelite wars (1828–34). At an even later period Sir R. F. Burton stated that he had met with Sebastianists in remote parts of Brazil (Burton, *Camoens*, vol. i. p. 363, London, 1881), and the cult appears to have survived until the beginning of the 20th century, although it ceased to be a political force after 1834.

See Portugal, *History*; J. Barbosa Machado, *Memorias para . . . . . o governo del rey D. Sebastião* (4 vols., Lisbon, 1736–1741); Miguel d'Antas, *Les Faux Don Sébastien* (Paris, 1866); São Mamede, *Don Sébastien et Philippe II* (Paris, 1884).

SÉBASTIANI, HORACE FRANÇOIS BASTIEN, Count (1772–1851) French marshal and diplomatist. Of Corsican birth, he was in his early years banished from his native island during the civil disturbances, and in 1789 he entered the French army. In 1793, as a French lieutenant, he took part in the war in his native island, after which he served in the Army of the Alps. He became *chef de brigade* in 1799. Attached by birth and service to the future Emperor Napoleon, he took part in the *Coup d'État* of 18th Brumaire (9th November 1799). He was present at Marengo in 1800. Sébastiani next appears in his first diplomatic post, in Turkey and Egypt (1802). Promoted general of brigade in 1803, he served in 1805 in the first of the great campaigns of the Empire. His conduct at Austerlitz (2nd December), where he was wounded, won him promotion to the rank of general of division. Sébastiani soon returned to Constantinople as French Ambassador. As ambassador he induced the Porte to declare war on Russia, as a soldier he directed with success the defence of Constantinople against the British squadron of Admiral (Sir) J. T. Duckworth. But the deposition of the Sultan Selim III. put an end to French diplomatic success in this quarter, and Sébastiani was recalled in April 1807 (see *La Politique orientale de Napoléon: Sébastiani et Gardane*, by E. Driault, Paris, 1905). He was at this time made Count of the Empire. As the commander of a corps he served in the Peninsular War, but his cavalry genius did not shine in the

laborious and painful operations against the careful English and the ubiquitous *guerrilleros*. In the more congenial *grande guerre* of Russia and Germany he was in his element, and at Smolensk, Borodino and Leipzig he did brilliant service. He accepted the Restoration government in 1814, but rejoined his old leader on his return from Elba. After Waterloo he retired into England for a time, but soon returned, and was placed on half-pay. From 1819 onwards he was a prominent member of the Chamber of Deputies. He held the posts of Minister of Marine, and, later, of Foreign Affairs. In this latter capacity he was the author of the historic saying "Order reigns at Warsaw." In 1832 he was a Minister of State without portfolio, next year ambassador at Naples, and from 1835 to 1840 was ambassador to Great Britain. On his retirement from this post he was made Marshal of France. He was a brilliant social figure in Paris. His last years were clouded by the death of his daughter at the hands of her husband, the duc de Praslin. He died at Paris on the 21st of July 1851.

His brother, JEAN ANDRÉ TIBURCE SÉBASTIANI (1786–1871), entered the army in 1806, served in the Peninsula from 1809 to 1811, and in the great campaigns of Russia, Germany, France and Belgium. He took part in the war of Greek independence under General Maison. In 1842, now lieutenant-general and peer of France, he was appointed to command the military division of Paris. But he proved incapable of dealing with the Revolution of 1848, and the remainder of his life was spent in retirement in Corsica.

SEBASTIANO DEL PIOMBO (1485–1547), Italian painter, was born at Venice in 1485. His family name was Luciani. He belongs to the Venetian school, exceptionally modified by the Florentine or Roman. At first a musician, chiefly a solo-player on the lute, he was in great request among the Venetian nobility. He soon showed a turn for painting, and became a pupil of Giovanni Bellini and afterwards of Giorgione. His first painting of note was done for the church of San Giovanni Crisostŏmo in Venice, and is so closely modelled on the style of Giorgione that in its author's time it often passed for the work of that master. It represents Chrysostom reading aloud at a desk, a grand Magdalene in front, and two other female and three male saints. Towards 1512 Sebastiano was invited to Rome by the wealthy Sienese merchant Agostino Chigi, who occupied a villa by the Tiber, since named the Farnesina; he executed some frescoes here, other leading artists being employed at the same time. The Venetian mode of colour was then a startling novelty in Rome. Michelangelo saw and approved the work of Luciani, became his personal friend, and entered into a peculiar arrangement with him. At this period the pictorial ability of Michelangelo was somewhat decried in Rome, the rival faculty of Raphael being invidiously exalted in comparison; in especial it was contended that Buonarroti fell short as a colourist. He therefore thought that he might try whether, by furnishing designs for pictures and leaving to Sebastiano the execution of them in colour, he could not maintain at its highest level his own general supremacy in the art. In this there seems to have been nothing particularly unfair, always assuming that the compact was not fraudulently concealed; and the facts are so openly stated by Michelangelo's friend Vasari (besides other writers) that there appears to have been little or no disguise in the matter. The pictures are there to speak for themselves; and connoisseurs have always acknowledged that the quality of Michelangelo's unmatched design is patent on the face of them. Some writers, however, jealous for Buonarroti's personal rectitude, have denied that his handiwork is to be traced in the pictures bearing the name of Sebastiano.

Four leading pictures which Sebastiano painted in pursuance of his league with Buonarroti are the "Pietà" (earliest of the four), in the church of the Conventuali, Viterbo; the "Transfiguration" and the "Flagellation," in the church of S. Pietro in Montorio, Rome; and, most celebrated of all, the "Raising of Lazarus," now in the National Gallery, London. This grand work—more remarkable for general strength of pictorial perception than for qualities of detailed intellectual or emotional expression—is more than 12 by 9 ft. in dimensions, with the principal figures of the natural size; it is inscribed "Sebastianus Venetus faciebat," and was transferred from wood to canvas in 1771. It was painted in 1517–1519 for Giulio de' Medici, then bishop of Narbonne, afterwards Pope Clement VII.; and it remained in Narbonne cathedral until purchased by the duke of Orleans early in the 18th century—coming to England with the Orleans gallery in 1792. It used to be generally admitted (yet it is now increasingly contested) that the design of Michelangelo appears in the figure of Lazarus and of those who are busied about him (the British Museum contains two sketches of the Lazarus regarded as Michelangelo's handiwork); but whether he actually touched the panel, as has often been said, appears more than doubtful, as he left Rome about the time when the picture was commenced. Raphael's "Transfiguration" was painted for the same patron and the same destination. The two works were exhibited together, and some admirers did not scruple to give the preference to Sebastiano's. The "Flagellation of Christ," though ordinarily termed a fresco, is, according to Vasari, painted in oil upon the wall. This was a method first practised by Domenico Venezziano, and afterwards by other artists; but Sebastiano alone succeeded in preventing the blackening of the colours. The contour of the figure of Christ in this picture is supposed by many to have been supplied by Buonarroti's own hand. Sebastiano, always a tardy worker, was occupied about six years upon this work, along with its companion the "Transfiguration," and the allied figures of saints.

After the elevation of Giulio de' Medici to the pontificate, the office of the "piombo" or leaden seal—that is, the office of sealer of briefs of the apostolic chamber—became vacant; two painters competed for it, Sebastiano Luciani, hitherto a comparatively poor man, and Giovanni da Udine. Sebastiano, assuming the habit of a friar, secured the very lucrative appointment—with the proviso that he should pay out of his emoluments 300 scudi per annum to Giovanni. If he had heretofore been slow in painting, he became now supine in a marked degree. One of the few subject-pictures which he executed after taking office was "Christ carrying the Cross" for the patriarch of Aquileia, also a "Madonna with the body of Christ." The former painting is done on stone, a method invented by Sebastiano himself. He likewise painted at times on slate—as in the instance of "Christ on the Cross," now in the Berlin gallery, where the slate constitutes the background. In the same method, and also in the same gallery, is the "Dead Christ supported by Joseph of Arimathea, with a weeping Magdalene"—colossal half-length figures. Late in life Sebastiano had a serious disagreement with Michelangelo with reference to the Florentine's great picture of the "Last Judgment." Sebastiano encouraged the pope to insist that this picture should be executed in oil. Michelangelo, determined from the first upon nothing but fresco, tartly replied to his holiness that oil was only fit for women and for sluggards like Friar Sebastian; and the coolness between the two painters lasted almost up to the friar's death. This event, consequent upon a violent fever acting rapidly upon a very sanguine temperament, took place in Rome in 1547. Sebastiano directed that his burial, in the church of S. Maria del Popolo, should be conducted without ceremony of priests, friars or lights, and that the cost thus saved should go to the poor; in this he was obeyed.

Numerous pupils sought training from Sebastiano del Piombo; but, owing to his dilatory and self-indulgent habits, they learned little from him, with the exception of Tommaso Laureti. Sebastiano, conscious of his deficiency in the higher sphere of invention, made himself especially celebrated as a portrait painter: the likeness of Andrea Doria, in the Doria Palace, Rome, is one of the most renowned. In the National Gallery, London, are two fine specimens: one canvas represents the friar himself, along with Cardinal Ippolito de' Medici; the other, a portrait of a lady in the character of St Agatha, used to be identified with one of Sebastiano's prime works, the likeness of Julia Gonzaga (painted for her lover, the aforenamed cardinal), but this assumption is now discredited. There were also portraits of Marcantonio Colonna, Vittoria Colonna, Ferdinand marquis of Pescara, Popes Adrian VI., Clement VII. (Studj Gallery, Naples) and Paul III., Sanmicheli, Anton Francesco degli Albizzi

and Pietro Aretino. One likeness of the last-named sitter is in Arezzo and another in the Berlin gallery.

See his general histories of art; and, with regard to his designs, Bernhard Berenson, *The Drawings of Florentine Painters* (1904). The decision as to the authorship of various pictures which may or may not be attributable to Sebastiano del Piombo is necessarily a matter of contemporary connoisseurship, and it need only be noted that Mr Berenson is inclined to give increased importance to this master. (W. M. R.)

SEBENICO (Serbo-Croatian, *Šibenik*), an episcopal city, and the centre of an administrative district in Dalmatia, Austria; at the end of a branch railway from Knin. Pop. (1900) of city and commune, 24,751. Sebenico is built on a hill overlooking the river Kerka, which here forms a broad basin, connected by a winding channel with the Adriatic Sea, 3 m. S.W. The city is partly walled, and guarded on the seaward side by the 16th-century castle of St Anna and two dismantled forts. Venetian influence is everywhere manifest; the Lion of St Mark is carved over the main gateway and on many public buildings; and among the narrow and steep lanes of the city there are numerous examples of Venetian Gothic or early Renaissance architecture. Sebenico has been the seat of a Roman Catholic bishop since 1298. It has also an orthodox bishop. The Roman Catholics, who constitute the majority of citizens, possess a lofty and beautiful cruciform cathedral, built entirely of stone and metal. Probably no other church of equal size in Europe is similarly constructed. Even the waggon vaults over the nave, choir and transepts are of stone unprotected by lead or tiles. The older part of the cathedral, dating from 1430 to 1441, and including the fine north doorway, is Italian Gothic. Giorgio Orsini of Zara, who had studied architecture in Venice and been strongly influenced by the Italian Renascence, carried on the work of construction until his death in 1475. It was finished early in the 16th century; and thus the cathedral belongs to two distinct periods and represents two distinct styles.

Sebenico is lighted by electric light; the power being supplied by the celebrated falls of the Kerka, near Scardona, on the north. Sebenico is a steamship station, with an excellent harbour. Wine, oil, corn and honey are produced in the neighbourhood; many of the inhabitants are fishermen and seamen. The Latin name of *Sicum* is adopted in public inscriptions; but the city cannot be identified with the Roman colony of Sicum, which was probably situated farther south. Sebenico first became prominent in the 12th century as a favourite residence of the Croatian kings. From 1358 to 1412 it was ruled by Hungary; it subsequently formed part of the Venetian dominions. In 1647 it was unsuccessfully besieged by the Turks.

SEBORRHOEA, a medical term applied to describe an accumulation on the skin of the normal sebaceous secretion mixed with dirt and forming scales or a distinct incrustation. On the head, where it is commonly seen, it may interfere with the nutrition of the hair and cause partial baldness. A form of this disease occurs in young infants. The main treatment consists in thoroughly cleansing the parts. The crusts may be softened with oil and the affected skin regularly washed with soft soap and rectified spirit. The sebum frequently accumulates in the sebaceous ducts, giving rise to the minute black points often noticed on the face, back and chest in young adults, to which the term *comedones* is applied. A form of this disorder, of larger size and white appearance, is termed *milium*. These affections may to a large extent be prevented by strict attention to ablution and brisk friction of the skin, which will also often remove them when they begin to appear. The retained secretion may be squeezed out or evacuated by incision and the skin treated with some simple sulphur application.

SECCHI, ANGELO (1818–1878), Italian astronomer, was born on the 29th of June 1818 at Reggio in Lombardy, and entered the Society of Jesus at an early age. In 1849 he was appointed director of the observatory of the Collegio Romano, which was rebuilt in 1853; there he devoted himself with great perseverance to researches in physical astronomy and meteorology till his death at Rome on the 26th of February 1878.

The results of Secchi's observations are contained in a great number of papers and memoirs. From about 1864 he occupied himself almost exclusively with spectrum analysis, both of stars (*Catalogo delle stelle di cui si è determinato lo spettro luminoso*, Paris, 1867, 8vo; "Sugli spettri prismatici delle stelle fisse," two parts, 1868, in the *Atti della Soc. Ital.*) and of the sun (*Le Soleil*, Paris, 1870, 8vo; 2nd ed., 1877).

For a list of his publications see Poggendorff, *Biographisch-Literarische*; also see *Monthly Notices R.A.S.*, No. 39, and Carlo Bricarelli, "Vita e opere di A. Secchi," *Nuovi Linc. Mem.* (1888), vol. 4.

SECESSION, a term used in political science to signify the withdrawal of a state from a confederacy or composite state, of which it had previously been a part; and the resumption of all powers formerly delegated by it to the federal government, and of its status as an independent state. To secede is a sovereign right; secession, therefore, is based on the theory that the sovereignty of the individual states forming a confederacy or federal union has not been absorbed into a single new sovereignty. Secession is a right claimed or exercised by weaker states of a union whose rights are threatened by the stronger states, which seldom acknowledge such a principle. War generally follows the secession of a member of a union, and the seceding state, being weaker, is usually conquered and the union more firmly consolidated. The history of Europe furnishes several examples of secession or attempts to secede: in 1309 the Swiss cantons withdrew from the Empire and formed a confederacy from which, in 1843–1847, the Catholic cantons seceded and formed a new confederacy called the *Sonderbund*, which was crushed in the war that followed; in 1523 Sweden seceded from the *Kalmarian* Union formed in 1397 of Denmark, Sweden and Norway: and in 1814 Norway seceded and entered into a union with Sweden, from which, in the same year, it attempted to secede but was forcibly prevented; Norway, however, accomplished a peaceful secession from the Union in 1905 and resumed her independent status; in 1848–1849 Hungary attempted to withdraw from the union with Austria but the attempt was defeated; Prussia and other north German states withdrew in 1866–1868 from the German Confederation and formed a new one; a late instance of successful secession is that of Panama, which seceded in 1903 from the Republic of Colombia. But secession in theory and practice is best exhibited in the history of the United States. Most of the original states, and many of the later ones, at some period when rights were in jeopardy proclaimed that their sovereignty might be exercised in secession. The right to secede was based, the secessionists claimed, upon the fact that each state was sovereign, becoming so by successful revolution against England; there had been no political connexion between the colonies; the treaty of 1783 recognized them "as free, sovereign and independent states"; this sovereignty was recognized in the Articles of Confederation, and not surrendered, they asserted, under the Constitution; the Union of 1787 was really formed by a secession from the Union of 1776–1787. New states claimed all the rights of the old ones, having been admitted to equal standing. Assertions of the right and necessity of secession were frequent from the beginning; separatist conspiracies were rife in the West until 1812; various leaders in New England made threats of secession in 1790–1796 and 1800–1815—especially in 1803 on account of the purchase of Louisiana, in 1811 on account of the proposed admission of Louisiana as a state, and during the troubles ending in the war of 1812. Voluntary separation was frequently talked of before 1815. Two early commentators on the Constitution, St George Tucker in 1803 and William Rawle in 1825, declared that the sovereign states might secede at will. In 1832–1833 the "Union" party of South Carolina was composed of those who rejected nullification, holding to secession as the only remedy; and from 1830 to 1860 certain radical abolitionists advocated a division of the Union. But as the North grew stronger and the South in comparison grew weaker, as slavery came to be more and more the dominant political issue, and as the South made demands concerning that "peculiar institution" to which the North was unwilling to accede, less was heard of secession in the North and more in the South. Between 1845

and 1860 secession came to be generally accepted by the South as the only means of preserving her institutions from the interference of the North. The first general movement toward secession was in 1850. In 1860–1861, when the federal government passed into the control of the stronger section, the Southern states, individually, seceded and then formed the Confederate states, and in the war that followed they were conquered and forced back into the Union. So, in the United States, secession along with state sovereignty is of the past. From the historical point of view it may be suggested that neither North nor South was correct in theory in 1861: the United States were not a nation; neither were the states sovereign; but from the embryo political communities of 1776–1787, in which no proper sovereignty existed anywhere, two nationalities were slowly being evolved and two sovereignties were in the making; the North and the South each fulfilled most of the requirements for a nation and they were mutually unlike and hostile.

See Jefferson Davis, *Rise and Fall of the Confederate Government* (New York, 1881); A. H. Stephens, *Constitutional View of the War between the States* (Philadelphia, 1868–1870); J. L. M. Curry, *Civil History of the Confederate States* (Richmond, 1900); J. W. Du Bois, *William L. Yancey* (Birmingham, 1892); J. Hodgson, *Cradle of the Confederacy* (Mobile, 1876); B. J. Sage, *Republic of Republics* (Boston, 1870); W. Wilson, *The State* (Boston, 1900); A. L. Lowell, *Government and Parties in Continental Europe* (Boston, 1896); J. W. Burgess, *Political Science and Comparative Constitutional Law* (New York, 1895), and C. E. Merriam, *American Political Theories* (New York, 1902). See also STATE RIGHTS, NULLIFICATION, and CONFEDERATE STATES. (W. L. F.)

SECKENDORF, FRIEDRICH HEINRICH, COUNT VON (1673–1763), German soldier, nephew of Veit Ludwig von Seckendorf (*q.v.*), was born at Königsberg in Franconia. His father was an official of Saxe-Gotha. In 1693 he served in the allied army commanded by William III. of England, and in 1694 became a cornet in a Gotha cavalry regiment in Austrian pay. Leaving the cavalry he became an infantry officer in the service of Venice, and (1697) in that of the margrave of Anspach, who in 1698 transferred the regiment in which Seckendorf was serving to the imperial army. In 1699 he married and returned to Anspach as a court officer, but the outbreak of the War of the Spanish Succession called him into the field again as lieutenant-colonel of an Anspach regiment, which was taken into the Dutch service. He distinguished himself at Oudenarde (1708), and was severely wounded at the siege of Ryssel. Disappointed of promotion in Holland and Austria, he entered the Polish-Saxon army as a major-general, and fought as a volunteer at the siege of Tournai and the battle of Malplaquet. He continued to serve in Flanders to the end of the war, acted in a diplomatic capacity in the peace negotiations, and in 1713 suppressed an insurrection in Poland. In 1715, as a lieutenant-general, he commanded the Saxon contingent at the siege of Stralsund, defended by Charles XII. of Sweden. In 1717 Seckendorf once more entered the service of the emperor, with the rank of lieutenant field marshal, and he was present at the siege of Belgrade by Prince Eugène. In 1718 and 1719 he fought in Italy, and in the latter year he was made a count of the empire. In 1726, at the instance of Prince Eugène, he was made the Austrian representative at the court of Prussia. He remained at Berlin, with short intervals, up to 1735, and for the greater part of this time exercis d a strong influence over Frederick William II. He was deeply involved in the family quarrels which embittered the lives of Frederick William, his queen and the crown prince (Frederick the Great), which culminated in the prince's condemnation to death by court martial, and is presented by Carlyle (*Frederick the Great*, vol. ii.) as a cold, passionless intriguer, taciturn, almost stolid, and absolutely unscrupulous in the furtherance of Austrian political aims. In 1726 Seckendorf was appointed general of cavalry of the army of the Holy Roman Empire, and served with such distinction as was to be gained in a war of positions in the Rhine campaigns of the War of the Polish Succession (1734–35). His dissensions with Prince Leopold of Anhalt-Dessau (*q.v.*)—the "old Dessauer" was Seckendorf's declared enemy at the Prussian court—made the conduct of operations impossible, and, after placing the Austrian and German armies in favourable positions, Seckendorf departed to Hungary to report on the state of the Austrian army there—a task which brought him fresh enemies. In 1737 the emperor Charles VI., however, made Seckendorf commander-in-chief in Hungary, at the same time giving him the bâton of field marshal. The new commander began well, but failed at the end, and his numerous enemies at Vienna brought about his recall, trial and imprisonment. He remained a prisoner till 1740, and was then reinstated by order of Maria Theresa, but being denied his arrears of pay he laid down all his Austrian and imperial offices and accepted from the emperor Charles VII., elector of Bavaria, the rank of field marshal in the Bavarian service. His last campaigns were those of 1743 and 1744 in the Austrian Succession War (*q.v.*), and, after the death of Charles VII. and the election of Maria Theresa's husband to the imperial dignity, he became reconciled with the Austrian court. From 1745 his life was spent more or less in retirement at Meuselwitz, near Altenburg. In 1757 the death of his wife, for whom, harsh and unamiable as he was, he had a deep and abiding affection, broke down his already failing health. He fell into the hands of a Prussian hussar party in December 1758, and was for five months held prisoner by Frederick the Great, who had little love for him either as his former court enemy or as his unsatisfactory ally in the first Silesian war. He died at Meuselwitz on the 23rd of November 1763.

See Wurzbach's *Biogr. Lexikon*, pt. 33, "Versuch einer Lebensbeschreibung des F. M. Seckendorf" (Leipzig, 1792–1794); Seelander, *Graf Seckendorf und der Friede v. Passau* (Gotha, 1883); Carlyle, *Frederick the Great*, vols. i.-v. *passim*; and memoir in *Allgemeine deutsche Biographie*.

SECKENDORF, VEIT LUDWIG VON (1626–1692), German statesman and scholar, was a member of a German noble family, which took its name from the village of Seckendorf between Nuremberg and Langenzenn. The family was divided into eleven distinct lines, but only three survive, widely distributed throughout Prussia, Württemberg and Bavaria.[1] Veit Ludwig von Seckendorf, son of Joachim Ludwig von Seckendorf, was born at Herzogenaurach, near Erlangen, on the 20th of December 1626. In 1639 the reigning duke of Saxe-Coburg-Gotha, Ernest the Pious, made him his protégé. Entering the university of Strassburg in 1642, he devoted himself to history and jurisprudence. The means for his higher education came from Swedish officers, former comrades of his father who had been actively engaged in the Twenty Years' War and who was executed at Salzwedel on the 3rd of February 1642 for his dealings with the Imperialists. After he finished his university course Duke Ernest gave him an appointment in his court at Gotha, where he laid the foundation of his great collection of historical materials and mastered the principal modern languages. In 1652 he was appointed to important judicial positions and sent on weighty embassages. In 1656 he was made judge in the ducal court at Jena, and took the leading part in the numerous beneficent reforms of the duke. In 1664 he resigned office under Duke Ernest, who had just made him chancellor and with whom he continued on excellent terms, and entered the service of Duke Maurice of Zeitz (Altenburg), with the view of lightening his official duties. After the death of Maurice in 1681 he retired to his estate, Meuselwitz in Altenburg, resigning nearly all his public offices. Although living in retirement, he kept up a correspondence with the principal learned men of the day. He was especially interested in the endeavours of the pietist Philipp Jakob Spener to effect a practical reform of the German church, although he was hardly himself a pietist. In 1692 he

[1] Besides Friedrich Heinrich, count von Seckendorf, separately noticed, other members of the family were Adolf Franz Karl (1742–1818), who was made a count by Frederick William III. of Prussia; Eduard Christoph Ludwig Karl v. Seckendorf-Gudent (1813–1875), a Württemberg official; Karl Sigmund (1744–1785), writer; Franz Karl Leopold v. Seckendorf-Aberdar (1775–1809), poet, literary man and soldier; the brothers Christian Adolf (1767–1833) and Gustav Anton ("Patrik Peale") (1775–1823), both literary men of some note, and Arthur v. Seckendorf-Gudent (1845–1886), student of forestry.

was appointed chancellor of the new university of Halle, but he died a few weeks afterwards, on the 18th of December.

Seckendorf's principal works were the following:—*Teutscher Fürstenstaat* (1656 and 1678), a handbook of German public law; *Der Christenstaat* (1685), partly an apology for Christianity and partly suggestions for the reformation of the church, founded on Pascal's *Pensées* and embodying the fundamental ideas of Spener; *Commentarius historicus et apologeticus de Lutheranismo sive de Reformatione* (3 vols., Leipzig, 1692), occasioned by the Jesuit Maimbourg's *Histoire du Luthéranisme* (Paris, 1680), his most important work, and still indispensable to the historian of the Reformation as a rich storehouse of authentic materials.

See Richard Pahner, *Veit Ludwig von Seckendorff und seine Gedanken über Erziehung und Unterricht* (Leipzig, 1892), the best sketch of Seckendorf's life, based upon original sources. See also Theodor Kolde, "Seckendorf," in Herzog-Hauck's *Realencyklopädie* (1906).

SECKER, THOMAS (1693–1768), archbishop of Canterbury, was born at Sibthorpe, Nottinghamshire. He studied medicine in London, Paris and Leiden, receiving his M.D. degree at Leiden in 1721. Having decided to take orders he graduated, by special letters from the chancellor, at Exeter College, Oxford, and was ordained in 1722. In 1724 he became rector of Houghton-le-Spring, Durham, resigning in 1727 on his appointment to the rectory of Ryton, Durham, and to a canonry of Durham. He became rector of St James's, Westminster, in 1733, and bishop of Bristol in 1735. About this time George II. commissioned him to arrange a reconciliation between the prince of Wales and himself, but the attempt was unsuccessful. In 1737 he was translated to Oxford, and he received the deanery of St Paul's in 1750. In 1758 he became archbishop of Canterbury. His advocacy of an American episcopate, in connexion with which he wrote the *Answer to Dr Mayhew's Observations on the Charter and Conduct of the Society for the Propagation of the Gospel in Foreign Parts* (London, 1764), raised considerable opposition in England and America.

His principal work was *Lectures on the Catechism of the Church of England* (London, 1769).

SECOND (through Fr. from Lat. *secundus*, following, *sequi*, to follow), next after the first in order, time, rank, &c., more particularly the ordinal number corresponding to two. It is the only French ordinal in English; the older word was "other," Ger. *ander*, Goth. *anthar*, Skt. *antara*. The use of the word for the sixtieth part of a minute of time and of degree is from Med. Lat. *secunda*, abbreviation of *minuta secunda*, the second small division of the hour, *minuta prima* or *minuta* being the first division. Another particular meaning is for one who supports or assists another, especially the friend at a duel, who arranges for his principal the terms of the encounter and sees that all rules of the duel are carried out. In the British army an officer is said to be "seconded" (with the accent on the second syllable) when he is employed on special service outside his regiment, his name being retained on the regimental list, but his place being filled by promotion of other officers. He may rejoin his regiment when his special employment is at an end.

SECOND SIGHT, a term denoting the opposite of its apparent significance, meaning in reality the seeing, in vision, of events *before* they occur. "Foresight" expresses the meaning of second sight, which perhaps was originally so called because normal vision was regarded as coming first, while supernormal vision is a secondary thing, confined to certain individuals.

Though we hear most of the "second sight" among the Celts of the Scottish Highlands (it is much less familiar to the Celts of Ireland), this species of involuntary prophetic vision, whether direct or symbolical, is peculiar to no people. Perhaps our earliest notice of symbolical second sight is found in the *Odyssey*, where Theoclymenus sees a shroud of mist about the bodies of the doomed Wooers, and drops of blood distilling from the walls of the hall of Odysseus. The Pythia at Delphi saw the blood on the walls during the Persian War; and, in the *Argonautica* of Apollonius Rhodius, blood and fire appear to Circe in her chamber on the night before the arrival of the fratricidal Jason and Medea. Similar examples of symbolical visions occur in the Icelandic sagas, especially in *Njala*, before the burning of Njal and his family. In the Highlands, and in Wales, the chief symbols beheld are the shroud, and the corpse candle or other spectral illumination. The Rev. Dr Stewart, of Nether Lochaber, informed the present writer that one of his parishioners, a woman, called him to his door, and pointed out to him a rock by the sea, which shone in a kind of phosphorescent brilliance. The doctor attributed the phenomenon to decaying sea-weed, but the woman said, "No, a corpse will be laid there to-morrow." This, in fact, occurred; a dead body was brought in a boat for burial, and was laid at the foot of the rock, where, as Dr Stewart found, there was no decaying vegetable matter.

Second sight flourished among the Lapps and the Red Indians, the Zulus and Maoris, to the surprise of travellers, who have recorded the puzzling facts. But in these cases the visions were usually "induced," not "spontaneous," and should be considered as "clairvoyance" (*q.v.*). Ranulf Higdon's *Polychronicon* (14th century) describes Scottish second sight, adding that strangers "setten their feet upon the feet of the men of that londe for to see such syghtes as the men of that londe doon." This method of communicating the vision is still practised, with success, according to the late Dr Stewart. The present writer once had the opportunity to make an experiment, but to him the vision was not imparted. (For the method see Kirk's *Secret Commonwealth of Elves, Fauns and Fairies*, 1691, 1815, 1893.) It is, by some, believed that if a person tells what he has seen before the event occurs he will lose the faculty, and recently a second-sighted man, for this reason, did not warn his brother against taking part in a regatta, though he had foreseen the accident by which his brother was drowned. Where this opinion prevails it is, of course, impossible to prove that the vision ever occurred. There are many seers, as Lord Tarbat wrote to Robert Boyle, to whom the faculty is a trouble, "and they would be rid of it at any rate, if they could."

Perhaps the visions most frequently reported are those of funerals, which later occur in accordance with "the sight," of corpses, and of "arrivals" of persons, remote at the moment, who later do arrive, with some distinctive mark of dress or equipment which the seer could not normally expect, but observed in the vision. Good examples in their own experience have been given to the present writer by well-educated persons. Some of the anecdotes are too surprising to be published without the names of the seers. A fair example of second sight is the following from Balachulish. An aged man of the last generation was troubled by visions of armed men in uniform, drilling in a particular field near the sea. The uniform was not "England's cruel red," and he foresaw an invasion. "It must be of Americans," he decided, "for the soldiers do not look like foreigners." The Volunteer movement later came into being, and the men drilled on the ground where the seer had seen them. Another case was that of a man who happened to be sitting with a boy on the edge of a path in the quarry. Suddenly he caught the boy and leaped aside with him. He had seen a runaway trolly, with men in it, dash down the path; but there were no traces of them below. "The spirits of the living are powerful to-day," said the percipient in Gaelic, and next day the fatal accident occurred at the spot. These are examples of what is, at present, alleged in the matter of second sight.

"The sight" may, or may not, be preceded or accompanied by epileptic symptoms, but this appears now to be unusual. A learned minister lately made a few inquiries on this point in his parish, at the request of the present writer. His beadle had "the sight" in rich measure: "it was always preceded by a sense of discomfort and anxiety," but was not attended by convulsions. Out of seven or eight seers in the parish, only one was not perfectly healthy and temperate. A well-known seer, now dead, whom the writer consulted, was weak of body, the result of an accident, but seemed candid, and ready to confess that his visions were occasionally failures. He said that "the sight" first came on him in the village street when he was a boy. He saw a dead woman walk down the street and enter the house that had been hers. He gave a few examples of his foresight of events, and one of his failure to discover the corpse of a man drowned in the loch.

The phenomena, as described, may be classed under "clairvoyance," "premonition," and "telepathy" (*q.v.*), with a residuum of symbolical visions. In these, "corpse candles" and spectral lights play a great part, but, in the region best known to the writer, the "lights" are visible to all, even to English tourists, and are not hallucinatory. The conduct of the lights is brilliantly eccentric, but, as they have not been studied by scientific specialists, their natural causes remain unascertained. It is plain that there is nothing peculiar to the Celts in second sight; but the Gaelic words for it and the prevailing opinion indicate telepathy, the action of "the spirits of the living" as the main agents. Yet, in cases of premonition, this explanation is difficult. Conceivably an engineer, in 1881, was thinking out a line of railway from Oban to Balachulish, at the moment when four or five witnesses were alarmed by the whizz and thunder of a passing train on what was then the road, but was later (1903) usurped by the railway track. (For this amazing anecdote the writer has the first-hand evidence of a highly educated percipient.) If the speculation of the engineer was "wired on," telepathically, to the witnesses, then telepathy may account for the premonition, which, in any case, is a good example of collective second sight. That second sight has died out, under the influence of education and newspapers, is an averment of popular superstition in the south.

The examples given, merely a selection from those known to the present writer, prove that the faculty is believed to be as common as in any previous age.

The literature of second sight is not insignificant. *The Secret Commonwealth* of the Rev. Mr Kirk (1691), edited by Sir Walter Scott in 1815 (a hundred copies), and by Andrew Lang in 1893, is in line with cases given in Trials for Witchcraft (cf Dalyell's *Darker Superstitions of Scotland*, and Wodrow's *Analecta*). Aubrey has several cases in his *Miscellanies*, and the correspondence of Robert Boyle, Henry More, Glanvil and Pepys, shows an early attempt at scientific examination of the alleged faculty. The great treatise on Second Sight by Theophilus Insulanus (a Macleod) may be recommended; with Martin's *Description of the Western Isles* (1703–1716), and the work of the Rev. Mr Fraser, Dean of the Isles (1707, 1820). Fraser was familiar with the contemporary scientific theories of hallucination, and justly remarked that "the sight" was not peculiar to the Highlanders; but that, in the south, people dared not confess their experiences, for fear of ridicule. (A. L.)

SECRET (Lat. *secretum*, hidden, concealed), that which is concealed from general knowledge. In special senses the word is applied to (*a*) a prayer in the Roman and other liturgies, said during mass by the priest in so low a voice that it does not reach the congregation, and (*b*) a covering or skull-cap made of steel fitting close to the head.

In law, the question of secrecy is an important one. Generally, English law does not require a solicitor or barrister to disclose secrets entrusted to them by a client, and the same probably holds good in the case of medical men. In the case of ministers of religion, it has never been definitely settled how far they can be compelled to disclose in evidence what has been confided in the secrecy of the confessional. But according to the 113th Canon, a priest of the Church of England would commit an ecclesiastical offence in revealing a secret disclosed to him in confession "except it be such as by the laws of this realm his own life may be called into question for concealing the same." As to what are called "trade secrets," it has been decided (*Merryweather* v. *Moore*, 1892, 2 Ch. 518) that it is a breach of contract to reveal trade secrets acquired during service.

Official Secrets. By the Official Secrets Act 1889 it was made a misdemeanour for an official to communicate any information or documents concerning the military or naval affairs of Her Majesty, to any person to whom it ought not to be communicated. If the information be communicated to a foreign state it is a felony. In Germany the betrayal of military secrets is punishable under an imperial law of 1893.

Secret Service.—In practically every civilized country, there is always a department of the government charged with the duty of espionage, either diplomatic or domestic. Its officials work in secret, and certain sums of money are placed at the disposal of the head of the department, and expended as he may think fit, without having to render any specific account of them. Various departments of governments have also their own departmental secret service, for the better guarding against frauds, such as in the United States, the Treasury Department and the Post Office.

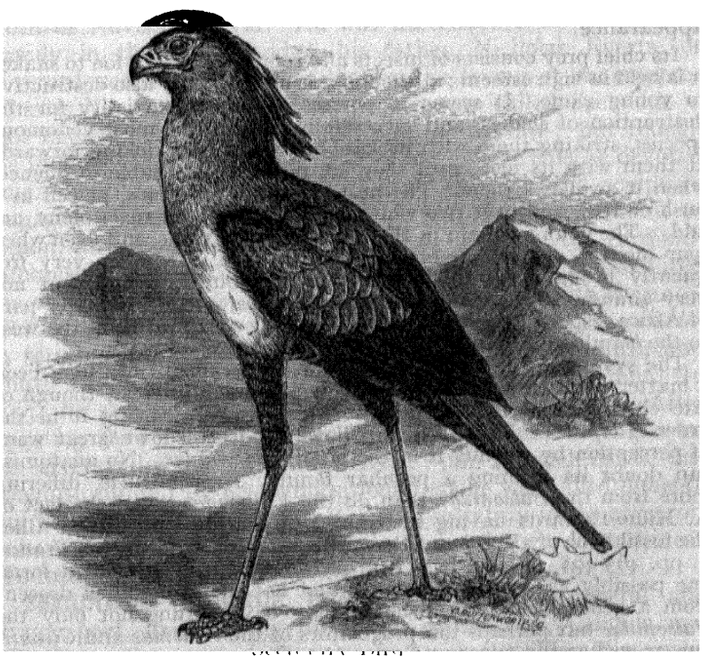
The various European codes generally have dealt with breach of secrecy, *e.g.* s. 300 of the German Penal Code imposes a fine up to 1500 marks and imprisonment up to three months on doctors, attorneys and other professional persons who reveal a secret entrusted to them in their professional capacity. For this offence also the French code, art. 378, imposes imprisonment of from one to six months and a fine of from 100 to 500 francs.

See Brouardel, *Le Secret médical* (Paris, 1887); Hallays, *Le Secret professionnel* (Paris, 1890).

SECRÉTAN, CHARLES (1815–1895), Swiss philosopher, was born on the 19th of January 1815, at Lausanne, where he died on the 21st of January 1895. Educated in his native town and later under Schelling at Munich, he became professor of philosophy at Lausanne (1838 to 1846), and at Neuchâtel (1850 to 1866). In 1866 he returned to his old position at Lausanne. In 1837 he founded, and for a time edited, the *Revue suisse*. His principal works were *La Philosophie de la liberté* (1848); *La Raison et le Christianisme* (1863); *La Civilisation et les croyances* (1887); *Mon Utopie* (1892). The object of his writing was to build up a rational, philosophical religion, to reconcile the ultimate bases of Christianity with the principles of metaphysical philosophy.

For a detailed examination of his philosophy, see Pillon, ***La Philosophie de Charles Secrétan***.

SECRETARY-BIRD, a very singular African bird, first accurately made known, from an example living in the menagerie of the prince of Orange, in 1769 by A. Vosmaer,[1] in a treatise published simultaneously in Dutch and French, and afterwards included in his collected works issued, under the title of *Regnum Animale*, in 1804. He was told that at the Cape of Good Hope this bird was known as the "Sagittarius" or Archer, from its striding gait being thought to resemble that of a bowman advancing to shoot, but that this name had been corrupted into that of "Secretarius." In August 1770 G. Edwards saw an example



(apparently alive, and the survivor of a pair which had been brought to England) in the possession of a Mr Raymond near Ilford in Essex; and, being unacquainted with Vosmaer's work, he figured and described it as "of a new genus" in the *Philosophical Transactions* for the following year (lxi. pp. 55, 56, pl. ii.). In 1776 P. Sonnerat (*Voy. Nouv. Guinée*, p. 87, pl. 50) again described and figured, but not at all correctly, the species, saying (but no doubt wrongly) that he found it in 1771 in the Philippine Islands. A better representation was given by D'Aubenton in

[1] Le Vaillant (*Oiseaux d'Afrique*, ii. p. 273) truly states that Kolben in 1719 (*Caput Bonæ Spei hodiernum*, p. 182, French version, ii. p. 198) had mentioned this bird under its local name of "Snake-eater" (*Slangenvreter*, Dutch translation, i. p. 214); but that author, who was a bad naturalist, thought it was a Pelican and also confounded it with the Spoonbill, which is figured to illustrate his account of it.

the *Planches enluminées* (721); in 1780 Buffon (*Oiseaux*, vii. p. 330) published some additional information derived from Querhoent, saying also that it was to be seen in some English menageries; and the following year J. Latham (*Synopsis*, i. p. 20, pl. 2) described and figured it from three examples which he had seen alive in England. None of these authors, however, gave the bird a scientific name, and the first conferred upon it seems to have been that of *Falco serpentarius*, inscribed on a plate bearing date 1779, by John Frederick Miller (*Ill. Nat. History*, xxviii.), which plate appears also in Shaw's *Cimelia Physica* (No. 28) and is a misleading caricature. In 1786 Scopoli called it *Otis secretarius*—thus referring it to the Bustards,[1] and Cuvier in 1798 designated the genus to which it belonged, and of which it still remains the sole representative, *Serpentarius*. Succeeding systematists have, however, encumbered it with many other names, among which the generic terms *Gypogeranus* and *Ophiotheres*, and the specific epithets *reptilivorus* and *cristatus*, require mention here.[2] The Secretary-bird is of remarkable appearance, standing nearly 4 ft. in height, the great length of its legs giving it a resemblance to a Crane or a Heron; but unlike those birds its tibiae are feathered all the way down. From the back of the head and the nape hangs, loosely and in pairs, a series of black elongated feathers, capable of erection and dilation in periods of excitement.[3] The skin round the eyes is bare and of an orange colour. The head, neck and upper parts of the body and wing-coverts are bluish grey; but the carpal feathers, including the primaries, are black, as also are the feathers of the vent and tibiae—the last being in some examples tipped with white. The tail-quills are grey for the greater part of their length, then barred with black and tipped with white; but the two middle feathers are more than twice as long as those next to them, and drooping downwards present a very unique appearance.

Its chief prey consists of insects and reptiles, and as a foe to snakes it is held in high esteem; although it is undoubtedly also destructive to young game. It seems to possess a strange partiality for the destruction of snakes, and successfully attacks the most venomous species, striking them with its knobbed wings and kicking forwards at them with its feet, until they are rendered incapable of offence, when it swallows them. The nest is a huge structure, placed in a bush or tree, and in it two white eggs, spotted with rust-colour, are laid. The young remain in the nest for a long while, and even when four months old are unable to stand upright. They are very frequently brought up tame. The Secretary-bird is found, but not very abundantly and only in some localities, over the greater part of Africa, especially in the south, extending northwards on the west to the Gambia and in the interior to Khartum.

The systematic position of the genus *Serpentarius* has long been a matter of discussion, and is still one of much interest, though of late classifiers have been pretty well agreed in placing it in the order *Accipitres*. Most of them, however, have shown great want of perception by putting it in the family *Falconidae*. No anatomist can doubt its forming a peculiar family, *Serpentariidae*, differing more from the *Falconidae* than do the *Vulturidae*; and the fact of A. Milne-Edwards having recognized in the Miocene of the Allier the fossil bone of a species of this genus, *S. robustus* (*Ois. foss. France*, ii. pp. 465-468, pl. 180, figs. 1-6), proves that it is an ancient form, one possibly carrying on a direct and not much modified descent from a generalized form, whence may have sprung not only the *Falconidae* but perhaps the progenitors of the *Ardeidae* and *Ciconiidae*, as well as the puzzling *Cariamidae* (Seriema, *q.v.*). (A. N.)

SECRETARY OF STATE, in England, the designation of certain important members of the administration. The ancient English monarchs were always attended by a learned ecclesiastic, known at first as their clerk, and afterwards as secretary, who conducted the royal correspondence; but it was not until the end of the reign of Queen Elizabeth that these functionaries were called secretaries of state. Upon the direction of public affairs passing from the privy council to the cabinet after 1688 the secretaries of state began to assume those high duties which now render their office one of the most influential of an administration.

Until the reign of Henry VIII. there was generally only one secretary of state, but at the end of his reign a second principal secretary was appointed. Owing to the increase of business consequent upon the union of Scotland, a third secretary, in 1708, was created, but a vacancy occurring in this office in 1746 the third secretaryship was dispensed with until 1768, when it was again instituted to take charge of the increasing colonial business. However, in 1782 the office was again abolished, and the charge of the colonies transferred to the home secretary; but owing to the war with France in 1794 a third secretary was once more appointed to superintend the business of the war department, and seven years later the colonial business was attached to his department. In 1854 a fourth secretary of state for the exclusive charge of the war department and in 1858 a fifth secretaryship for India were created. There are therefore now five principal secretaries of state, four of whom, with their political under-secretaries, occupy seats in the House of Commons. One of these secretaries of state is always a member of the House of Lords. The secretaries of state are the only authorized channels through which the royal pleasure is signified to any part of the body politic, and the counter-signature of one of them is necessary to give validity to the sign manual. The secretaries of state constitute but one office, and are coordinate in rank and equal in authority. Each is competent in general to execute any part of the duties of the secretary of state, the division of duties being a mere matter of arrangement. For the existing division of duties, see under separate headings, COLONIAL OFFICE, FOREIGN OFFICE, &c.

In the United States the "secretary of state" is a member of the executive, who deals with foreign affairs, and who, in the event of a vacancy in the office of president, is next in succession after the vice-president. The title of "secretary"—"of the treasury," "of war," &c.—is used for some other members of the executive. In various states there is an executive officer called "secretary of state."

SECT, a body of persons holding distinctive or separate doctrines or opinions, especially in matters of religion; thus there are various sects among the Jews, the Mahommedans, and the Buddhists, &c. In the Christian Church it has usually a hostile or depreciatory sense and is applied, like "sectary," to all religious bodies outside the one to which the user of the term belongs.

The latter use has been influenced by the false etymology which makes the word mean "cut off" (Lat. *secare*, to cut). The derivation has been long a matter of dispute. The Latin *secta* was used in classical Latin first of a way, a trodden or beaten path; it seems to be derived from *secare*, to cut, cf. the phrase *secare viam*, to travel, take one's way, Gr. *τέμνειν ὁδόν*. From the phrase *sectam sequi*, to follow in the footsteps of any one, the word came to mean a party, following, faction. Another transferred sense is a manner or mode of life, so *hanc sectam rationemque vitae . . . secuti sumus* (Cic. *Cael.* 17, 40). It was also the regular word for a school of philosophy and so translates *αἵρεσις*, lit. choice (*αἱρεῖσθαι*, to choose), from which is derived "heresy" (*q.v.*). The Vulgate (N.T.) translates *αἵρεσις* sometimes by *secta*, sometimes by *haeresis*. In Med. Lat., besides these uses we find *secta* meaning a suit at law, a suit of clothes, and a following or suite. These meanings point to the derivation of *secta* adopted by Skeat (*Etym. Dict.*, 1910); which connects the word with *sequi*, to follow. Whichever derivation is accepted a "sect" does not mean a part "cut off" from the church.

SECTION (Lat. *sectio*, cutting, *secare*, to cut), the act of cutting or a part cut off, thus used of any division of a subject, as the paragraph of a book, article, statute, &c., of a division of land, of a town, &c., or a separate class of a community or race; the term is more particularly applied to a thin slice of any substance prepared for examination by the microscope (see MICROTOMY) or to a diagram of any structure showing the internal plan as if exposed by the cutting off of an external surface; thus, in architecture, a section is a drawing of a building cut in half, so as to show the relative height of the floors, the depth of the foundation and its footings, the framing of the roof, if in timber or iron, or the construction of the vault or dome, if in masonry. The term is also applied to the details of the structure, such as the cornice and the various mouldings showing their profile.

SECULAR (Lat. *saecularis*, of or belonging to an age or generation, *saeculum*), a word with two main branches of meaning: (1) lasting or occurring for a long indefinite period of time, and (2) non-spiritual, having no concern with religious or spiritual matters. The first sense, which is directly taken from the classical

[1] Curiously enough, Boddaert in 1783 omitted to give it a scientific name.

[2] The scientific synonymy of the species is given at great length by Drs Finsch and Hartlaub (*Vögel Ost-Afrikas*, p. 93) and by R. B. Sharpe (*Cat. B. Brit. Museum*, i. p. 45).

[3] It is from the fancied resemblance of these feathers to the pens which a clerk is supposed to stick above his ear that the bird's name of Secretary is really derived.

Latin, is chiefly found in scientific applications, of processes or phenomena which are continued through the ages and are not regularly recurrent or periodical, *e.g.* the secular cooling of the earth, secular change of the mean annual change of the temperature. The word is thus used widely of that which is lasting or permanent. In medieval and Late Latin, *saecularis* was particularly used of that which belongs to this world, hence non-spiritual, lay. It is thus used, first to distinguish the "regular" or monastic clergy from those who were not bound by the rule (*regula*) of a religious order, the parish priests, the "seculars," who were living in the world, and secondly in the wide sense of anything which is distinct, opposed to or not connected with religion or ecclesiastical things, temporal as opposed to spiritual or ecclesiastical. Thus property transferred or alienated from spiritual to temporal hands is said to be "secularized"; "secularism" (*q.v.*) is the term applied in general to the separation of state politics or administration from religious or church matters; "secular education" is a system of training in which definite religious teaching is excluded.

SECULAR GAMES (*Ludi Saeculares*, originally *Terentini*). These were celebrated at Rome for three days and nights to mark the commencement of a new *saeculum* or generation. It is important to note that there was a *saeculum civile*, the length of which was definitely fixed at 100 years, and a *saeculum naturale*, which, under Greek and Etruscan influence, came to be accepted by the quindecimviri as 110 years. According to tradition, the secular games had their origin in certain sacrificial rites of the gens Valeria, which were performed at the Terentum, a volcanic cleft in the Campus Martius. According to the Roman antiquarians themselves, they were derived from the Etruscans, who, at the end of a mean period of 100 years (as representing the longest human life in a generation), presented to the chthonian deities an expiatory offering on behalf of the coming generation. The first definitely attested celebration of the games took place in 249 B.C., on which occasion a vow was made that they should be repeated every hundredth year (their name being also changed to *Saeculares*), a regulation which seems to have been immediately disregarded, for they were next held in 146 (not 149, although the authorities are not unanimous); in 49 the civil wars prevented any celebration. They would probably have fallen entirely into oblivion, had not Augustus revived them in 17 B.C., for which occasion the *Carmen Saeculare* was composed by Horace. In explanation of the selection of this year it is supposed that the quindecimviri invented celebrations for the years 456, 346, 236, 126, the *saeculum* being taken as lasting 110 years.

In later times various modes of reckoning were adopted. The dates were: A.D. 47 (under Claudius), celebrating the 800th year of the foundation of the city; 88 (under Domitian), an interval of only 105 instead of 110 years; 147 (under Antoninus Pius), the 900th year of the city; 204 (under Septimius Severus), exactly two *saecula* (220 years) after the Augustan celebration; 248 (under Philip the Arabian), the 1000th year of the city; 262 (under Gallienus), probably a special ceremony in time of calamity; in 304 (which should have been 314) Maximian intended to hold a celebration, but does not appear to have done so. From this time nothing more is heard of the secular games, until they were revived in the year 1300 as the popish jubilees instituted by Boniface VIII.

At the beginning of the harvest, heralds went round and summoned the people to the festival. The quindecimviri distributed to all free citizens on the Capitol and in the temple of Apollo on the Palatine various means of expiation—torches, sulphur and bitumen. Here and in the temple of Diana on the Aventine, wheat, barley, and beans were distributed, to serve as an offering of firstfruits. The festival then began, at which offerings were made to various deities. On the first night the emperor sacrificed three rams to the Parcae at an underground altar on the banks of the Tiber, while the people lighted torches and sang a special hymn. On the same or following nights a black hog and a black pig were sacrificed to Tellus, and dark victims to Dis (Pluto) and Proserpine. On the first day white bulls and a white cow were offered to Jupiter and Juno on the Capitol, after which scenic games were held in honour of Apollo. On the second day noble matrons sang supplicatory hymns to Juno on the Capitol; on the third, white oxen were sacrificed to Apollo and twenty-seven boys and maidens sang the "secular hymn" in Greek and Latin.

The above particulars are from Zosimus (ii. 5, and 6, which contain the Sibylline oracle), who, with Censorinus (*De Die Natali*, 17), Valerius Maximus, ii. 4, and Horace (*Carmen Saeculare*) is the chief ancient authority on the subject; see also Mommsen, *Romische Chronologie* (1858); C. L. Roth, "Über die römischen Säcularspiele" in the *Rheinisches Museum*, viii. (1853); and Marquardt, *Romische Staatsverwaltung*, iii. (1885), p. 386. The inscription commemorating the *ludi* of 17 B.C. was discovered in 1890 and is printed in the *Ephemeris epigraphica*, vol. viii. The best account of the whole subject is in H. Diels, *Sibyllinische Blätter* (1890), p. 109 foll.

SECULARISM, a term applied specially (see SECULAR) to the system of social ethics associated with the name of G. J. Holyoake (*q.v.*). As the word implies, secularism is based solely on considerations of practical morality with a view to the physical, social and moral improvement of society. It neither affirms nor denies the theistic premises of religion, and is thus a particular variety of utilitarianism. Holyoake founded a society in London which subsequently under the leadership of Charles Bradlaugh advocated the disestablishment of the Church, the abolition of the Second Chamber and other political and economic reforms.

See Holyoake's *Principles of Secularism* (1885).

SECUND (Lat. *secundus*, following), a botanical term used of plants when similar parts are directed to one side only, as flowers on an axis.

SECUNDERABAD, one of the chief British military stations in India, situated in the state of Hyderabad or the Nizam's Dominions, 1830 ft. above sea-level, and 6 m. N.E. of Hyderabad city. Pop. (1901) 83,550. It is now the headquarters of the 9th division of the southern army. Secunderabad includes Bolaram, the former cantonment of the Hyderabad contingent (now merged in the Indian army), and also Trimulgherry, the artillery cantonment, covering a total area of 22 sq. m. These two places have an additional population of 12,888.

SECUNDUS, JOHANNES, whose real name was JOHANN EVERTS (1511–1536), Latin poet, was born at The Hague on the 10th of November 1511. He was descended from an ancient family in the Netherlands; his father, Nicholas Everts, or Everard, seems to have been high in the favour of the emperor Charles V. On what account the son was called Secundus is not known. His father intended him for the law; but though he took his degree at Bourges it does not appear that he devoted much time to legal pursuits. Poetry, painting and sculpture engaged his mind at a very early period. In 1533 he went to Spain, and soon afterwards became secretary to the cardinal-archbishop of Toledo, in a department of business which required no other qualification than that of writing Latin with elegance. During this period he composed his most famous work, the *Basia*, a series of amatory poems, of which the fifth, seventh, and ninth *Carmina* of Catullus seem to have given the hint. In 1534 he accompanied Charles V. to the siege of Tunis. After quitting the service of the archbishop, Secundus was employed as secretary by the bishop of Utrecht; and so much did he distinguish himself by his compositions that he was called upon to fill the important post of private Latin secretary to the emperor, who was then in Italy. But, having arrived at St Amand, near Tournay, he died of fever on the 8th of October 1536.

SECUNDUS, PUBLIUS POMPONIUS, Roman general and tragic poet, lived during the reigns of Tiberius, Caligula and Claudius. He was on intimate terms with the elder Pliny, who wrote a biography of him (now lost). The chief authority for his life is Tacitus, according to whom Secundus was a man of refinement and brilliant intellect. His friendship with Sejanus and his brother made him politically suspect, and he only escaped death by remaining practically a prisoner in his own brother's house until the accession of Caligula. During his enforced retirement he composed tragedies, which were put on the stage during the reign of Claudius. In A.D 50 he distinguished himself against the Chatti and obtained the honour of the triumphal insignia. Quintilian asserts that he was far superior to any writer of tragedies he had known, and Tacitus expresses a high opinion of his literary abilities. Secundus devoted much attention to the niceties of grammar and style, on which he was recognized as an authority. Only a few lines of his work remain, some of which belong to the tragedy *Aeneas*.[4]

See O. Ribbeck, *Geschichte der römischen Dichtung*, iii. (1892),

and *Tragicorum Romanorum fragmenta* (1897); Tacitus, *Annals*, v. 8, xi. 13, xii. 28; Quintilian, *Inst. Orat.* x. 1. 98; Pliny, *Nat. Hist.* xiv. 5; M. Schanz, *Geschichte der römischen Literatur*, ii. 2 (1900); Teuffel, *Hist. of Roman Literature* (Eng. trans., 1900), 284, 7.

SECURITY (Lat. *securus*, free from care, safe), in general, the condition of being secure. In law, a security is a document evidencing the right to money, goods or other property, *e.g.* stocks, shares, bills of exchange, mortgages, &c. A security is termed *collateral* when it is given merely as a guarantee for the repayment of money; *personal*, when it gives a right of action against a person for the recovery of money. A convertible security is one which can be readily converted into money (*e.g.* consols), as contrasted with land or buildings, sometimes termed "dead" security. A person who holds himself responsible for the fulfilment of another's obligations or goes surety for him is called a security.

SEDAINE, MICHEL JEAN (1719–1797), French dramatist, was born at Paris on the 4th of July 1719. His father, who was an architect, died when Sedaine was quite young, leaving no fortune, and the boy began life as a mason's labourer. He was at last taken as pupil by an architect whose kindness he eventually repaid by the help he was able to give to his benefactor's grandson, the painter David. Meanwhile he had done his best to repair his deficiencies of education, and in 1750 he published a *Recueil de pièces fugitives*, which included fables, songs and pastorals. His especial talent was, however, for light opera. He produced *Le Diable à quatre* (1756), the music being by several composers; *Blaise le Savetier* (1759), for the music of Danican Philidor; *On ne s'avise jamais de tout* (1761) and others with Pierre Alexandre de Monsigny; *Aucassin et Nicolette* (1780), *Richard Cœur de Lion* (1784), and *Amphitryon* (1788) with André Grétry. Sedaine's vaudevilles and operettas attracted the attention of Diderot, and two plays of his were accepted and performed at the *Théâtre Français*. The first and longest, the *Philosophe sans le savoir*, was acted in 1765; the second, a lively one-act piece, *La Gageure imprévue* in 1768. These two at once took their place as stock pieces and are still ranked among the best French plays, each of its class. Except these two pieces little or nothing of his has kept the stage or the shelves, but Sedaine may be regarded as the literary ancestor of Scribe and Dumas. He had the practical knowledge of the theatre, which enabled him to carry out the ideas of Diderot and give him claims to be regarded as the real founder of the domestic drama in France. Sedaine, who became a member of the Academy (1786), and secretary for architecture of the fine arts division, died at Paris on the 17th of May 1797. He wrote two historical dramas, *Raymond V, comte de Toulouse*, and *Maillard, ou Paris sauvé*.

His *Œuvres* (1826) contain a notice of his life by Ducis.

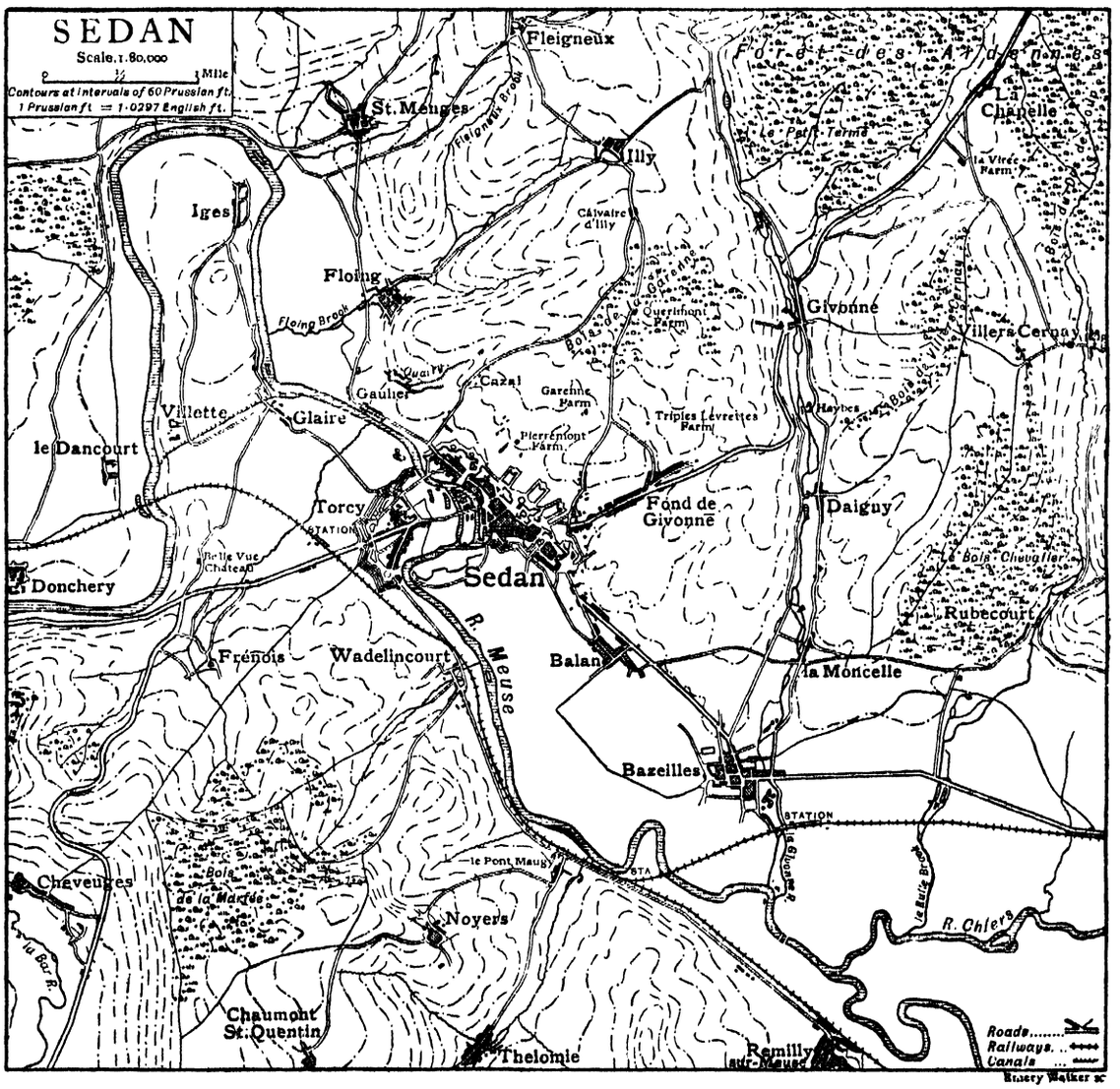
SEDALIA, a city and the county-seat of Pettis county, Missouri, U.S.A., a little W. of the centre of the state. Pop. (1900) 15,231; (1907, local estimate), 20,000. Sedalia is served by the Missouri Pacific and the Missouri, Kansas & Texas railway systems, and is a transportation centre with good facilities. The city has a high and pleasant site (about 990 ft. above sea-level) on a rolling prairie, and is laid out as an exact square. Among the public buildings much the handsomest are the court house, built of Warrensburg blue sandstone (1884), and the Public Library (1900), given by Andrew Carnegie. Sedalia is the seat of the George R. Smith College (M.E., founded in 1894) for negroes. Liberty Park (60 acres), in the W. part of the city, is owned by the municipality. Broadway, the principal residence street, is 120 ft. wide, and is parked on either side. The State Board of Agriculture established fair grounds (now 210 acres) adjoining the city on the S.W. in 1900, and the annual state fair attracts many visitors. The water supply is derived from a storage lake on Flat Creek, 3 m. from the city, settling basins being used to clarify the water. There are a city hospital and the Maywood, a private hospital; and the Missouri, Kansas & Texas railway maintains here a hospital for all parts of its system. The surrounding country is a magnificent livestock and farming region, and in the immediate vicinity are valuable deposits of coal, of limestone, of shale suitable for sewer pipe and of fire clays. The city has important horse and mule yards. The Missouri Pacific, three of whose operating divisions end at Sedalia and thus make the city its central division point, in 1904 established large shops (129 acres) in a suburb E. of the city. These shops and those of the Missouri, Kansas & Texas railway, of which Sedalia is the central division point on the N. end of its system, add greatly to the industrial importance of the city. The total value of the factory product in 1905 was $1,691,727, showing an increase of 31·8 % since 1900.

Sedalia was established as a station on the Missouri Pacific railroad in 1857. In 1864 it was chartered as a town and was made the county-seat, succeeding Georgetown (then a flourishing town, which speedily fell into decay), the transfer of the offices taking place in 1865. Sedalia was a Union military post throughout the Civil War; on the 15th of October 1864 a detachment from Sterling Price's raiding column dislodged a small Union force that was occupying the town, but the Confederate occupation lasted only one day. Sedalia was chartered as a city in 1889. In 1896 a constitutional amendment to remove the state capital from Jefferson City to Sedalia was defeated by popular vote.

SEDAN, a town of northern France, capital of an arrondissement in the department of Ardennes, on the right bank of the Meuse, 12 m. E.S.E. of Mézières by rail. Pop. (1906) town 16,014; commune 19,599. Sedan is built on the right bank of the Meuse round a bend in the river forming a peninsula. On the left bank stands the suburb of Torcy, situated partly within the bend, partly beyond the canal which cuts across the neck of the peninsula. There is a statue of Turenne (born at Sedan in 1611), remains of a castle of the 15th century and a Protestant temple dating from 1593. Sedan is the seat of a sub-prefect and has a municipal school of weaving. The manufacture of fine black cloth established in the middle of the 17th century by Cardinal Mazarin, held its place as the staple industry of the town till towards the end of the 19th century. A large variety of woollen fabrics are produced, and there are flour mills and factories for industrial machinery, boilers and heavy iron goods, chocolate, &c.

Sedan was in the 14th century a dependency of the abbey of Mouzon, the possession of which was disputed by the bishops of Liége and Reims. United to the crown of France by Charles V., it was ceded by Charles VI. to Guillaume de Braquemont, whose son sold it to his brother-in-law Evrard de la Marck. For two centuries this family continued masters of the place in spite of the bishops of Liége and the dukes of Burgundy and Lorraine; and Henri Robert adopted the title "prince of Sedan." In the 16th century the town was an asylum for many Protestant refugees, who laid the basis of its industrial prosperity, and it became the seat of a Protestant seminary. Robert I. de la Marck (d. 1489) was lord of Sedan when he acquired Bouillon. His grandson, Robert III., seigneur of Fleurange and Sedan (d. 1537), was marshal of France and left interesting memoirs. Robert IV. de la Marck (d. 1556), also marshal of France, erected Sedan on his own authority into an independent principality. By the marriage of his granddaughter Charlotte with Henry I. de la Tour d'Auvergne, the duchy of Bouillon and the principality of Sedan passed to the house of Turenne. When the new duke attempted to maintain his independence, Henry IV. captured Sedan in three days; and the second duke Frédéric Maurice de la Tour d'Auvergne, eldest brother of the great marshal, who had several times revolted against Louis XIII., was, after his share in the conspiracy of Cinq-Mars, obliged to surrender his principality. Sedan thus became part of the royal domain in 1642. On the 1st of September 1870 the fortress was the centre of the most disastrous conflict of the Franco-German War (see below). The village of Bazeilles, 3 m. S.E. of Sedan, contains the great ossuary. The house, rendered famous by Neuville's painting, "Les Dernières Cartouches," now contains objects found on the battlefield. At Donchery, 3½ m. to the west of Sedan, is the château of Bellevue, where Napoleon III. surrendered his sword and where the terms of capitulation of Sedan were agreed upon.

Battle of Sedan (September 1st, 1870).—During the course of the 31st of August (see FRANCO-GERMAN WAR) the retreating French army (1st, 5th, 7th and 12th corps) under Marshal MacMahon assembled in and around Sedan, watched throughout the day by the German cavalry but not severely pushed by them. Sedan is a small old-fashioned fortress, lying in a depression between two ridges which converge in the plateau of Illy about 2½ m. north-east of the town. The only part which its defences played, or might have played, in the ensuing battle lay in the strategic possibilities contained in the fine and roomy bridge-head of Torcy, covering an elbow bend of the Meuse whence the whole French army might have been hurled into the gap between the German III. and Meuse armies, had there been a Napoleon to conceive and to execute this plan. But MacMahon seems to have been too despondent to contemplate anything further than a battle for the honour of the army, and though communications with Mezières, where Vinoy's corps (13th) was gathering, lay open throughout the day, he neither sent orders to it nor made any arrangements to meet the coming danger.



The troops received food and ammunition, the disorders consequent on the successive days' fighting in retreat were remedied, and the men themselves got what they needed most of all, an almost unbroken day's rest. Locally their positions were strong, particularly to the east, where the stream flowing through the Fond du Givonne, though fordable, presented a serious obstacle to the tactical handling of the German infantry. But as a whole it was far too cramped for the numbers crowded into it; it could be completely overlooked from the heights of Frénois, where the king of Prussia's headquarters took their stand, and whence in the afternoon the German artillery fire began to cross over the town itself. At nightfall on the 31st the leading German infantry were approaching. The Army of the Meuse on the right bank of the river, with the II. Bavarians moving towards Bazeilles to reinforce it, and the III. Army, consisting of the V. and XI. corps with the Württemberg division, was heading for Donchéry to cut off the French from Mezières, and only a weak cavalry screen closed the gap between them.

During the night of the 31st of August the Bavarians threw a pontoon bridge across the Meuse below Rémilly, and soon after daybreak, in a fog which lay thickly over the whole country, they began their advance towards Bazeilles, held by Vassoigne's division of the 12th corps and fairly prepared for defence. The firing called all troops within reach of the sound to arms, and before 5 A.M. the Meuse Army was marching to the battle-field, the Guards on the northern road via Villers-Arnay, the Saxons and IVth corps to the south along the river.

Vassoigne's division contained a number of Marine battalions, and their stubborn resistance completely disconcerted the Bavarians. Deprived of all artillery co-operation owing to the fog, the latter spent themselves in fruitless and disconnected efforts in the gardens and streets of the village, and reinforcements were soon urgently needed. About 6 A.M. the fog lifted, and the German batteries at once took part in the struggle. One of the first shells wounded Marshal MacMahon. The next senior officer, General Ducrot, at once assumed command (7 A.M.). But it happened that General Wimpffen, who had only joined the army from Algiers on the night of the 30th, brought with him a secret commission to assume command in the event of the death or disablement of MacMahon. Of this power he did not at first avail himself, since he was a stranger both to the army and the country, whilst Ducrot possessed the confidence of the one and the knowledge of the other in the highest degree. But when about 9 A.M. he learnt that Ducrot proposed to move the whole army under cover of rearguards to the west towards Mezières, he produced his commission and countermanded the movement, being himself convinced that eastward towards Bazaine at Metz lay the road to salvation. Orders once issued on a battle-field are not easily recalled, and the result of this change of command was dire confusion. The French troops northward of Bazeilles, along the Fond du Givonne, were already commencing their withdrawal, when the leading troops of the Saxon XII. corps began to arrive about Daigny, and being only opposed by a weak rearguard, easily carried the ridge south of the Givonne-Sedan road, thus threatening the retreat of Vassoigne's division in and about Bazeilles, which then fell into the hands of the Bavarians between 10 and 11 A.M. At the same moment the Guard corps had begun to form up between Daigny

and Givonne, and there being no serious force of the enemy in front of them, the artillery was deploying along the western heights above the valley of Givonne, covered only by weak advanced guards of infantry, when suddenly a great column of French infantry, some 6000 strong, moving west in pursuance of Wimpffen's orders, came over the eastern border of the valley and charged down at full speed towards the guns. Then followed one of the most dramatic spectacles of the entire war. The whole of the corps artillery of the Guard turned upon these devoted men, and tore the column in half, shrouding it in dense clouds of dust and smoke from the bursting shells, above which could be seen the trunks and limbs of men flung upwards by their explosion. The head of the column, perhaps 2000 strong, nevertheless kept on its way, but under the combined fire of the Guard rifle battalion and the flanking fire from other guns its impetus died out and its débris disappeared by degrees under convenient cover. The German Guards were now free to stretch out their right towards the Belgian frontier (where the scouts of the III. Army were already moving) and prepare with all deliberation for the attack on the Bois de la Garenne.

The III. Army had moved off as early as 2.30 A.M., and by 4 A.M. was already crossing the Meuse at Donchéry, aided by several pontoon and trestle bridges thrown over during the night. Their right was covered from sight by the peninsula formed by a bend of the river, and the march of the several columns was unopposed till, clearing its northern extremity, they began to deploy to their right between St Menges and Floing. Here they encountered French outposts, which fell back on their main position on the ridge, to the south of the Floing-Illy road. Against this position the German artillery now pressed forward, and seeing their exposed position, General Gallifet brought forward his brigade of Chasseurs d'Afrique and delivered a most dashing charge. But being unsupported he was compelled to withdraw again behind the cover of the Cazal-Illy ridge.

It was now about 11 A.M., and, whether moved by the belated impulse of Ducrot's orders or attracted by the apparent weakness of the Prussians within sight, the French infantry now made a brilliant counter-attack out of their position in their usual manner. But German reinforcements coming suddenly into view, and their *élan* having spent itself, they fell back again, holding only to Floing, whence it required nearly two hours more to expel them.

About noon Wimpffen rode up to General Douay and asked him whether he could hold on to his position. The latter, possibly elated by the success of his recent attack, replied in the affirmative, pointing out only the importance of maintaining the Calvaire d'Illy to the north. De Wimpffen promised him support from the 1st corps on the right rear, part of which, hidden in the Bois de la Garenne, had as yet been little engaged, and then rode south to Balan, where he found the 12th corps fighting desperately. He then sent back to Douay for reinforcements, and the latter despatched all he could spare. These, marching south, crossed the troops of the 1st corps sent to Douay's assistance. The Prussian shells were already crashing into the woods from all sides, and countless stragglers and riderless horses caused most serious delay. To gain time, Margueritte's division was ordered to charge. Margueritte was killed as he rode forward to reconnoitre, and Gallifet took command. "For the next half-hour," says the Prussian official account, "the scene defies description. Gallifet and his squadrons covered themselves with glory, but he had not 2000 sabres at his disposal. Under the storm of shell and over the broken ground manœuvring was impossible. But a series of isolated charges were delivered with results which convinced well-nigh every survivor that the day of cavalry, in sufficient numbers and properly handled on the battle-field, was by no means spent." About an hour after the cavalry charges, between 3 and 4 P.M., the Germans at length gathered weight enough to attempt the assault of the French main position, and moved by a common instinct, lines of men almost 2 m. in extent, pressed on, gaining cover from the convex slope of the hill, till at length they were able to storm the stubbornly-defended ridge. Meanwhile, Wimpffen had initiated a fresh counter-stroke from the Fond du Givonne against Balan and Bazeilles. Carried out with magnificent courage, it swept the Bavarians out of both villages, and for a moment the road seemed open for escape, but Wimpffen did not know that the IV. Prussian corps stood waiting behind the gap.

Riding back to the town to seek the emperor and implore him to place himself at the head of all available reinforcements, he saw a white flag break out from the steeple of the church tower, but almost instantaneously disappear. He did indeed reach the emperor, but, delayed by the appalling confusion, was too late. The flag had gone up again and he knew that further resistance was hopeless. The fighting did not cease at once. The troops he had directed to make the final effort, their eyes fixed on the enemy in front of them, never saw the flag; and until 6 P.M. a series of isolated attempts were made to break the iron circle with which the Germans had surrounded them. The emperor, who during the early hours of the day had fearlessly courted death, at length overcome by extreme physical pain and exhaustion, had ridden back to the town, and about 4 P.M., seeing no hope of success, had sent a parlementaire conveying his personal surrender to the king of Prussia, at the same time ordering the white flag to be hoisted. It was torn down by a Colonel Fauve, but was hoisted again half an hour later, when Prussian troops from Cazal were almost at the western gates of Sedan. It only remained for Wimpffen to make terms for the army, and after a long and gallant effort to avert the inevitable, he at length signed an unconditional surrender, with the sole alleviation (introduced as a tribute of respect for the gallantry shown by his men) that all officers were to retain their swords.

Thus passed into captivity 82,000 men, 558 guns and stores to an immense amount. The price to the victors for this result was in round numbers 9000. The French killed and wounded numbered about 17,000. It is indicative of the demoralization in the French army that this figure is 1000 less than the cost of the victory to the Germans at Wörth, although on that occasion the French troops actually engaged numbered one half those available at Sedan. The duration of the fighting was the same in both cases. (F. N. M.)

SEDAN-CHAIR, a portable chair or covered vehicle, with side windows, and entrance through a hinged doorway at the front, the roof also opening to allow the occupant to stand. It is carried on poles by two "chairmen." Alike in Paris and in London the sedan-chair man was an institution—in the one



Sedan-Chair (after Hogarth).

city he was usually an Auvergnat, in the other an Irishman. The sedan-chair was a fashionable mode of transport in towns up to a century or so ago. It took its name from the town of Sedan, in France, where it was first used, and was introduced into England by Sir S. Duncombe in 1634. Although a typically 18th-century vehicle it was used in the 17th, and had been known much earlier. Indeed, the ancient *sedia gestatoria* of the popes is really a rudimentary form of sedan-chair. These vehicles were

often beautifully painted, even the greatest French pastoralists not disdaining to embellish their panels. It is still in use at the public baths at Ischl, in Austria, and also in the city of Bath, England, as a mode of transit in connexion with the medical baths. The sedan-chair can be taken into the bedroom, and the invalid conveyed without exposure to the outer air to and from the mineral-water bath. The poles are so arranged that the chair may be carried up and down stairs and still preserve its horizontal position.

SEDBERGH, a market town in the Skipton parliamentary division of the West Riding of Yorkshire, England, 28¼ m. S.S.E. of Penrith by a branch of the London & North-Western railway. Pop. (1901) 2430. It is pleasantly situated at the junction of several small streams forming the river Lune, in a deep valley surrounded by high-lying moors. The church of St Andrew is principally late Norman. The grammar school was founded by Dr Roger Lupton, provost of Eton College, in 1528, but as it was connected with a chantry it was suppressed by Henry VIII., to be refounded in 1551 by Edward VI.; it now takes rank among the important public schools.

SEDDON, RICHARD JOHN (1845–1906), New Zealand statesman, was born at Eccleston, Lancashire, England, in 1845, his father being a schoolmaster at Eccleston Hill school. He was brought up to the engineering trade, and when eighteen went to Australia and entered the railway workshops at Melbourne. He was caught by the "gold fever" and went to Bendigo, where he spent some time in the diggings; but in 1866 he joined an uncle on the west coast of New Zealand, starting work as a miner. In 1869 he married Miss Louisa Jane Spotswood, of Melbourne. In the same year he was elected to a seat on his local Road Board, and he was soon returned to the Westland Provincial Council for the Arahura district, becoming its first chairman of committees. In 1879 he was returned to the New Zealand parliament for Kumara, and sat for that constituency for twenty-six years, though its name was changed to Westland. He was a member of the Ballance ministry (1891), holding the portfolios for public works, defence and mines; and on Ballance's death (1893) became premier, a position he retained till his sudden death on the 10th of June 1906. During these years Seddon held a unique place in the public life of New Zealand, and in its relations with the empire. He combined his premiership with various offices—as colonial treasurer, minister for education, postmaster-general, telegraph commissioner, minister of marine, minister for land purchase, and minister for labour,—but his strenuous personality, and the confidence inspired by his determination to make New Zealand a living force among the British dominions, were the dominating features in all his course of action. His large physique, his profound earnestness, his gift of popular oratory, his expansive kindliness and his power of dealing with men, made him supreme among his own people. He became known in a wider sphere after his attending the colonial conference in London in 1897, and thenceforth he was regarded as one of the pillars of British imperialism. During the Boer War, and afterwards in the movement for preferential trade with the colonies, he was an enthusiastic supporter of Mr Chamberlain, though he was characteristically outspoken in opposition to the introduction of Chinese labour into South Africa. His rough and ready views were frequently open to criticism, but his vigorous patriotism and intensity of character give him a permanent place among those who have worked for the consolidation of the British dominions.

A *Life*, by J. Drummond, was published in 1907.

SEDDON, THOMAS (1821–1856), English landscape painter, was born in London on the 28th of August 1821. His father was a cabinetmaker, and the son for some time followed the same occupation; but in 1842 he was sent to Paris to study ornamental art. On his return he executed designs for furniture for his father. In 1849 he made sketching expeditions in Wales and France, and in 1852 began to exhibit in the Royal Academy, sending a figure-piece, Penelope, and afterwards landscapes, deriving their subjects from Brittany. In the end of 1853 he joined Holman Hunt at Cairo. He worked for a year in Egypt and Palestine, executing views which Ruskin pronounced to be "the first landscapes uniting perfect artistical skill with topographical accuracy; being directed, with stern self-restraint, to no other purpose than that of giving to persons who cannot travel trustworthy knowledge of the scenes which ought to be most interesting to them." Seddon's Eastern subjects were exhibited in Berners Street, London, in 1855, and in Conduit Street in 1856. In October 1856 Seddon again visited Cairo, where he died on the 23rd of November. In 1857 his works were exhibited in the rooms of the Society of Arts, and his important and elaborately finished picture, "Jerusalem and the Valley of Jehoshaphat," was purchased by subscription and presented to the National Gallery.

A memoir of Seddon, by his brother, was published in 1859.

SEDERUNT, ACT OF, in Scots law, an ordinance for regulating the forms of judicial procedure before the Court of Session, passed by the judges under authority of a power originally conferred by an act of the Scottish parliament, 1540, c. 93. A quorum of nine judges is required to pass an act of Sederunt.

SEDGLEY, an urban district of Staffordshire, England, between Dudley and Wolverhampton, in the parliamentary borough of Wolverhampton. Pop. (1901) 15,951. The district abounds in coal, lime and ironstone. Nails, rivets, chains, fire-irons, locks and safes are produced. The parish includes the large manufacturing districts of Upper and Lower Gornal, Coseley and Deepfields, the last having a station on the London & North-Western railway, 10 m. W.N.W. from Birmingham.

SEDGWICK, ADAM (1785–1873), English geologist, was born on the 22nd of March 1785 at Dent in Yorkshire, the second son of Richard Sedgwick, vicar of the parish. He was educated at the Grammar Schools of Dent and Sedbergh, and at Trinity College, Cambridge, where he graduated B.A. as fifth wrangler in 1808, and two years later was elected a Fellow of his college. For several years he was occupied as private tutor and afterwards as assistant mathematical tutor at Trinity College. In 1818 he was admitted to priests' orders. He had at this time paid no serious attention to geology. As a lad he had collected fossils from the Mountain Limestone near Dent, and in 1813 he had visited the mines near Furness and Coniston. Nevertheless, when the Rev. John Hailstone retired in 1818 from the post of Woodwardian professor of geology, Sedgwick applied for the vacancy, and was so strongly supported by his college as a man of talent that he was elected by a large majority. He now took up the study of geology with intense zeal, traversed large areas in the south of England, and, becoming acquainted with W. D. Conybeare, regarded him as his master in geology. It is astonishing with what rapidity he grasped the principles of stratigraphical geology and the relationships of rocks in the field. In papers read before the Cambridge Philosophical Society, 1820–1821, on the structure of parts of Devonshire and Cornwall, he made observations of exceptional interest and value. Of this society in 1819 he had been one of the founders with J. S. Henslow. Every year for a long period now brought its season of field-work. Sedgwick dealt with the geology of the Isle of Wight, and with the strata of the Yorkshire coast (in papers published in the *Annals of Philosophy*, 1822, 1826); and he examined the rocks of the north of Scotland with Murchison in 1827. He contributed an important essay *On the Geological Relations and Internal Structure of the Magnesian Limestone* to the Geological Society of London (1828). As early as 1822 he had begun to make a detailed geological map of the older rocks of the Lake District; he continued these researches, whereby the main structure of this mountain region was first unravelled, in succeeding years; and the principal results were brought before the Geological Society (1831–1836). Meanwhile he was elected president of the Geological Society in 1829–1830, and in 1831 he commenced field-work in North Wales. His chief attention was now concentrated on the older rocks of England and Wales. Murchison began the task of unravelling the structure of the older rocks on the Welsh borders in the same year. They had intended to start together, but the arrangements fell through, and thus they began their labours independently

and from opposite sides of the principality. Eventually Sedgwick founded the Cambrian system for the oldest group of fossiliferous strata, and Murchison the Silurian system for the great group immediately below the Old Red Sandstone. Their systems were found to overlap—Sedgwick's Upper Cambrian and Murchison's Lower Silurian being practically equivalent. Hence arose a painful controversy that has only of late years been terminated by the adoption of Professor C. Lapworth's term Ordovician in place of the Upper Cambrian of Sedgwick and the Lower Silurian of Murchison.

Sedgwick was ever actively interested in the work of his university. His famous *Discourse on the Studies of the University of Cambridge*, delivered in 1832, was published in expanded form in 1833; it reached a fifth edition in 1850. The studies were reviewed under the headings of (1) The laws of nature, (2) Ancient literature and language, and (3) Ethics and metaphysics; and the volume had so grown that it ultimately consisted of 442 pages of preface, or preliminary dissertation on the history of creation, with arguments against the transmutation of species, and an essay on the evidences of Christianity; the discourse occupied 94 pages; and there was an appendix of notes, &c., that filled 228 pages.

In 1833 Sedgwick was president of the British Association at the first Cambridge meeting, and in 1834 he was appointed a canon of Norwich. In 1836 with Murchison he made a special study of the Culm-measures of Devonshire, which until that time had been grouped with the greywacke, and together they demonstrated that the main mass of the strata belonged to the age of the true Coal Measures. Continuing their researches into the bordering strata they were able to show in 1839, from the determinations of William Lonsdale, that the fossils of the South Devon limestones and those of Ilfracombe and other parts of North Devon were of an intermediate type between those of the Silurian and Carboniferous systems. They therefore introduced the term Devonian for the great group of slates, grits and limestones, now known under that name in West Somerset, Devon and Cornwall. These results were published in the great memoir by Sedgwick and Murchison, "On the Physical Structure of Devonshire" (*Trans. Geol. Soc.*, 1839). Of later published works it will be sufficient to mention *A Synopsis of the Classification of the British Palaeozoic Rocks* (1855), which contained a systematic description of the fossils by F. McCoy. Also the preface by Sedgwick to *A Catalogue of the collection of Cambrian and Silurian Fossils contained in the Geological Museum of the University of Cambridge*, by J. W. Salter (1873).

The Wollaston Medal of the Geological Society was awarded to Sedgwick in 1851, and the Copley Medal of the Royal Society in 1863. He continued to lecture until 1872, when ill-health rendered necessary the appointment of a deputy (Professor J. Morris). He died at Cambridge on the 27th of January 1873.

In 1865 the senate of the university received from A. A. Van Sittart the sum of £500 "for the purpose of encouraging the study of geology among the resident members of the university, and in honour of the Rev. Adam Sedgwick." Thus was founded the Sedgwick prize to be given every third year for the best essay on some geological subject. The first Sedgwick prize was awarded in 1873. On the death of Sedgwick it was decided that his memorial should take the form of a new and larger museum. Hitherto the geological collections had been placed in the Woodwardian Museum in Cockerell's Building. Through the energy of Professor T. McK. Hughes (successor to Sedgwick) the new building termed the Sedgwick Museum was completed and opened in 1903.

See the *Life and Letters*, by John Willis Clark and Thomas McKenny Hughes (1890).

SEDGWICK, JOHN (1813–1864), American general, was born at Cornwall, Connecticut, on the 13th of September 1813, and graduated at West Point in 1837. Amongst his classmates were Joseph Hooker, Braxton Bragg and J. A. Early. He saw active service against the Seminoles in Florida, and took part as an artillery officer in the Mexican war, winning the brevets of captain and major for his conduct at Contreras-Churubusco and Chapultepec. In command first of a brigade and later of a division in the army of the Potomac, he took part in the Seven Days' and Maryland campaigns. At the battle of Antietam he was twice wounded, but remained on the field. Soon afterwards he was given command of the VI. corps, in which position he took an important part in the battle of Chancellorsville, capturing the famous lines of Fredericksburg and fighting the severe battle of Banks's Ford. The VI. corps bore a share in the battle of Gettysburg, having made a fine forced march to the field. Sedgwick had been offered the chief command of the army upon Hooker's resignation; but he declined, and retained his command of the VI. corps during the Virginian campaign of the autumn of 1863, being on several occasions placed by Meade in charge of a wing of the army. He was also given the command of the whole army in Meade's absence. At the action of Rappahannock station Sedgwick by a brilliant night attack destroyed two brigades of Early's division (November 7th). When Grant became commander-in-chief and the army of the Potomac was reorganized in three corps, the VI. was one of these, and Sedgwick thus led his old corps, now greatly augmented, at the battle of the Wilderness. At the opening of the battle of Spottsylvania Court House, Sedgwick was killed (9th of May 1864) by a shot from a Confederate skirmisher. A monument to his memory, cast from the guns taken in action by the VI. corps, was erected at West Point in 1868.

SEDILIA (the plural of Lat. *sedile*, seat), in ecclesiastical architecture, the term given to the seats on the south side of the chancel near the altar for the use of the officiating priests. They are generally three in number, for the priest, deacon and sub-deacon. The custom of recessing them in the thickness of the wall began about the end of the 12th century; some early examples consist only of stone benches, and there is one instance of a single seat or arm-chair in stone at Lenham in Kent, thought by some to be a confessional. The niches or recesses in which they are sunk are often richly decorated with canopies and subdivided with moulded shafts, pinnacles and tabernacle work; the seats are sometimes at different levels, the eastern being always the highest, and sometimes an additional niche is provided in which the piscina is placed.

SEDITION (Lat. *se* or *sed*, apart, and *ire*, to go, a going apart, dissension), in law, an attempt to disturb the tranquillity of the state. In Roman law sedition was considered as *majestas* or treason. In English law it is a very elastic term, including offences ranging from libel to treason (*q.v.*). It is rarely used except in its adjectival form, *e.g.* seditious libel, seditious meeting or seditious conspiracy. "As to sedition itself," says Mr Justice Stephen, "I do not think that any such offence is known to English law" (*Hist. Crim. Law*, vol. ii. chap. xxiv.).[1] The principal enactments now in force dealing with seditious offences were all passed during the last twenty-five years of the reign of George III. They are the Unlawful Oaths Act 1797, prohibiting the administering or taking of unlawful oaths (see OATH) or the belonging to an unlawful confederacy; the Unlawful Drilling Act 1819–1820 prohibited unlawful drilling and military exercises; and the acts for the suppression of corresponding societies, the Unlawful Societies Act 1799 and the Seditious Meetings Act 1817. No proceedings can be instituted under these last two acts without the authority of the law officers of the crown (Corresponding Societies, &c., Act, 1846). Under the head of statutes aimed at seditious offences may also be classed statutes of Richard II. (1378, 1388) against *scandalum magnatum* or slander of great men, such as peers, judges or great officers of state, whereby discord may arise within the realm, and a statute of Charles II. (1661) against tumultuous petitioning (see PETITION). There has been no prosecution for many years for seditious words as distinguished from seditious libel, but such words have been admitted as evidence in proceedings for editious conspiracy (*q.v.*), as in the prosecution of O'Connell in 1844 and of C. S. Parnell and others in 1880 (see *Reg.* v. *Parnell*, Cox's *Criminal Cases*, vol. xiv. 508). By the Prison Act 1877, any prisoner under sentence for sedition or seditious libel is to be treated as a misdemeanant of the first division.

[1] The word "sedition" occurs, however, in the Prison Act 1877, s. 40.

Scotland.—"All acts by which the minds of the people may be incited to defeat the government or control legislation by violent or unconstitutional means are seditious" (Macdonald, *Criminal Law*, 229). Sedition is punishable by fine or imprisonment or both (Punishment of Leasing-making, &c., 1825). A very large number of acts of the Scottish parliament dealt with sedition, beginning as early as 1184 with the assize of William the Lion, c. 29. Leasing-making is to be distinguished from sedition, as it attacked only the sovereign individually, not the government.

United States.—In the acts of Congress the word "sedition" appears to occur only in the army and navy articles. A soldier joining any sedition or who, being present at any sedition, does not use his utmost endeavour to suppress the same, is punishable with death or such other punishment as a court-martial shall direct (U.S. Rev. Stats. § 1342, arts. 22, 23). A sailor uttering seditious words is punishable at the discretion of a court-martial. In 1798 an act of Congress called the Sedition Act was passed, which expired by effluxion of time in 1801. Its constitutionality was violently assailed at the time and "was beyond all question condemned by public sentiment" as "susceptible of being used for purposes of oppression and terrorism." (See Story on the constitution of the United States, §§ 1293–1294.) Several prosecutions under the act will be found in Wharton's *State Trials*. Sedition is also dealt with by the state laws mostly in a very liberal spirit. Thus the Louisiana Code, § 394, enacted that "there is no such offence known to our law as defamation of the government or either of its branches, either under the name of libel, slander, seditious writing or other appellation." By § 111, to constitute the offence of sedition "there must be not only a design to dismember the state, or to subvert or change its constitution, but an attempt must be made to do it by force. It has been held that publications which tend to degrade and vilify the constitution, to promote insurrection and circulate discontent through its members, to asperse its justice and anywise impair the exercise of its functions are *seditious* and are visited with the peculiar rigour of the law (1805, *Respub. v. Dennie*, 4 Yeates (Penna), 267). The defendant was indicted "as a factitious and seditious person of a wicked mind and unquiet and turbulent disposition and conversation, seditiously, maliciously and wilfully intending as much as in him lay to bring into contempt and hatred the independence of the United States, the constitution of this commonwealth and of the United States, to excite popular discontent and dissatisfaction against the scheme of polity instituted and upon trial in the said United States and in the said commonwealth, to molest, disturb and destroy the peace and public tranquillity of the said United States . . . to condemn the principles of revolution and revile, depreciate and scandalize the characters of the revolutionary patriots and statesmen, to endanger, subvert and totally destroy the republican constitutions and free governments of the United States . . . to involve (it) . . . in civil war, desolation and anarchy and to procure by art and force a radical change and alteration in the principles and forms of the said constitutions and governments without the free will and concurrence of the people of the United States, and to fulfil, perfect and bring to effect his wicked, seditious and detestable intentions aforesaid he the said Joseph Dennie on the 23rd of April 1803 at the city of Philadelphia falsely, maliciously, factiously and seditiously did make, compose, write and publish the following libel, to wit, 'a *democracy* is scarcely tolerable at any period of national history. Its omens are always *sinister* and its powers are *unpropitious*; it was weak and wicked at *Athens*, it was bad in Sparta and worse in *Rome*. . . . It was tried in England and rejected with the utmost *loathing and abhorrence*. *It is on its trial* here and its issue will be *civil war, desolation and anarchy*. . . . No honest man but proclaims its *fraud*, and no brave man but draws his *sword against its force*,' &c., &c." The defendant was found not guilty.

Continent of Europe.—The continental codes as a rule are little more definite than English law in their treatment of sedition In Germany a distinction is drawn between *Auflauf*, the remaining together of a mob after the authorities have thrice bid it disperse, and *Aufruhr* or *Aufstand*, an organized resistance to the authorities; but no definition is given of the terms. The Hungarian penal code defines *Aufstand* to be an armed assembly which has the intention of attacking a class of citizens, a nationality or a religious body. The French penal code recognizes a difference between *sédition* and *réunion séditieuse*. If carried out with sufficient numbers and sufficient force *sédition* becomes *rébellion*. Section 100 exempts from the penalties of sedition those who have merely been present at a seditious meeting without taking any active part therein, and have dispersed at the first warning of the military or civil authorities.

SEDLEY, SIR CHARLES (*c.* 1639–1701), English wit and dramatist, was born about 1639, and was the son of Sir John Sedley of Aylesford in Kent. He was educated at Wadham College, Oxford, but left without taking a degree. Sedley is famous as a patron of literature in the Restoration period, and was the "Lisideius" of Dryden's *Essay of Dramatic Poesy*. His most famous song, "Phyllis is my only joy," is much more widely known now than the author's name. His first comedy, *The Mulberry Garden* (1668), hardly sustains Sedley's contemporary reputation for wit in conversation. The best, but most licentious, of his comedies is *Bellamira; or The Mistress* (1687), an imitation of the *Eunuchus* of Terence, in which the heroine is supposed to represent the duchess of Cleveland, the mistress of Charles II. His two tragedies, *Antony and Cleopatra* (1667) and *The Tyrant King of Crete* (1702), an adaptation of Henry Killigrew's *Pallantus and Eudora*, have little merit. He also produced *The Grumbler* (1702), an adaptation of *Le Grondeur* of Brueys and Palaprat. An indecent frolic in Bow Street, for which he was heavily fined, made Sedley notorious. He was member of parliament for New Romney in Kent, and took an active and useful part in politics. A speech of his on the civil list after the Revolution is cited by Macaulay as a proof that his reputation as a man of wit and ability was deserved. His *bon mot* at the expense of James II. is well known. The king had seduced his daughter and created her countess of Dorchester, whereupon Sedley remarked that he hated ingratitude, and, as the king had made his daughter a countess, he would endeavour to make the king's daughter a queen. He died on the 20th of August 1701.

His only child, CATHERINE, countess of Dorchester (*c.* 1657–1717), was the mistress of James II. both before and after he came to the throne, and was created a countess in 1686, an elevation which aroused much indignation and compelled Catherine to reside for a time in Ireland. In 1696 she married Sir David Colyear, Bart. (d. 1730), who was created earl of Portmore in 1703, and she was thus the mother of Charles Colyear, 2nd earl of Portmore (1700–1785). She died at Bath on the 26th of October 1717, when her life peerage became extinct. By James II. Lady Dorchester had a daughter Catherine (d. 1743), who married James Annesley, earl of Anglesey (d. 1702), and after his death married John Sheffield, duke of Buckingham. Through Catherine, her daughter by her first husband, she was the ancestress of the Barons Mulgrave.

See *The Works of Sir Charles Sedley in Prose and Verse* (1778), with a slight notice of the author.

SEDUCTION (from Lat. *seducere*, to lead astray), a term generally used in the special sense of wrongfully inducing a woman to consent to sexual intercourse. The action for seduction of an unmarried woman in England stands in a somewhat anomalous position. The theory of English law is that the woman herself has suffered no wrong; the wrong has been suffered by the parent or person *in loco parentis*, who must sue for the damage arising from the loss of service caused by the seduction of the woman. Some evidence of service must be given, but very slight evidence will be sufficient, even making of tea, milking cows, minding children or any small household work. It is no bar if a daughter is out at work during the day time, provided she assists in the household when she comes home in the evening. The relationship of master and servant must, however, exist, and the action must be brought by the person with whom the seduced girl was residing at the time, whether in the capacity of daughter and servant, ward and servant, or servant only. It is so seldom indeed that an action is brought against a seducer when the seduced girl is a servant only, that what Serjeant Manning wrote many years ago is still painfully true: "The *quasi* fiction of *servitium amisit* affords protection to the rich man whose daughter occasionally makes his tea, but leaves without redress the poor man whose child is sent unprotected to earn her bread amongst strangers" (note to *Grinnell v. Wells*, 1844, 7 M. & G. 1044). This capricious working of the action for seduction is somewhat obviated in Scots law, under which the seduced woman may sue on her own account, but only if deceit has been used, and most often there is a difficulty in showing that the deceit alone was the cause of the injury. Although the action is nominally for loss of service, still exemplary damages are given for the dishonour of the plaintiff's family beyond recompense for the mere loss of service. An action for seduction cannot be brought in the county court except by agreement of the parties. As to seduction of a married woman, the old action for criminal conversation was abolished

by the Divorce Act 1857, which substituted for it a claim for damages against the co-respondent in a divorce suit; but if a married woman were living apart from her husband in her father's house, and giving her services to her father in the slightest degree, an action for seduction would lie. Seduction in England is not as a rule a criminal offence. But a conspiracy to seduce is indictable at common law. And the Criminal Law Amendment Act 1885 (which extends to the United Kingdom) makes it felony to seduce a girl under the age of thirteen, and misdemeanour to seduce a girl between thirteen and sixteen (§§ 4, 5). The same act also deals severely with the cognate offences of procuration, abduction and unlawful detention with the intent to seduce a woman of any age. The Children Act 1908 gave a further protection to young people, enacting that if any person having the custody, charge or care of a girl under the age of sixteen causes or encourages the seduction of that girl he shall be guilty of a misdemeanour, and be liable to imprisonment, with or without hard labour, for a term not exceeding two years.

United States.—In the United States state legislation has generally modified the common law. In some states the father brings the action as the representative of the family whose purity has been invaded; in others the woman herself may bring the action. In many states there is a criminal as well as a civil remedy. The penal codes of New York, New Jersey, Louisiana and other states make it a crime to seduce under promise of marriage an unmarried woman of good reputation. Subsequent intermarriage of the parties is in most cases a bar to criminal proceedings. The state legislation of the United States is in remarkable opposition to the rule of the canon law, by which the seduction of a woman by her betrothed was not punishable on account of the inchoate right over her person given by the betrothal.

SEDULIUS, COELIUS or CAELIUS (a praenomen of doubtful authenticity), a Christian poet of the first half of the 5th century, is termed a presbyter by Isidore of Seville and in the Gelasian decree. He must not be confused with Sedulius the Irish-Scot grammarian of the 9th century. His fame rests mainly upon a long poem, *Carmen paschale*, based on the four gospels. In style a bombastic imitator of Virgil, he shows, nevertheless, a certain freedom in the handling of the Biblical story, and the poem soon became a quarry for the minor poets. A hymn by Sedulius in honour of Christ, consisting of twenty-three quatrains of iambic dimeters, has partly passed into the liturgy, the first seven quatrains forming the Christmas hymn *A solis ortus cardine*, and some later ones the Epiphany hymn, *Hostis Herodes impie*. A *Veteris et novi Testamenti collatio* in elegiac couplets has also come down, but we have no grounds for ascribing to him the Virgilian cento, *De verbi incarnatione*.

Sedulius's works were edited by F. Arevalo (Rome, 1794), reprinted in J. P. Migne's *Patrol. Lat.* vol. xix; and finally by J. Huemer (Vienna, 1885). See J. Huemer, *De Sedulii poëtae vita et scriptis commentatio* (Vienna, 1878); M. Manitius, *Geschichte der christlich-lateinischen Poesie* (Stuttgart, 1891); Teuffel-Schwabe, *Hist. of Roman Lit.* (Eng. trans.), 473; Herzog-Hauck, *Realencyklopädie für protestantische Theologie*, xviii. (Leipzig, 1906); Smith and Wace, *Dictionary of Christian Biography* (1887).

SEDUM, in botany, a genus of the natural order Crassulaceae, containing about 120 species, natives chiefly of the north temperate and frigid regions, and mostly perennial herbs with succulent leaves of varied form, but never compound. The white or yellow, rarely pink or blue, flowers are usually small and grouped in cymes. They have a calyx of five sepals, as many petals, usually ten stamens and five distinct carpels, which have as many glands at their base and ripen into as many dry seed-pods. Several species are British, including some with tuberous roots and large leaves (*Telephium*), and others of smaller size, chiefly found on rocks, walls and dry banks; *S. acre* is stonecrop (see fig. 1), well known also in gardens, a variety of which, *aureum*, is in cultivation with golden-yellow tips to the leaves and shoots. Many others are cultivated for the beauty of their foliage or flowers, and many are remarkable for their vitality under adverse circumstances. They succeed on rockwork, old walls or as border plants; some, *e.g. S. Lydium*, a native of Asia Minor, are excellent for carpet bedding. *S. spectabile*, 1 to 1½ ft., with pink flowers in great cymose heads, is a fine plant for the borders, and worthy also of pot-culture for greenhouse decorations *S. Sieboldi* and its variegated form, from Japan, are often grown



Sedum acre (Stonecrop), ⅔ nat. size. (After Curtis.)
Flora Lindinensis. 1, Diagram of flower; 2, flower enlarged.

in hanging pots or baskets in cottage windows. *Sedums* are very closely allied to *Sempervivums* (see HOUSELEEK).

SEE (Lat. *sedes*, a seat), a seat or throne, particularly the throne of a bishop, the *cathedra*, the symbol of his office and dignity, the placing of which in a church makes it a cathedral (*q.v.*). The term is thus applied to the place where the bishop's cathedral is situated and from which he properly takes his title, and so is to be distinguished from diocese (*q.v.*), the territorial province over which his jurisdiction extends (see BISHOP).

SEEBACH, MARIE (1830–1897), German actress, was born at Riga, in Russia, on the 24th of February 1830, being the daughter of an actor, Wilhelm Friedrich Seebach (1798–1863). After appearing first at Nuremberg at Julie in *Kean*, she played soubrette parts at Lübeck, Danzig and Cassel. In 1852 she achieved her first great success at the Thaliatheater in Hamburg as Gretchen in Goethe's *Faust*, and she remained there until 1854, when she appeared in Vienna. She then played in Munich, establishing her reputation as a tragic actress with the rôles of Jane Eyre and Adrienne Lecouvreur. From 1855 to 1866 she was engaged at the court theatre at Hanover, and there in 1859 she married the tenor Albert Niemann. In 1866 she followed her husband to Berlin, but separated from him after two years. In 1870–1871 she visited the United States, and gave in seventeen cities no less than 160 performances—mostly of *Faust*; and in 1886 she accepted a permanent engagement at the Schauspielhaus in Berlin. She retired from the stage in 1897, and died on the 3rd of August of that year. In 1895 she endowed a home for poor actors and actresses at Weimar, called the Marie Seebach Stiftung.

See Gensichen, *Aus Marie Seebachs Leben* (Berlin, 1900).

SEED (from the root seen in Lat. *serere*, to sow), the fertilized ovule of plants. The seeds of the cryptogams or flowerless plants are not true seeds and are properly designated "spores" (see FRUIT). For the sowing of seed see SOWING.

SEELEY, SIR JOHN ROBERT (1834–1895), English essayist and historian, was born in London in 1834. His father, R. B. Seeley, was a publisher, and author of several religious books and of *The Life and Times of Edward I.*, which was highly esteemed by historians. From his father Seeley doubtless derived his taste for religious and historical subjects. He was educated at the City of London School and at Christ's College, Cambridge, where he was head of the classical tripos and senior chancellor's medallist, was elected fellow and became classical tutor of his college. For a time he was a master at his old school, and in 1863 was appointed professor of Latin at University College, London. His essay *Ecce Homo*, published anonymously in 1866, and afterwards owned by him, was widely read, and called forth

many replies, being held to be an attack on Christianity. Dealing only with Christ's humanity, it dwells on his work as the founder and king of a theocratic state, and points out the effect which this society, his church, has had upon the standard and active practice of morality among men. Some who condemned the book seem to have forgotten that it was avowedly "a fragment," and that the author does not deny the truth of doctrines which he does not discuss. Its literary merit is unquestionable; it is written with vigour and dignity; its short and pointed sentences are never jerky, and there is a certain stateliness in the admirable order of their sequence. His later essay on *Natural Religion*, which, premising that supernaturalism is not essential to religion, maintains that the negations of science tend to purify rather than destroy Christianity, satisfied neither the Christian nor the scientist, and though well written excited far less interest than his earlier work. In 1869 he was appointed professor of modern history at Cambridge. His influence as a teacher was stimulating; he prepared his lectures carefully and they were largely attended. In historical work he is distinguished as a thinker rather than a scholar. Avoiding research and disliking all attempts at a picturesque representation of the past, he valued history solely in its relation to politics, as the science of the state. He maintained that it should be studied scientifically and for a practical purpose, that its function was the solution of existing political questions. Hence he naturally devoted himself mainly to recent history, and specially to the relations between England and other states. His *Life and Times of Stein*, a valuable narrative of the anti-Napoleonic revolt, led by Prussia mainly at Stein's instigation, was written under German influence, and shows little of the style of his short essays. Its length, its colourlessness, and the space it devotes to subsidiary matters render it unattractive. Far otherwise is it with his *Expansion of England* (1883). Written in his best manner, this essay answers to his theory that history should be used for a practical purpose; it points out how and why Great Britain gained her colonies and India, the character of her empire, and the light in which it should be regarded. As an historical essay the book is a fine composition, and as a defence of the empire is unanswerable and inspiring. It appeared at an opportune time, and did much to make Englishmen regard the colonies, not as mere appendages, but as an expansion of the British state as well as of British nationality, and to remind them of the value of Great Britain's empire in the East. Seeley was rewarded for this public service by being made K.C.M.G., on the recommendation of Lord Rosebery. His last book, *The Growth of British Policy*, written as an essay and intended to be an introduction to a full account of the expansion of Great Britain, was published posthumously. Seeley died on the 13th of January 1895. He married in 1869 Miss Mary Agnes Phillott, who survived him.

See G. W. Prothero, *Memoir* prefixed to *Growth of British Policy* (London, 1895). (W. Hu.)

SÉES, a town of north-western France, in the department of Orne, on the river Orne 3 m. from its source and 13 m. N.N.E. of Alençon by rail. Pop. (1906) town, 2612; commune, 3982. The town is a bishop's see and has a Gothic cathedral remarkable for the boldness of its architecture. The church dates from the 13th and 14th centuries and occupies the site of three earlier churches. The west front, which is disfigured by the buttresses projecting beyond it, has two stately spires of open work 230 ft. high. The nave was built towards the end of the 13th century. The choir, built soon afterwards, is remarkable for the lightness of its construction. In the choir are four bas-reliefs of great beauty representing scenes in the life of the Virgin; and the altar is adorned with another depicting the removal of the relics of St Gervais and St Protais. The church has constantly been the object of restoration and reconstruction. Other noteworthy buildings are the episcopal palace (1778), with a pretty chapel; the higher seminary, located in the old abbey of St Martin (supposed to be one of the fourteen or fifteen monasteries founded in the 6th century by St Evroult); and the sumptuous modern chapel of the Immaculate Conception, a resort of pilgrims.

The first bishop of Sées (*Saium*, *Sagium*) was St Lain, who lived about the 4th century. In the 9th century Sées was a fortified town and fell a prey to the Normans. At that period Sées consisted of two distinct parts, separated by the Orne—the bishop's burgh, and to the south, the new or count's burgh (*Bourg le Comte*). From 1356 the counts of Alençon were its possessors. It was captured and recaptured in the wars between Henry II. of England and his sons. In the Hundred Years' War it was one of the first towns of Normandy to fall into the hands of the English (1418). Pillaged by the Protestants during the Wars of Religion, Sées attached itself to the League in 1589, but voluntarily surrendered to Henry IV. in 1590.

SEETZEN, ULRICH JASPER (1767–1811), German explorer of Arabia and Palestine, was born, the son of a yeoman, in the little lordship of Jever in German Frisia on the 30th of January 1767. His father, who was a man of substance, sent him to the university of Göttingen, where he graduated in medicine. His chief interests, however, were in natural history and technology; he wrote papers on both these subjects which gained him some reputation, and had both in view in making a series of journeys through Holland and Germany. He also engaged in various small manufactures, and in 1802 obtained a government post in Jever. In 1801, however, the interest which he had long felt in geographical exploration culminated in a resolution to travel. In the summer of 1802 he started down the Danube with a companion Jacobsen, who broke down at Smyrna a year later. His journey was by Constantinople, where he stayed six months, thence through Asia Minor to Smyrna, then again through the heart of Asia Minor to Aleppo, where he remained from November 1803 to April 1805, and made himself sufficiently at home with Arabic speech and ways to travel as a native. Now began the part of his travels of which a full journal has been published (April 1805 to March 1809), a series of most instructive journeys in eastern and western Palestine and the wilderness of Sinai, and so on to Cairo and the Fayum. His chief exploit was a tour round the Dead Sea, which he made without a companion and in the disguise of a beggar. From Egypt he went by sea to Jidda and reached Mecca as a pilgrim in October 1809. In Arabia he made extensive journeys, ranging from Medina to Lahak and returning to Mocha, from which place his last letters to Europe were written in November 1810. In September of the following year he left Mocha with the hope of reaching Muscat, and was found dead two days later, having, it is believed, been poisoned by the command of the imâm of Sana.

For the parts of Seetzen's journeys not covered by the published journal (*Reisen*, ed. Kruse, 4 vols, Berlin, 1854), the only printed records are a series of letters and papers in Zach's *Monatliche Correspondenz* and Hammer's *Fundgruben*. Many papers and collections were lost through his death or never reached Europe. The collections that were saved form the Oriental museum and the chief part of the Oriental MSS. of the ducal library in Gotha.

SEGANTINI, GIOVANNI (1858–1899), Italian painter, was born at Arco in the Trentino on the 15th of June 1858. His mother, who died in 1863, belonged to an old family of the mountain country. His father, who was a man of the people, went to Milan, whence he set forth with another son to seek his fortune, leaving Giovanni behind. At the age of seven the child ran away; he was found perishing of cold and hunger, and was obliged to earn his bread by keeping the flocks on the hills. He spent his long hours of solitude in drawing. Owing to his fame having reached the ears of a syndic, he was sent back to Milan; but, unable to endure domestic life, he soon escaped again, and led a wandering life till he met at Arco with his half-brother, who offered him the place of cashier in his provision shop. After more flights and more returns, Segantini remained at Milan to attend classes at the Brera, earning a living meanwhile by giving lessons and painting portraits. His first picture, "The Choir of Sant Antonio," was noticed for its powerful quality. After painting this, however, he shook himself free by degrees of academical teaching, as in his picture "The Ship." He subsequently painted "The Falconer" and "The Dead Hero," and then settled in Brianza, near Como. There he gave himself up to the study of mountain life, and became in truth the painter of

the Alps. At this time he painted the "Ave Maria," which took a gold medal at the Amsterdam Exhibition (1883), "Mothers," "After a Storm in the Alps," "A Kiss," and "Moonlight Effect." Deeply impressed by Millet, the artist nevertheless quickly strove to reassert his individuality, as may be seen in "The Drinking-place," which gained a gold medal in Paris (1889), "In the Sheep-fold," "By the Spinning-wheel," and "Ploughing in the Engadine," for which he was awarded a gold medal at the Turin Exhibition (1892). Besides those works in which he studied simple effects of light and Alpine scenery, such as "Midday on the Alps" and "Winter at Savognino," he also painted symbolical subjects: "The Punishment of Luxury," and the "Unnatural Mothers" (in the Walker Art Gallery, Liverpool). Segantini died at Maloja in October 1899. An exhibition of his works was held in London, and afterwards at Brussels in 1899, and at Milan in 1900.

AUTHORITIES.—H. Zimmern, *Magazine of Art* (London, 1897); W. Ritter, *Gazette des beaux-arts* (Paris, 1898); Robert de la Sizeranne, *Revue de l'art* (Paris, 1899); and *Revue des deux mondes* (Paris, 1900).

SEGESTA (Gr. Ἔγεστα), an ancient city of Sicily, 8 m. W.S.W. of the modern Alcamo and about 15 m. E.S.E. of Eryx. It was a city of the Elymi, but, though the Elymi were regarded as *barbari*, Segesta, in its relations with its neighbours, was almost like a Greek city. Disputes with Selinus over questions of boundary seem to have been frequent from 580 B.C. onwards. In 454 B.C. we hear of dealings—possibly even an alliance—with Athens (the authority is a fragmentary inscription, see E. A. Freeman, *History of Sicily*, ii. 554), and in 426 an alliance was concluded by Laches. One of the ostensible objects of the Athenian expedition to Sicily in 415 was to aid Segesta against Selinus in a dispute, not only as to questions of boundary, but as to rights of marriage. After the Athenian *débâcle*, the Segestans turned to Carthage; but when Hannibal in 409 B.C. firmly established the Carthaginian power in western Sicily, Segesta sank to the position of a dependent ally, and was indeed besieged by Dionysius in 397, being at last relieved by Himilco. In 307 Agathocles marched on the city, massacred 10,000 men, sold the rest of the inhabitants into slavery and changed its name to Dicaeopolis; but it soon recovered its old name and returned to the Carthaginians. Early in the First Punic War, however, the inhabitants, having massacred the Carthaginian garrison and allied themselves with Rome, had to stand a severe siege from the Carthaginians. Segesta was treated with favour by the Romans, retaining its freedom and immunity from tithe; indeed it seems probable that the municipal constitution of Eryx was suppressed and its territory assigned to Segesta. It received Latin rights before Caesar's concession of them to the rest of Sicily.

The site is now absolutely deserted. The town lay upon the Monte Varvaro (1345 ft.); considerable remains of its external walls, of houses and of a temple of Demeter are to be seen. The theatre is well preserved: its diameter is 205 ft. It is partly hewn in the rock, the rest (especially the back wall of the stage) being of very roughly hewn, long, thin blocks of hard limestone, approximately rectangular, with smaller pieces filling up the interstices. To the W.N.W., 350 ft. below the theatre, is a temple, 200½ ft. long and 86½ wide, including the steps: it is a hexastyle peripteros, and has 36 columns, 29 ft. in height, 6½ ft. in lower diameter. The building was, however, not completed; the *cella* was never built, and the columns, not having been fluted, have a heavy appearance. It is, however, extremely well preserved. Its style places the date of its construction between 430 and 420, so that the interruption of the work must be due to the events of 416 or of 409 B.C. The *Thermae Segestanae* were situated about 5 m. to the north on the road to Castellammare: the hot springs are still in use. (T. As.)

SEGESVÁR (Ger. *Schässburg*), a town of Hungary, in Transylvania, the capital of the county of Nagy-Küküllö, 126 m. S.E. of Koloszvár by rail. Pop. (1900) 10,857. Amongst the principal buildings are a Gothic church of the 15th century, the town and county hall, a German gymnasium with a good collection of antiquities, and the municipal museum. In front of the county hall is a bronze statue of the Hungarian poet Alexander Petöfi (1823–1849), erected in 1897. Segesvár has a good woollen and linen trade, as well as exports of wine and fruit.

Segesvár was founded by Saxon colonists at the end of the 12th century; its Latin name was *Castrum Sex*. Here, on the 31st of July 1849, the Hungarian army under Bem was defeated by the overwhelming numbers of the Russian General Lüders. Petöfi is generally believed to have met his end in this battle.

SEGOVIA, a province of central Spain, formerly part of Old Castile, bounded on the N. and N.E. by the provinces of Burgos and Soria, S.E. by Guadalajara and Madrid, S.W. by Avila, and N.W. by Valladolid. Pop. (1900) 159,243; area, 2635 sq. m. The greater portion of the country consists of an arable tableland, some 2500 ft. above the sea, monotonous enough in appearance, and burnt to a dull brown during summer, but yet producing some of the finest corn in the Peninsula. Along the whole south-eastern boundary the Sierra de Guadarrama rises up suddenly, like a huge barrier, separating Old from New Castile and the basin of the Duero from that of the Tagus. The province is well watered by the streams which rise in the Guadarrama range and flow northwards to the Duero, and by careful irrigation. The Eresma, Cega, Duraton and Riaza are the principal water-courses. Except the capital, Segovia, there is no town of more than 5000 inhabitants; but Sepulveda and other small towns contain monuments of some historical and ecclesiastical interest. At the foot of the Navacerrada pass lies the royal demesne and summer residence of La Granja (*q.v.*). After the completion (1883) of the railway from Medina del Campo to the city of Segovia, and its subsequent extensions to Madrid and Aranda de Duero, the towns adjoining these lines showed signs of increased prosperity and animation. There are manufactures on a small scale of coarse pottery, dyes, paper, alcohol, rosin, hats, pins and needles, flour, oil and beer. Such prosperity, however, as Segovia retains is dependent upon its agricultural produce—wheat, rye, barley, peas, hemp, flax, &c.—together with the rearing of sheep, cattle, mules and pigs. There are extensive forests in the sierras, which yield excellent granite, marble and limestone; but the difficulty of transport has prevented any systematic development of these resources.

SEGOVIA, the capital of the Spanish province of Segovia; on the railway from Madrid to Valladolid and Zamora. Pop. (1900) 14,547. Segovia is built upon a narrow ridge of rock which rises in the valley of the Eresma, where this river is joined by its turbulent tributary the Clamores. It is an episcopal see in the archbishopric of Valladolid. Founded originally as a Roman pleasure resort, it became in the middle ages a great religious centre and seat of the Castilian court; it was surrounded by Alphonso VI. with the walls and towers which still give to it, even in their dilapidation, the air of a military stronghold. The streets are steep, irregular and narrow, and are lined with quaint old-fashioned houses, built for the most part of granite from the neighbouring Sierra Guadarrama. The place teems with records and monuments of the many vicissitudes of fortune and art through which it has passed, foremost among the latter being the ancient alcázar or citadel, the cathedral, the aqueduct of Trajan, and a notable array of churches and other ecclesiastical edifices.

The alcázar is perched upon the western tip of the long tongue of rock upon which the city is built. Of the original medieval fortress but little remains save the noble façade—the building having been wantonly fired in 1862 by the students of the artillery school then domiciled within its walls, and all but destroyed. The work is Gotho-Moorish, with an admixture of Renaissance in the decoration. The 16th-century cathedral (1521–1577), the work of Juan Gil de Ontañon and his son Rodrigo, occupies the site of a former church of the 11th century, of which the present cloisters, rebuilt in 1524, formed part. It is a well-proportioned and delicate piece of Late Gothic—the latest of its kind in Spain—and contains some very fine stained glass. The most remarkable of the many other churches are those of La Vera Cruz (Knights Templar, Romanesque of the early 13th century), San Millan and San Juan (both Romanesque of second half of 13th century), El Parral (Gothic of early 16th century), and Corpus Christi, an ancient Jewish sanctuary and an interesting specimen of Moorish work. The towers and external cloistering, or *corredores*, of several of the later churches—especially those of San Estéban and San Martin—are fine. The great aqueduct, however, called El Puente del Diablo, usually ranks as the glory of Segovia, and is remarkable alike for its colossal proportions, its history, its picturesqueness, and the art with which

it is put together. Erected or rebuilt, according to fairly trustworthy tradition, in the time of the emperor Trajan (*c.* A.D. 53–117), and several times barely escaping destruction, it is now in perfect working order, bringing the waters of the Rio Frio down from the Sierra Fuenfria, 10 m. S. The bridge portion striding across the valley into the city is 847 yds. long, and consists of a double tier of superimposed arches, built of rough-hewn granite blocks, laid without lime or cement. (For illustration, see AQUEDUCT.) Segovia lost its ancient prosperity when it was taken and sacked by the French in 1808. Since then, however, suburbs have sprung up on all sides, outside the walls. The woollen industry decayed, but its place was taken by dyeing, iron-founding, and manufactures of paper, flour, earthenware, and coarse porcelain. Segovia has a botanical garden, a museum and picture gallery, a savings bank, two public libraries, and two remarkable collections of archives. Public education is provided by an institute, a dozen primary schools, a school for teachers, and schools of art and handicrafts. The royal artillery school of Spain is also established here.

SEGRAVE, the name of an English baronial family. Stephen de Segrave, or Sedgrave (d. 1241), the son of a certain Gilbert de Segrave of Segrave in Leicestershire, became a knight and was made constable of the Tower of London in 1203. He obtained lands and held various positions under Henry III., and in 1232 he succeeded Hubert de Burgh as chief justiciar of England. As an active coadjutor of Peter des Roches, bishop of Winchester, Segrave incurred some share of the opprobrium which was lavished on the royal favourites, and in 1234 he was deprived of his office. Soon, however, he was again occupying an influential position at Henry's court, and he retained this until his death on the 9th of November 1241. His son and heir, Gilbert de Segrave (d. 1254), who was also a judge, died in prison at Pons in France, whither he had gone to fight for Henry III.

Gilbert was the father of NICHOLAS DE SEGRAVE, 1st Baron Segrave (*c.* 1238–1295), who was one of the partisans of Simon de Montfort; he led the Londoners at the battle of Lewes, and was a member of Earl Simon's famous parliament of 1265. He was wounded at the battle of Evesham, and was afterwards among those who defied the royal authority in the isle of Ely. Soon, however, he obtained terms of peace, and went to the Holy Land with his future sovereign, Edward I. In 1283 he was summoned to parliament as a baron, and he served the king in various ways. He had six sons, three of whom, John (who succeeded him), Nicholas and Gilbert (bishop of London from 1313 until his death in December 1316), were men of note. Nicholas the younger (*c.* 1260–1322) was summoned to parliament in 1295, and was present at the battle of Falkirk and at the siege of Carlaverock Castle. In 1305 he was found worthy of death for deserting the English army in Scotland and for crossing over to France in order to fight a duel with Sir John de Cromwell; he was, however, pardoned, and again served Edward I. in Scotland. Under Edward II., Nicholas, who was one of Piers Gaveston's few friends, was made marshal of England, but lost this office definitely in 1316. Later he associated himself with Thomas, earl of Lancaster. Through marriage he obtained the manor of Stowe in Northamptonshire, and he is generally called lord of Stowe.

JOHN DE SEGRAVE, 2nd Baron Segrave (*c.* 1256–1325), was one of those who supported the earls of Norfolk and of Hereford in their refusal to serve Edward I. in Gascony in 1297. He took part in campaigns in Scotland, and like his brother Nicholas he signed the letter which was sent in 1301 by the barons at Lincoln to Pope Boniface VIII. repudiating the papal claim to the suzerainty of Scotland. Having been appointed warden of Scotland, Segrave was defeated at Roslin in February 1303; after the capture of Stirling he was again left in charge of this country and was responsible for the capture of Sir William Wallace, whom he conveyed to London. He was also warden of Scotland under Edward II., and was taken prisoner at Bannockburn, being quickly released, and dying whilst on active service in Aquitaine. His grandson and heir, another John (*c.* 1295–1353), married Margaret, daughter and heiress of Thomas of Brotherton, earl of Norfolk, a son of Edward I. Their daughter Elizabeth married John de Mowbray, and the barony of Segrave was united with, and shared the fate of, that of Mowbray (*q.v.*).

Other celebrated members of the Segrave family are Sir Hugh Segrave (d. *c.* 1386), treasurer of England from 1381 until his death, and Stephen de Segrave (d. 1333), a noted pluralist, who was archbishop of Armagh from 1323 until his death on the 27th of October 1333.

SÉGUIER, PIERRE (1588–1672), chancellor of France, was born in Paris on the 28th of May 1588, of a famous legal family originating in Quercy. His grandfather, Pierre Séguier (1504–1580), was *président à mortier* in the parlement of Paris from 1554 to 1576, and the chancellor's father, Jean Séguier, seigneur d'Autry, was civil lieutenant of Paris at the time of his death in 1596. Pierre was brought up by his uncle, Antoine Séguier, *président à mortier* in the parlement, and became master of requests in 1620. From 1621 to 1624 he was intendant of Guienne, where he became closely allied with the duc d'Épernon. In 1624 he succeeded to his uncle's charge in the parlement, which he filled for nine years. In this capacity he showed great independence with regard to the royal authority; but when in 1633 he became keeper of the seals under Richelieu, he proceeded to bully and humiliate the parlement in his turn. He became allied with the cardinal's family by the marriage of his daughter Marie with Richelieu's nephew, César du Cambout, marquis de Coislin,[1] and in December 1635 he became chancellor of France. In 1637 Séguier was sent to examine the papers of the queen, Anne of Austria, at Val de Grâce. According to Anquetil, the chancellor saved her by warning her of the projected inquisition. In 1639 Séguier was sent to punish the Normans for the insurrection of the Nu-Pieds, the military chief of the expedition, Gassion, being placed under his orders. He put down pillage with a strong hand, and was sufficiently disinterested to refuse a gift of confiscated Norman lands. He was the submissive tool of Richelieu in the prosecutions of Cinq-Mars and François Auguste de Thou in 1642. His authority survived the changes following on the successive deaths of Richelieu and Louis XIII., and he was the faithful servant of Anne of Austria and of Mazarin. His resolute attitude towards the parlement of Paris made the chancellor one of the chief objects of the hatred of the Frondeurs. On the 25th of August 1648, Séguier was sent to the parlement to regulate its proceedings. On the way he was assailed by rioters on the Pont-Neuf, and sought refuge in the house of Louis Charles d'Albert, duc de Luynes. In the course of the concessions made to the Fronde in 1650, Séguier was dismissed from his office of keeper of the seals. He spent part of his retirement at Rosny, with his second daughter Charlotte and her husband, the duke of Sully.[2] He was recalled in April 1651, but six months later, on the king's attaining his majority, Séguier was again disgraced, and the seals were given to President Mathieu Molé, who held them with a short interval till his death in 1656, when they were returned to Séguier. Séguier lived for some time in extreme retirement in Paris, devoting himself to the affairs of the academy. When Paris was occupied by the princes in 1652, he was for a short time a member of their council, but he joined the king at Pontoise in August, and became president of the royal council. After Mazarin's death in 1661 Séguier retained but a shadow of his former authority. He showed great violence in his conduct of the case against Fouquet (*q.v.*), voting for the death of the prisoner. In 1666 he was placed at the head of a commission called to simplify the police organization, especially that of Paris; and the consequent ordinances of 1667 and 1670 for the better administration of justice were drawn up by him. He died at St Germain on the 28th of January 1672.

Séguier was a man of great learning, and throughout his life a patron of literature. In December 1642 he succeeded Richelieu as official "protector" of the Academy, which from that time until his death held its sessions in his house. His library was one of the most valuable of his time, only second, perhaps, to the royal collection. It contained no less than 4000 MSS. in various languages, the most important section of them being the Greek MSS. A catalogue was drawn up in Latin and in French (1685–1686) by the

[1] Mme de Coislin became a widow, and in 1644 married clandestinely Guy de Laval, chevalier de Bois-dauphin, afterwards marquis of Laval.

[2] She afterwards contracted a second marriage with Henri de Bourbon, duke of Verneuil, a grandson of Henry IV.

duc de Coislin The chancellor's great-grandson, Henri Charles du Cambout de Coislin, bishop of Metz, commissioned Bernard de Montfaucon, a learned Benedictine of St Maur, to prepare a catalogue of the Greek MSS. with commentaries This work was published in folio 1715, as *Bibliotheca Coislinana, olim Segueriana*. . . . The greater part of the printed books were destroyed by fire, in the abbey of St Germain-des-Prés, in 1794.

See F. Duchesne, *Hist. des chanceliers de France* (fol. 1680); for the affair of Val de Grâce, *Catalogue de documents historiques . . relatifs au règne de Louis XIII* (Paris, 1847); also R. Kerviler, *Le Chancelier P. Séguier* (Paris, 1874). Great part of his correspondence is preserved in the Bibliothèque Nationale, Paris.

SÉGUR, the name of a French family, the first member of which to attain distinction was FRANÇOIS DE SÉGUR, better known as the seigneur de Sainte-Aulaye (d. *c.* 1605), who professed the reformed religion, and was closely associated with Henry IV., becoming in 1576 president of his council. Jean-Isaac, marquis de Ségur (d. 1707), fought in most of the campaigns of the France of his time, and remained loyal throughout the troubles of the Fronde. His son, HENRI JOSEPH, marquis de Ségur (1661–1737), was lieutenant-general of Champagne and Brie, governor of Foix. In his youth he was the hero of an episode of gallantry with Anne of Beauvilliers, abbess of La Joye, which led to the suggestion that she was none other than the Portuguese nun of the famous Letters. His son, HENRI FRANÇOIS, comte de Ségur (1689–1751), was colonel at seventeen, when he succeeded to the command of the Ségur regiment which his father had raised. In 1718 he began a thirty years' tenure of the lieutenant-generalship of Champagne and Brie. He had married in that year Angélique de Froissy, a natural daughter of the regent, Philip of Orleans, but the death of his father-in-law a few years later prevented his reaping special advancement from his marriage, though Mme de Ségur belonged to the inner circle of Louis XV.'s intimates. Ségur served in Italy during the war of the Polish Succession under Marshal Villars, and became, in 1736, inspector-general of cavalry. In 1738 he was sent to Nancy as lieutenant-general under Marshal Belle-Isle, and to Bohemia in 1741 with the French troops allied with the Bavarians. But in September 1741 he was compelled by the imperial troops to surrender at Linz. In 1744 he was again sent to Bavaria, and defeated the Austrians at Lichtenau on the 28th of January 1745. He served throughout the Flemish campaigns of 1746 and 1747, and was commandant of Metz at the time of his death (18th of June 1751). His son, PHILIPPE HENRI, marquis de Ségur (1724–1801), marshal of France, his grandson, LOUIS PHILIPPE, comte de Ségur (1753–1830), and Louis Philippe's son PHILIPPE PAUL, comte de Ségur (1780–1873), are separately noticed.

JOSEPH ALEXANDRE PIERRE, vicomte de Ségur (1756–1805), second son of the marshal, quitted the army at the outbreak of the Revolution to devote himself to literature. He edited the *Mémoires* of Besenval in 1795 from the MS. which, originally in his possession, had been surreptitiously placed with the printer during Ségur's imprisonment under the Terror. These were printed in 1804–1805. Between 1790 and 1800 he produced a number of pieces at the Comédie Française and the Opéra Comique. He published in 1802 a selection from his works entitled *Comédies, chansons et proverbes*, and in 1801 appeared *Les Femmes, leurs mœurs* . . . (3 vols.), which has often been reprinted, but is of doubtful authorship.

OCTAVE-HENRI GABRIEL DE SÉGUR (1778–1818), elder son of Louis Philippe de Ségur, served in the later Napoleonic campaigns, and remained in the army under the Restoration. He threw himself into the Seine on the 15th of August 1818. The domestic unhappiness that led to his suicide is retailed by the comtesse de Boigne in her *Mémoires* (vol. i., 1907). His elder son, EUGÈNE, comte de Ségur, succeeded his grandfather in the peerage in 1830. He married Sophie Rostopchine (1799–1894), daughter of Count Feodor Rostopchine, governor of Moscow. The countess of Ségur wrote some famous books for children, the most familiar of which are perhaps the *Malheurs de Sophie* and the *Mémoires d'un âne*, and many tales in the *Bibliothèque rose*. Her letters to her daughter and son-in-law, the count and countess de Simard de Petray, were published in 1891, and those to her grandson in 1898.

RAYMOND JOSEPH PAUL, comte de Ségur d'Aguesseau (1803–1889), third son of Octave de Ségur, took his mother's family name in addition to his own. He studied law at Aix and Paris. As *procureur général* of Amiens he gave in March 1830 a decision on the question of the electoral lists which pleased the liberal party, but late in the year, as substitute in the royal court of Paris, he ordered the suppression of certain liberal journals, and in other civil appointments was accused of reactionary administration. He gave his adhesion to Prince Louis Napoleon, and became a member of the consultative commission in 1851, and of the senate in 1852. After the fall of the empire he retired into private life.

LOUIS GASTON ADRIEN DE SÉGUR (1820–1881), son of Eugène de Ségur and Sophie Rostopchine, became a prelate of the papal court, and canon-bishop of Saint-Denis. He was a champion of the ultra-montane party and wrote a number of Catholic works, collected in ten volumes (Paris, 1876–1877). His life was written by his brother Anatole, who edited two collections of his letters in 1882 and 1899.

ANATOLE HENRI PHILIPPE DE SÉGUR (1823–1902), Gaston's brother, became councillor of state in 1872, serving until 1879. His works include the life of his grandfather Count Rostopchine (1872), *Fables* (1879), *Un Épisode de la Terreur* (1864), *Paul Marie Charles Bernard* (1875).

His son, PIERRE MARIE MAURICE HENRI, marquis de Ségur (b. 1853), wrote a life (1895) of the marshal de Ségur, which was crowned by the French Academy. His book on Madame Geoffrin, *Le Royaume de la rue Saint-Honoré* (1897), also received a prize. His principal work is the three volumes devoted to Marshal Luxemburg—*La Jeunesse du maréchal de Luxembourg, 1628-1668* (1900); *Le Maréchal de Luxembourg et le prince d'Orange, 1668–1678* (1902); *Le Tapissier de Notre-Dame. Dernières années du maréchal de Luxembourg, 1678–1695* (1904); *Julie de Lespinasse* (1905); English Transl., 1907; and *Au couchant de la monarchie Louis XVI et Turgot, 1774-1776* (Paris, 1910). He was elected to the French Academy in 1907.

There is much general information on the family of Ségur in A. de Ségur's *Le Maréchal de Ségur, 1724–1801* (Paris, 1895), and in L. P. de Ségur's *Recueil de famille* (1826).

SÉGUR, LOUIS PHILIPPE, COMTE DE (1753–1830), French diplomatist and historian, son of Philippe Henri, marquis de Ségur, was born in Paris on the 10th of December 1753. He entered the army in 1769, served in the American War of Independence in 1781 as a colonel under Rochambeau. In 1784 he was sent as minister plenipotentiary to St Petersburg, where he was received into the intimacy of the empress Catherine II. and wrote some comedies for her theatre. At St Petersburg he concluded (11 January 1787) a commercial treaty which was exceedingly advantageous to France, and returned to Paris in 1789. He took up a sympathetic attitude towards the Revolution at its outset and in 1791 was sent on a mission to Berlin, where he was badly received. After fighting a duel he was forced to leave Berlin, and went into retirement until 1801 when, at Bonaparte's instance, he was nominated by the senate to the *Corps législatif*. Subsequently he became a member of the council of state, grand master of the ceremonies, and senator, 1813. In 1814 Ségur voted for the deposition of Napoleon and entered Louis XVIII.'s Chamber of Peers. Deprived of his offices and functions in 1815 for joining Napoleon during the Hundred Days, he was reinstated in 1819, supported the revolution of 1830, but died shortly afterwards in Paris on the 27th August 1830. By his wife, Antoinette d'Aguesseau, he had two sons, of whom Count Philippe Paul is separately noticed. Among his writings may be mentioned *Histoire des principaux événements du règne de Frédéric-Guillaume II* (1800); *Pensées politiques* (Paris, 1795); *Histoire de France* (11 vols., 1824–1834); *Histoire des juifs* (1827); *Mémoires* (3 vols., 1824); and *Contes* (1809). His *Œuvres complètes* were published in 34 volumes in 1824 et seq.

See duc de Broglie, "Deux Français aux États-Unis" in *Mélanges publiés par la Société des Bibliophiles français* (2nd part, 1903); A. Cornereau, "La Mission du comte de Ségur dans la xviiie division militaire," in the *Mémoires de la Société bourguignonne de géographie et d'histoire* (vol. 17, 1901).

SÉGUR, PHILIPPE HENRI, MARQUIS DE (1724–1801), marshal of France, son of Henri François, comte de Ségur, and his wife Angélique de Froissy, was appointed to the command of an infantry regiment at eighteen, and served under his father in Italy and Bohemia. He was wounded at Roucoux in Flanders in October 1746, and lost an arm at Lauffeld in 1747. In 1748 he succeeded his father as lieutenant-general of Champagne and Brie; he also received in 1753 the governorship of the county of Foix. During the Seven Years' War he fought at Hastenbeck (1757), Crefeld (1758) and Minden (1759). In 1760 he was taken prisoner at Kloster-campen. The ability which he showed in the government of Franche-Comté in 1775 led in 1780 to his appointment as minister of war under Necker. He created in 1783 the permanent general staff, and made admirable regulations with regard to barracks and military hospitals; and though he was officially responsible for the reactionary decree requiring four quarterings of nobility as a condition for the appointment of officers, the scheme is said not to have originated with him and to have been adopted under protest. In 1783 he became a marshal of France. He resigned from the ministry of war in 1787. During the Terror he was imprisoned in La Force, and after his release was reduced to considerable straits until in 1800 he received a pension from Napoleon. He died in Paris on the 3rd of October of the next year.

See A. de Ségur, *Le Maréchal de Ségur, 1724–1801* (Paris, 1895).

SÉGUR, PHILIPPE PAUL, COMTE DE (1780–1873), French general and historian, son of Louis Philippe, comte de Ségur, was born in Paris on the 4th of November 1780. He enlisted in the cavalry in 1800, and forthwith obtained a commission. He served with General Macdonald in the Grisons in 1800–1801, and published an account of the campaign in 1802. By the influence of Colonel Duroc (afterwards duc de Frioul) he was attached to the personal staff of Napoleon. He served through most of the important campaigns of the first empire, and was frequently employed on diplomatic missions. During the campaign in Poland in 1807 he was taken prisoner by the Russians, but was exchanged at the peace of Tilsit. His brilliant conduct in the cavalry charge at Somo Sierra on the 30th of November 1808 (see PENINSULAR WAR) won him the grade of colonel, but his wounds compelled him to return to France. As general of brigade he took part in the Russian campaign of 1812, and in the campaigns of 1813 and 1814 he repeatedly distinguished himself, notably at Hanau (October 1813), and in a brilliant affair at Reims (March 1814). He remained in the army at the Restoration, but, having accepted a command from Napoleon during the Hundred Days, he was retired until 1818, and took no further active part in affairs until the revolution of 1830. During his retirement he wrote his *Histoire de Napoléon et de la grande armée pendant l'année 1812* (Paris, 2 vols., 1824), which ran through numerous editions, and was translated into several languages. The unfavourable portrait of Napoleon given in this book provoked representations from General Gourgaud, and eventually a duel, in which Ségur was wounded. On the establishment of the July monarchy he received, in 1831, the grade of lieutenant-general and a peerage. In 1830 he was admitted to the French Academy, and he became grand cross of the Legion of Honour in 1847. After the revolution of 1848 he lived in retirement. He died in Paris on the 25th of February 1873. His works include: *Histoire de Russie et de Pierre le Grand* (1829); *Histoire de Charles VIII* (2 vols., 1834–1842), in continuation of the history of France begun by his father; and the posthumous *Histoire et mémoires* (8 vols., 1873).

See *Un Aide-de-camp de Napoléon (1800–1812), mémoires du général comte de Ségur*, new edition by his grandson Louis de Ségur (3 vols., 1894–1895), of which an abridged English version was published in 1895.

SEGURA (anc. *Tader*), a river of south-eastern Spain about 150 m. long. It is formed by the confluence of three head-streams, one of which rises on the northern versant of La Sagra (7875 ft.), a mountain in Granada, while the other two spring from the Sierra de Segura, in Jaen. From the junction of these three streams below Yeste the river winds in an easterly and south-easterly direction past the towns of Cieza and Archena to Murcia. Thence it trends N.E. and passing Orihuela falls into the Mediterranean 19 m. S.W. of Alicante. Its chief tributaries are the Mundo and Arroyo del Jua on the left, and the Caravaca, Quipar and Sangonera on the right. It is only navigable by small sailing-vessels, even in its estuary, but its waters are extensively utilized for irrigation.

SEGUSIO (mod. *Susa, q.v.*), an ancient town in north Liguria, the capital of the Cottii (see COTTII REGNUM). Here the son of King Donnus, Cottius—who held the rank of imperial praefect over the fourteen tribes over which his father had ruled as king, so that in the inscription he calls himself "M. Iulius regis Donni f(ilius) Cottius praefectus civitatium quae subscriptae sunt"—erected a triumphal arch in honour of Augustus in 9–8 B.C., which is still standing. The style of the sculptures on the frieze is quite barbaric, with archaic elements, and is probably derived from Gaul. His tomb, situated near the city walls, mentioned by Ammianus Marcellinus, has long since disappeared. Claudius restored the royal titles to the family; but, after the death of its last member, Nero made the district into a province, and the town into a *municipium*. It was strongly fortified and garrisoned, and remains of its walls, including those of a double-arched gate, exist, while inscriptions testify to its importance, one of them mentioning baths erected by Gratian. Constantine captured the town, which offered some resistance to him, on his march against Maxentius.

See F. Genin, *Susa Antica* (Saluzzo, 1886); E. Ferrero, *L'Arc d'Auguste à Suse* (Turin, 1901); F. Studniczka, *Jahrbuch des K. D. archaologischen Instituts*, XVIII. (1903), 1 sqq. (T. As.)

SEHESTED, HANNIBAL (1609–1666), Danish statesman, born at Arensborg Castle on Ösel. After completing his education abroad, he returned to Denmark in 1632 and was attached to the court of Christian IV. Two or three years later he was sent to Wismar to negotiate a treaty with the Swedish chancellor, Axel Oxenstjerna, and, if possible, bring about a match between Christian's son Frederick and Gustavus Adolphus's daughter Christina. Though failing in both particulars, he retained the favour of the king, who had marked him out as one of his seven sons-in-law, by whose influence he hoped to increase the influence of the crown; and in 1636 he was betrothed to one of the daughters, the countess Christine, then in her tenth year, whom he married in 1642. In May 1640 Sehested became a member of the august *Rigsraad*. He imagined, with some reason, that the proper field for the exercise of his talents was diplomacy, and he openly aspired to be minister of foreign affairs. Despite a successful embassy to Spain in 1640–1641 he did not obtain the coveted post, but was appointed viceroy of Norway (April 1642). He had now the opportunity of displaying an administrative and organizing ability, united with a zeal for reform, as remarkable as unexpected, which raises him high above his compeers. He made it his first object thoroughly to develop Norway's material resources, and reorganize her armaments and fiscal system; and he aimed at giving her a more independent position as regards Denmark. During Christian IV.'s second war with Sweden (1643–1645), Sehested, as viceroy of Norway, assisted his father-in-law materially. He invaded Sweden four times; successfully defended Norway from attack; and, though without any particular military talent, won an engagement at Nysaker in 1644. After the war he renewed his reforming efforts, and during the years 1646–1647 strove to withdraw his viceroyalty from the benumbing influence of the central administration at Copenhagen, and succeeded with the help of Christian IV. in creating a separate defensive fleet for Norway and giving her partial control of her own finances. He was considerably assisted in his endeavours by the fact that Norway was regarded as the hereditary possession of the kings of Denmark. At the same time Sehested freely used his immense wealth and official position to accumulate for himself property and privileges of all sorts. His successes finally excited the envy and disapprobation of the Danish *Rigsraad*, especially of his rival Korfits Ulfeldt (*q.v.*), also one of the king's sons-in-law. The quarrel became acute when Sehested's semi-independent administration of the finances

of Norway infringed upon Ulfeldt's functions as lord treasurer of the whole realm; in November 1647 Ulfeldt carried his point, and a decree was issued that henceforth the Norwegian provincial governors should send their rents and taxes direct to Copenhagen. On the accession of Frederick III. (1648), Sehested strove hard to win his favour; but an investigation into his accounts as viceroy, conducted by his enemies, brought to light such wholesale embezzlement and peculation that he was summoned to appear before a *herredag*, or assembly of notables, in May 1551, and give an account of his whole administration. Unable to meet the charges brought against him, he compromised matters by resigning his viceroyalty and his senatorship, and surrendering all his private property in Norway to the crown. Throughout his trial Sehested had shown consummate prudence. He surrendered voluntarily thrice as much as he had ever embezzled, and, calculating on the secret fondness of Frederick III. for a man of his monarchical tendencies, carefully abstained from the wild and treasonable projects of revenge which were the ruin of Korfits Ulfeldt. From 1651 to 1660 he lived abroad. At the end of 1655 he met the exiled Charles II. of England at Cologne, and lived a part of the following year with him in the Spanish Netherlands. In the summer of 1657 he returned to Denmark, but Frederick III. refused to receive him, and he hastily quitted Copenhagen. During the crisis of the war of 1658 he was at the headquarters of Charles X. of Sweden. In seeking the help and protection of the worst enemy of his country, Sehested approached the very verge of treason, but he never quite went beyond it. When, at last, it seemed probable that the war would not result in the annihilation of Denmark, Sehested strained every nerve to secure his own future by working in the interests of his native land while still residing in Sweden. In April 1660 he obtained permission from Frederick III. to come to Copenhagen, and was finally instructed by him as plenipotentiary to negotiate with the Swedes. The treaty of Copenhagen, which saved the honour of Denmark and brought her repose, was very largely Sehested's work. He was one of the willing abettors of Frederick III. at the revolution of 1660, when he re-entered the Danish service as lord treasurer and councillor of state. Both at home and on his frequent foreign missions he displayed all his old ability. As a diplomatist he, in some respects, anticipated the views of Griffenfeldt, supporting the policy of friendship with Sweden and a French alliance. He died suddenly on the 23rd of September 1666 at Paris, where he was conducting important negotiations. His "political testament" is perhaps the best testimony to his liberal and statesmanlike views.

See Thyra Sehested, *Hannibal Sehested* (Copenhagen, 1886); Julius Albert Fridericia, *Adelsvaeldens sidste Dage* (Copenhagen, 1894). (R. N. B.)

SEHORE, a British station in Central India, within the state of Bhopal, with a station on the Bhopal-Ujjain section of the Indian Midland railway, 24 m. E. from Bhopal. Pop. (1901) 16,864. It is the headquarters of the political agent for Bhopal, and a British military cantonment. For many years it was also the headquarters of the Bhopal contingent, raised in 1818, which was in 1903 incorporated in the Indian army. It is an important centre of trade.

SEICHE (Fr. *sèche*, fem. of *sec*, dry), in limnology, an irregular fluctuation of the water-level of lakes, first observed and so named in Switzerland. (See LAKE, and GENEVA.)

SEIDL, ANTON (1850–1898), Hungarian operatic conductor, was born at Budapest on the 7th of May 1850. He entered the Leipzig Conservatorium in October 1870, and remained there until 1872, when he was summoned to Bayreuth as one of Wagner's copyists. There he assisted to make the first fair copy of *Der Ring des Nibelungen*. Thoroughly imbued with the Wagnerian spirit, it was natural that he should take a part in the first Bayreuth Festival in 1876. His chance as a conductor came when, on Wagner's recommendation, he was appointed to the Leipzig Stadt-Theater, where he remained until, in 1882, he went on tour with Angelo Neumann's *Nibelungen Ring* company. To his conducting the critics attributed much of such artistic success as attended the production of the Trilogy at Her Majesty's Theatre in London in June of that year. In 1883 Seidl went with Neumann to Bremen, but two years later was appointed successor to Leopold Damrosch as conductor of the German Opera in New York, and in the same year he married Fräulein Kraus, the distinguished singer. In America Seidl's orchestra became famous. In 1886 he was one of the conductors at Bayreuth, and in 1897 at Covent Garden, London. He died in New York on the 28th of March 1898.

See the memorial volume prepared by H. T. Finck, H. E. Krehbiel and others (New York, 1899).

SEIGNIORAGE, the due levied by the authority that possesses the right of coining on the metal that it manufactures into coin. The term "brassage" has been used to describe this due, when confined to the mere cost of the process; the wider term "seigniorage" being employed when the charge is so raised as to become a profit to the imposer. The exercise of the right of seigniorage has been the instrument by which most of the debasements of currency have been carried out. Under feudalism, especially in France, the chief nobles had this prerogative. In the modern state it is reserved for the sovereign authority. Most countries adopt a moderate seigniorage charge. Thus the fundamental currency law of France (1803) provides that "only the expense of coining" shall be charged. At present this due is 6 fr. 70 c. per kilo. of gold $\frac{9}{10}$ fine, or 0·24 %. The charge by the same law on silver was 3 fr. per kilo. or 1·66 %. The limitation on the coinage of silver in practically all countries has made the seigniorage on that metal very heavy. The policy of England in respect to gold has been peculiar. Since 1664 it has been freed from any charge, though the delay in return amounts to a small due. In consequence of this gratuitous coinage, English gold has been regarded as equivalent to bullion, and exchange fluctuations have been reduced. The policy was severely criticized by Adam Smith, and it does in fact amount to a bounty on the coinage of gold. The amount is, however, too insignificant to deserve attention, especially as there are compensating gains. The employment of a seigniorage of about 1 % on the "sovereign" was suggested by the proceedings of the Paris Monetary Conference of 1867, in order to bring about an assimilation of English and French money. By reducing the amount of gold in the sovereign to that in the proposed 25-franc piece an exact *par* would have been created, and, so it was hoped, the English currency and accounts need have undergone no change. The scheme was, however, rejected by a Royal Commission on the ground that an adjustment of obligations would be required.

The theory of the effects that a seigniorage produces have been discussed at length. The definitive results obtained may be briefly stated as follows: (1) A seigniorage charge is the same as a debasement, but its evil effect may be avoided by limiting the amount of coin issued. (2) Seigniorage operates as a tax on the metal subject to it, and this tax tends ultimately to fall on the producers, or rather on the rent obtained through the production. A heavy seigniorage on gold would tend to lower the profits derived from the gold mines of the world, and might even compel the abandonment of the least productive ones.

See MONEY, MONETARY CONFERENCES, and TOKEN MONEY. (C. F. B.)

SEIGNORY, or SEIGNIORY (Fr. *seigneur*, lord; Lat. *senior*, elder), in English law, the lordship remaining to a grantor after the grant of an estate in fee-simple. There is no land in England without its lord: "Nulle terre sans seigneur" is the old feudal maxim. Where no other lord can be discovered the crown is lord as lord paramount. The principal incidents of a seignory were an oath of fealty; a "quit" or "chief" rent; a "relief" of one year's quit rent, and the right of escheat. In return for these privileges the lord was liable to forfeit his rights if he neglected to protect and defend the tenant or did anything injurious to the feudal relation. Every seignory now existing must have been created before the Statute of *Quia Emptores* (1290), which forbade the future creation of estates in fee-simple by subinfeudation. The only seignories of any importance at present are the lordships of manors. They are regarded as incorporeal hereditaments,

and are either appendant or in gross. A seignory appendant passes with the grant of the manor; a seignory in gross—that is, a seignory which has been severed from the demesne lands of the manor to which it was originally appendant—must be specially conveyed by deed of grant.

Freehold land may be enfranchised by a conveyance of the seignory to the freehold tenant, but it does not extinguish the tenant's right of common (*Baring* v. *Abingdon*, 1892, 2 Ch. 374). By s. 3 (ii.) of the Settled Land Act 1882, the tenant for life of a manor is empowered to sell the seignory of any freehold land within the manor, and by s. 21 (v.) the purchase of the seignory of any part of settled land being freehold land, is an authorized application of capital money arising under the act.

SEINE (Lat. *Sequana*), one of the chief rivers of France, rising on the eastern slope of the plateau of Langres, about 5 m. N.W. of St Seine-l'Abbaye and 18 m. N.W. of Dijon. It keeps the same general direction (north-westwards) throughout its entire course, but has numerous windings: between its source and its mouth in the English Channel the direct distance is only 250 m., but that actually traversed by the river (through the departments of Cote-d'Or, Aube, Marne, Seine-et-Marne, Seine-et-Oise, Seine, Eure and Seine-Inférieure) is 482 m. Though shorter than the Loire and Rhone, and inferior in volume to the Loire, Rhone and Gironde, the Seine derives an exceptional importance from the regularity of its flow. This feature is due to the geological character of its basin, an area of 30,000 sq. m., entirely belonging to France (with the exception of a few communes in Belgium), and formed in three-fourths of its extent of permeable strata, which absorb the atmospheric precipitation to restore it gently to the river by perennial springs. At Paris the average volume of the river per second is 5300 cub. ft.; after it has received all its tributaries the volume is about 10,600 cub. ft. At Paris it falls as low as 1550 cub. ft., and in exceptional droughts the figure of 1200 is reached. During the flood of 1658 the volume between the quays at Paris is believed to have risen to 88,000 cub. ft. per second. The height of the river above the normal at Paris was probably on that occasion about 21 ft., whereas in the disastrous floods of January 1910 it was over 24 ft. Other notable floods are recorded in 1740, 1799, 1802, 1876 and 1883.

Rising at a height of 1545 ft. above sea-level, at the base of the statue of a nymph erected on the spot by the city of Paris, the Seine is at first such an insignificant streamlet that it is often dry in summer as far as Châtillon (705 ft.) some 31 m. from its source. At Bar its waters feed the Haute-Seine Canal, though navigation thereon only begins at Troyes. It next passes Méry, and at Marcilly receives the Aube (right), at which point the canal terminates and the river itself is canalized; here it is deflected from its hitherto north-north-westerly to a south-westerly direction by the heights of the Brie, the base of which it skirts past Nogent and Montereau. At the latter point it receives the Yonne, its most important left-hand tributary, and is deepened from 5 ft. 3 in. to 6 ft. 6 in. It then resumes its general north-westerly direction, receiving the Loing (left) at Moret; having passed Melun it is joined at Corbeil by the Essonne (left), and after its junction with the Marne (right), a tributary longer than itself by 31 m. at the confluence, reaches Paris. From this point to the sea its channel has been so deepened that vessels of 9 to 10 ft. draught can reach the capital. The river then winds through a pleasant champaign country past St Cloud, St Denis, Argenteuil, St Germain, Conflans (where it is joined from the right by the Oise, 56 ft. above the sea), Poissy, Mantes, Les Andelys, between which and the sea the river is remarkable for its détours, as also in the vicinity of Paris. At Poses the tide first begins to be perceptible. It next receives the Eure (left), and passes Pont de l'Arche, Elbeuf and Rouen, where the sea navigation commences. The river is dyked below Rouen so as to admit vessels of 20 ft. draught, and large areas have thus been reclaimed for cultivation. At every tide there is a "bore" (*barre* or *mascaret*), ranging usually from 8 to 9 ft., and attaining its maximum from Quillebeuf to Caudebec. Below Quillebeuf (where the Risle is received from the left) the estuary begins, set with extensive sand-banks, between which flows a narrow navigable channel. Tancarville (right) is the starting-point of a canal to enable river boats for Havre to avoid the sea passage. The river enters the English Channel between Honfleur on the left and Havre on the right. The Marne brings to the Seine the waters of the Ornain, the Ourcq, and the Morin; the Oise those of the Aisne; the Yonne those of the Armançon. The low elevation of the bounding hills has rendered it comparatively easy to connect the Seine and its affluents with adjoining river basins by means of canals. The Oise and Somme are connected to the Picardy or Crozat Canal, which in turn is continued to the Scheldt by means of the St Quentin Canal and the Oise, and to the Sambre by that of Oise and Sambre. Between the Aisne and the Meuse is the Ardennes Canal, and the Aisne and the Marne are united by a canal which passes Reims. The Marne has similar communication with the Meuse and the Rhine, the Yonne with the Saône (by the Burgundy Canal) and with the Loire by the Loing Canal dividing at Montargis into two branches—those of Orleans and Briare.

SEINE, the department of northern France which has Paris as its chief town, formed in 1790 of part of the province of Ile-de-France. It is entirely surrounded by the department of Seine-et-Oise, from which it is separated at certain parts by the Seine, the Marne and the Bièvre. The area of the department is only 185 sq. m., and of this surface about a sixth is occupied by Paris; the suburban towns also are close together and very populous. In actual population (3,848,618 in 1906) as well as in density (23·7 persons per acre) it holds the first place. Flowing from south-east to north-west through the department, the Seine forms three loops: on the right it receives above Paris the Marne, and below Paris the Rouillon, and on the left hand the Bièvre within the precincts of the city. The left bank of the Seine is in general higher than the right, and consists of the Villejuif and Châtillon plateaus separated by the Bièvre; the highest point (560 ft.) is above Châtillon and the lowest (105) at the exit of the Seine. Below Paris the river flows between the plain of Gennevilliers and Nanterre (commanded by Mont Valérien) on the left and the plain of St Denis on the right. On the right side, to the east of Paris, are the heights of Avron and Vincennes commanding the course of the Marne. Communication is further facilitated by canals.

Market gardening is the chief agricultural industry, and by means of irrigation and manuring the soil is made to yield from ten to eleven crops per annum. Some districts are specially celebrated, Montreuil for its peaches, Fontenay-aux-Roses for its strawberries and roses, and other places for flowers and nurseries. The plain of Gennevilliers fertilized by the sewage water of Paris yields large quantities of vegetables. Milch-cows are reared in large numbers. The principal woods (Boulogne and Vincennes) belong to Paris. It is partly owing to the number of quarries in the district that Paris owes its origin: Châtillon and Montrouge in the south yield freestone, and Bagneux and Clamart in the south and Montreuil and Romainville in the east possess the richest plaster quarries in France. Within the circuit of Paris are certain old quarries now forming the catacombs. Most of the industrial establishments in the department are situated in Paris or at St Denis (*qq.v.*). The department is traversed by all the railway lines which converge in Paris, and also contains the inner circuit railway (Chemin de Fer de Ceinture) and part of the outer circuit. There are 3 arrondissements (Paris, St Denis, and Sceaux), 41 cantons and 78 communes. The department forms the archiepiscopal diocese of Paris, falls within the jurisdiction of the Paris court of appeal and the académie (educational division) of Paris, and is divided between the II., III., IV., V. and VI. *corps d'armée*. The chief places besides Paris are St Denis, Asnières, Aubervilliers, Boulogne-sur-Seine, Clichy-sur-Seine, Courbevoie, Levallois-Perret, Neuilly-sur-Seine, Pantin, St Ouen, Colombes, Charenton, Ivry-sur-Seine, Montreuil-sous-Bois, Nanterre, Nogent-sur-Marne, Vincennes and Arcueil.

SEINE, or SEAN (O. Fr. *seigne*, mod. *seine*, Lat. *sagena*, Gr. σαγήνη, a draw-net), a type of fishing net, consisting of an expanse of netting weighted at the bottom and floated at the top edge by corks, cast from a boat or ship to enclose a space of water and then drawn into the vessel or to shore.

SEINE-ET-MARNE, a department of northern France, formed in 1790 of almost the entire district of Brie (half of which belonged to Champagne and half to Ile-de-France) and a portion of Gâtinais (from Ile-de-France and Orléanais). Pop. (1906) 361,939. Area, 2289 sq. m. Seine-et-Marne is bounded N. by the department of Oise, N.E. by that of Aisne, E. by Marne and Aube, S.E. by Yonne, S. by Loiret and W. by Seine-et-Oise. The whole department belongs to the basin of the Seine, and is drained partly by that river and partly by its tributaries the Yonne and the Loing from the left, and from the right the Voulzie, the Yères and the Marne, with its affluents the Ourcq, the Petit Morin and the Grand Morin. With the exception of the Loing, flowing from south to north, all these streams cross the department from east to west, following the general slope of the surface, which is broken up into several plateaus from 300 to 500 ft. in height (highest point, in the north-east, 705 ft., lowest 105), and separated from each other by deep valleys. Most of

the plateaus belong to the Brie, a fertile well-wooded district of a clayey character. In the south lie the dry sandy district of the Fontainebleau sandstones and part of the region known as the Gâtinais. The climate is rather more "continental" than that of Paris—the summers warmer, the winters colder; the annual rainfall does not exceed 16 in. There is a striking difference in temperature between the south of the department, where the famous white grape (*chasselas*) of Fontainebleau ripens, and the country to the north of the Marne,—this river marking pretty exactly the northern limit of the vine.

The wheat and oats of Brie are especially esteemed; potatoes, sugar beet, mangel-wurzel and green forage are also important crops, and market gardening flourishes. Provins and other places are well-known for their roses. The cider and honey of the department are of good quality. Thousands of the well-known Brie cheeses are manufactured, and large numbers of calves, sheep and poultry are reared. The forests (covering a fifth of the surface) are planted with oak, beech, chestnut, hornbeam, birch, wild cherry, linden, willow, poplar and conifers. Best known and most important is the forest of Fontainebleau. Large areas are devoted to game-preserves. Excellent freestone is quarried in the department, notably at Château-Landon in the valley of the Loing, mill-stones at La Ferté-sous-Jouarre; the Fontainebleau sandstone is used for pavements, and the white sand which is found along with it is in great request for the manufacture of glass. Along the Marne are numerous gypsum quarries; lime-kilns occur throughout the department; and peat is found in the valleys of the Ourcq and the Voulzie. Beds of common clay and porcelain clay supply the potteries of Fontainebleau and Montereau. Other industrial establishments are numerous large flour-mills, notably those of Meaux, the chocolate works of Noisiel, sugar factories, alcohol distilleries, paper-mills (the Jouarre paper-mill manufactures bank-notes, &c., both for France and for foreign markets), saw-mills, printing works (Coulommiers, &c.) and tanneries. Much of the motive-power used is supplied by the streams. Paris is the chief outlet for the industrial and agricultural products of the department. Coal and raw material for the manufactures are the chief imports. The Seine, the Yonne, the Marne, and the Grand Morin are navigable, and, with the canals of the Loing and the Ourcq and those of Chalifert, Cornillon and Chelles, which cut off the windings of the Marne, form a total waterway of over 200 m. Seine-et-Marne has 5 arrondissements (Melun, Coulommiers, Fontainebleau, Meaux, Provins), 29 cantons and 533 communes. It forms the diocese of Meaux (archiepiscopal province of Paris), and part of the region of the V. army corps and of the *académie* (educational circumscription) of Paris. Its court of appeal is at Paris. Melun, the capital, Meaux, Fontainebleau, Coulommiers, Provins, Nemours and Montereau (*qq.v.*), are the more important towns in the department. Among other interesting places are Lagny (pop. 5302), with an abbey-church of the 13th century; Brie-Comte Robert, with a church of the early 13th century; Ferrières, with a fine château built in 1860 by Baron Alphonse Rothschild; Moret-sur-Loing, which preserves fortifications dating from the 15th century including two remarkable gateways; St Loup-de-Naud, with a church of the first half of the 12th century; Jouarre, where there is a church of the 15th century, built over a crypt containing workmanship of the Merovingian period; and Vaux-le-Vicomte with the famous château built by Fouquet, minister of Louis XIV.

SEINE-ET-OISE, a department of northern France, formed in 1790 of part of the old province of Ile-de-France, and traversed from south-east to north-west by the Seine, which is joined by the Oise. Pop. (1906) 749,753. Area, 2184 sq. m. It is bounded by the departments of Seine-et-Marne on the E., Loiret on the S., Eure-et-Loir on the W., Eure on the N.W. and Oise on the N. It encloses the department of Seine. The Epte on the north-west is almost the only natural boundary of the department. The streams (all belonging to the basin of the Seine) are: on the right the Yères, the Marne, the Oise and the Epte, and on the left the Essonne (joined by the Juine, which passes Étampes), the Orge, the Bièvre and the Mauldre. Seine-et-Oise belongs in part of the tableland of Beauce in the south and to that of Brie in the east. In the centre are the high wooded hills which make the charm of Versailles, Marly and St Germain. But it is in the north-west, in the Vexin, that the culminating point (690 ft.) is reached, while the lowest point, where the Seine leaves the department, is little more than 40 ft. above the sea. The mean temperature is 51° F.

Seine-et-Oise is a flourishing agricultural and horticultural department. Wheat, oats, potatoes and sugar-beet are important crops. Versailles, Rambouillet, Argenteuil are among the numerous market-gardening and horticultural centres, and wine is grown at Argenteuil and in other localities on the right bank of the Seine. Milch-cows and draught-oxen are the chief livestock, and poultry farming is prosperous, the town of Houdan giving its name to a well-known breed of fowls. Forests occupy about 190,000 acres, the largest being that of Rambouillet (about 32,000 acres). Oak, hornbeam, birch and chestnut are the commonest trees. Building, paving and mill stones, gypsum, cement, &c., are produced by the department which is very rich in quarries. There are mineral springs at Enghien and Forges-les-Bains. The most important industrial establishments are the national porcelain factory at Sèvres; the government powder-mills of Sevran and Bouchet; paper-mills, especially those of Essonnes and its vicinity, which are among the most important in Europe; textile works, flour-mills, foundries and engineering, metallurgical or railway works at Evry-Petit-Bourg, Villeneuve-St Georges (pop. 9508) and elsewhere; agricultural implement factories at Dourdan and elsewhere; sugar-refineries and distilleries; crystal works (Meudon), laundries, large printing establishments, close to Paris; factories for chemical products, candles, hosiery, perfumery, shoes and buttons; zinc-works, saw-mills. Seine-et-Oise exports chiefly the products of its farms and quarries. Its imports include coal, raw material for its industries, wine, kaolin and wood.

The railways of all the great companies of France (except the Southern) traverse the department, but most of the lines belong to those of the Western and Northern systems. The Seine and the Oise, and the canals of Ourcq and Chelles provide about 120 m. of waterway. Seine-et-Oise is divided into six arrondissements (Versailles, Corbeil, Étampes, Mantes, Pontoise, Rambouillet) with 37 cantons and 691 communes. It forms the diocese of Versailles and part of the educational circumscription (académie) of Paris and of the regions of the II., III., IV. and V. army corps, the troops in its territory being under the command of the military government of Paris. Its court of appeal is also at Paris.

The most notable towns in the department are Versailles, the capital, Corbeil, Sèvres, Étampes, Mantes, Pontoise, Rambouillet, Argenteuil, Poissy, St Cloud, St Cyr, St Germain-en-Laye, Meudon, Montmorency, Rueil and Marly-le-Roi (see separate articles). Other places of interest are Montfort-l'Amaury, which has a Renaissance church with fine stained glass, a gateway of the 16th century and a ruined château once the seat of the powerful family of Montfort; Montlhéry, which preserves the keep (13th century) and other ruins of a celebrated fortress which commanded the road from Paris to Orléans; Roche-Guyon, seat of the family of that name, which has two châteaus, one a feudal stronghold, the other also medieval but altered in the 18th century; Vigny, with a Gothic château of the 15th century; Ecouen, where there is a château of the 16th century once the property of the Condé family, now a school for daughters of members of the Legion of Honour; Dampierre, which has a château of the 17th century once the property of Charles, Cardinal of Lorraine; Maisons-Laffitte (pop. 8117), with a château of the same period once belonging to the family of Longueil. The château of Malmaison (18th century) is famous as the residence of the Empress Joséphine.

Of the churches of the department, which are very numerous mention may be made of those of Jouy-le Moutier (11th and 12th centuries); Beaumont-sur-Oise (13th century); Taverny (12th and 13th centuries); Longpont (remains of an abbey-church dating from the 11th to the 13th centuries). Near Cernay-la-Ville are interesting remains of a Cistercian abbey and near Lévy-St-Nom those of the abbey of Notre-Dame de la Roche, including a church (13th century) with stalls which are among the oldest in France and the tombs of the Lévis-Mirepoix family.

SEINE-INFÉRIEURE, a department of the north of France, formed in 1790 of four districts (Norman Vexin, Bray, Caux and Roumois) belonging to the province of Normandy. Pop. (1906) 863,879. Area 2448 sq. m. Seine-Inférieure is bounded N.W. and N. by the English Channel for a distance of 80 m., N.E. by Somme, from which it is separated by the Bresle, E. by Oise, S. by Eure and the estuary of the Seine, which separates it from Calvados. It is divided almost equally between the basin of the Seine in the south and the basins of certain coast streams in the north. The Seine receives from the right hand before it reaches the department the Epte and the Andelle from the Bray district, and then the Darnétal, the Cailly, the Austreberthe, the Bolbec and the Lézarde. The main coast streams are the Bresle (which forms the ports of Eu and Tréport), the Yères, the Arques or Dieppe stream (formed by the junction of the Varennes, the Béthune and the Eaulne), the Scie, the Saane, the Durdent. The Pays de Caux, the most extensive natural division, is a system of plateaus separated by small valleys, terminating along the Seine in high bluffs and towards the sea in steep chalk cliffs 300 to 400 ft. high, which are continually being eaten away and transformed into beds of shingle. The Bray district in the south-east is a broad valley of denudation formed by the sea as it retired, and traversed by valleys covered with excellent

pasture. The highest point (about 800 ft.) is on the eastern border of the department. In the comparatively regular outline of the coast there are a few breaks, as at Le Tréport, Dieppe, St Valery-en-Caux, Fécamp and Havre, the Cap de la Hève, which commands this last port, and Cape Antifer, 12 or 13 m. farther north. Le Tréport, Dieppe, Veules, St Valery, Veulettes, Fécamp, Yport, Etretat and Ste Adresse (to mention only the more important) are fashionable watering-places. Forges-les-Eaux (in the east of the department) has cold chalybeate springs of some note. The winter is not quite so cold nor the summer so hot as in Paris, but the average temperature of the year is higher. The rainfall at Rouen is 28 in. per annum, increasing towards Dieppe.

In general the department is fertile and well cultivated. Along the Seine fine meadow-land has been reclaimed by dyking; and sandy and barren districts have been planted with trees, mostly with oaks and beeches, and they often attain magnificent dimensions, especially in the forest of Arques and along the railway from Rouen to Dieppe; *Pinus sylvestris* is the principal component of the forest of Rouvray opposite Rouen. The forest of Eu covers 36 sq. m. in the north-east. Of the arable crops wheat and oats are the principal, rye, flax, colza, sugar beet and potatoes being also of importance. Milch cows are kept in great numbers especially in the Bray district, and Gournay butter and Gournay and Neufchâtel cheese are in repute. The farms of the Caux plateau are each surrounded by an earthen dyke, on which are planted forest trees, generally beech and oak. Within the shelter thus provided apple and pear trees grow, which produce the cider generally drunk by the inhabitants. With the exception of a little peat and a number of quarries, Seine-Inférieure has no mineral source of wealth; but manufacturing and especially the textile industry is well developed. Rouen is the chief centre of the cotton trade, which comprises spinning and the weaving of *rouenneries*, *indiennes* (cotton prints), cretonnes and other cotton goods. Elbeuf is the centre of woollen manufacture. Flax-spinning, the dyeing and printing of fabrics and other accessory industries also employ many hands. Engineering works, foundries and iron ship-building yards are found at Havre and Rouen. Wooden ships are also built at Havre, Rouen, Dieppe and Fécamp. Other establishments of importance are the national tobacco-factories at Dieppe and Havre, sugar-refineries, distilleries, glass-works, potteries, paper works, soap-works, chemical works, flour-mills, oil-factories, leather works, &c. The fisheries are the great resource for the inhabitants of the sea-board. Fécamp, which plays a very important part at the Newfoundland fisheries, sends large quantities of cod, herrings, mackerel, &c., into the market; Dieppe supplies Paris with fresh fish; St Valery sends boats as far as Iceland. The principal ports for foreign trade are Havre, Rouen and Dieppe.

The chief imports of the department are cotton, wool, cereals, hides, coffee, timber and dye-woods, indigo and other tropical products, coal, petroleum, &c. The exports include industrial and dairy products. Seine-Inférieure is served principally by the Western railway, but the Northern railway also has several lines there. The Seine and other rivers provide 85 m. of navigable waterway. The canal of Tancarville from Quillebeuf to Havre is about 15 m. long, that from Eu to Tréport about 2 m. The department is divided into five arrondissements (Rouen, Dieppe, Havre, Neufchâtel and Yvetot) 55 cantons and 760 communes. It forms the diocese of the archbishopric of Rouen and part of the region of the III. army corps and of the *académie* (educational division) of Caen. Its court of appeal is at Rouen, the capital.

Rouen, Havre and Dieppe and in a lesser degree, Elbeuf, Fécamp, Harfleur, Lillebonne, Yvetot, Eu, Le Tréport, Aumale, Etretat, Bolbec, Barentin and Caudebec-en-Caux (see separate articles) are noteworthy towns for commercial, architectural or other reasons. The following places are also of architectural interest. St Martin-de Boscherville, where there are remains of an important abbey including a fine church in the Romanesque style of the early 12th century and a Gothic chapter house of the latter half of the 12th century; Valmont, which has fine ruins (16th century) of the choir of a Cistercian abbey-church; Varengeville, well known for the manor (16th century) of Jacques Ango (see DIEPPE); Graville-Ste Honorine, with a Romanesque church and other remains of an ancient abbey; Montivilliers, which has a fine abbey-church of the 11th, 12th and 16th centuries; and Arques, Boos, Martainville, Mesnières and Tancarville which have old châteaus of various periods.

SEISIN (from M. Eng. *saysen*, *seysen*, in the legal sense of to put in possession of, or to take possession of, hence, to grasp, to seize; the O. Fr. *seisir*, *saisir*, is from Low Lat. *sacire*, generally referred to the same source as Goth. *satjan*, O.Eng. *settan*, to put in place, set), the possession of such an estate in land as was anciently thought worthy to be held by a free man (Williams, *On Seisin*, p. 2). Seisin is of two kinds, in law and in deed. Seisin in law is where lands descend and the heir has not actually entered upon them; by entry he converts his seisin in law into seisin in deed. Seisin is now confined to possession of the freehold, though at one time it appears to have been used for simple possession without regard to the estate of the possessor.[1] Its importance is considerably less than it was at one time, owing to the old form of conveyance by feoffment with livery of seisin having been superseded by a deed of grant (see FEOFFMENT), and the old rule of descent from the person last seised having been abolished in favour of descent from the purchaser. At one time the right of the wife to dower and of the husband to an estate by curtesy depended upon the doctrine of seisin. The Dower Act (1833–1834), however, rendered the fact of the seisin of the husband of no importance, and the Married Women's Property Act 1882 practically abolished the old law of curtesy.

Primer seisin was a feudal burden at one time incident to the king's tenants *in capite*, whether by knight service or in socage. It was the right of the crown to receive of the heir, after the death of a tenant *in capite*, one year's profits of lands in possession and half a year's profits of lands in reversion. The right was abandoned by the act abolishing feudal tenures (12 Car. II. c. 24, 1660).

In Scots law the corresponding term is "sasine." Like seisin in England, sasine has become of little legal importance owing to modern legislation. By an act of 1845 actual sasine on the lands was made unnecessary. By an act of 1858 the instrument of sasine was superseded by the recording of the conveyance with a warrant of registration thereon.

SEISMOMETER (from Gr. σεισμός, earthquake, and μέτρον, a measure). This name was originally given to instruments designed to measure the movement of the ground during earthquakes (*q.v.*). Observations have shown that, in addition to the comparatively great and sudden displacements which occur in earthquakes, the ground is subject to other movements. Some of these, which may be called "earth-tremors," resemble earthquakes in the rapidity with which they occur, but differ from earthquakes in being imperceptible (owing to the smallness of the motion) until instrumental means are used to detect them. Others, which may be called "earth-tiltings," show themselves by a slow bending and unbending of the surface, so that a post stuck in the ground, vertical to begin with, does not remain vertical, but inclines now to one side and now to another, the plane of the ground in which it stands shifting relatively to the horizon. No sharp distinction can be drawn between these classes of movements. Earthquakes and earth-tremors grade into one another, and in almost every earthquake there is some tilting of the surface. The term "seismometer" may conveniently be extended (and will here be understood) to cover all instruments which are designed to measure movements of the ground.

Seismoscope.

Popularly it is supposed that earthquake recorders are instruments so sensitive to slight vibrations that great care is necessary in selecting a site for their installation. Although this supposition is correct for a certain class of apparatus, as for example that which will record rapid elastic vibrations produced by the movement of a train a mile distant, it is far from being so for the ordinary apparatus employed by the seismologist. What he usually aims at is either to record the more or less rapid movements of the ground which we can feel, or the slow but large disturbances which do not appeal to our unaided senses. Generally speaking, the instruments used for these purposes are not disturbed by the vibrations resulting from ordinary traffic. In almost every household something may be found which will respond to a gentle shaking of the ground. Sometimes it is a loosely-fitting shutter or window-frame, a hanging drawer-handle, or a lamp-shade which will rattle; the timbers in a roof may creak, or a group of wine-glasses with their rims in contact may chatter. Any of these sounds may call attention to movements which otherwise would pass unnoticed. Specially arranged contrivances which tell us that the ground has been shaken are called *seismoscopes* or earthquake indicators. A small column, as for example a lead pencil standing on end, or a row of pins propped up against suitable supports, or other bodies which are easily overturned, may be used as seismoscopes. Experience, however, has

[1] Up to the middle of the 15th century "seisin" was applied to chattels equally with freeholds, the word "possessed" being rarely used. In course of time the words acquired their modern meaning. See F. W. Maitland, "Seisin of Chattels," *Law Quarterly Review*, vol. i. p. 324 and "The Mystery of Seisin," *Law Q. R.* ii. 481. Pollock and Maitland, *Hist. Eng. Law*, vol. ii. 29 seq.; Fry, L. J., in *Cochrane* v. *Moore* (1890), 25 Q.B.D. 57.

shown that contrivances of this order are wanting in sensibility, and often remain standing during movements that are distinctly perceptible. A more satisfactory arrangement is one where the body to be overturned is placed upon a platform which exaggerates the movements of the ground. For example, the platform *h* (see fig. 1) may be on the top of a small rod *r*, fixed at its lower end by plaster of Paris in a watch-glass *w*, and carrying a disk or sphere of lead at *l*. When the stand on which *w* rests is shaken, a multiplied representation of this movement takes place at *h*, and any small body resting on that point, as for example a small screw *s* standing on its head, may be caused to topple over. If the loaded rod is elastic its lower end may be fixed in a stand, and the spherically curved base *w* is no longer required. In this case the motion at *h* is that of elastic switching. Apparatus of this kind may be employed for several purposes beyond merely indicating that an earthquake has taken place.

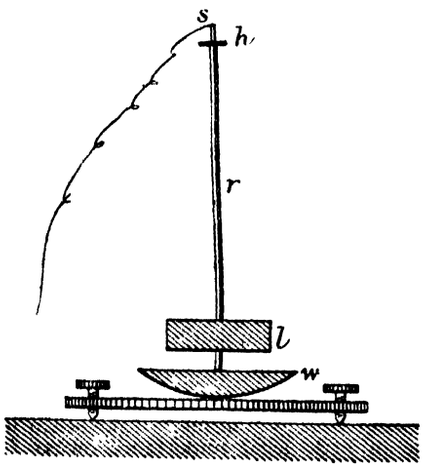


FIG. 1.

For example, if the falling body *s* is attached by a thread to the pendulum of a timepiece, it may be used to stop it and indicate the approximate time at which the tremor occurred. In its most sensitive form *r* is a steel wire, the upper end of which passes freely through a small hole in a metal plate. By the movement of the wire or the movement of the plate, especially if the latter projects from the top of a second and similar piece of apparatus, an electrical contact can be established by means of which an electromagnet may ring a bell, stop a clock, or set free machinery connected with a cylinder or other surface upon which an earthquake machine may record the movement of the ground.

The next class of instruments to be considered are seismometers or earthquake measurers, and seismographs or instruments which give diagrams of earhtquake motion. Although a seismograph may be designed that will not only respond to fairly rapid elastic vibrations, but will also record very slow and slight undulatory movements of the ground, experience has shown that the most satisfactory results are obtained when special instruments are employed for special purposes.

Seismometer. Seismograph.

First we will consider the types of apparatus which are used to record the rapid back-and-forth movements of earthquakes which can be distinctly felt and at times are even destructive. The essential feature in these seismographs is a fairly heavy mass of metal, so suspended that although its supports are moved, some point in the mass remains practically at rest. For small earthquakes, in which the movement is rapid, the bob of a very long and heavy pendulum will practically comply with these conditions. If a style projecting from this pendulum rests upon say the smoked surface of a glass plate fixed to the ground, the vibratory motion of the ground will be recorded on the glass plate as a set of superimposed vibrations. To obtain an open diagram of these movements the plate must be moved, say by clockwork.

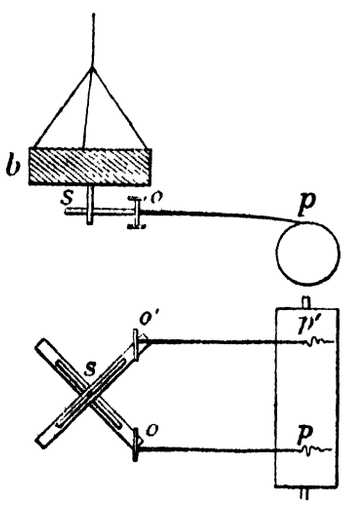


FIG. 2.

Experience, however, has shown that even when the movements of the ground are alarming the actual range of motion is so small that a satisfactory record can be obtained only by some mechanical (or optical) method of multiplication. This is usually accomplished as shown in fig. 2. *b* is the bob of a pendulum, with its style *s* passing through a slot in the short arm of a light lever, *sop*, pivoted at *o*, and with its outer end resting upon a revolving cylinder covered with smoked paper. As shown in the figure, it is evident that the motion of *o* in the line *sop* would not be recorded, and to obtain a complete record of horizontal movements it is necessary to have two levers at right angles to each other. A complete arrangement of this kind is shown in the plan of fig. 2. Here the style *s* of the pendulum rests in slots in the short arms of two writing levers pivoted at *o* and *o'*. Motion of the ground in the direction *os* actuates only the lever *so'p'*, motion in the direction *o's* actuates only *sop*, whilst motion in intermediate directions actuates both. The length of the short arms of the levers is usually $\frac{1}{4}$ or $\frac{1}{5}$ of the long arms.

This type of apparatus has been replaced in Japan by what are called duplex pendulum seismographs. The change was made because it frequently happened that in consequence of the movement of the ground agreeing with the period of the pendulum, the latter no longer acted as a steady point, but was caused to swing, and the record became little better than that given by a seismoscope. Very long pendulums (30 to 40 ft.) are less subject to this disadvantage, but on the other hand their installation is a matter of some difficulty. A duplex pendulum (fig. 3) consists of an ordinary pendulum diagrammatically represented by *ab*, connected by a universal joint to an inverted pendulum *dc*. The latter, which is a rod pointed at its lower end and loaded at *c*, would be unstable if it were not connected with *b*. Now imagine this system to be suddenly displaced so that *a* moves to *a'* and *d* moves to *d'*. In the new position *b* would tend to follow the direction of its point of support, whilst *c* would tend to fall in the opposite direction, and the bob of one pendulum would exercise a restraint upon the motion of the other. If, as in practice, the moment of *b* is made slightly greater than that of *c*, the system will come *slowly* to a vertical position beneath *a'd'*. In this way, by coupling together an ordinary pendulum about 3 ft. in length with an inverted pendulum 2 ft. 6 in. long, it is easy to obtain the equivalent of a slowly-moving very long pendulum which is too sluggish to follow the back-and-forth movements of its supports.

Duplex pendulums.

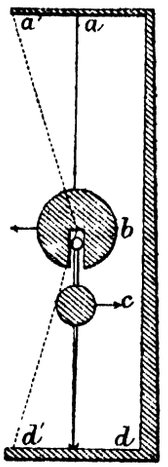


FIG 3.

To complete an instrument of this description (see fig. 4) a point in the steady mass *b* is used as the fulcrum for the short arm of a light-writing index. This has a ball joint at *s*, a universal joint at *o* and a writing point at *p*, resting upon a piece of smoked glass. Attention was first directed to the possibility of rendering ordinary pendulums more truly astatic by Professor Thomas Gray, who suggested methods by which this might be accomplished. The method shown in fig. 4 is that devised by Professor J. A. Ewing Records obtained from instruments of this description give information respecting the range and principal direction of motion, and show us that in a given earthquake the ground may move in many azimuths.

For obtaining an open diagram of an earthquake the best type of apparatus consists of a pair of horizontal pendulums writing their movements upon a moving surface. A simple form of horizontal pendulum as shown in fig. 5, consists of a rod, *op*, free to swing like a gate round a vertical or nearly vertical axis, *oo'*, and loaded at some point *b*. In practice the weight *b* is pivoted on the rod whilst its outer end, *bp*, which writes on a smoked surface, is made extremely light. When the frame of this arrangement is rapidly displaced through a small horizontal range to the right and left of the direction in which the rod points, the weight *b* by its inertia tends to remain at rest, and the motion of the frame, which is that of the earth, is magnified in the ratio *op* to *bp*. This apparatus, of which there are many types, was first introduced into seismometry by Professor Ewing.

Horizontal pendulums.

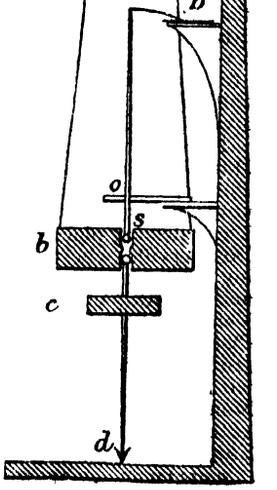


FIG. 4.

To obtain a complete record of horizontal motion, two of these pendulums are placed at right angles; and by cranking one of the writing levers, *o'p'*, as shown in the plan of fig. 5, two rectangular components of the earth's movements are written side by side. Since the movements of the ground are frequently accompanied by a slight tilting, which would cause *b* or *b'* to swing or wander away from its normal position, a sufficient stability is given to the weights by inclining the axis of the instrument slightly forwards. Although by compounding corresponding portions of the diagrams given by instruments of this type, it is possible to determine the range and direction of the movement of which they are the resolved parts, their chief value is that they enable us to measure with ease the extent of any vibration, half of which is called its amplitude, and the time taken to make any complete back-and-forth movement, or its period. Now if *a* be the amplitude expressed in millimetres, and *t* the period expressed in seconds, then the maximum velocity of an earth particle as it vibrates to and fro equals $2\pi a/t$, whilst the maximum acceleration equals $4\pi^2 a/t^2$. The former quantity determines the distance to which a body, as for example the capping

of a pillar, may be projected, whilst the latter measures the effort exerted by an earthquake to overturn or shatter various bodies. If after a heavy earthquake we find bodies that have been projected or overturned, then by observing the distance of projection, and the height through which they have fallen, or their dimensions, we can

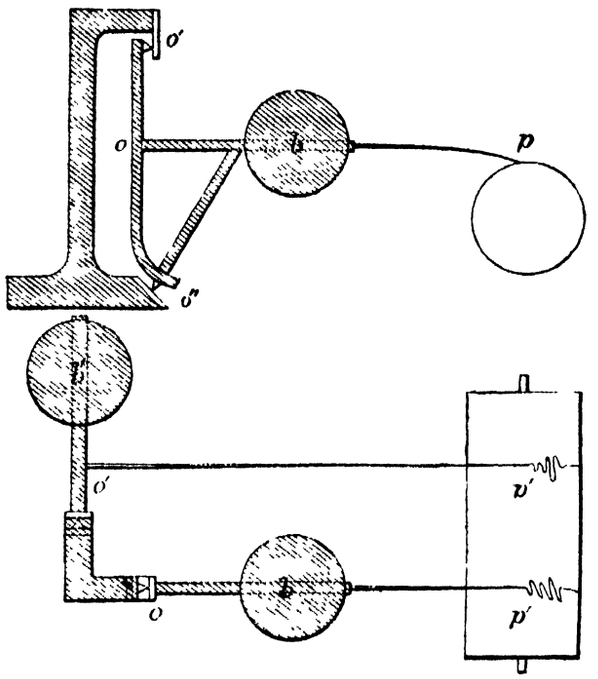


FIG. 5.

by means of simple formulae calculate quantities closely agreeing with those obtained from the seismogram. For example, if a body, say a coping-stone, has been thrown horizontally through a distance a, and fallen from a height b, the maximum horizontal velocity with which it was projected equals $\sqrt{(ga^2/2b)}$; or if the height of the centre of gravity of a column like a gravestone above the base on which it rests is y, and x is the horizontal distance of this centre from the *edge* over which it has turned, then the acceleration or suddenness of motion which caused its overthrow is measured, as pointed out by C. D. West, with fair accuracy by gx/y.

To measure vertical motion, which with the greater number of earthquakes is not appreciable, a fairly steady mass to which a multiplying light-writing index can be attached is obtained from a weight carried on a lever held by any form of spring in a horizontal position. Such an arrangement, for which seismologists are indebted to Professor T. Gray, is shown in fig. 6, in which B is the mass used as the steady point. This, when supported as shown, can be arranged to have an extremely slow period of vertical motion, and in this respect be equivalent to a weight attached to a very long spring, an alternative which is, however, impracticable. The value of these records, as is the case with other forms of seismographs, is impaired by pronounced tiltings of the ground.

Gray's seismograph.

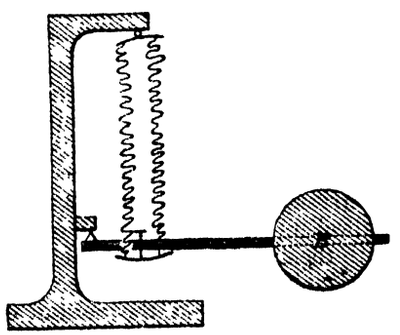


FIG. 6.

We next turn to types of instruments employed to record earthquakes which have radiated from their origins, where they may have been violent, to such distances that their movements are no longer perceptible. In these instruments the same principles are followed as in the construction of horizontal pendulums, the chief difference being that the so-called steady mass is arranged to have a much longer period than that required when recording perceptible earthquakes. Instruments largely employed for this purpose in Italy are ordinary pendulum seismographs as in fig. 2. One at Catania consists of a weight of 300 kilos suspended by a wire 25 metres in length, the movements of which by means of writing indexes are multiplied 12·5 times. With pendulums of shorter length, say 2 metres, it is necessary to have a multiplication 80 to 100 fold by a double system of very light levers, in order to render the extremely slight tilting of their support perceptible. This arrangement, as devised by Professor G. Vicentini of Padua, will yield excellent diagrams of the gentle undulations of earthquakes

Instruments to record distant earthquakes.

which have originated at great distances, but for local disturbances, even if the bob of the pendulum acts as a steady point, the highly multiplied displacements are usually too great to be recorded.

In Japan, Germany, Austria, England and Russia horizontal pendulums of the von Rebeur-Paschwitz type are employed, which by means of levelling screws are usually adjusted to have a natural period or double swing of from 15 to 30 seconds. These pendulums are usually small. The swinging arm or boom is from 4 to 8 in. long horizontally, and carries at its extremity a weight of a few ounces. A simple form, which is sometimes referred to as a conical pendulum, may be constructed with a large sewing needle carrying a galvanometer mirror, suspended by means of a silk or quartz fibre as shown in fig. 7. To avoid the possibility of displacements due to magnetic influences, the needle may be replaced by a brass or glass rod. The adjustment of the instrument is effected by means of screws in the bed-plate, by turning which the axis $o'o''$ may be brought into a position nearly vertical. As this position is approached the period of swing becomes greater and greater, and sensibility to slight tilting at right angles to the plane of $o'o''m$ is increased. The movements of the apparatus, which when complete should consist of two similar pendulums in planes at right angles to each other, are recorded by means of a beam of light, which, after reflection from the mirror or mirrors, passes through a cylindrical lens and is focussed upon a moving surface of photographic paper. The more distant this is from the pendulum the greater is the magnification of the angular movements of the mirror. With a period of 18 seconds, and the record-receiving paper at a distance of about 15 ft., a deflection of 1 millimetre of the light spot may indicate a tilting of $\frac{1}{10}$ part of a second of arc, or 1 in. in 326 miles. Although this high degree of sensibility, and even a sensibility still higher, may be required in connexion with investigations respecting changes in the vertical, it is not necessary in ordinary seismometry. A very sensitive modified von Rebeur instrument was employed by O. Hecker in his measurement of the variation in the vertical and of tidal earth tremors.

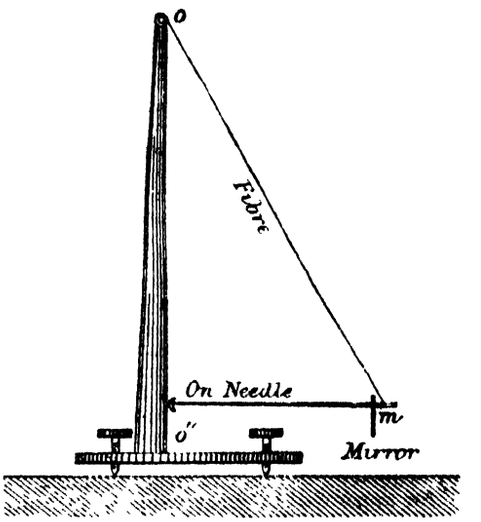


FIG. 7.

A type of instrument which has sufficient sensibility to record the various phases of unfelt earthquake motion, and which, at the suggestion of a committee of the British Association, has been adopted at many observatories throughout the world, is shown in fig. 8. With an adjustment to give a 15-second period, a deflection

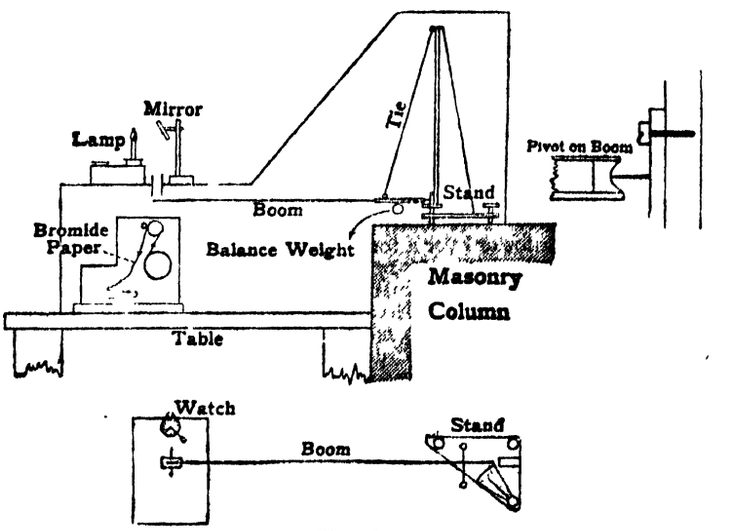


FIG. 8.

of 1 mm. at the outer end of the boom corresponds to a tilting of the bed-plate of 0″·5, or 1 in. in 6·4 m. The record is obtained by the light from a small lamp reflected downwards by a mirror so as to pass through a slit in a small plate attached to the outer end of the boom. The short streak of light thus obtained moves with

the movement of the boom over a second slit perpendicular to the first and made in the lid of a box containing clockwork driving a band of bromide paper. With this arrangement of crossed slits a spot of light impinges on the photographic surface and, when the boom is steady, gives a sharp fine line. The passage of the long hand of a watch across the end of the slit every hour cuts off the light, and gives hour marks enabling the observer to learn the time at which a disturbance has taken place. The chief function of the instrument is to measure slow displacements due to distant earthquakes. For local earthquakes it will move relatively to the pivoted balance weight like an ordinary bracket seismograph, and for very rapid motion it gives seismoscopic indications of slight tremors due to the switching of the outer end of the boom, which is necessarily somewhat flexible. If we wish to obtain mechanical registration from a horizontal pendulum of the above type, we may minimize the effect of the friction of the writing index—say a glass fibre touching the smoked surface of moderately smooth paper - by using a considerable weight and placing it near to the outer end of the boom. In the Isle of Wight there is a pair of pendulums arranged as in fig. 5. The stand is 3 ft. in height. Weights of 10 lb each are carried at a distance of 10 in. from the pivots of booms which have a total length of 34 in. With these, or even with booms half the above length, actuating indices arranged as shown in fig. 2, but multiplying the motion six or seven times, good results may be obtained. At Rocca di Papa near Rome there is a pair of horizontal pendulums with booms 8 ft. 9 in. in length, 17 ft. in vertical height, which carry near their outer ends weights exceeding half a hundredweight. Although such apparatus is far too cumbersome to be used by ordinary observers, it yields valuable results.

An apparatus of great value in measuring slight changes in the vertical which have a bearing upon seismometrical observation is the Darwin bifilar pendulum. This consists of a mirror about half an inch in diameter, which, when it is suspended as shown in fig. 9, rotates by tilting at right angles to the paper. By this rotation a beam of light reflected from the surface suffers displacement. It is possible to adjust the apparatus so that a tilt of $\frac{1}{1000}$ sec. of arc, or a change of slope of 1 in. in 1000 miles, can be detected. (See Sir G. H. Darwin, *Scientific Papers*, vol. i. (1907).)

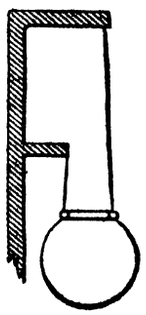


FIG. 9.

The principle of the Vicentini instrument described above has been adopted by G. Agamennone, director of the observatory at Rocca di Papa, near Rome, and also by E. Wiechert of Göttingen. In the Agamennone seismometrograph the pendulum is cheese-shaped, and weighs 500 kilos in one form and 2000 kilos, or over two tons, in the largest. This cylinder, which is suspended from a stand rigidly attached to the earth, has a vertical hole in its centre extending from its upper surface to its centre of gravity, and to the bottom of this well a light rod is fixed. The motion of the frame is communicated to this rod by an extension of the frame which makes contact with it just above its point of attachment to the well. The motion is first magnified by the lever, and, on its communication to a complex lever system above the stationary mass, is still further magnified before registration, which is effected by a pen supplied with ink writing on white paper. Mechanism is provided whereby the speed of the paper is doubled on receipt of a shock, an electric bell ringing at the same time to summon an attendant. In the Wiechert astatic pendulum seismometer the stationary mass is also cheese-shaped, but it is supported by a conical extension from its base, which balances it on the floor of its case. There is also an extension from the upper surface of the pendulum, in contact with a system of levers and rods attached to the case; an air-damping cylinder is fitted to annul the free vibrations of the pendulum. The motion of the rod consequent to a motion of the case is modified by the projecting axle of the stationary mass, and after much magnification is recorded on a sheet of smoked paper. This instrument was made with a pendulum weight of 1100 kilos or over a ton; and with a modified construction the weight was increased to 17,000 kilos or nearly 19 tons, portability being obtained by replacing the solid pendulum of the smaller instrument by a shell which can be filled with barytes, a heavy mineral readily obtainable in most places. This instrument, which has a magnification of 2200, detects the slightest tremors, and is consequently most useful in recording earthquakes of distant origin; its high sensitiveness and complications, however, militates against its common use. Wiechert has also constructed a seismometer on the same principle, but in which the stationary mass is smaller, being adjustable between 80 and 200 kilos (180 and 440 lb).

The Strassburg or Bosch seismograph differs from those just described in resembling the Milne instrument, *i.e.* it is a horizontal and not a vertical pendulum. The steady mass, however, is much larger, being 100 kilos (or 220 lb); the magnification is from 80 to 100; and the registration is effected on a roll of smoked paper. An air-damping apparatus is attached in order to annul the natural oscillations of the pendulum. Two of these instruments are set up, one in the N.-S. direction and the other in the E.-W. so as to record the two horizontal components. A more popular Strassburg instrument has a stationary mass of 25 kilos. The Galitzin seismograph, devised by Prince Galitzin, is of the same type, but it essentially differs from the Milne instrument in having its pendulum dead-beat; this is brought about by an electromagnetic device. Magnification and registration of the motion is effected in the following way. Attached to the pendulum is a coil of fine wire which moves in the field of a pair of magnets. The currents induced in the coil are led to a dead-beat D'Arsonval galvanometer having the same natural period of vibration as the pendulum. It is found that the motion of the galvanometer mirror faithfully records, except in a few special cases, the motion of the pendulum; the actual record is made on sensitized paper. Two instruments are set up, and the two components are recorded on one strip.

AUTHORITIES.—For older forms see R. Mallet's *Report of the British Association* (1858). For modern forms see J. Milne, *Seismology* (London, 1898); *Transactions of the Seismological Society of Japan*, vols. i.-xvi.; *Seismological Journal*, vols. i.-v. (Yokohama, 1880–1895); *Bollettino della Società Sismologica Italiana*, vols. i.-v. (Rome, 1895); J. A. Ewing, *Memoir on Earthquake Measurement* (Tokyo, 1883); *Reports of the British Association* (1887–1902); E. von Rebeur-Paschwitz, *Das Horizontalpendel* (Halle, 1892); A. Sieberg, *Handbuch der Erdbebenkunde* (Braunschweig, 1904).

SEISTAN, or SISTAN (SEJISTAN), the ancient *Sacastane* ("land of the Sacae") and the *Nimruz* or "Meridies" of the *Vendidad*, a district of Persia and Afghanistan, situated generally between 30° 0′ and 31° 35′ N., and between 61° 0′ and (including Rudbar) 62° 40′ E. Its extreme length is about 100 and its breadth varies from 70 to over 100 m., but the exact limits are vague, and the modern signification of the name practically comprehends the peninsula formed by the lower Helmund and its embouchure on the one side and the Hamun (lake) on the other. Its area is 7006 sq. m.; 2847 sq. m. are Persian territory, while 4159 sq. m. belong to Afghanistan. When British arbitration was brought to bear upon the disputed claims of Persia over this country in 1872, it was found necessary to suppose two territories—one compact and concentrated, which was called "Seistan Proper," the other detached and irregular, called "Outer Seistan."

1. Seistan Proper is bounded on the north by the Naizar, or reed-bed which fringes the Hamun; west by the Hamun itself, of which the hill called Kuh-i-Khwajah marks the central point; south by a line shutting in Sikuha and all villages and lands watered by the main Seistan canal; and east by the old bed of the Helmund, from 1 m. above the dam at Kohak to the mouth. Kal'ah-i-nau and Rindan are among the more northerly inhabited villages. The Kuh-i-Khwajah is a sufficient indication of the western side. Burj-i-'Alam Khan should be included within the southern boundary as well as Sikuha. Khwajah Ahmad and Jahanabad, villages on the left bank, or west of the true bed of the Helmund, denote the eastern line. The whole area is estimated at 947 sq. m. The fixed population may be roughly stated at 35,000—some 20,000 Seistanis and 15,000 settlers—the greater part of whom are Parsiwans, or rather, perhaps, a Persian-speaking people. To the above numbers may be added 10,000 Baluch nomads. Taking the aggregate at 45,000, we find nearly 48 persons to the square mile. These figures are eight times in excess of the proportional result found for the whole of Persia. It should be explained that the designation Seistan Proper is not arbitrarily given. The territory comprehended in it is spoken of as Seistan by the dwellers on the right bank of the Helmund, in contradistinction to their own lands. At the same time it could only be but a fractional part—as indeed the whole country under consideration could only be—of the Seistan of Persian history.

Seistan Proper is an extensive tract of sand and clay alluvium, generally flat, but irregular in detail. It has heaps, but no hills; bushes, but no trees, unless indeed three or four tamarisks of aspiring height deserve the name; many old ruins and vestiges of civilization, but few monuments or relics of antiquity. It is well watered by rivers and canals, and its soil is of proved fertility. Wheat or barley is perhaps the staple cultivation; but pease, beans, oil-seeds and cotton are also grown. Among fruits, grapes and mulberries are rare, but melons and water-melons, especially the latter, are abundant. Grazing and fodder are not wanting, and besides the reeds peculiar to Seistan there are two grasses which merit notice—that called *bannu*, with which the bed of the Hamun abounds on the south, and the taller and less salt *kirta* on the higher ground.

2. Outer Seistan, the country on the right bank of the Helmund, and east of its embouchure in the Hamun, extends more than 100 m. in length, or from a point between the Charboli and Khuspas rivers north to Rudbar south. In breadth the district of Chakhansur, measuring from the old bed of the Helmund, inclusive of Nad Ali, to Kadah, may be estimated at some 30 m. It produces wheat and barley, melons, and perhaps a few vegetables and oil seeds. Beyond the Chakhansur limits, southward or up to the Helmund, there is probably no cultivation save that obtained on the river bank, and ordinarily illustrated by patches of wheat and barley with melon beds. On the opposite side of the river, in addition to the cultivated portions of the bank, there is a large tract extending from south of Kuhak, or the Seistan dam (*band*), to the gravelly soil below the mountain ranges which separate Seistan from Baluchistan and Narmashir. The distance from north to south of this plain may be computed at 40 m., and from east to west at 80 or 90 m. Lands north of the Naizar not belonging to the Afghan district of Lash Juwain may also be included in Outer Seistan; but it is unnecessary to make any distinction of the kind for the tract marked Hamun on the west, where it merges into the Persian frontier. The inhabitants are Seistanis or Parsiwans, Baluch nomads and Afghans. Between the Kuhak *band* and Rudbar they are mainly Baluch. Most of the less nomad tribesmen are Sanjurani and Toki, the sardars jealously claiming the former appellation.

The most remarkable geographical feature of Seistan generally, in the modern acceptation of the term, is the Hamun, which stretches far and wide on the north, west and south, but is for a great part of the year dry or a mere swamp. It is a curious feature in the physical conformation of northern and western Afghanistan that none of the rivers flow to the sea, but that the Helmund and all the other rivers of western Afghanistan empty themselves into these lagoons, which spread over thousands of square miles. A noteworthy feature of the Seistan lagoon is that in times of excessive flood it overspreads a vast area of country, both to the north and south, shutting off the capital of Seistan (Nusretabad) from surrounding districts, and spreading through a channel southwards, known as Shelag, to another great depression, called the Gaud-i-Zirreh. This great salt swamp is about 1000 ft. lower in elevation and is situated so close to the Helmund as to leave but a few miles of broken ridge between. By that ridge all communication with Seistan must pass in time of flood. Seistan becomes a promontory connected with the desert south of the Helmund by that isthmus alone. In the early spring the existence of a lake could only be certified by pools or hollows of water formed at the mouths of the principal feeders, such as the Khash Rud on the north-east, the Farah Rud on the north-west, and the Helmund, where its old bed terminates at no great distance from the Khash Rud. Bellew describes the aspect of that portion of Seistan limited to the actual basin of the Helmund as indicating the former existence of a lake which covered with its waters a considerable area. On the north this tract has been raised to a higher level than the remainder by the deposit at the mouths of rivers of the solid matter brought down. It is still, however, from 200 to 500 ft. below the level of the desert cliffs that bound it, and at some former period formed the shores of the lake; and it is from 50 or 60 to 200 ft. above the level of the beds of the rivers now flowing into the existing Hamun.

The water-supply of Seistan is about as uncertain as that of Sind, though the general inclination to one bank, the left, is more marked in the Helmund than in the Indus. Therefore the boundary lines given must be received with slight reservation. It is easy to see that a good year of inundation extends the borders of the so-called lake to within the Naizar; and there are well-defined beds of dry canals intersecting the country, which prove the existence formerly of an extensive water-system no longer prevailing. The main canal of Seistan, confounded by some writers with the parent river, bears the waters of the Helmund westward into the heart of the country. They are diverted by means of a large *band* or dam, known indifferently as the "Amir's," the "Seistan" or the "Kuhak" *band*. It is constructed of horizontally laid tamarisk branches, earth and perpendicular stakes, and protected from damage by a fort on the left and a tower on the right bank of the river. Although this diversion of the stream may be an artificial development of a natural channel, and undoubtedly dates from a period long prior to recent Persian occupation, it appears that the later arrangements have been more maturely and better organized than those carried on by the predecessors of the amir of Kaian. The towns of Deshtak, Chelling, Burj-i-'Alam Khan, Bahramabad, Kimmak and others of less note are actually on the banks of this main canal. Moreover, it is the indirect means of supplying water to almost every town and village in Seistan Proper, feeding as it does a network of minor canals, by which a system of profuse irrigation is put in force. The yearly rainfall is only 2 to 3 in. The Seistan depression receives the drainage of a tract of country over 125,000 sq. m. in area.

Provisions in Seistan are as a rule sufficient, though sheep and oxen are somewhat poor. Bread is cheap and good, being procurable to natives at less than a halfpenny the pound. Vegetables are scarce, and rice is chiefly obtained from Herat. The inundated lands abound with water-fowl. Partridges and sand-grouse are occasionally seen. River fish are plentiful enough, but confined to one species, the barbel.

The population is about 205,000, but the country, even with the lazy methods of the present day, furnishes a very large amount of grain and food-supplies in excess of local requirements, and it could, of course, be made to furnish very much more. Under improved government Seistan could with but little trouble be made into a second Egypt.

The inhabitants of Seistan are mainly composed of Kaianis, descendants of the ancient rulers of the land; Sarbandis and Shahrakis, tribes supposed to have consisted originally of immigrants from western Persia; and Baluchis of the Nharui and Sanjurani (Toki) clans. Bellew separates the "Seistanis"; but it is a question whether this term is not in a large measure applied to fixed inhabitants of the country, whatever their descent and nationality. The dense reed-beds (Naizar) skirting the Hamun, often several miles in width and composed of reeds 10 ft. or more in height, look impenetrable, but narrow winding lanes exist in them, known only to the Sayāds (Arab. for "hunter"), a strange aboriginal race of Seistan, who live by netting fish and water-fowl. These people live all the year round at the water's edge, in huts made of reeds, and change their abodes as the waters advance or recede. They have a language of their own, and are an unsociable people, suspicious of strangers, ever ready to decamp if they think a tax-collector is near.

History.—The ancient Drangiana (Zaraya, Darañka, "lake land") received the name of "land of the Sacae" after this country was permanently occupied by the "Scythians" or Sacae, who overran Iran in 128 B.C. It was included in the Sassanian empire, and then in the empire of the caliphs. About A.D. 860, when it had undergone many changes of government under lieutenants of the Bagdad caliphs, or bold adventurers acting on their own account, Yakub b. Laith al-Saffar made it the seat of his power. In 901 it fell under the power of the Samanids, and a century later into that of the Ghaznevids. An invasion of Jagatais and the irruption of Timur are salient points in the history of Seistan prior to the Sefavid conquest (1508). Up to 1722 Seistan remained more or less a Persian dependency. At the time of the Afghan invasion of Mir Mahmud (1722), Malik Mahommed Kaiani was the resident ruler in Seistan, and by league with the invader or other intrigue he secured for himself that particular principality and a great part of Khorasan also. He was slain by Nadir Kuli Khan, the general of Shah Tahmasp, who afterwards, as Nadir Shah, became possessor of Seistan as part of his Persian dominions. Shortly after the death of Nadir (1751) Seistan passed, together with other provinces, into the hands of Ahmad Shah Abdali, the first sovereign in a united Afghanistan. On the death of Ahmad Shah in 1773 the country became a recognized bone of contention, not so much between Persians and Afghans as between Herat and Kandahar; but eventually the internal dissensions of Afghanistan gave Persia the desired opportunity; and by a steady course of intrigue and encroachment she managed to get within her grasp the better lands on the left bank of the lower Helmund and something on the right bank besides. When the British arbitrator appeared on the scene in the beginning of 1872, though compelled to admit the shah's possession of what has been called "Seistan Proper," he could in fairness insist on the evacuation of Nad Ali, Kala Fath, and all places occupied on the right bank by Persian troops; and furthermore he left to the Afghans both sides of the river Helmund from the dam of Kuhak to its elbow west of Rudbar. A part of the work of General Sir Frederic J. Goldsmid, K.C.S.I., who conducted the first Seistan demarcation commission in 1872, was left undone and completed only in 1903–1905 by Col. Sir Henry McMahon, K.C.I.E.

See *Eastern Persia*, vol. i.; Bellew's "Record of Seistan Mission," *Journal of R. Geog. Society*, vol. xliii. (1873); Col. Sir H. McMahon's paper in *Geographical Journal* (September to October, 1906); also PERSIA.

(F. J. G.; A. H.-S.)

SEJANUS, LUCIUS AELIUS, favourite and minister of the Emperor Tiberius. He was the son of Seïus Strabo, prefect of the praetorians, and was adopted into the Aelian gens. After his father's departure from Rome to take up the governorship of Egypt, Sejanus was made prefect in his stead. He gained the confidence of Tiberius, and, supported by the praetorians, whom he concentrated in a camp on the Viminal Hill, became virtually ruler of Rome. But he aimed still higher, and determined to put all the members of the royal house out of his way. Having removed Drusus (the son of Tiberius) by poison, he persuaded the emperor to retire to the island of Capreae. The death of Drusus was followed some years later by those of Agrippina (the wife of Germanicus) and her sons Drusus and Nero. Tiberius at last saw through his designs, and caused Sejanus to be put to death (A.D. 31).

Tacitus, *Annals*, iv. 1, 2, 3, 8, 39-59, 74, v. 6-9; Suetonius, *Tiberius*, 62; Dio Cassius lvii. lviii.; Juvenal x. 65-80; J. Jülg, *Vita Aelii Sejani* (1882), with notes giving full references to authorities; J. C. Tarver, *Tiberius the Tyrant* (London, 1902), chap. xvii.

SEKONDI, a port on the Gold Coast in 4° 57′ N., 1° 42′ W., and 167 m. by rail S. by W. of Kumasi. Pop. (1908) about 5000, of whom some 200 were whites. Sekondi is one of the old trading stations on the Guinea coast, and Fort Orange was built here by the Dutch about 1640, the English later on building another fort near by. In 1694 the Dutch fort was plundered by the Ahanta, who in 1698 burnt the English fort. It was not rebuilt, and it was not until 1872 that the place became definitely British. The town was of comparatively little importance until it was chosen as the sea terminus of the railway serving the gold-mining districts and Ashanti. The railway reached the Tarkwa gold-fields in 1901 and the Obuassi mines in 1902. From that date Sekondi became the chief port of the Gold Coast colony, gold, rubber and timber being the principal exports. In 1908 the total trade of the port was £2,121,420. There is no sheltered harbour; but at the landing place are piers provided with cranes. Landing is effected in lighters, ships anchoring in the roadstead half a mile from the shore. The public buildings include Fort Orange, a church, court-house, government offices and hospital. The mean temperature is about 79° F.; the rainfall about 40 in. a year. The climate is unhealthy for Europeans, but by the reclamation of the neighbouring lagoons its sanitary condition has been improved. Sekondi is governed by a municipality, created in 1905. It is in telegraphic communication with Europe by submarine cable, and is served by British, German and Belgian lines of steamers.

SELACHIANS, or ELASMOBRANCHII, a subclass of fishes, including the various kinds of Sharks and Rays.

Structural Features.—The general shape is somewhat spindle-like in the Sharks, while in the Rays—in correlation with the ground-feeding habits—the body has become greatly depressed. Departures from the normal are seen in the Hammerheads (*Sphyrna*), where the sides of the head are so produced as to give a hammer shape, and in the Saw-fishes (*Pristis*), where the head is prolonged forwards as a greatly elongated flattened rostrum. In regard to the fins, the tail is heterocercal in the adults of living forms, except in *Chlamydoselachus*, where the protocercal condition persists; the pectoral fins are greatly enlarged in the Rays, in which movement is effected mainly by the passage backwards of waves of flexure along the pectoral fins; the pelvic fins in the last-named fishes have their hinder portions modified in the male to form special copulatory organs, the *myxipterygia* or "claspers."

The mouth opening is a ventrally placed crescentic slit except in *Chlamydoselachus*, where it is nearly terminal. The olfactory organs, lying in front of the mouth, are widely open to the exterior, and in some cases are connected with the mouth by oronasal grooves. The spiracular opening frequently retains in the adult an opening to the exterior behind or below the eye. In the Rays it is used mainly for inspiration. The post-spiracular clefts open freely to the exterior, each guarded by a flap-like extension of its anterior margin which serves as a valve to allow water to pass only in one direction, viz. outwards. In the Holocephali the anterior flap, that arising from the hyoid arch, is greatly enlarged so as to form an *operculum* covering over all the clefts lying posterior to it.

The postspiracular clefts are usually five in number, but six in *Chlamydoselachus* and *Notidanus griseus*, and seven in *N. cinereus*. The gill lamellae are strap-like and attached by their edges to the gill septa. Fully developed lamellae are present on the anterior wall of the hyobranchial clefts and vestigial lamellae on the anterior wall of the spiracle where they form the "pseudobranch."

In the Basking Shark *Cetorhinus* the pharyngeal openings of the gill clefts are guarded by series of long slender rods—the greatly elongated representatives of the small conical "gill rakers" found in this position in other fishes. These structures form a sieve-like arrangement for preventing the minute creatures (plankton) upon which this shark feeds from passing out through the gill clefts.

There appears to be no representative of the lung or swimbladder, and there are no pyloric caeca. The intestine is provided with a spiral valve in its interior which varies in character in different forms (1). A glandular caecum—the *rectal caecum*—opens into the dorsal side of the rectum. In regard to the coelomic spaces the Selachians exhibit the interesting feature that the pericardiac cavity is in the adult in communication with the general splanchnocoele by an open channel sometimes forked at its posterior end. This communication apparently arises secondarily and is not due to a persistence of the embryonic communication (2). In the case of *Torpedo* and in the ordinary Rays certain portions of the muscular system are converted into electrical organs. In the Skates and Rays the electrical disturbance is relatively small—imperceptible by human beings—but in *Torpedo* it is very considerable. No doubt the electric organs subserve a defensive function.

The kidney of the adult is a mesonephros. The pronephros is never functional, though it appears in a vestigial form in the embryo. The mesonephros shows a division into a broader posterior portion which alone is renal in function, and a slender anterior portion which in the male subserves a genital function. The female genital duct is a typical Mullerian duct having at its anterior end a wide coelomic funnel and lined by glandular epithelium whose secretion forms adventitious coats round the egg during its downward passage. The spermatozoa find their way to the cloaca by way of the mesonephric duct, the hinder portion of which is dilated to form a vesicula seminalis. The urino-genital sinus—formed by the fusion of the mesonephric ducts at their hinder ends—projects forward as a pair of pockets (the so-called sperm sacs).

The skeleton of the Selachian shows remarkably archaic features, inasmuch as the internal skeleton is entirely cartilaginous, the bony or placoid skeleton retaining its primitive superficial position and not showing in any part a tendency to sink or spread inwards for the reinforcement of the cartilaginous skeleton. The vertebral column is of the chordacentrous type, although in some of the more archaic of known fossil forms (Pleuropterygii, Ichthyotomi, Acanthodei, *Hybodus*) the chondrified secondary sheath of the notochord apparently retained in the adult the unsegmented condition. The same holds for the Holocephali and for the hinder part of the vertebral column of the existing *Chlamydoselachus*. The centra are usually, if not always, strengthened in the adult by the deposition of lime salts in the intercellular matrix: such calcified cartilage must be carefully distinguished from true bone. The arrangement of the calcified tracts shows differences which are of taxonomic importance.

In the *cyclospondylous* type (fig. 1, A) the calcified tract has the form of a double cone—of the wall of a dice-box—and in the transverse section appears as a simple circle (*Palaeospinax*, *Acanthias*, *Scymnus*). In the *tectospondylous* (fig. 1, B) type, additional calcified tracts are developed outside and concentric with the original double cone (Batoidei), while in the *asterospondylous* (fig. 1, C) type the additional calcification takes the form of longitudinally arranged plates radiating outwards from the original double cone, so as to produce a star-like appearance in cross section (*Scyllium*, *Lamna*). Eventually in the adult the calcification may extend from the special tracts above mentioned throughout the whole centrum. In certain cases (Carchariidae, &c.) the transverse section of the centrum is modified by its surface becoming indented by the ingrowth of cartilage tracts (calcified or not) situated *external* to the primary sheath, thus producing an appearance something like a Maltese cross.

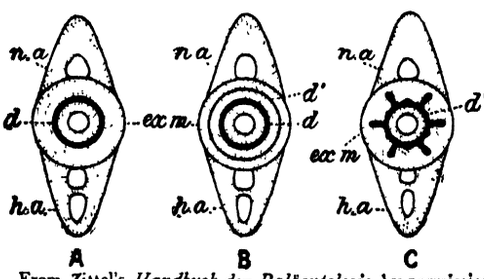


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FIG. 1.—Diagrammatic tranverse sections to illustrate the Cyclospondylous (A), the Tectospondylous (B) and the Asterospondylous (C) type of vertebra.
d, *d'*, *d"*, Calcified tracts. *h.a*, Haemal arch.
ex.m, Primary sheath. *n.a*, Neural arch.

The arch elements of the vertebral column have lost in variable degrees the numerical correspondence with the centra which they possibly once possessed. The same applies to the relations of the

centra with the fundamental body metamerism, as shown by the neuro-muscular segments; *e.g.* there are frequently in the caudal region in sharks (3) two centra to each neuro-muscular segment, while in part of the trunk in Notidanidae one centrum corresponds to two neuro-muscular segments.

The chondrocranium retains through life its primitive character. The ethmoidal region is prolonged forwards into a *rostrum*—which may be of enormous size (*Pristis*), or may be of insignificant dimensions as in most sharks.

The jaw apparatus is also remarkably archaic: the functional jaws being the *palatopterygoquadrate* cartilage and Meckel's cartilage respectively. The suspension from the skull is typically *hyostylic*, except in *Notidanus* where it is *amphistylic*, in the *Holocephali* where it is *autostylic*, and in *Heterodontus* where it approaches the autostylic condition.

The skeleton of the postmandibular visceral arches consists of a half hoop of cartilage on each side divided into a number of segments: the two half hoops are connected ventrally by a median *copula* (*basihyal*, or *basibranchial*). The hyoid arch most usually shows a division into a dorsal (*hyomandibular*) and a ventral (*ceratohyal*) element, and except in the Notidanidae the dorsal segment is of large size in correlation with its function in the suspension of the jaws. This enlargement of the hyomandibular is particularly marked in the case of the Rays (*Raia*) where it may become freed from the ventral segmented part of the arch which articulates directly with the skull. The branchial arches usually are segmented on each side into four pieces (*pharyngobranchial, epibranchial, ceratobranchial* and *hypobranchial*) in addition to the median copula.

All these visceral arch skeletons bear on their outer surface a number of cartilaginous rays which radiate outwards and support the gill septa. Those attached to the hyoid arch (*branchiostegal* rays) show by their specially large size a foreshadowing of the development of the operculum of the higher group of fishes.

In addition to the elements already mentioned slender cartilaginous rods of doubtful significance are found superficial to the jaw cartilage (*labials*) and to certain of the branchial arches (*extra branchials*).

The limb girdles of the Selachians are very simple—a hoop of cartilage incomplete dorsally in the case of the pectoral, a transverse bar of cartilage in the case of the pelvic girdle.

In the ancient Pleuracanthids the two halves of the pectoral girdle remained distinct in the adult, and each was segmented into three pieces, thus showing a remarkable correspondence with the visceral arches lying in front of them. (For the bearing of this on theories of the origin of limbs see ICHTHYOLOGY: *Anatomy*.) In some existing sharks (*e.g. Acanthias*) a relic of this condition is found—the dorsal extremity of the girdle being segmented off from the rest.

The cartilaginous skeleton of the pectoral limb consists of numerous cartilaginous rays which typically are connected with the girdle through the intermediary of three basal pieces known as *propterygium, mesopterygium* and *metapterygium*. In the Rays, in correlation with the gigantic development of the pectoral fins, the propterygium and metapterygium become greatly enlarged in an anteroposterior direction—the former becoming attached to the side of the cranium or even meeting and fusing with its fellow in front (*Trygon*). In the pelvic limb the rays are—except a few in front—borne on the outer side of a single backwardly projecting basal piece (*metapterygium*). In the male this is continued backwards to form the skeleton of the clasper.

The limb skeleton shows remarkably interesting features in the ancient extinct sharks *Cladoselache* and *Pleuracanthus*.

The placoid or bony skeleton is seen in its most archaic form in Selachians in the form of superficially placed placoid scales. These may be uniform in size forming the characteristic shagreen of the various sharks, or scattered scales may be greatly enlarged as in the thornbacks, or finally the scales may have completely atrophied as in the electric ray (*Torpedo*).

Local placoid elements or aggregations of placoid elements may become specially enlarged to form defensive or offensive weapons. In the sawfish (*Pristis*) a row of greatly enlarged placoid spines along each side of the rostrum form the "teeth" of the saw, and a similar condition occurs in the sharks of the genus *Pristiophorus*. In the sting-rays the tail is armed with a large serrated spine taking the place of the dorsal fin and having behind it smaller spines, the front one of which increases in size and becomes functional if the previously functional spine is broken off.

The portion of skin involuted to line the buccal cavity carries with it its armature of placoid scales (*Chlamydoselachus*). Normally these undergo atrophy except near the margin of the cavity where they are greatly enlarged to form the teeth. These vary greatly, as might be expected, in accordance with the nature of the food—they may be sharp prehensile spines, or triangular cutting blades with serrated edges (*e.g. carcharodon* and other sharks) or flattened plates adapted to crushing Molluscan shells (*e.g.* various rays).

Vascular System.—The heart possesses a single atrium and a single ventricle. Opening into the atrium is a well-developed sinus venosus and leading from ventricle into ventral aorta is a well-developed rhythmically contractile conus arteriosus, containing a complex arrangement of pocket valves. These pocket valves are arranged in longitudinal rows, each row representing the remains of a longitudinal ridge in the conus of the embryo. The valves of each row tend to become differentiated in size, *e.g.* in *Rhina* the anterior valve in each row is considerably enlarged. Finally a condition may be reached in which all the valves of the row disappear except two as in *Scyllium canicula*. As regards the remaining parts of the blood-vascular system, probably the most characteristic feature is the tendency seen in various Selachians for the main venous trunks (cardinals and hepatic veins) to become dilated at their front ends into a special sinus which fills the cavity of the orbit. The kidneys are provided with a well-developed renal portal system.

Nervous System.—The brain of the Selachians shows a mixture of primitive and specialized characters. The hemisphere region is remarkable for the indistinctness of the two hemispheres. This has been looked on by some, *e.g.* Gegenbaur, as a primitive feature, the hemispheres having not yet been developed. To others, including the writer of this article, the balance of evidence seems in favour of the condition in Selachians being due to a secondary disappearance of the separation between the two hemispheres. In such comparatively primitive forms as the Notidanidae the paired character of the hemisphere region is still clearly indicated. In the Raiidae on the other hand even the lateral ventricles have lost their paired character, while in *Myliobatis* the ventricle of the region has disappeared entirely, leaving a solid unpaired mass. Although the hemisphere region has in great part lost its paired character, this does not apply to the anterior outgrowths from the hemispheres, the olfactory lobes. In the Holocephali the olfactory lobes remain close to the hemisphere surface. In other Selachians, however, the olfactory organ, with the olfactory lobe attached to it, becomes carried away by differential growth to a lesser or greater distance from the hemisphere. The result is that the middle part of the olfactory lobe becomes greatly drawn out (*Olfactory tract* or *peduncle*). The swelling at its anterior end is now spoken of as the olfactory lobe, while its hinder end, where it passes into the brain, is the *olfactory tubercle*.

In the region of the thalamencephalon there is a well-developed infundibular gland, and the pineal body is present in the form of a greatly elongated slender tube which passes upwards and forwards to end in contact with the cranial roof about the level of the anterior boundary of the hemisphere region. The pineal body ends in a small bulbous enlargement but shows no trace of eye structure. In the mesencephalon are a pair of well-developed optic lobes.

The cerebellum is highly developed—as in the case of other fishes which perform active and complex movements. The medulla oblongata shows a characteristic feature in *Torpedo*, where the nucleus of origin of the electric nerves forms a large swelling on the floor of the fourth ventricle on each side of the mesial plane. In connexion with the organs of special sense in the Selachians, there are various points of general interest. In various forms, *e.g. Scyllium* and *Raia*, the olfactory organ is connected with the mouth by means of an open gutter—the oronasal groove—in which we may probably see the homologue of the similar groove which appears in the embryo of the higher vertebrates and which, becoming covered in, gives rise to the communication between nose and buccal cavity *via* the internal nares. The *otocyst* or auditory organ, which arises in ontogeny as an involution of the ectoderm, is remarkable in the Selachians from the fact that it does not become completely enclosed. Throughout life the ductus endolymphaticus remains open to the exterior by a minute pore on the dorsal side of the head. In *Rhina* (4) this communication of otocyst with exterior is relatively wide, and through it grains of sand gain admission to the interior of the otocyst, where they take the place functionally of the small calcareous *otoconia* of other forms.

Cutaneous Sense Organs.—As in other fishes there is a rich development of sense buds scattered over the general surface of the head and body. Certain of these retain their superficial position throughout life, while others are carried inwards by involution of the ectoderm so that they come to be sunk in pits. These pits may become prolonged into tubes with dilatations at their inner ends containing the sense buds ("Ampullae of Lorenzini" of the head region), or their external opening may be narrowed to a fine slit, or they may become completely shut off from the exterior ("Savi's vesicles" on ventral side in *Torpedo*). Another series of these cutaneous sense buds is arranged in rows on the head and trunk to form the characteristic organs of the lateral line. These are innervated by the *lateralis* system of nerves. These organs, like the sense buds already mentioned, become sunk beneath the surface, lying first in the floor of an open groove (*Chimaera*) and later, as this becomes covered in, in a canal which opens to the exterior at intervals by pores.

Ontogenetic Development.—The Selachians possess large heavily yolked eggs and show corresponding modifications in their developmental processes. Segmentation is partial, resulting in the formation of a blastoderm. The process of gastrulation is much less modified than in the Sauropsida (where similar conditions prevail as regards quantity of yolk), and can be readily compared with the method seen in the larger types of holoblastic egg.

Fertilization is internal, the myxipterygia or claspers serving as intromittent organs. On its passage down the oviduct the egg normally becomes surrounded by a layer of albumen and by a tough external envelope of flattened quadrangular shape. The corners of the external capsule may be produced into points (*Raia*) or into long

tendril-like structures (*Scyllium*) which serve to anchor it to seaweeds.

In a large number of Selachians the adoption of internal fertilization has been followed by the retention of the embryo within the oviduct (uterus) for a prolonged period. In such cases we find interesting adaptive arrangements for aiding the nutrition and respiration of the young individual. The highly vascular wall of the yolk sac may come into intimate relation with the uterine lining, so as to form a simple yolk sac placenta (*Mustelus laevis*, &c.). In other forms the uterine lining secretes a nutritive fluid or uterine milk which apparently is taken into the alimentary canal of the embryo through the spiracles (*Myliobatis* sp., *Taeniura* sp.). In certain Rays (*Pteroplataea micrura*) this secretory activity of the uterine lining is concentrated in long villous processes known as *trophonemata*, which pass through the wide spiracles of the young fish and pour their secretion directly into the cavity of its alimentary canal.

Classification

The following table gives a convenient classification (taken from Bridge (5)) of those Selachians at present known:—

Order I. Pleuropterygii (Extinct: palaeozoic).
,, II. Acanthodii (Extinct: palaeozoic mainly).
,, III. Ichthyotomi (Extinct: palaeozoic mainly).
,, IV. Plagiostomi.

Suborder I. *Squali* (Selachii *s.s.*).

Fam. 1. Notidanidae (*Notidanus* = Hexanchus and Heptanchus).
,, 2. Chlamydoselachidae (*Chlamydoselachus*).
,, 3. Heterodontidae (*Heterodontus* = *Cestracion*).
,, 4. Cochliodontidae (Extinct: palaeozoic).
,, 5. Psammodontidae (Extinct: palaeozoic).
,, 6. Petalodontidae (Extinct: mainly palaeozoic).
,, 7. Scylliidae (*Scyllium*, *Pristiurus*, *Stegostoma*).
,, 8. Carchariidae (*Carcharias*, *Galeus*, *Galeocerdo*, *Mustelus*).
,, 9. Sphyrnidae (*Sphyrna* = Zygaena).
,, 10. Lamnidae (*Lamna*, *Carcharodon*, *Alopecias*, *Mitsukurina*).
,, 11. Cetorhinidae (*Cetorhinus*).
,, 12. Rhinodontidae (*Rhinodon*).
,, 13. Spinacidae (*Acanthias*, *Spinax*, *Scymnus*, *Laemargus*, *Echinorhinus*).
,, 14. Rhinidae (*Rhina*).
,, 15. Pristiophoridae (*Pristiophorus*).

Suborder II. *Batoidei*.

Fam. 1. Pristidae (*Pristis*).
,, 2. Rhinobatidae (*Rhinobatus*).
,, 3. Raiidae (*Raia*).
,, 4. Tamiobatidae (Extinct: palaeozoic).
,, 5. Torpedinidae (*Torpedo*: *Narcine*).
,, 6. Trygonidae (*Trygon*, *Pteroplataea*, *Taeniura*).
,, 7. Myliobatidae (*Myliobatis*, *Aëtobatis*, *Ceratoptera*).

Order V. Holocephali.

Fam. 1. Ptychodontidae (Extinct: palaeozoic).
,, 2. Squaloraiidae (Extinct: mesozoic).
,, 3. Myriacanthidae (Extinct: mesozoic).
,, 4. Chimaeridae (*Chimaera*, *Callorhynchus*, *Harriotta*).

Existing Forms.—The Selachians known to survive to the present day are confined to orders IV. and V., the former including the Sharks (Squali) and Rays (Batoidei), and the latter including the remarkable *Chimaera* and its allies. For the more interesting members of the Plagiostomi see Shark and Ray.

The general morphological features of the Plagiostomi are dealt with in the article Ichthyology. It remains now to refer shortly to one or two of the subdivisions which contain forms of special morphological interest from their in many respects primitive character. Such families are the Notidanidae, the Chlamydoselachidae and the Heterodontidae. The second of these is of very special interest: it contains the single living genus *Chlamydoselachus*, specimens of which have been obtained in considerable numbers from deep water off the coast of Japan, while isolated specimens have been taken off the coasts of Australia and Norway and near Madeira.

The general shape of *Chlamydoselachus* is elongated, almost eel-like (fig. 2). The mouth is nearly terminal, instead of being well back on the ventral surface as in other sharks. The teeth are very characteristic, flattened in shape, pointing backwards and overlapping one another in longitudinal rows. Each tooth has three slender pointed cusps and closely resembles the teeth of various members of the extinct group Ichthyotomi. The small placoid elements which cover the general body surface are seen to become enlarged at the margin of the mouth, especially posteriorly, these enlarged placoid elements functioning as accessory teeth and in fact being practically teeth in an early stage of evolution. It is interesting to note also that the lining of the mouth still develops a covering of placoid elements. (In the typical gnathostome the placoid elements have of course disappeared from the mouth lining, except in the case of the functional teeth.) There is no oronasal groove in the adult, and the spiracle is greatly reduced. The valvular flaps guarding the external openings of the gill (6) clefts are much larger than in other sharks, particularly the most anterior (hyoidean) which meets its fellow ventrally and is prolonged backwards for some distance as an incipient operculum. The tail is practically protocercal, although the median fin-fold is considerably more developed on its ventral side than dorsally. The lateral line organs on the sides of the body are situated at the bottom of an open groove; only in the head region has this become covered in.



From *Challenger Reports Zool.*, published by H.M. Stationery Office. (After Günther.)

Fig. 2.

The Notidanidae, like *Chlamydoselachus*, show more than the ordinary number of gill clefts. *Notidanus griseus* (*Hexanchus*) has six, while *N. cinereus* (*Heptanchus*) has seven postspiracular gill-clefts. In both Notidanidae and Chlamydoselachidae the vertebral column shows very primitive features with either very slight calcification or none at all.

The Heterodontidae include the recent genus *Heterodontus* (= *Cestracion*), the Port Jackson shark or Bullhead shark, widely distributed through the Pacific. Numerous Mesozoic and possibly also Palaeozoic forms belong to this family. The small and nearly terminal mouth, the amphistylic skull, and the egg cases with an external spiral lamina are characteristic features.

Palaeontological History (6).—It must be borne in mind that the sharply delimited groups into which animals appear to be divided are due to our imperfect knowledge, to the fact that our knowledge is limited to short isolated periods of geological time. Were our knowledge of palaeontology complete, it would be found that the various groups graded into one another by insensible gradations, so that it would be quite impossible to set definite limits to any one group. Already even in the extraordinarily imperfect condition of palaeontological knowledge this difficulty is making itself felt, and in the remains from the older deposits it becomes difficult to decide which of the recognized groups the various forms are most closely allied to.

Amongst the most ancient forms of fishes known at present are the remarkable *Ostracodermi* of the Upper Silurian and Devonian. The general form of these creatures gives the impression that they were ground-feeding fishes which had become highly specialized along much the same lines as the rays amongst existing Selachians. In the highly interesting Coelolepidae described by Traquair (7) from the Upper Silurian and Devonian and comprising the genera *Thelodus* and *Lanarkia* a placoid skeleton is present, the individual elements being in the form of small hollow spines without any basal plate of bone. The main organ of propulsion seems to have been the heterocercal tail, while the broad anterior region passes out on each side into a flap-like portion which may represent a pectoral fin. On the under surface of *Thelodus* there occur transverse markings which probably are caused by the presence of a branchial apparatus of the ordinary Selachian type. In the *Drepanaspidae* (Lower Devonian) and *Pteraspidae* (Upper Silurian and Lower Devonian) the isolated placoid elements of the Coelolepidae have undergone fusion to a less or greater extent into large plates which ensheath the anterior body region, the posterior portion possessing rhombic scales. The Ostracoderms so far mentioned are grouped together under the name Heterostraci. The Osteostraci form another main division of the Ostracoderms, distinguished from the Heterostraci by the presence of true unmodified bone in their skeletal plates. The orbits are more dorsal in position and a dorsal fin is known to occur, while none has as yet been recognized in the Heterostraci. The most familiar members of the group are the *Cephalaspidae* of the Silurian and Devonian with their highly characteristic crescentic shield covering the dorsal side of the head region. From behind the posterior horns of this shield there project in some specimens paddle-like structures which may be pectoral fins, or possibly structures serially homologous with limbs and not represented in modern Selachians.

Among the less doubtful members of the Selachii among fossil forms first place must be given to the *Pleuropterygii* represented by the genus *Cladoselache* (8) from the Upper Devonian of Ohio. This was a shark-like creature with the mouth apparently terminal. The body was covered with shagreen placoid elements: there were a series (five or seven) of gill slits on each side and the skull was probably hyostylic. The notochord was apparently persistent. The chief interest of *Cladoselache*, however, lies in its paired fins which are held by upholders of the "lateral fold" theory to be remarkably primitive. The unpaired fins are obviously highly developed—the tail being almost homocercal with a lateral keel on each side as in various existing sharks, and it seems on the whole unlikely that the paired fins should be very primitive while the unpaired fins are so highly developed. Moreover, the facts of structure of the paired fins so far as at present known seem to fit in quite well with the view that they are modifications of the uniserial archipterygial type (see Ichthyology, fig. 2).

The *Ichthyotomi*, including the family *Pleuracanthidae* (Lower Carboniferous to Permian), are again of special interest as regards their paired fins which are obviously of the uniserial archipterygial type. The tail is protocercal and the mouth nearly terminal.

The *Acanthodei* are small fishes ranging from the Upper Silurian to Permian. They had strongly heterocercal tail, gill clefts apparently opening independently to the exterior, but they are specially characterized by the strong spines in front of each fin and by the calcified plates lying superficial to the cranium, jaw apparatus and pectoral girdles.

AUTHORITIES.—(1) T. J. Parker, *Trans. Zool. Soc.* xi. (1879); (2) Hochstetter, *Morphol. Jahrb.* xxix. (1900); (3) W. G. Ridewood, *Journ. Linn. Soc. Zool.* vol. xxvii.; (4) C. Stewart, *Journ. Linn. Soc. Zool.* xxix. (1906); (5) T. W. Bridge, *Cambridge Nat. History*, "Fishes" (1904); (6) A. Smith Woodward, *Vertebrate Palaeontology* (1898), for references to special literature; (7) R. H. Traquair, *Trans. Roy. Soc. Edin.*, xxxix. (1899); (8) Bashford Dean, *Journ. Morph.* ix. (1894), and *Trans. New York Acad. Sci.* xiii. (1894).

(J. G. K.)

SELBORNE, ROUNDELL PALMER, 1ST EARL OF (1812–1895), English lawyer and statesman, was born at Mixbury, in the county of Oxford, on the 27th of November 1812. His father was rector of the parish: his grandfather and great-grandfather were merchants in the City of London, where their descendants for a long while continued to be influential people; his mother belonged to the family of Roundell, which had been settled for four centuries in the West Riding of Yorkshire. He was educated at Rugby and at Winchester, and in 1830 went into residence in the university of Oxford as a scholar of Trinity College. Here he lived in intimacy with many friends, especially P. C. Claughton and Charles Wordsworth. In 1834 he took a first class in *Literae Humaniores*; he won the Eldon scholarship and was elected to a fellowship at Magdalen College; and after a year, spent chiefly in private tuition, partly in Lord Winchilsea's house and partly in the university, he removed to London (November 1835) and commenced reading for the bar.

He was called to the bar on the 7th of June 1837, the same day on which John Rolt (1804–1871), a man of very different antecedents, but afterwards a worthy rival of Palmer, was also called. Through his family connexions in the City of London, clients soon came to Palmer's chambers, and his business at the Chancery bar increased rapidly. Meanwhile his interests were not wholly confined to law: for some time (1840-1843) he wrote for *The Times* and the *British Critic*; he made a plunge into patristic learning, from which he soon recoiled; he was much interested in the controversies which distracted the Church on the subject of Tract 90; in the treatment of the Episcopal Church in Canada by the Canadian government and the Colonial Office; in the establishment by the crown, in conjunction with the king of Prussia, of the Jerusalem bishopric; and in the contest for the professorship of poetry at Oxford on Keble's retirement.

In 1847, and again in 1853, Palmer was returned as member of Parliament for Plymouth, as a Peelite, and in the House of Commons he took an active and independent part. He advocated the admission of Jews to parliament; he opposed Lord John Russell's measure to repel the so-called papal aggression; he opposed the admission of Dissenters into the university of Oxford; and he was hostile to the action of the government in the Crimean War. On the question of the reform of the university of Oxford, he sympathized with the reformers, but felt himself prohibited, by the oaths which he had taken, from assuming any active part. In 1855 he supported Gladstone in the efforts to bring about peace with Russia before the capture of Sebastopol; in 1856 he opposed the opening of museums on Sunday; in the following year he supported Cobden in his disapproval of the second opium war with China. At the general election on March 1857, Palmer, finding that the independent part he had taken, especially in reference to the Chinese question, had alienated from him many of his constituents in Plymouth, abandoned the prospect of re-election for that borough, and did not seek for election elsewhere. In 1848 he married Lady Laura Waldegrave, daughter of Earl Waldegrave. In 1849 he had become a Q.C.; and in 1851 he took his seat in the Rolls Court, where he soon obtained a leading practice, and was engaged in many of the most important cases in the Court of Chancery. In July 1861 he accepted from Lord Palmerston the office of solicitor-general, a knighthood, and a safe seat for the borough of Richmond in Yorkshire, secured for him through the friendly action of Lord Zetland, and thus began the second spell of Palmer's membership of the House of Commons, which continued till his elevation to the woolsack and the peerage. In September 1863 he became attorney-general, and so continued till the government of which he was a member resigned in 1866.

The Civil War in America, and the questions which arose from the relations of Great Britain with both belligerents, rendered the duties of the law officers of the crown more than usually onerous, and Palmer was called upon to take part, as adviser of the ministry, in the courts, and in the House, in the questions which arose in respect of the "Trent" and the "Peterhoff," the cruisers "Alabama" and "Florida," and the "Alexandra," a ship which was seized by the government, and other matters. In 1865 he took a large part in the passing of the act under which all the law courts were gathered together in the Strand. In 1866 he expressed himself favourable to the making of household suffrage the basis of representation, an expression of opinion which probably influenced the Reform Bill of the following year—in the discussions on which Palmer took a prominent part, and especially in opposition to the so-called "fancy franchises" originally proposed by its authors. In the same year he took part in supporting the measure for the abolition of compulsory Church rates.

In 1868 occurred an event of great importance in his career. In April of that year Gladstone proposed his resolutions with reference to the Irish Church on which the bill for its disestablishment was subsequently based. This measure was opposed to many of the dearest beliefs and feelings of Palmer, and he evidenced his disapproval by abstaining from voting on the resolutions. At the election of November 1868 Palmer was again returned for Richmond, and Gladstone offered him the office of lord chancellor or the office of a lord justice with a peerage; both offers were declined by Palmer, and he assumed a position of independent opposition to the measure relative to the Irish Church. On the 22nd of March 1869 he delivered a very powerful speech against the second reading of the bill, and during its later stages exercised a considerable influence in modifying the severity of its provisions. The position of Palmer at this time was very remarkable. The foremost advocate at the bar, he was known to have declined the highest prize in the profession rather than promote a measure of which he disapproved; a very prominent member of the House of Commons, whose action had been more than usually independent of party, he had separated himself from his political friends and maintained a position as the dignified and forcible opponent of disestablishment. Without office and without combination with the Conservative Opposition, he exercised great influence within and without the walls of St Stephen's. What made his position the more remarkable was that he was frequently consulted by the government which he had declined to join, and that on some occasions they invoked the assistance which his great influence in the House enabled him to afford to them.

In 1869 he sought to modify rather than to oppose the bill for the abolition of tests in the universities. In 1870 he gave a qualified support to Gladstone's first Irish Land Act, and in the same year he supported Forster's Education Act. In 1872 he undertook the defence of his friend Lord Chancellor Hatherley, when attacked for his appointment of Sir Robert Collier to the judicial committee of the Privy Council, and, by a line of argument more ingenious than convincing, secured a majority for the government.

The treaty of Washington was the means of casting a great duty upon Palmer. After the conclusion of the Civil War in America very large claims were preferred against Great Britain for alleged breaches of her duty as a neutral power; and after long negotiations, England and the United States agreed to arbitration. Palmer, who had been advising the British government during these negotiations, and who (4th August 1871) had defended the treaty in the House of Commons, was briefed

on behalf of Great Britain. In the end the Geneva tribunal made an award requiring the payment by Great Britain to the United States of a sum of about £3,000,000. To those who, in order to promote the cause of international arbitration, are desirous of acquiring a knowledge of the dangers and difficulties which beset this mode of settling disputes, the account which Palmer has left of his part in this arbitration may be commended.

In September 1872 Gladstone again offered him the great seal, which Lord Hatherley had resigned; in the same year he took up his residence in his newly erected house at Blackmoor, in the parish of Selborne, in the county of Hampshire, from which he took his new title as a peer. In the following year (1873) Lord Selborne carried through parliament the Judicature Act. The foundations of this measure were laid so long ago as February 1867, when Palmer had moved for a royal commission on the constitution of the courts, and had taken an active part in the work of that commission, of which the first report was made in 1869. The result of this act of 1873 was to effect a fundamental change in the judicature system. By the operation of the Judicature Act one supreme court with several divisions was constituted; each division could administer the whole law; the conflict of divergent systems of law was largely overcome by declaring that when they were at variance, the principles of equity should prevail over the doctrines of the common law. The details of this great change were embodied in a code of general rules prepared by a committee of judges, over which Lord Selborne for two years presided week by week, with unfaltering attention to the minutest detail. "If," wrote Lord Selborne in his memoirs, speaking of the Judicature Act of 1873, "I leave any monument behind me which will bear the test of time, it may be this." It is impossible to separate this fusion of law and equity, this union of all the higher courts into one supreme tribunal, from the construction of a single home for this great institution; and the opening of the Royal Courts in the Strand in the year 1882, when Queen Victoria personally presided in her one supreme court, and handed over the care of the building to Lord Selborne, as her chancellor and as the head of this great body, was impressive as an outward and visible sign of the silent revolution, which owed more to Lord Selborne than to any other individual. To the student of the natural history of jurisprudence the fusion of the two systems of law and equity may well recall a similar result brought about in Imperial Rome; to the student of British institutions, the supreme court, for once presided over in person by the sovereign, could not but recall the Aula Regia, where the Norman kings sat amid their counsellors before equity had arisen to correct law, and before the separation between the three great common law courts had begun. A small incident may illustrate the novelty of the assemblage of the one great court on that day. The queen, on the prayer of the attorney-general, ordered that the proceedings of the day should be recorded, an order which caused a momentary embarrassment to the lord chancellor, as the court had no existing registrar, and no existing book in which the record should be made. On the occasion of the opening of the Royal Courts Lord Selborne received an earldom.

The year 1885 was marked in Lord Selborne's life by the death of his wife, and by his final separation from the party of which Gladstone was the acknowledged leader. That statesman had in the latter part of the year indicated his leaning towards the disestablishment of the Church of England, and towards Home Rule for Ireland. Both these leanings were opposed to the deepest convictions of Lord Selborne; and it was an inevitable result that when in January 1886 Gladstone resumed office as premier, Lord Selborne should not be again his chancellor: on the 30th of January in that year they parted for ever; and Lord Selborne felt that his public life, except so far as he might serve his country by voice or pen, was now over. But neither his courage nor his industry forsook him; and he found, in opposing the new views of his old colleague, ample scope for both voice and pen; and as a member of the House of Lords he continued almost to the last to take part in hearing and deciding appeals, and sometimes in the ordinary business of the House.

In addressing the electors of Midlothian in September 1885, Gladstone had suggested the severance of the Church of England from the state as a subject on which the foundation of discussion had already been laid, and he averred the existence of "a current almost throughout the civilized world, slowly setting in the direction of disestablishment." Such an utterance from such a man greatly excited the hopes of Nonconformists, who had previously published a manifesto under the title of "The Case for Disestablishment." This stirring of the question deeply moved Lord Selborne, who was strongly opposed alike to disestablishment and disendowment, and in the following year, 1886, he published a work entitled *A Defence of the Church of England against Disestablishment*, with an introductory letter addressed to Gladstone. In the introductory letter he criticized Gladstone's pronouncement on the subject, and especially examined the allegation of a general tendency towards disestablishment in the civilized world at large, and arrived at a negative conclusion. In the body of the book the learned author treated of the history of the English Church, its endowments and the case of the advocates of disestablishment. The work is throughout characterized by an abundant supply of learning and of information as to the history and the state of the Church of England at that time, and by great dialectical acuteness. It is a powerful defence as well as a valuable summary of the history of the established Church in England. In 1888 Lord Selborne published a second work on the Church question, entitled *Ancient Facts and Fallacies concerning Churches and Tithes*, in which he examined more critically than in his earlier book the developments of early ecclesiastical institutions, both on the continent of Europe and in Anglo-Saxon England, which resulted in the formation of the modern parochial system and its general endowment with tithes. A second edition of this work, embodying the result of its author's subsequent researches in the Vatican library and elsewhere, was published in the year 1892. A perusal of these books will show with how wide a range of investigation and with what care Lord Selborne prepared himself for the discussion of these ecclesiastical questions which deeply stirred him. But Lord Selborne did not carry on his opposition to Gladstone's proposals only in his library or by his pen; in the year 1886–1887 he travelled to many parts of the country, and addressed meetings in defence of the union between the Church and state and against Home Rule; and in September 1893, in his eighty-first year, he addressed a powerful speech to the House of Lords in opposition to the Home Rule Bill.

Lord Selborne's health had, with the exception of two collapses in 1883 and 1888, which appear to have been due to overwork, continued excellent till February 1895, when he was attacked by influenza. He died on the 4th of May 1895 at his seat in Hampshire, full of years and of honours.

To the subject of university education Lord Selborne at different times in his life gave much time and attention. As a fellow of Magdalen College, he had been desirous of changes which he felt himself bound by his oath from advocating; and he had taken part in the discussions on the abolition of tests in the old universities.[1] He gave much time and attention to his duties as chairman of the second Oxford commission under the act of 1876; in 1878 he filled the office of lord rector of the university of St Andrews; and in the following year he presided over a commission on the subject of university education in London. Lord Selborne's literary labours included the publication in 1862 of a selection of hymns, under the title of *The Book of Praise*, a work in which he was greatly assisted by Daniel Sedgwick (1814–1879), a bookseller and publisher in the city of London. The work was characterized by the great pains taken to ascertain the true authorship of hymns which were either anonymous or attributed to those who had not composed them, and by a like effort to exclude all variations grafted on the

[1] In 1867 he founded an association for the improvement of legal education, in the hope of bringing about the establishment or the restoration of "a general school of law in London on a scale worthy of the importance of the law and of the resources of the Inns of Court." This enterprise was not successful. The opposing forces were too strong to permit Lord Selborne to succeed.

original language, and to give the hymns "in the genuine uncorrupted text of the authors themselves." In the course of his labours as editor of this volume he was struck by the unity which was presented by Christian hymnody, "binding together by the force of a common attraction, more powerful than all causes of difference, times ancient and modern, nations of various race and language, Churchmen and Nonconformists, Churches reformed and unreformed" (Preface). In the same field of literature Lord Selborne further laboured by the publication of another collection called *The Book of Praise Hymnal*; a contribution to an edition of Bishop Ken's hymns; a paper on English Church Hymnody at a Church Congress; and the article in the *Encyclopaedia Britannica* on "Hymns" (*q.v.*), which was republished as a separate volume in 1892.

During the last few years of his life Lord Selborne engaged in the composition, for the benefit of his children, of memorials of his own life and of the lives of many members of his family. These *Memorials, Part I., Family and Personal*, in 2 vols., which were published in 1896, *Memorials, Part II., Personal and Political*, also in 2 vols., were edited by his daughter, Lady Sophia Palmer, and published in 1898. In the years 1880–1881 Lord Selborne wrote to his son a series of letters on religious subjects, dealing in an elementary way with natural and revealed religion, the inspiration of the Bible and Biblical criticism. These were published in 1898, under the title of *Letters to His Son on Religion, by Roundell, First Earl of Selborne.*

In person Lord Selborne was of about the average height: his manners when among strangers were somewhat reserved; his style, both in speaking and writing, was fluent, tending to diffuseness; his oratory was marked by uniform good sense and lucidity, both of arrangement and language; and if he never reached the highest level of oratorical excellence, he never descended to what was commonplace or irrelevant. As a judge, whether in the Supreme Court or in the House of Lords, he displayed high qualities: he was patient, courteous, logical and learned, and his judgments contain many valuable expositions of the principles of law. The fusion of law and equity, the reorganization of the whole judicial system of England, and the association of all the supreme tribunals in one common home were works of no ordinary magnitude or importance, and give a character of unusual importance to his chancellorship. That Lord Selborne was a truly religious man it is impossible to doubt: his whole life was regulated and inspired by a sense of his duty towards God and his fellowmen, and a long life spent amid the temptations of legal and public life left not the faintest stain on his memory. He was a devout member of the Church of England, to which he looked up with unstinted affection and reverence; and he found in its service and formularies an adequate satisfaction for all his religious feelings. He belonged to the High Church school, which was influenced by the teaching of Newman and Pusey and the Oxford teachers of their day; but he by no means slavishly followed them. With the later High Church movement, usually described as Ritualism, he had less sympathy. His life was prosperous, for from his first prize at the university till his acquisition of an earldom, he went on a course of almost unbroken success. He had the double dignity of having refused the highest prize in his profession for conscience' sake, and of having accepted that dignity without loss of consistency; in his life he acquired a high reputation and the sincere admiration of his fellowmen, as well as an abundant fortune and ample titular distinctions. His life was also happy, for he had pleasure in his work, he loved and was loved by his wife and children; he had a strong constitution, and retained his bodily and mental powers to the last; his faith in the religion of his youth was unshaken to the end; and he lived throughout his long life with the consciousness of rectitude. (E. F.)

SELBORNE, WILLIAM WALDEGRAVE PALMER, 2ND EARL OF (1859–), son of the preceding, was educated at Winchester and University College, Oxford, where he took a first class in history. In 1883, being then Viscount Wolmer, he married Lady Beatrix Cecil, 3rd daughter of the 3rd marquess of Salisbury. He served a political apprenticeship as assistant private secretary to the chancellor of the exchequer (Mr Childers) from 1882 to 1885, when he was elected Liberal member of parliament for East Hampshire. Like his father, he became a Liberal Unionist when in 1886 Mr Gladstone proposed Home Rule for Ireland, and he retained his seat till 1892, when he was elected for West Edinburgh. From 1895 to 1900 he was under-secretary for the colonies, having Mr Chamberlain as his chief, and during the difficult period before the outbreak of the South African War he came rapidly to the front. In 1900 he entered the cabinet as first lord of the admiralty, and held this office till 1905, when he succeeded Lord Milner as high commissioner for South Africa and governor of the Transvaal and Orange River colonies. He assumed office at Pretoria in May of that year. He had gone out with the intention of guiding the destinies of South Africa during a period when the ex-Boer republics would be in a transitional state between crown colony government and self-government, and letters patent were issued granting the Transvaal representative institutions. But the Liberal party came into office in England in the December following, before the new constitution had been actually established, and the decision was now taken to give both the Transvaal and Orange River colonies self-government without delay. Lord Selborne loyally accepted the changed situation, and it was due in considerable measure to his moderation, common sense, administrative gifts and appreciation of the Boers' standpoint, that the experiment proved successful. He ceased to be governor of the Orange River Colony on its assumption of self-government in June 1907, but retained his other posts until May 1910, retiring on the eve of the establishment of the Union of South Africa. No one had done more to effect that union. The despatch, dated January 7th, 1907, in which he reviewed the situation in its economic and political aspects, was a masterly and comprehensive statement of the dangers inherent in the existing system and of the advantages likely to attend union. The force of its appeal had a marked influence on the course of events, while the loyalty with which Lord Selborne co-operated with the Botha administration was an additional factor in reconciling the Dutch and British communities. He returned to England with his reputation as a statesman enhanced by the respect of all parties, and with a practical experience, second only to that of Lord Milner, of British imperialism in successful operation. This experience made him a valuable ally in the movement among the Unionist party at home for Tariff Reform and Colonial Preference, to which he could now give his whole-hearted support.

SELBORNE, a village in the Petersfield parliamentary division of Hampshire, England, 4½ m. S.S.E. of Alton station on the London & South-Western railway. It is pleasantly situated in a thickly wooded valley, and is celebrated as the birthplace and scene of the work of Gilbert White the naturalist; his house is in the village, and his memorial and grave are in the ancient church. Fine views over the district of which he wrote are obtained from the hills (between 500 and 700 ft.) in the neighbourhood.

SELBY, WILLIAM COURT GULLY, 1ST VISCOUNT (1835–1909), Speaker of the British House of Commons, was born on the 29th of August 1835, the son of Dr James Manby Gully of Malvern. His grandfather was Daniel Gully, a Jamaican coffee-planter. He was educated at Trinity College, Cambridge, where he was president of the Union. He was called to the bar in 1860, went the northern circuit, and took silk in 1877. In 1880 and 1885 he unsuccessfully contested Whitehaven as a Liberal, but was elected for Carlisle in 1886, and continued to represent that constituency until his elevation to the peerage. In April 1895 he was elected Speaker by a majority of eleven votes over Sir Matthew White Ridley (cr. Viscount Ridley, 1900), the Unionist nominee. In 1905 he resigned and was raised to the peerage with the title of Viscount Selby, the name being that of his wife, Miss Elizabeth Selby (d. 1906), whom he married in 1865. He died on the 6th of November 1909, and was succeeded by his son, James William Herschell Gully (b. 1867).

SELBY, a market town in the Barkston Ash parliamentary division of the West Riding of Yorkshire, England, 13½ m. S. of York on the Great Northern and North-Eastern railways. Pop. of urban district (1901) 7786. It stands in a level plain on the left bank of the river Ouse, by which communication is provided with the Humber. The church of St Mary and St German belonged to a Benedictine abbey founded under a grant from William the Conqueror in 1069 and raised to the dignity of a mitred abbey by Pope Alexander II. The monastic buildings have practically disappeared, but the church was a splendid building of various dates from Norman to Decorated, the choir

and Lady chapel representing the later period. The nave passes from Norman to Early English in the course of its eight bays from east to west and also from the arcade through the triforium to the clerestory. About midnight of the 19th–20th of October 1906, a fire broke out in the Latham chapel adjoining the north choir aisle, in which a new organ had recently been erected, and soon involved the whole building. Specially serious damage was done in the immediate neighbourhood of the chapel, the oak-groined roof and rich fittings of the choir were wholly destroyed, but the finely moulded arches and the magnificent tracery of the east window survived in great part. Much damage was done to the tower, and the nave roof perished, for the fire reached practically every part of the building, though the stonework of the nave suffered comparatively little. Schemes for the collection of funds and the complete restoration of the church were immediately set on foot, the architect being Mr Oldrid Scott.

Selby is the centre of a rich agricultural district, and its industries include rope and twine making, flax-scutching, boat-building, iron-founding, tanning and brewing. Tradition indicates Selby as the birth-place of Henry I., and thus accounts for the high privileges conferred upon the abbey. The town had a considerable part in the operations of the Civil Wars, being held at the outset by the Parliamentarians, and captured by the Royalists in 1644, but soon retaken by Sir Thomas Fairfax.

SELDEN, JOHN (1584–1654), English jurist, legal antiquary and oriental scholar, was born on the 16th of December 1584 at Salvington, in the parish of West Tarring, Sussex. His father, also John Selden, held a small farm. It is said that his accomplishments as a violin-player gained him his wife, whose social position was somewhat superior to his own. She was Margaret, the only child of Thomas Baker of Rustington, a village in the vicinity of West Tarring, and was more or less remotely descended from a knightly family of the same name in Kent. John Selden commenced his education at the free grammar-school at Chichester, whence in 1600 he proceeded to Hart Hall, Oxford. In 1603 he was admitted a member of Clifford's Inn, London, and in 1604 migrated to the Inner Temple, and in 1612 he was called to the bar. His earliest patron was Sir Robert Cotton, the antiquary, by whom he seems to have been employed in copying and abridging certain of the parliamentary records then preserved in the Tower. For some reason which has not been explained, Selden never went into court as an advocate, save on rare and exceptional occasions. But his practice in chambers as a conveyancer and consulting counsel is stated to have been large, and, if we may judge from the considerable fortune he accumulated, it must also have been lucrative.

It was, however, as a scholar and writer that Selden won his reputation both amongst his contemporaries and with posterity. His first work, an account of the civil administration of England before the Norman Conquest, is said to have been completed when he was only two- or three-and-twenty years of age. But if this was the *Analecton Anglo-Britannicon*, as is generally supposed, he withheld it from the world until 1615. In 1610 appeared his *England's Epinomis* and *Janus Anglorum*; *Facies Altera*, which dealt with the progress of English law down to Henry II.; and *The Duello, or Single Combat*, in which he traced the history of trial by battle in England from the Norman Conquest. In 1613 he supplied a series of notes, enriched by an immense number of quotations and references, to the first eighteen cantos of Drayton's *Polyolbion*. In 1614 he published *Titles of Honour*, which, in spite of some obvious defects and omissions, has remained to the present day the most comprehensive and trustworthy work of its kind that we possess; and in 1616 his notes on Fortescue's *De laudibus legum Angliae* and Ralph de Hengham's *Summae magna et parva*. In 1617 his *De diis Syriis* was issued, and immediately established his fame as an oriental scholar among the learned in all parts of Europe. It is remarkable for its brilliant use of the comparative method, in which it was far ahead of its age, and is still consulted by students of Semitic mythology. In 1618 his *History of Tithes*, although only published after it had been submitted to the censorship and duly licensed, nevertheless aroused the apprehension of the bishops and provoked the intervention of the king. The author was summoned before the privy council and compelled to retract his opinions, or at any rate what were held to be his opinions. Moreover, his work was suppressed and himself forbidden to reply to any of the controversialists who had come or might come forward to answer it.

This seems to have introduced Selden to the practical side of political affairs. The discontents which a few years later broke out into civil war were already forcing themselves on public attention, and it is pretty certain that, although he was not in parliament, he was the instigator and perhaps the draftsman of the memorable protestation on the rights and privileges of the House affirmed by the Commons on the 18th of December 1621. He was with several of the members committed to prison, at first in the Tower and subsequently under the charge of Sir Robert Ducie, sheriff of London. During his detention, which only lasted a short time, he occupied himself in preparing an edition of Eadmer's *History* from a manuscript lent to him by his host or jailor, which he published two years afterwards. In 1623 he was returned to the House of Commons for the borough of Lancaster, and sat with Coke, Noy and Pym on Sergeant Glanville's election committee. He was also nominated reader of Lyon's Inn, an office which he declined to undertake. For this the benchers of the Inner Temple, by whom he had been appointed, fined him £20 and disqualified him from being chosen one of their number. But he was relieved from this incapacity after a few years, and became a master of the bench. In the first parliament of Charles I. (1625), it appears from the "returns of members" printed in 1878 that, contrary to the assertion of all his biographers, he had no seat. In Charles's second parliament (1626) he was elected for Great Bedwin in Wiltshire, and took a prominent part in the impeachment of George Villiers, duke of Buckingham. In the following year, in the "benevolence" case, he was counsel for Sir Edmund Hampden in the court of king's bench. In 1628 he was returned to the third parliament of Charles for Ludgershall in Wiltshire, and had a large and important share in drawing up and carrying the Petition of Right. In the session of 1629 he was one of the members mainly responsible for the tumultuous passage in the House of Commons of the resolution against the illegal levy of tonnage and poundage, and, along with Eliot, Holles, Long, Valentine, Strode, and the rest, he was sent once more to the Tower. There he remained for eight months, deprived for a part of the time of the use of books and writing materials. He was then removed, under less rigorous conditions, to the Marshalsea, until not long afterwards owing to the good offices of Archbishop Laud he was liberated. Some years before he had been appointed steward to the earl of Kent, to whose seat, Wrest in Bedfordshire, he now retired. In 1628 at the suggestion of Sir Robert Cotton he had compiled, with the assistance of two learned coadjutors, Patrick Young and Richard James, a catalogue of the Arundel marbles. He employed his leisure at Wrest in writing *De successionibus in bona defuncti secundum leges Ebraeorum* and *De successione in pontificatum Ebraeorum*, published in 1631. About this period he seems to have inclined towards the court rather than the popular party, and even to have secured the personal favour of the king. To him in 1635 he dedicated his *Mare clausum*, and under the royal patronage it was put forth as a kind of state paper. It had been written sixteen or seventeen years before; but James I. had prohibited its publication for political reasons; hence it appeared a quarter of a century after Grotius's *Mare liberum*, to which it was intended to be a rejoinder, and the pretensions advanced in which on behalf of the Dutch fishermen to poach in the waters off the British coasts it was its purpose to explode. The fact that Selden was not retained in the great case of ship money in 1637 by John Hampden, the cousin of his former client, may be accepted as additional evidence that his zeal in the popular cause was not so warm and unsuspected as it had once been. During the progress of this momentous constitutional conflict, indeed, he seems to have been absorbed in his oriental

researches, publishing *De jure naturali et gentium juxta disciplinam Ebraeorum* in 1640. He was not elected to the Short Parliament of 1640; but to the Long Parliament, summoned in the autumn, he was returned without opposition for the university of Oxford. He opposed the resolution against episcopacy which led to the exclusion of the bishops from the House of Lords, and printed an answer to the arguments used by Sir Harbottle Grimston on that occasion. He joined in the protestation of the Commons for the maintenance of the Protestant religion according to the doctrines of the Church of England, the authority of the crown, and the liberty of the subject. He was equally opposed to the court on the question of the commissions of lieutenancy of array and to the parliament on the question of the militia ordinance. In 1643 he participated in the discussions of the assembly of divines at Westminster, and was appointed shortly afterwards keeper of the rolls and records in the Tower. In 1645 he was named one of the parliamentary commissioners of the admiralty, and was elected master of Trinity Hall in Cambridge—an office he declined to accept. In 1646 he subscribed the Solemn League and Covenant, and in 1647 was voted £5000 by the parliament as compensation for his sufferings in the evil days of the monarchy. He had not, however, relaxed his literary exertions during these years. He published in 1642 *Privileges of the Baronage of England when they sit in Parliament* and *Discourse concerning the Rights and Privileges of the Subject*; in 1644, *Dissertatio de anno civili et calendario reipublicae Judaicae*; in 1646 his treatise on marriage and divorce among the Jews entitled *Uxor Ebraica*; and in 1647 the earliest printed edition of the old English law-book *Fleta*. In 1650 Selden passed the first part of *De synedriis et prefecturis juridicis veterum Ebraeorum* through the press, the second and third parts being severally published in 1653 and 1655, and in 1652 he wrote a preface and collated some of the manuscripts for Sir Roger Twysden's *Historiae Anglicae scriptores decem*. His last publication was a vindication of himself from certain charges advanced against him and his *Mare clausum* in 1653 by Theodore Graswinckel, a Dutch jurist.

After the death of the earl of Kent in 1639 Selden lived permanently under the same roof with his widow. It is believed that he was married to her, although their marriage does not seem to have ever been publicly acknowledged. He died at Friary House in Whitefriars on the 30th of November 1654, and was buried in the Temple Church, London. In 1880 a brass tablet was erected to his memory by the benchers of the Inner Temple in the parish church of West Tarring.

Several of Selden's minor productions were printed for the first time after his death, and a collective edition of his writings was published by Archdeacon Wilkins in 3 vols. folio in 1725, and again in 1726. His *Table Talk*, by which he is perhaps best known, did not appear until 1689. It was edited by his amanuensis, Richard Milward, who affirms that "the sense and notion is wholly Selden's," and that "most of the words" are his also. Its genuineness has sometimes been questioned, although on insufficient grounds.

See Wood's *Athenae Oxonienses*, ed. Bliss (London, 1817, 4 vols.); Aikin, *Lives of John Selden and Archbishop Usher* (London, 1812); Johnson, *Memoirs of John Selden*, &c. (London, 1835); Singer, *Table Talk of John Selden* (London, 1847); and Wilkins, *Johannis Seldeni opera omnia*, &c. (London, 1725).

SELĒNĒ, in Greek mythology, the divine personification of the moon, daughter of Hyperion and Theia, sister of Helios and Eos. By Zeus she was said to have been the mother of Pandia (the all-bright), who was worshipped with her father at the festival named after her Pandia.[1] She was also wooed by Pan in the form of a white ram, or she had selected a white ram from his flock as the price of her favours. The most famous of her amours was with Endymion (*q.v.*). Selene was represented as a beautiful young woman with wings and a golden diadem, sometimes riding in a chariot drawn by two white, sometimes winged, horses (or cows, symbolizing the moon's crescent, or bulls), or herself mounted on a horse, a bull, a mule or a ram. At Elis there was a statue of Selene, her head surmounted by a crescent. Later, she was identified with Artemis, and as such called Phoebe, the sister of Phoebus Apollo. She was worshipped on the days of the new and the full moon. Another name for Selene was Mēnē, in reference to the monthly changes of the moon. The existence of a male moon-god (Mēn), whose cult probably came to Attica from Asia Minor, is attested by inscriptions. The Roman goddess of the moon was Luna, who possessed sanctuaries on the Aventine and Palatine hills. In the former she was worshipped on the last day of March (the first month of the old Roman year); in the latter as *Noctiluca* (giving light by night), her sanctuary being illuminated on such occasions.

[1] The connexion of Selene or Pandia with this festival is denied by Wilamowitz-Möllendorff (*Aus Kydathen*, p. 133).

See W. H. Roscher, *Über Selene und Verwandtes* (1890), with *Nachträge* (1895); Preller, *Griechische Mythologie* (4th ed., 1894), pp. 443-446; A. Legrand, *s.v.* "Luna" in Daremberg and Saglio's *Dictionnaire des antiquités*.

SELENGA-ORKHON, a river of Central Asia, which rises in two principal head-streams, the Selenga and the Orkhon, on the plateau of N.W. Mongolia, not far apart in 101° E. Both flow generally E.N.E. as far as their confluence near Kiakhta, on the frontier of Mongolia and Siberia, at the eastern extremity of the Sayan Mountains. Beyond Kiakhta the river flows generally N. nearly as far as 52° N., when it turns W. and enters Lake Baikal on the S.W., forming a delta. It is navigable from Kiakhta downwards, a distance of 210 m., its total length being 750 m. From the left it receives the Eghin-gol and the Jida, and from the right the Tala, Kharagoy, Chikoy, Khilok and Uda, streams each 150 to 300 m. in length. Near the upper Orkhon was the permanent camp of Karakorum, from the 8th century down to the end of the 13th the centre of the Mongol power, especially under the sway of Jenghiz Khan and his son Ogotai or Ogdai in the 12th and 13th centuries.

Several remarkable inscriptions were discovered here in the end of the 19th century, and were interpreted by Professor V. Thomsen of Copenhagen *Inscriptions de l'Orkhon* (Helsingfors, 1900).

SELENIUM [symbol Se, atomic weight 79·2 (O=16)], a non-metallic chemical element, discovered in 1817 by J. J. Berzelius, who called it selenium (Gr. σελήνη, the moon) on account of its close analogy with tellurium (Lat. *tellus*, the earth). It is occasionally found in the native condition, but more frequently in combination with metals in the form of selenides, the more important seleniferous minerals being euchairite, crookesite, clausthalite, naumannite and zorgite. It is also found as a constituent of various pyrites and galenas, and in some specimens of native sulphur. The element is usually obtained from the flue dust or chamber deposits of sulphuric-acid works in which a seleniferous pyrites is burned. In this process, the residues are boiled with a dilute sulphuric acid to which nitric acid and potassium chlorate are added in order to transform the element into selenic acid, H_2SeO_4, which is then reduced to selenious acid, H_2SeO_3, by boiling with hydrochloric acid, and finally to selenium by sulphur dioxide. L. F. Nilson (*Ber.*, 1874, 7, p. 1719) digests the well-washed chamber mud with a moderately concentrated solution of potassium cyanide, whereby the element goes into solution in the form of potassium selenocyanide, KSe(CN), from which it is precipitated by hydrochloric acid. As alternative methods, F. Wöhler (*Ann.*, 1859, 109, p. 375) heats the well-washed chamber residues with potassium nitrate and carbonate in order to obtain an alkaline selenate, which is then boiled with hydrochloric acid, yielding selenious acid, from which the element is obtained as above; whilst H. Rose (*Pogg. Ann.*, 1828, 90, p. 471) by the action of chlorine obtains selenium tetrachloride, which is converted into selenious acid by water, and the acid so prepared is finally reduced to selenium by treatment with sodium sulphite (see also G. Magnus, *Pogg. Ann.*, 1830, 96, p. 165; O. Pettersson, *Ber.*, 1873, 6, p. 1477; H. Koch, German Patent 167457, 1903). It is obtained from zorgite by heating the mineral with aqua regia; the excess of acid is evaporated, and the resulting syrupy liquid diluted, filtered and decomposed by sulphur dioxide, when the selenium is precipitated (Billandot, *Ency. chimique*, 1883, 5, p. 198).

The commercial element usually contains a certain amount of sulphur, and some tellurium, and various methods have been devised

for its purification. L. Oppenheim (*Jour. prakt. Chem.*, 1857, 71, p. 279) fuses the commercial selenium with potassium cyanide in a stream of hydrogen, takes up the melt in water and passes air through the solution; the precipitated tellurium is filtered off, and the solution then supersaturated with hydrochloric acid, when selenium is gradually deposited. E. Divers (*Chem. News*, 1885, 51, p. 199) dissolves the element in boiling concentrated sulphuric acid and reduces the resulting selenious acid with sulphur dioxide, filters off the precipitate and washes it with water and alcohol. The resulting product, however, still contains traces of sulphur. C. Hugot (*Ann. chim. phys.*, 1900 (7), 21, p. 34) converts the element by dilute nitric acid into selenium dioxide which is then sublimed, and dissolved in water. Any sulphuric acid present is removed by baryta water, the precipitated barium sulphate filtered off, the solution acidified by hydrochloric acid and reduced by sulphur dioxide.

Several allotropic forms of selenium have been described, but the work of A. P. Saunders (*Jour. Phys. Chem.*, 1900, 4, p. 423) seems to establish that the element exists in three distinct forms, namely *liquid selenium* (which includes the vitreous, soluble and amorphous forms), *crystalline red selenium* (which includes, perhaps, two very closely allied forms), and *crystalline, grey* or *metallic selenium*. Liquid selenium becomes more and more viscous in character as its temperature falls from 220° C. to 60° C.; it is soft at about 60°, but is hard and brittle between 30° and 40°. It shows a conchoidal fracture. The amorphous variety, which only differs from the vitreous form in its state of aggregation, is obtained by reducing solutions of selenious acid with sulphur dioxide. It is slightly soluble in carbon bisulphide. The red crystalline variety is obtained by crystallization of selenium from carbon bisulphide, or by leaving the amorphous form in contact with the same solvent. The grey crystalline form is obtained by heating the other varieties, and is the most stable form from ordinary temperatures up to 217°. All varieties of selenium dissolve in concentrated sulphuric acid, forming a green solution (see also R. Marc, *Ber.*, 1906, 39, p. 697; and W. Oechsner de Coninck, *Comptes rendus*, 1906, 143, p. 682). A colloidal selenium was obtained by C. Paal and C. Koch (*Ber.*, 1905, 38, p. 526) by reducing selenious acid dissolved in an aqueous solution of sodium protalbate with hydrazine hydrate and hydrochloric acid, the precipitate obtained being then dissolved in sodium carbonate. The specific gravity of selenium is 4·8; the specific heat varies from 0·0716 to 0·1147, depending upon the particular form. Selenium combines directly with hydrogen when heated in the gas, and with fluorine in the cold. It burns with a blue flame when heated in the air or in oxygen, at the same time giving a characteristic smell of rotten horse-radish, a reaction which serves for the recognition of the element. It combines directly with nitrogen, phosphorus, antimony and carbon, and with all the metals (except gold) to form selenides, of which those of the alkali and alkaline earth metals are soluble in water. Metallic selenium is a conductor of electricity, and its conductivity is increased by light; this property has been utilized in apparatus for transmitting photographs by telegraphy (see TELEGRAPH).

Seleniuretted Hydrogen, H_2Se, is obtained by the direct union of its constituent elements in the heat; by the decomposition of various selenides with mineral acids; by the decomposition of aluminium selenide, or phosphorus selenide with water; by the action of selenium on a concentrated solution of hydriodic acid; and by heating selenium with colophene (H. Moissan), or better with paraffin wax (H. Wuyts and A. Stewart, *Bull. Soc. chim. Belg.*, 1909, 23, p. 9). It is a colourless gas which possesses a characteristic smell, more unpleasant than sulphuretted hydrogen. Its physiological effects are much more persistent and injurious than sulphuretted hydrogen, producing temporary paralysis of the olfactory nerves and inflammation of the mucous membrane. It may be liquefied, the liquid boiling at −41° to −42° C. and becoming solid at −68° C. (K. Olszewski). It is somewhat soluble in water and forms a hydrate. It is decomposed by heat, burns with a blue flame, and behaves as a reducing agent. It precipitates many of the heavy metals as selenides when passed into solutions of their salts. Its aqueous solution is unstable, gradually depositing red selenium on standing. *Selenium fluoride*, SeF_4, is obtained as a colourless liquid by the direct action of fluorine on selenium (P. Lebeau, *Comptes rendus*, 1907, 144, p. 1042). It boils at about 100° C., attacks glass readily, is decomposed by water, and dissolves iodine. *Selenium dichloride*, Se_2Cl_2, is obtained by the action of chlorine on selenium; by the action of phosphorus pentachloride on selenium or the dioxide; by the action of hydrochloric acid on seleno-sulphur trioxide (E. Divers, *Chem. News*, 1884, 49, p. 212): $2S{\cdot}SeO_3+2HCl=H_2SO_4+S{\cdot}SeO_3{\cdot}SeCl_2(+H_2O)\rightarrow Se_2Cl_2+SO_2(OH)Cl$; and by heating selenium and selenium tetrachloride to 100° C. in a sealed tube. It is a yellowish-brown oily liquid which commences to distil at 130° C. with partial decomposition into selenium and the tetrachloride. It is decomposed by water with formation of selenium and selenious acid: $2Se_2Cl_2+3H_2O=H_2SeO_3+3Se+4HCl$. *Selenium tetrachloride*, $SeCl_4$, is obtained by passing excess of chlorine over selenium; by the action of phosphorus pentachloride on selenium dioxide: $SeO_2+PCl_5=SeOCl_2+POCl_3$; $3SeOCl_2+2POCl_3=3SeCl_4+P_2O_5$; and by the action of thionyl chloride on selenium oxychloride. It is a white solid which can be obtained crystalline by sublimation in a current of chlorine. It dissociates when heated, and is decomposed by water with production of selenious acid. It dissolves selenium. Similar bromides and iodides are known. *Selenyl chloride*, $SeOCl_2$, is formed when selenium tetrachloride is heated with the dioxide to 150° C. (R. Weber, *Pogg. Ann.*, 1859, 184, p. 615), or when the dioxide is heated with common salt: $2SeO_2+2NaCl-SeOCl_2+Na_2SeO_3$. It is a yellow-coloured liquid which solidifies at 0° C., and fumes on exposure to air. It combines with titanium and tin bichlorides and with antimony trichloride, and it is decomposed by water.

Selenium dioxide, SeO_2, is prepared by burning selenium in oxygen, or by oxidizing selenium with nitric acid and heating the residue. It may also be prepared by the action of selenium on sulphur oxyfluoride (H. Moissan, *Bull. Soc. chim.*, 1902 (3), 27, p. 251): $2SO_2F_2+Se+SiO_2=SeO_2+2SO_2+SiF_4$. It crystallizes in needles or prisms and volatilizes when heated, giving a pale yellow vapour. It is very hygroscopic, and dissolves in water and alcohol. It reacts with the caustic alkalis to form selenites, and combines directly with hydrocyanic acid. It is decomposed by hydriodic acid with liberation of selenium and iodine, and by ammonia with formation of selenium and nitrogen. *Selenious acid*, H_2SeO_3, is obtained in the crystalline form when a solution of selenium dioxide in water is concentrated over sulphuric acid. It effloresces on exposure to air. Oxidizing agents readily convert it into selenic acid, whilst reducing agents transform it into selenium. It yields normal, acid and super-acid salts (*e.g.* $KHSeO_3{\cdot}H_2SeO_3$). It is decomposed by many acids with liberation of selenium. *Selenic acid*, H_2SeO_4, was discovered by E. Mitscherlich (*Pogg. Ann.*, 1827, 85, p. 623). Its salts, the selenates, are obtained by the oxidation of the selenites, and the free acid may be obtained by the decomposition of the lead or barium salt. It is also obtained in the electrolysis of solutions of selenious acid (C. Manuelli and G. Lazzarini, *Gazz.*, 1909, 39, 1, p. 50). The acid crystallizes in hexagonal prisms and melts at 58° C. It dissolves in water and yields a hydrate of composition $H_2SeO_4{\cdot}H_2O$. It is very hygroscopic, dissolves sulphur readily and acts on organic compounds, in a manner similar to sulphuric acid. It decomposes when strongly heated. The selenates are isomorphous with the chromates and sulphates. A compound of selenium and sulphur has been described as resulting from the action of sulphuretted hydrogen on selenious acid, but A. Gutbier (*Zeit. anorg. Chem.*, 1905, 43, p. 384) is of the opinion that in this reaction, at ordinary temperature, a simple reduction takes place, leading to the formation of a mixture of sulphur and selenium. *Selenium sulphoxide*, $SeSO_3$, is formed as a yellowish crystalline mass when selenium is warmed with sulphur trioxide. It decomposes when heated above 35° C., and also in the presence of water. A compound of composition, $SeSO_5$, has been obtained by the addition of selenium dioxide to sulphuric acid saturated with sulphur trioxide (R. Metznen, *Ann. chim. phys.*, 1898, (7), 15, p. 203). It crystallizes in colourless needles. *Selenosulphuric acid*, H_2SeSO_3, is only known in the form of its salts, which are usually obtained by the action of selenium on solutions of the metallic sulphites, a seleno-trithionate being simultaneously produced. The salts are unstable and readily decompose when heated. *Selenotrithionic acid*, $H_2SeS_3O_6$, is also obtained in the form of its potassium salt by the action of potassium hydrogen sulphite on a selenosulphate. It is readily decomposed by acids with liberation of sulphur dioxide and selenium.

Nitrogen selenide, N_2Se_2, is formed by the decomposition of selenium chloride with ammonia (A. Verneuil, *Bull. soc. chim.*, 1882, 38, p. 548). It crystallizes readily from benzene or acetic acid and explodes when subjected to shock or when heated. It is also obtained when dry ammonia gas is passed into a dilute solution of selenyl chloride in benzene, the precipitate produced being digested with potassium cyanide to remove any selenium (V. Lenher and E. Wolesensky, *Jour. Amer. Chem. Soc.*, 1907, 29, p. 215). It is a brick-red powder which explodes when heated to 130° C. *Selenium cyanide*, $Se(CN)_2$, is obtained by decomposing silver selenocyanide with cyanogen iodide, or by the action of silver cyanide on a solution of selenium bromide in carbon bisulphide. It crystallizes in tables and is very soluble in water. A more complex cyanide, $Se_3(CN)_2$, is obtained by passing a current of chlorine and air into an aqueous solution of potassium selenocyanide (A. Verneuil, *Ann. chim. phys.*, 1886 (6), 9, p. 289). It crystallizes in golden yellow needles and is decomposed by boiling water: $2Se_3(CN)_2+2H_2O=4HCN+SeO_2+5Se$. When heated to 180° C. *in vacuo* it yields the simple cyanide $Se(CN)_2$. *Potassium selenocyanide*, KSeCN, is obtained by the action of selenium on a concentrated aqueous solution of potassium cyanide, or by heating selenium with anhydrous potassium ferrocyanide (W. Crookes, *Ann.*, 1851, 78, p. 177). It crystallizes in needles,

possesses an alkaline reaction, and is readily decomposed by acids with liberation of selenium. It forms numerous double salts.

Numerous determinations of the atomic weight of selenium have been made. The earlier results of J. J. Berzelius from an analysis of the chloride gave values from 79·2 to 79·35. Later determinations by V. Lenher (*Jour. Amer. Chem. Soc.*, 1898, 20, p. 595), from the analysis of silver selenite and the reduction of the double selenium ammonium bromide, give values from 79·277 to 79·367; whilst J. Meyer (*Ber.*, 1902, 35, p. 1591) by the electrolysis of silver selenite in the presence of potassium cyanide obtained the value 79·22.

SELEUCIA (Gr. Σελεύκεια), the name of several ancient Greek cities named after Seleucus I. Nicator, founder of the Seleucid dynasty. The following are the most important.

1. SELEUCIA on the Tigris, at the mouth of the great royal canal (*Naharmalka*, mod. *Radhwaniya*) from the Tigris to the Euphrates, about 50 m. N. of Babylon and 15 m. S. of Bagdad. It was founded by Seleucus Nicator (see SELEUCID DYNASTY), ruler of Babylonia from autumn 312. Seleucus, departing from the precedent of Alexander the Great, who, after his return from India, had settled in Babylon, preferred to build a new capital of a decidedly Greek character. The new city "was founded with the object of exhausting Babylon" (Plin. vi. 122; Strabo xvi. 738); a legend says that the Chaldaean priests, when they were consulted about the right hour for the initiation of the city, tried to frustrate the design of the king by naming a wrong hour, but that by chance the work was begun in the moment predicted by the stars and the decree of fate accomplished (Appian, *Syr.* 58). Seleucia was peopled with Macedonians and Greeks; Syrians and Jews were admitted to the citizenship (Joseph. *Ant.* xviii. 9. 8). It obtained a free constitution. A great many other Greek cities were founded in Babylonia by Seleucus I. and Antiochus I., while Babylon and the other ancient cities (Sippara, Erech, Ur, Borsippa) decayed into mere villages. Here the Chaldaean priests continued to teach their astrological wisdom (we possess many astrological tablets in cuneiform writing from the time of the Seleucids and the earlier Arsacids); but Seleucia became the centre of the new hellenistic civilization (see HELLENISM). A great many Greek authors were born here (*e.g.* the Stoic Diogenes of Babylonia, 2nd century), though the inhabitants of Seleucia in Babylonia generally are simply called Babylonians by the Greeks. In the time of Pliny the town was said to have 600,000 inhabitants (vi. 122). Seleucia suffered from the rebellion of the satrap Molon of Media, who was put down by Antiochus III. the Great in 220 (Polyb. v. 54). Antiochus IV. *Epiphanes* once more restored the Seleucid supremacy in the east; but after his death (163) the decay of the empire began and was accelerated by the intrigues of the Romans. In Babylonia the governor Timarchus rebelled and was acknowledged by the Roman senate. But he was defeated and killed by Demetrius I. (*c.* 158), who was hailed as deliverer (*Soter*, "saviour") by the inhabitants (Appian, *Syr.* 45. 4 f.; Trogus, *Prol.* 34; Diod. 31. 27a). Soon after, the great conquests of the Arsacid king Mithradates I. began; Babylonia became subject to the Parthians (*c.* 140). The Greek towns were very unwilling to submit to the foreign rule, and welcomed Antiochus VII. Sidetes, when in 130 he attempted to restore his empire; but his defeat by Phraates II. in 129 ended the Seleucid rule in the east. Seleucia and other towns were cruelly punished by Phraates and his prefect Himerus, who also devastated Babylon (Justin xlii. 1; Trog. *Prol.* 42; Diod. xxxv. 19. 21; cf. Posidonius *ap.* Athen. xi. 466 B). Seleucia, however, maintained her self-government and her spirit of Greek independence (Plin. vi. 122; Tac. *Ann.* vi. 42; cf. Joseph. *Ant.* xviii. 9. 8 f.), and remained the greatest commercial town of the east. The Arsacids did not dare to bring their host of barbarian soldiers and retinue into Seleucia, but fixed their residence opposite to it on the left bank of the Tigris in Ctesiphon (Strabo xvi. 743; see CTESIPHON). In all the wars with the Romans Seleucia inclined to the western deliverers; from A.D. 37 to 43 it was in open rebellion against the Parthians (Tac. *Ann.* xi. 8 f.). Vologaeses I. (A.D. 50–91) "founded the town Vologesocerta (near Ctesiphon) with the intention of draining the stormy Seleucia" (Plin. vi. 122). Trajan occupied Seleucia in 116. In the war of Marcus Aurelius and L. Verus against the Parthians, Seleucia was taken by Avidius Cassius in 164, and then the Romans did what the Parthians had not dared to do: they burnt down the great Greek town with 300,000 inhabitants (Dio Cass. lxxi. 2; Zonar. xii. 2; Capitol. *Vit. Veri*, 8; Eutrop. 8. 10; Ammian. Marc. xxiii. 6. 24; xxiv. 5. 3). The great plague, which laid waste the Roman empire during the next years, is said to have sprung from the ruins of Seleucia. The destruction of Seleucia may be considered as the end of Hellenism in Babylonia. (See also SELEUCID DYNASTY and HELLENISM.) (ED. M.)

2. A city on the north frontier of Syria towards Cilicia about 4 m. N. of the mouth of the Orontes, near the shore at the foot of Mount Pieria (hence called Seleucia Pieria). This town also was founded by Seleucus I. It served as the port of Antioch (Acts xiii. 4), and with Apamea, Laodicea and Antioch formed the Syrian tetrapolis. Considerable remains are still visible: the chief are those of a cutting through the solid rock nearly 1100 yds. long, which Polybius describes as the road from the city to the sea; the triple line of walls; amphitheatre, cemetery, citadel, temples. It was of great importance in the struggle between the Seleucids and the Ptolemies; captured by Ptolemy Euergetes in 246, it was recovered by Antiochus III. the Great in 219. It was recognized as independent by the Romans in 70, but little of its subsequent history is known. It had practically ceased to exist in the 5th century A.D. The district stretching inland was known as Seleucis.

3. SELEUCIA TRACHEOTIS, sometimes called TRACHEA, a city of Cilicia on the Calycadnus (Geuk Su), also founded by Seleucus I. about 300 B.C., near the older Olbia. It had considerable commercial prosperity as the port of Isauria, and was even a rival of Tarsus. In 1137 it was besieged by Leon, king of Cilician Armenia. On the 10th of June 1190 the emperor Frederick Barbarossa was drowned in trying to cross the Calycadnus. In the 13th century it was captured by the Seljuks. There are many ancient remains, and on the Acropolis the ruins of a castle; many rock-cut tombs with inscriptions have been found. On the site is the modern Selefke, the chief town of the Ichili sanjak.

Other towns bearing the name Seleucia were:—(4) Seleucia in Mesopotamia, the modern Birejik; (5) in the Persian Margiana, founded as Alexandria by Alexander the Great and rebuilt as Seleucia by Antiochus I. (of Syria); (6) in Pisidia; (7) in Pamphylia; (8) on the Belus in Syria. The city of Tralles (*q.v.*) also bore the name for a short period.

SELEUCID DYNASTY, a line of kings who reigned in Nearer Asia from 312 to 65 B.C.

The founder SELEUCUS (surnamed for later generations Nicator) was a Macedonian, the son of Antiochus, one of Philip's generals. Seleucus, as a young man of about twenty-three, accompanied Alexander into Asia in 333, and won distinction in the Indian campaign of 326. When the Macedonian empire was divided in 323 (the "Partition of Babylon") Seleucus was given the office of *chiliarch* (Gr. χίλιοι, a thousand), which attached him closely to the person of the regent Perdiccas. Seleucus himself had a hand in the murder of Perdiccas in 321. At the second partition, at Triparadisus (321), Seleucus was given the government of the Babylonian satrapy. In 316, when Antigonus had made himself master of the eastern provinces, Seleucus felt himself threatened and fled to Egypt. In the war which followed between Antigonus and the other Macedonian chiefs, Seleucus actively co-operated with Ptolemy and commanded Egyptian squadrons in the Aegean. The victory won by Ptolemy at Gaza in 312 opened the way for Seleucus to return to the east. His return to Babylon in that year was afterwards officially regarded as the beginning of the Seleucid empire. Master of Babylonia, Seleucus at once proceeded to wrest the neighbouring provinces of Persis, Susiana and Media from the nominees of Antigonus. A raid into Babylonia conducted in 311 by Demetrius, son of Antigonus, did not seriously check Seleucus's progress. Whilst Antigonus was occupied in the west, Seleucus during nine years (311–302) brought under his authority the whole eastern part of Alexander's empire as far as the Jaxartes and Indus. In 305, after the extinction of the old royal line of Macedonia, Seleucus, like the other four principal Macedonian chiefs, assumed the style of king.

His attempt, however, to restore Macedonian rule beyond the Indus, where the native Chandragupta had established himself, was not successful. Seleucus entered the Punjab, but felt himself obliged in 302 to conclude a peace with Chandragupta, by which he ceded large districts of Afghanistan in return for 500 elephants. The pressing need for Seleucus once more to take the field against Antigonus was at any rate in large measure the cause of his abandonment of India. In 301 he joined Lysimachus in Asia Minor, and at Ipsus Antigonus fell before their combined power. A new partition of the empire followed, by which Seleucus added to his kingdom Syria, and perhaps some regions of Asia Minor. The possession of Syria gave him an opening to the Mediterranean, and he immediately founded here the new city of Antioch upon the Orontes as his chief seat of government. His previous capital had been the city of Seleucia which he had founded upon the Tigris (almost coinciding in site with Bagdad), and this continued to be the capital for the eastern satrapies. About 293 he installed his son Antiochus there as viceroy, the vast extent of the empire seeming to require a double government. The capture of Demetrius in 285 added to Seleucus's prestige. The unpopularity of Lysimachus after the murder of Agathocles gave Seleucus an opportunity for removing his last rival. His intervention in the west was solicited by Ptolemy Ceraunus, who, on the accession to the Egyptian throne of his brother Ptolemy II. (285), had at first taken refuge with Lysimachus and then with Seleucus. War between Seleucus and Lysimachus broke out, and on the field of Coru-pedion in Lydia Lysimachus fell (281). Seleucus now saw the whole empire of Alexander, Egypt alone excepted, in his hands, and moved to take possession of Macedonia and Thrace. He intended to leave Asia to Antiochus and content himself for the remainder of his days with the Macedonian kingdom in its old limits. He had, however, hardly crossed into the Chersonese when he was assassinated by Ptolemy Ceraunus near Lysimachia (281).

ANTIOCHUS I. SOTER (324 or 323–262) was half a Persian, his mother Apame being one of those eastern princesses whom Alexander had given as wives to his generals in 324. On the assassination of his father (281), the task of holding together the empire was a formidable one, and a revolt in Syria broke out almost immediately. With his father's murderer, Ptolemy, Antiochus was soon compelled to make peace, abandoning apparently Macedonia and Thrace. In Asia Minor he was unable to reduce Bithynia or the Persian dynasties which ruled in Cappadocia. In 278 the Gauls broke into Asia Minor, and a victory which Antiochus won over these hordes is said to have been the origin of his title of *Soter* (Gr. for "saviour"). At the end of 275 the question of Palestine, which had been open between the houses of Seleucus and Ptolemy since the partition of 301, led to hostilities (the "First Syrian War"). It had been continuously in Ptolemaic occupation, but the house of Seleucus maintained its claim. War did not materially change the outlines of the two kingdoms, though frontier cities like Damascus and the coast districts of Asia Minor might change hands. About 262 Antiochus tried to break the growing power of Pergamum by force of arms, but suffered defeat near Sardis and died soon afterwards (262). His eldest son Seleucus, who had ruled in the east as viceroy from 275 (?) till 268/7, was put to death in that year by his father on the charge of rebellion (Wace, *J.H.S.* xxv., 1905, p. 101 f.). He was succeeded (261) by his second son ANTIOCHUS II. THEOS (286–246), whose mother was the Macedonian princess Stratonice, daughter of Demetrius Poliorcetes. War with Egypt still went on along the coasts of Asia Minor (the "Second Syrian War"). Antiochus also made some attempt to get a footing in Thrace. About 250 peace was concluded between Antiochus and Ptolemy II., Antiochus repudiating his wife Laodice and marrying Ptolemy's daughter Berenice, but by 246 Antiochus had left Berenice and her infant son in Antioch to live again with Laodice in Asia Minor. Laodice poisoned him and proclaimed her son SELEUCUS II. CALLINICUS (reigned 246–227) king, whilst her partisans at Antioch made away with Berenice and her son. Berenice's brother, Ptolemy III., who had just succeeded to the Egyptian throne, at once invaded the Seleucid realm and marched victoriously to the Tigris or beyond, receiving the submission of the eastern provinces, whilst his fleets swept the coasts of Asia Minor. In the interior of Asia Minor Seleucus maintained himself, and when Ptolemy returned to Egypt he recovered Northern Syria and the nearer provinces of Iran. In Asia Minor his younger brother Antiochus Hierax was put up against him by a party to which Laodice herself adhered. At Ancyra (about 235 ?) Seleucus sustained a crushing defeat and left the country beyond the Taurus to his brother and the other powers of the peninsula. Of these Pergamum now rose to greatness under Attalus I., and Antiochus Hierax perished as a fugitive in Thrace in 228/7. A year later Seleucus was killed by a fall from his horse. His elder son, SELEUCUS III. SOTER (reigned 227–223), took up the task of reconquering Asia Minor from Attalus, but fell by a conspiracy in his own camp.

ANTIOCHUS III. THE GREAT (242–187), Callinicus's younger son, a youth of about eighteen, now succeeded to a disorganized kingdom (223). Not only was Asia Minor detached, but the further eastern provinces had broken away, Bactria under the Greek Diodotus (*q.v.*), and Parthia under the nomad chieftain Arsaces. Soon after Antiochus's accession, Media and Persis revolted under their governors, the brothers Molon and Alexander. The young king was in the hands of the bad minister Hermeias, and was induced to make an attack on Palestine instead of going in person to face the rebels. The attack on Palestine was a fiasco, and the generals sent against Molon and Alexander met with disaster. Only in Asia Minor, where the Seleucid cause was represented by the king's cousin, the able Achaeus, was its prestige restored and the Pergamene power driven back to its earlier limits. In 221 Antiochus at last went east, and the rebellion of Molon and Alexander collapsed. The submission of Lesser Media, which had asserted its independence under Artabazanes, followed. Antiochus rid himself of Hermeias by assassination and returned to Syria (220). Meanwhile Achaeus himself had revolted and assumed the title of king in Asia Minor. Since, however, his power was not well enough grounded to allow of his attacking Syria, Antiochus considered that he might leave Achaeus for the present and renew his attempt on Palestine. The campaigns of 219 and 218 carried the Seleucid arms almost to the confines of Egypt, but in 217 Ptolemy IV. confronted Antiochus at Raphia and inflicted a defeat upon him which nullified all Antiochus's successes and compelled him to withdraw north of the Lebanon. In 216 Antiochus went north to deal with Achaeus, and had by 214 driven him from the field into Sardis. Antiochus contrived to get possession of the person of Achaeus (see POLYBIUS), but the citadel held out till 213 under Achaeus's widow and then surrendered. Having thus recovered the central part of Asia Minor—for the dynasties in Pergamum, Bithynia and Cappadocia the Seleucid government was obliged to tolerate—Antiochus turned to recover the outlying provinces to the north and east. Xerxes of Armenia was brought to acknowledge his supremacy in 212. In 209 Antiochus invaded Parthia, occupied the capital Hecatompylus and pushed forward into Hyrcania. The Parthian king was apparently granted peace on his submission. In 209 Antiochus was in Bactria, where the original rebel had been supplanted by another Greek Euthydemus (see further BACTRIA and articles on the separate rulers). The issue was again favourable to Antiochus. After sustaining a famous siege in his capital Bactra (Balkh), Euthydemus obtained an honourable peace by which the hand of one of Antiochus's daughters was promised to his son Demetrius. Antiochus next, following in the steps of Alexander, crossed into the Kabul valley, received the homage of the Indian king Sophagasenus and returned west by way of Seistan and Kerman (206/5). From Seleucia on the Tigris he led a short expedition down the Persian Gulf against the Gerrhaeans of the Arabian coast (205/4). Antiochus seemed to have restored the Seleucid empire in the east, and the achievement brought him the title of "the Great King." In 205/4 the infant Ptolemy V. Epiphanes succeeded to the Egyptian throne, and Antiochus concluded a secret pact with Philip of

Macedonia for the partition of the Ptolemaic possessions. Once more Antiochus attacked Palestine, and by 199 he seems to have had possession of it. It was, however, recovered for Ptolemy by the Aetolian Scopas. But the recovery was brief, for in 198 Scopas was defeated by Antiochus at the battle of the Panium, near the sources of the Jordan, a battle which marks the end of Ptolemaic rule in Palestine. In 197 Antiochus moved to Asia Minor to secure the coast towns which had acknowledged Ptolemy and the independent Greek cities. It was this enterprise which brought him into antagonism with Rome, since Smyrna and Lampsacus appealed to the republic of the west, and the tension became greater after Antiochus had in 196 established a footing in Thrace. The evacuation of Greece by the Romans gave Antiochus his opportunity, and he now had the fugitive Hannibal at his court to urge him on. In 192 Antiochus invaded Greece, having the Aetolians and other Greek states as his allies. In 191, however, he was routed at Thermopylae by the Romans under Manius Acilius Glabrio, and obliged to withdraw to Asia. But the Romans followed up their success by attacking Antiochus in Asia Minor, and the decisive victory of L. Cornelius Scipio at Magnesia ad Sipylum (190), following on the defeat of Hannibal at sea off Side, gave Asia Minor into their hands. By the peace of Apamea (188) the Seleucid king abandoned all the country north of the Taurus, which was distributed among the friends of Rome. As a consequence of this blow to the Seleucid power, the outlying provinces of the empire, recovered by Antiochus, reasserted their independence. Antiochus perished in a fresh expedition to the east in Luristan (187).

The Seleucid kingdom as Antiochus left it to his son, SELEUCUS IV. PHILOPATOR (reigned 187–176), consisted of Syria (now including Cilicia and Palestine), Mesopotamia, Babylonia and Nearer Iran (Media and Persis). Seleucus IV. was compelled by financial necessities, created in part by the heavy war-indemnity exacted by Rome, to pursue an unambitious policy, and was assassinated by his minister Heliodorus. The true heir, Demetrius, son of Seleucus, being now retained in Rome as a hostage, the kingdom was seized by the younger brother of Seleucus, ANTIOCHUS IV. EPIPHANES (*i.e.* "the Manifest [god]"; parodied *Epimanes*, "the mad"), who reigned 176–164. In 170 Egypt, governed by regents for the boy Ptolemy Philometor, attempted to reconquer Palestine; Antiochus not only defeated this attempt but invaded and occupied Egypt. He failed to take Alexandria, where the people set up the younger brother of Philometor, Ptolemy Eurgetes, as king, but he left Philometor as his ally installed at Memphis. When the two brothers combined, Antiochus again invaded Egypt (168), but was compelled to retire by the Roman envoy C. Popillius Laenas (consul 172), after the historic scene in which the Roman drew a circle in the sand about the king and demanded his answer before he stepped out of it. Antiochus exercised his contemporaries by the riddles of his half-brilliant, half-crazy personality. He had resided at Rome as a hostage, and afterwards for his pleasure at Athens, and had brought to his kingdom an admiration for republican institutions and an enthusiasm for Hellenic culture—or, at any rate, for its externals. There is evidence that the forms of Greek political life were more fully adopted under his sway by many of the Syrian cities. He spent lavishly on public buildings at home and in the older centres of Hellenism, like Athens. Gorgeous display and theatrical pomp were his delight. At the same time he scandalized the world by his riotous living and undignified familiarities. But he could persevere in an astute policy under the cover of an easy geniality and had no scruples. It is his contact with the Jews which has chiefly interested later ages, and he is doubtless the monarch described in the pseudo-prophetic chapters of Daniel (*q.v.*). Jerusalem, near the Egyptian frontier, was an important point, and in one of its internal revolutions Antiochus saw, perhaps not without reason, a defection to the Egyptian side. His chastisement of the city, including as it did the spoliation of the temple, served the additional purpose of relieving his financial necessities. It was a measure of a very different kind when, a year or two later (after 168), Antiochus tried to suppress the practices of Judaism by force, and it was this which provoked the Maccabaean rebellion (see MACCABEES). In 166 Antiochus left Syria to attempt the reconquest of the further provinces. He seems to have been signally successful. Armenia returned to allegiance, the capital of Media was re-colonized as Epiphanea, and Antiochus was pursuing his plans in the east when he died at Tabae in Persis, after exhibiting some sort of mental derangement (winter 164/3).

He left a son of nine years, ANTIOCHUS V. EUPATOR (reigned 164–162), in whose name the kingdom was administered by a camarilla. Their government was feeble and corrupt. The attempt to check the Jewish rebellion ended in a weak compromise. Their subservience to Rome so enraged the Greek cities of Syria that the Roman envoy Graeus Octavius (consul 165 B.C.) was assassinated in Laodicea (162). At this juncture Demetrius, the son of Seleucus IV., escaped from Rome and was received in Syria as the true king. Antiochus Eupator was put to death. DEMETRIUS I. SOTER (reigned 162–150) was a strong and ambitious ruler. He crushed the rebellion of Timarchus in Media and reduced Judaea to new subjection. But he was unpopular at Antioch, and fell before a coalition of the three kings of Egypt, Pergamum and Cappadocia. An impostor, who claimed to be a son of Antiochus Epiphanes, ALEXANDER BALAS (reigned 150–145), was installed as king by Ptolemy Philometor and given Ptolemy's daughter Cleopatra to wife, but Alexander proved to be dissolute and incapable, and when Demetrius, the son of Demetrius I., was brought back to Syria by Cretan *condottieri*, Ptolemy transferred his support and Cleopatra to the rightful heir. Alexander was defeated by Ptolemy at the battle of the Oenoparas near Antioch and murdered during his flight. Ptolemy himself died of the wound he had received in the battle.

DEMETRIUS II. NICATOR (first reign 145–140) was a mere boy,[1] and the misgovernment of his Cretan supporters led to the infant son of Alexander Balas, ANTIOCHUS VI. DIONYSUS, being set up against him (145) by Tryphon, a magnate of the kingdom. Demetrius was driven from Antioch and fixed his court in the neighbouring Seleucia. In 143 Tryphon murdered the young Antiochus and assumed the diadem himself. Three years later Demetrius set off to reconquer the eastern provinces from the Parthians, leaving Queen Cleopatra to maintain his cause in Syria. When Demetrius was taken prisoner by the Parthians, his younger brother ANTIOCHUS VII. SIDETES (164–129) appeared in Syria, married Cleopatra and crushed Tryphon. Antiochus VII. was the last strong ruler of the dynasty (138–129). He took Jerusalem and once more brought the Jews, who had won their independence under the Hasmonaean family, to subjection (see MACCABEES). He led a new expedition against the Parthians in 130, but, after signal successes, fell fighting in 129 (see also PERSIA, *History*). Demetrius (second reign 129–126), who had been allowed by the Parthians to escape, now returned to Syria, but was soon again driven from Antioch by a pretender, ALEXANDER ZABINAS, who had the support of the king of Egypt. Demetrius was murdered at the instigation of his wife Cleopatra in 126. The remaining history of the dynasty is a wretched story of the struggle of different claimants, while the different factors of the kingdom, the cities and barbarian races, more and more assert their independence. Both Demetrius II. and Antiochus VII. left children by Cleopatra, who form rival branches of the royal house. To the line of Demetrius belong his son SELEUCUS V. (126), assassinated by his mother Cleopatra, ANTIOCHUS VIII. GRYPUS (141–96), who succeeded in 126 the younger brother of Seleucus V., the sons of Grypus, SELEUCUS VI. EPIPHANES NICATOR (reigned 96–95), ANTIOCHUS XI. EPIPHANES PHILADELPHUS (reigned during 95), PHILIP I. (reigned 95–83), DEMETRIUS III. EUKAIROS (reigned 95–88), and ANTIOCHUS XII. DIONYSUS EPIPHANES (reigned 86 ?–85 ?), and lastly PHILIP II., the son of Philip I., who appears momentarily on the stage in the last days of confusion. To the line of Antiochus VII. belong his son ANTIOCHUS IX. CYZICENUS (reigned 116–95), the son of Cyzicenus, ANTIOCHUS X. EUSEBES (reigned 95–83 ?), and the son of Eusebes, ANTIOCHUS XIII. ASIATICUS (reigned 69–65). In 83 Tigranes, the king of Armenia, invaded Syria, and by 69 his conquest had reached as far as Ptolemais, when he was obliged to evacuate Syria to defend his own kingdom from the Romans. When Pompey appeared in Syria in 64, Antiochus XIII. begged to be restored to his ancestral

[1] Some of the indications of our documents would make him older, and these are followed by Niese (iii. p. 276, note 5). But in that case Demetrius I. must have already had a wife and son when he escaped from Rome, and it seems to me highly improbable that such a material factor in the situation would have been left out of account in Polybius's full narrative. After all, it is only a question of probabilities, and the difficulties of fitting a wife and child into the story seem to be very great, whether we conceive them left behind by Demetrius in Italy, or sent out of the country before him,

kingdom or what shred was left of it. Pompey refused and made Syria a Roman province. Antiochus Grypus had given his daughter in marriage to Mithradates (*q.v.*), a king of Commagene, and the subsequent kings of Commagene (see under ANTIOCHUS) claimed in consequence still to represent the Seleucid house after it had become extinct in the male line, and adopted Antiochus as the dynastic name. The kingdom was extinguished by Rome in 72. The son of the last king, Gaius Julius Antiochus Epiphanes Philopappus, was Roman consul for A.D. 100.

AUTHORITIES.—E. R. Bevan, *House of Seleucus* (1902), and the earlier literature of the subject there cited. In addition may be mentioned Dssa. Adalgisa Corvatta, *Divisione amministrativa dell' impero dei Seleucidi* (1901); Haussoullier, *Histoire de Milet et du Didymeion* (1902); B. Niese, *Gesch. d. griech. u. maked. Staaten*, Teil 3 (1903); J. Beloch, *Griechische Geschichte*, vol. iii.; G. Macdonald, "Early Seleucid Portraits," *Journ. of Hell. Stud.* xxiii. (1903), p. 92 f.; A. J. B. Wace, "Hellenistic Royal Portraits," *Journ. of Hell. Stud.* xxv. (1905), p. 86 f. For the chronology of the end of the reign of Antiochus Epiphanes and the Maccabaean revolt, see a paper by J. Wellhausen, "Über den geschichtlichen Wert des 2ten Makkabäerbuchs," *Nachrichten d. k. Gesellschaft d. Wissensch. zu Göttingen. Philol.-hist. Klasse*, 1905, Heft 2; and MACCABEES, *History*. (E. R. B.)

SELF (O.Eng. *seolf, silf*, &c., cf. Dutch *zelf*, Ger. *selbe, selbst*), as a pronoun, an element attached to a personal pronoun or pronominal adjective to give emphasis, or to indicate a reflexive use; as an adjective a word properly meaning same, identical, also very (seen in the expression "self-same"), hence single, plain, not mixed with another colour. It is also a florist's term for a flower which has uniformity of tint, without markings or other tints. As a noun "self" means one's own person; for the psychological use of the term see PSYCHOLOGY, &c., and for its ethical aspect EGOISM.

SELIGMAN, EDWIN ROBERT ANDERSON (1861–), American economist, was born at New York on the 25th of April 1861. He was educated at Columbia University, and, after studying for three years in Germany and France, became prize lecturer at Columbia University in 1885, being made adjunct professor of political economy in 1888. He became McVickar professor of political economy in the same university in 1904. His principal works are *Railway Tariffs* (1887), *The Shifting and Incidence of Taxation* (1899; 3rd ed. 1910), *Progressive Taxation in Theory and Practice* (1894; 2nd ed. 1908), *Economic Interpretation of History* (1902; 2nd ed. 1907), and *Principles of Economics* (1907).

SELIM, the name of three sultans of Turkey.

SELIM I. (1465–1521) succeeded in 1512 his father Bayezid II., whom he dethroned, and whose death, following immediately afterwards, gave rise to suspicions which Selim's character certainly justified. He signalized his accession by putting to death his brothers and nephews; and gave early proof of resolution by boldly cutting down before their troops two officers who showed signs of insubordination. A bigoted Sunni, he resolved on putting down the Shi'ite heresy, which had gained many adherents in Turkey: the number of these was estimated as high as 40,000. Selim determined on war with Persia, where the heresy was the prevalent religion, and in order that the Shi'ites in Turkey should give no trouble during the war, "measures were taken," as the Turkish historian states, which may be explained as the reader desires, and which proved fully efficacious. The campaign which followed was a triumph for Selim, whose firmness and courage overcame the pusillanimity and insubordination of the Janissaries. Syria and Egypt next fell before him; he became master of the holy cities of Islam; and, most important of all, he induced the last Caliph of the Abbasid dynasty formally to surrender the title of caliph (*q.v.*), as well as its outward emblems, viz. the holy standard, the sword and the mantle of the prophet. The dignity with which the Ottoman sultans have thereby become invested lends them that prestige throughout the Mussulman world which is of such importance to the present day, and which has thrown into oblivion the condition that the caliph ought to be an Arab of the tribe of Koreish. After his return from his Egyptian campaign, he was preparing an expedition against Rhodes when he was overtaken by sickness and died, on the 22nd of September 1521, in the ninth year of his reign, near the very spot where he had attacked his father's troops, not far from Adrianople. He was about fifty-five years of age. He was bigoted, bloodthirsty and relentless, though one Turkish historian praises his humanity for having forbidden the cutting up alive of condemned persons, or the roasting of them before a slow fire; and at one time he was with difficulty dissuaded from ordering the complete extirpation of all the Christians in Turkey. His ambition was insatiable; he is said to have exclaimed when looking at a map that the whole world did not form a sovereignty vast enough for one monarch. His four months' victorious campaign against Persia was undertaken and successfully carried through contrary to the advice of his ministers, several of whom he executed for their opposition to his plans; and he achieved an enterprise which neither Jenghiz Khan nor Timur was able to carry out. It is said that he contemplated the conquest of India and that he was the first to conceive the idea of the Suez Canal.

SELIM II. (1524–1574) was a son of Suleiman I. and his favourite Roxelana, and succeeded his father in 1566. He was the first sultan entirely devoid of military virtues and willing to abandon all power to his ministers, provided he were left free to pursue his orgies and debauches. Fortunately for the country, an able grand vizier, Mahommed Sokolli, was at the head of affairs, and two years after Selim's accession succeeded in concluding at Constantinople an honourable treaty with the emperor Maximilian II., whereby the emperor agreed to pay to Turkey an annual "present" of 30,000 ducats (Feb. 17, 1568). Against Russia he was less fortunate, and the first encounter between Turkey and her future northern rival gave presage of disaster to come. A plan had been elaborated at Constantinople for uniting the Volga and Don by a canal, and in the summer of 1569 a large force of Janissaries and cavalry were sent to lay siege to Astrakhan and begin the canal works, while an Ottoman fleet besieged Azov. But a sortie of the garrison of Astrakhan drove back the besiegers; 15,000 Russians, under Knes Serebianov, attacked and scattered the workmen and the Tatar force sent for their protection; and, finally, the Ottoman fleet was destroyed by a storm. Early in 1570 the ambassadors of Ivan the Terrible concluded at Constantinople a treaty which restored friendly relations between the sultan and the tsar. Expeditions in the Hejaz and Yemen were more successful, and the conquest of Cyprus in 1571, which provided Selim with his favourite vintage, led to the calamitous naval defeat of Lepanto in the same year, the moral importance of which has often been under-estimated, and which at least freed the Mediterranean from the corsairs by whom it was infested. Turkey's shattered fleets were soon restored, and Sokolli was preparing for a fresh attack on Venice, when the sultan's death on the 12th of December 1574 cut short his plans. Little can be said of this degenerate son of Suleiman, who during the eight years of his reign never girded on the sword of Osman, and preferred the clashing of wine-goblets to the shock of arms, save that with the dissolute tastes of his mother he had not inherited her ferocity.

SELIM III. (1762–1808) was a son of Sultan Mustafa III. and succeeded his uncle Abd-ul-Hamid I. in 1789. The talents and energy with which he was endowed had endeared him to the people, and great hopes were founded on his accession. He had associated much with foreigners, and was thoroughly persuaded of the necessity of reforming his state. But Austria and Russia gave him no time for anything but defence, and it was not until the peace of Jassy (1792) that a breathing space was allowed him in Europe, while Bonaparte's invasion of Egypt and Syria soon called for Turkey's strongest efforts and for the time shattered the old-standing French alliance. Selim profited by the respite to abolish the military tenure of fiefs; he introduced salutary reforms into the administration, especially in the fiscal department, sought by well-considered plans to extend the spread of education, and engaged foreign officers as instructors, by whom a small corps of new troops called *nizam-i-jedid* were collected and drilled. So well were these troops organized that they were able to hold their own against rebellious Janissaries in the European provinces, where disaffected governors made no scruple of attempting to make use of them against the reforming

sultan. Emboldened by this success, Selim issued an order that in future picked men should be taken annually from the Janissaries to serve in their ranks. Hereupon the Janissaries and other enemies of progress rose at Adrianople, and in view of their number, exceeding 10,000, and the violence of their opposition, it was decided that the reforms must be given up for the present. Servia, Egypt and the principalities were successively the scene of hostilities in which Turkey gained no successes, and in 1807 a British fleet appeared at Constantinople, strange to say to insist on Turkey's yielding to Russia's demands besides dismissing the ambassador of Napoleon I. Selim was, however, thoroughly under the influence of this ambassador, Sebastiani, and the fleet was compelled to retire without effecting its purpose. But the anarchy, manifest or latent, existing throughout the provinces proved too great for Selim to cope with. The Janissaries rose once more in revolt, induced the Sheikh-ul-Islam to grant a fetva against the reforms, dethroned and imprisoned Selim (1807), and placed his nephew Mustafa on the throne. The pasha of Rustchuk, Mustafa Bairakdar, a strong partisan of the reforms, now collected an army of 40,000 men and marched on Constantinople with the purpose of reinstating Selim. But he came too late; the ill-fated reforming sultan had been strangled in the seraglio, and Bairakdar's only resource was to wreak his vengeance on Mustafa and to place on the throne Mahmud II., the sole surviving member of the house of Osman.

For authorities see TURKEY: *History*.

SELINUS (Σελινοῦς), an ancient city on the S. coast of Sicily, 27 m. S.E. direct from Lilybaeum (the modern Marsala) and 7 m. S.E. of Castel Vetrano, which is 74 m. S.S.W. of Palermo by rail. It was founded, according to Thucydides, in 628 B.C. by colonists from Megara Hyblaea, and from the parent city of Megara (see SICILY: *History*). The name, which belonged both to the city and to the river on the W. of it, was derived from the wild celery [1] which grows there abundantly, and which appears on some of its coins (see NUMISMATICS, *Greek*, § "Sicily"). We hear of boundary disputes with Segesta as early as 580 B.C. Selinus soon grew in importance, and extended its borders from the Mazarus to the Halycus. Its wealth is shown by the fact that several of its temples belong to the first half of the 6th century B.C. Its government was at first oligarchical, but about 510 B.C. a short-lived despotism was maintained by Peithagoras and, after him, Euryleon (Herod. v. 43, 46). In 480 B.C. Selinus took the Carthaginian side. After this it seems to have enjoyed prosperity: Thucydides (vi. 20) speaks of its wealth and of the treasures in its temples, and the city had a treasury of its own at Olympia.

A dispute between Selinus and Segesta (probably the revival of a similar quarrel about 454, when an Athenian force appears to have taken part [2]) was one of the causes of the Athenian expedition of 415 B.C. At its close the former seemed to have the latter at its mercy, but an appeal to Carthage was responded to, and an overwhelming force (the Siceliot cities delaying too much in coming to the rescue) under Hannibal took and destroyed the city in 409 B.C.; the walls were razed to the ground; 6000 inhabitants were killed, 5000 taken prisoners, and only 2600 escaped to Agrigentum (Acragas).[3] In 408 Hermocrates, returning from exile, occupied Selinus and rebuilt the walls; and it is to him that the fine fort on the neck of the acropolis must be attributed. Hence he attacked Motya and Panormus and the rest of Punic Sicily. He fell, however, in 407 in an attempt to enter Syracuse, and, as a result of the treaty of 405 B.C., Selinus became absolutely subject to Carthage, and remained so until its destruction at the close of the first Punic War, when its inhabitants were transferred to Lilybaeum. It was never afterwards rebuilt, and Strabo (vi. p. 272) mentions it as one of the extinct cities of Sicily.

The ancient city occupied a sand-hill running N. and S.; the S. portion, overlooking the sea, which was the acropolis, is surrounded by fine walls of masonry of rectangular blocks of stone, which show traces of the reconstruction of 408 B.C. It is traversed by two main streets, running N. and S. and E. and W., from which others diverged at right angles. There are, however, some traces of earlier buildings at a different orientation. Only the S.E. portion of the acropolis, which contains several temples, has been excavated: in the rest private houses seem to predominate. The deities to whom the temples were dedicated not being certainly known, they are as a rule indicated by letters. In all the large temples the cella is divided into two parts, the smaller and inner of which (the *adytum*) was intended for the cult image. The opisthodomus is sometimes omitted. All of them lie in a state of ruin, and, from the disposition of the drums of the columns, it is impossible to suppose that their fall was due to any other cause than an earthquake. Temple C is the earliest of those on the acropolis. It had six columns at each end (a double row in the front) and seventeen on each long side. From it came the three archaic metopes now in the museum at Palermo, which are of great importance in the history of the development of art, showing Greek sculpture in its infancy. Portions of the coloured terra-cotta slabs which decorated the cornice and other architectural members have also been discovered. Next to it on the N. lies temple D, both having been included in one *temenos*, with other buildings of less importance: to the E. of D is a large altar. B is a small temple of comparatively late date; while A and O lie on the S. side of the main street from E. to W. in another *peribolos*.

Table of Measurements of the Temples (in feet).

	A.	B.	C.	O.	D.	E.	F.	G.
Length excluding steps	132	31⅛	209¼	..	183¾	222½	203	362
Breadth excluding steps	53¼	18½	78½	..	77½	83	80¼	164⅜
Length of cella	94¼	..	136½	..	129	163½	(?)	226½ (?)
Breadth of cella	28½	..	34½	..	32¾	46⅜	30¼	69
Height of columns with capitals	23½ (?)	..	28¾	..	27½	..	..	33½
Diameter of columns at bottom	4⅛	..	6½	..	6	6⅝	5¾	8⅝ (11½)
Number of columns in peristasis	36	4	42	36 (?)	34	38	36	46
Class	Peripteros-hexastylos	Prostylos-tetrastylos	Peripteros-hexastylos	..	Peripteros-hexastylos	Peripteros-hexastylos	Peripteros-hexastylos	Pseudo-dipteros-octostylos
Approximate date	480 B.C.	After 240 B.C.	581 B.C.	480 B.C.	570–554 B.C.	Soon after 480 B.C.	570–554 B.C.	

At the N. end of the acropolis are extensive remains of the fortifications of Hermocrates across the narrow neck connecting it with the rest of the hill. In front of the wall lies a deep trench, into which several passages descend, as at the nearly contemporary fort of Euryelus above Syracuse (*q.v.*). Outside this again lies a projecting semicircular bastion, which commands the entrance from the exterior of the city on the E., a winding trench approached by a pair of double gateways, which are not vaulted but covered by the gradual projection of the upper courses. Capitals and triglyphs

[1] The plant was formerly thought to be wild parsley. It is now generally agreed that it is celery.

[2] Cf. Timaeus, fr. 99, with Diod. xi. 86 and *I.G.* xiv. p. 45, No. 268.

[3] The figures are those of Diodorus (xiii. 58), but seem strangely small.

from earlier buildings have been used in the construction of these fortifications: from their small size they may be mostly attributed to private houses. A way across the curving trench leads to an open space, where the Agora may have been situated: beyond it lay the town, the remains of which are scanty, though the line of the walls can be traced.

Outside the ancient city, on the W. of the river Selinus, lie the ruins of a temple of Demeter, with a propylon leading to the sacred enclosure: the temple itself has a cella with a narrow door and without columns. A large number of votive terra-cotta figures, vases and lamps were found in the course of the excavations. The earliest temple must have been erected soon after the foundation of the city, while the later building which superseded it dates from shortly after 600 B.C. The propylon, on the other hand, may date from after 409 B.C.

On the hill E. of Selinus, separated from it by a small flat valley, lies a group of three huge temples. No other remains have been found round them, though it seems improbable that they stood quite alone and unprotected. It is likely that they were outside the town, but stood in a sacred enclosure. All of them have fallen, undoubtedly owing to an earthquake. The oldest of the three is F. A peculiarity of the construction of this temple is that all the intercolumniations were closed by stone screens. In it were found the lower parts of two metopes. Next in date comes the huge temple G, which, as an inscription proves, was dedicated to Apollo; though it was never entirely completed (many of the columns still remain unfluted), it was in use. The columns vary somewhat in diameter (more than even the difference caused by fluting would warrant) and three different types of capital are noticeable. The plan is a curious one: despite the comparative narrowness of the cella, it had two rows of ten columns in it, in line with the front angles of the inner shrine. The third temple, E, has been proved by the discovery of an inscription to have been dedicated to Hera. It is famous for its fine metopes now in the museum at Palermo, belonging to the beginning of the 5th century B.C.

See R. Koldewey and O. Puchstein, *Die griechischen Tempel in Unteritalien und Sicilien* (Berlin, 1899), 77-131. (T. As.)

SELJŪKS, SELJŪḲS, or SELJUQS, the name of several Turkish dynasties issued from one family, which reigned over large parts of Asia in the 11th, 12th and 13th centuries of the Christian era. The history of the Seljūks forms the first part of the history of the Turkish empire. Proceeding from the deserts of Turkestan, the Seljūks reached the Hellespont; but this barrier was crossed and a European power founded by the Ottomans (Osmanli). The Seljūks inherited the traditions and at the same time the power of the Arabian caliphate, of which, when they made their appearance, only the shadow remained in the person of the Abbāsid caliph of Bagdad. It is their merit from a Mahommedan point of view to have re-established the power of orthodox Islam and delivered the Moslem world from the subversive influence of the ultra-Shīite tenets, which constituted a serious danger to the duration of Islam itself. Neither had civilization anything to fear from them, since they represented a strong neutral power, which made the intimate union of Persian and Arabian elements possible, almost at the expense of the national Turkish—literary monuments in that language being during the whole period of the Seljūk rule exceedingly rare.

The first Seljūk rulers were Toghrul Beg, Chaḳir Beg and Ibrahīm Niyāl, the son of Mikail, the son of Seljūk, the son of Tuḳāḳ, or Tuqāq (also styled Timūryālik, "iron bow"). They belonged to the Turkish tribe of the Ghuzz (Οὔζοι of Const. Porphyr. and the Byzantine writers), which traced its lineage to Oghuz, the famous eponymic hero not only of this but of all Turkish tribes. There arose, however, at some undefined epoch a strife on the part of this tribe and some others with the rest of the Turks, because, as the latter allege, Ghuzz, the son (or grandson) of Yafeth (Japhet), the son of Nūḥ (Noah), had stolen the genuine *rain-stone*, which Turk, also a son of Yafeth, had inherited from his father. By this party, as appears from this tradition, the Ghuzz were not considered to be genuine Turks, but to be Turkmans (that is, according to a popular etymology, resembling Turks). But the native tradition of the Ghuzz was unquestionably right, as they spoke a pure Turkish dialect. The fact, however, remains that there existed a certain animosity between the Ghuzz and their allies and the rest of the Turks, which increased as the former became converted to Islam (in the course of the 4th century of the Flight). The Ghuzz were settled at that time in Transoxiana, especially at Jand, a well-known city on the banks of the Jaxartes, not far from its mouth. Some of them served in the armies of the Ghaznavids Sabuktagīn (Sebuktegin) and Maḥmūd (997–1030); but the Seljūks, a royal family among them, had various relations with the reigning princes of Transoxiana and Khwārizm, which cannot be narrated here.[1] But, friends or foes, the Ghuzz became a serious danger to the adjoining Mahommedan provinces from their predatory habits and continual raids, and the more so as they were very numerous. It may suffice to mention that, under the leadership of Pīgu Arslān Israil, they crossed the Oxus and spread over the eastern provinces of Persia, everywhere plundering and destroying. The imprisonment of this chieftain by Masūd, the son and successor of Maḥmūd, was of no avail: it only furnished his nephews with a ready pretext to cross the Oxus likewise in arms against the Ghaznavids. We pass over their first conflicts and the unsuccessful agreements that were attempted, to mention the decisive battle near Merv (1040), in which Masūd was totally defeated and driven back to Ghazni (Ghazna). Persia now lay open to the victors, who proclaimed themselves independent at Merv (which became from that time the official capital of the principal branch of the Seljūks), and acknowledged Toghrul Beg as chief of the whole family. After this victory the three princes Toghrul Beg, Chaḳir Beg and Ibrahīm Niyāl separated in different directions and conquered the Mahommedan provinces east of the Tigris; the last named, after conquering Hamadān and the province of Jebel (Irak i Ajami), penetrated as early as 1048, with fresh Ghuzz troops, into Armenia and reached Manzikert, Erzerūm and Trebizond. This excited the jealousy of Toghrul Beg, who summoned him to give up Hamadān and the fortresses of Jebel; but Ibrahīm refused, and the progress of the Seljūkian arms was for some time checked by internal discord—an ever-recurring event in their history. Ibrahīm was, however, compelled to submit.

At this time the power of Qaim, the Abbāsid caliph of Bagdād (see CALIPHATE, section C, § 26), was reduced to a mere shadow, as the Shīite dynasty of the Būyids and afterwards his more formidable Fātimite rivals had left him almost wholly destitute of authority. The real ruler at Bagdād was a Turk named Basāsīrī, lieutenant of the last Būyid, Malik-ar-Raḥīm. Nothing could, therefore, be more acceptable to the caliph than the protection of the orthodox Toghrul Beg, whose name was read in the official prayer (*khotba*) as early as 1050. At the end of the same year (1055) the Seljūk entered the city and after a tumult seized the person of Malik-ar-Raḥīm. Basāsīrī had the good fortune to be out of his reach; after acknowledging the right of the Fātimites, he gathered fresh troops and incited Ibrahīm Niyāl to rebel again, and he succeeded so far that he re-entered Bagdād at the close of 1058. The next year, however, Toghrul Beg got rid of both his antagonists, Ibrahīm being taken prisoner and strangled with the bowstring, while Basāsīrī fell in battle. Toghrul Beg now re-entered Bagdād, re-established the caliph, and was betrothed to his daughter, but died before the consummation of the nuptials (September 1063). Alp Arslān, the son of Chakir Beg, succeeded his uncle and extended the rule of his family beyond the former frontiers. He made himself master, *e.g.* of the important city of Aleppo; and during his reign a Turkish amir, Atsiz, wrested Palestine and Syria from the hands of the Fātimites. He made successful expeditions against the Greeks, especially that of 1071, in which the Greek emperor Romanus Diogenes was taken prisoner and forced to ransom himself for a large sum (see ROMAN EMPIRE, LATER). The foundation of the Seljūk empire of Rūm (*q.v.*) was the immediate result of this great victory. Alp Arslān afterwards undertook an expedition against Turkestan, and met with his death at the hands of a captured chief, Barzami Yussuf (Yussuf Kothnal), whom he had intended to shoot with his own hand.

Malik Shāh, the son and successor of Alp Arslān, had to encounter his uncle Kāvurd, founder of the Seljūkian empire of Kermān (see below), who claimed to succeed Alp Arslān in accordance with the Turkish laws, and led his troops towards Hamadān. However, he lost the battle that ensued, and the

[1] Comp. Sachau, "Zur Geschichte und Chronologie von Khwārizm," in *Sitzungsberichte* of the Vienna Acad., lxxiv. 304 seq.

bowstring put an end to his life (1073). Malik Shāh regulated also the affairs of Asia Minor and Syria, conceding the latter province as an hereditary fief to his brother Tutush, who established himself at Damascus and killed Atsiz. He, however, like his father Alp Arslān, was indebted for his greatest fame to wise and salutary measures of their vizier, Niẓām ul-Mulk. This extraordinary man, associated by tradition with Omar Khayyām (*q.v.*), the well-known mathematician and free-thinking poet, and with Hassan (ibn) Sabbāh, afterwards the founder of the sect of the Assassins (*q.v.*), was a renowned author and statesman of the first rank, and immortalized his name by the foundation of several universities (the Niẓāmiyah at Bagdād), observatories, mosques, hospitals and other institutions of public utility. At his instigation the calendar was revised, and a new era, dating from the reign of Malik Shāh and known as the Jelalian, was introduced. Not quite forty days before the death of his master this great man was murdered by the Assassins. He had fallen into disfavour because of his unwillingness to join in the intrigues of the princess Turkān Khātūn, who wished to secure the succession to the throne for her infant son Mahmūd at the expense of the elder sons of Malik Shāh.

Constitution and Government of the Seljūk Empire.—It has been already observed that the Seljūks considered themselves the defenders of the orthodox faith and of the Abbāsid caliphate, while they on their side represented the temporal power which received its titles and sanction from the successor of the Prophet. All the members of the Seljūk house had the same obligations in this respect, but they had not the same rights, as one of them occupied relatively to the others a place almost analogous to that of the great khān of the Mongols in later times. This position was inherited from father to son, though the old Turkish idea of the rights of the elder brother often caused rebellions and violent family disputes. After the death of Malik Shāh the head of the family was not strong enough to enforce obedience, and consequently the central government broke up into several independent dynasties. Within the limits of these minor dynasties the same rules were observed, and the same may be said of the hereditary fiefs of Turkish amirs not belonging to the royal family, who bore ordinarily the title of *atabeg* or *atabek* (properly "father bey"), *e.g.* the atabegs of Fars, of Azerbaijan, of Syria, &c. The title was first given to Niẓām ul-Mulk and expressed the relation in which he stood to the prince,—as *lala*, "tutor." The affairs of state were managed by the divān under the presidency of the vizier; but in the empire of Rūm its authority was inferior to that of the *pervāneh*, whom we may name "lord chancellor." In Rūm the feudal system was extended to Christian princes, who were acknowledged by the sultan on condition of paying tribute and serving in the armies. The court dignitaries and their titles were manifold; not less manifold were the royal prerogatives, in which the sultans followed the example set by their predecessors, the Būyids.

Notwithstanding the intrigues of Turkān Khātūn, Malik Shāh was succeeded by his elder son Barkiyāroq (1092–1104), whose short reign was a series of rebellions and strange adventures such as one may imagine in the story of a youth who is by turns a powerful prince and a miserable fugitive.[1] Like his brother Mahommed (1104–1118), who successfully rebelled against him, his most dangerous enemies were the Isma'īlites, who had succeeded in taking the fortress of Alamut (north of Kazvīn) and become a formidable political power by the organization of bands of *fedais*, who were always ready, even at the sacrifice of their own lives, to murder any one whom they were commanded to slay.

Mahommed had been successful by the aid of his brother Sinjar, who from the year 1097 held the province of Khorāsan with the capital Merv. After the death of Mahommed, Sinjar became the real head of the family, though Irak acknowledged Mahmūd, the son of Mahommed. Thus there originated a separate dynasty of Irak with its capital at Hamadān (Ecbatana); but Sinjar during his long reign often interfered in the affairs of the new dynasty, and every occupant of the throne had to acknowledge his supremacy. In 1117 he led an expedition against Ghazni and bestowed the throne upon Bahrām Shāh, who was also obliged to mention Sinjar's name first in the official prayer at the Ghaznavid capital—a prerogative that neither Alp Arslān nor Malik Shāh had attained. In 1134 Bahrām Shāh failed in this obligation and brought on himself a fresh invasion by Sinjar in the midst of winter; a third one took place in 1152, caused by the doings of the Ghorids (Hosain Jihānsūz, or "world-burner"). Other expeditions were undertaken by him against Khwārizm and Turkestan; the government of the former had been given by Barkiyāroq to Mahommed b. Anushtagīn, who was succeeded in 1128 by his son Atsiz, and against him Sinjar marched in 1138. Though victorious in this war, Sinjar could not hinder Atsiz from afterwards joining the *gurkhan* (great khān) of the then rapidly rising empire of the Karakitai, at whose hands the Seljūk suffered a terrible defeat at Samarkand in 1141. By the invasion of these hordes several Turkish tribes, the Ghuzz and others, were driven beyond the Oxus, where they killed the Seljūk governor of Balkh, though they professed to be loyal to Sinjar. Sinjar resolved to punish this crime; but his troops deserted and he himself was taken prisoner by the Ghuzz, who kept him in strict confinement during two years (1153–1155), though treating him with all outward marks of respect. In the meantime they plundered and destroyed the flourishing cities of Merv and Nishāpūr; and when Sinjar, after his escape from captivity, revisited the site of his capital he fell sick of sorrow and grief and died soon afterwards (1157). His empire fell to the Karakitai and afterwards to the shāh Khwārizm. The successors of Mahommed in Irak were:—Maḥmūd (d. 1131); Toghrul, son of Mahommed, proclaimed by Sinjar (d. 1134); Masūd (d. 1152); Malik Shāh and Mahommed (d. 1159), sons of Maḥmūd; Suleimān Shāh, their brother (d. 1161); Arslān, son of Toghrul (d. 1175); and Toghrul, son of Arslān, killed in 1194 by Inānej, son of his atabeg, Mahommed, who was in confederation with the Khwārizm shāh of the epoch, Takash. This chief inherited his possessions; Toghrul was the last representative of the Seljūks of Irak.

The province of Kermān was one of the first conquests of the Seljūks, and became the hereditary fief of Kāvurd, the son of Chakir Beg. Mention has been made of his war with Malik Shāh and of his ensuing death (1073). Nevertheless his descendants were left in possession of their ancestor's dominions; and till 1170 Kermān, to which belonged also the opposite coast of Omān, enjoyed a well-ordered government, except for a short interruption caused by the deposition of Irān Shāh, who had embraced the tenets of the Isma'īlites, and was put to death (1101) in accordance with a *fatwa* of the *ulema*. But after the death of Toghrul Shāh (1170) his three sons disputed with each other for the possession of the throne, and implored foreign assistance, till the country became utterly devastated and fell an easy prey to some bands of Ghuzz, who, under the leadership of Malik Dīnār (1185), marched into Kermān after harassing Sinjar's dominions. Afterwards the shāhs of Khwārizm took this province.[2]

The Seljūkian dynasty of Syria came to an end after three generations, and its later history is interwoven with that of the crusaders. The first prince was Tutush, mentioned above, who perished, after a reign of continuous fighting, in battle against Barkiyāroq near Rai (Rhagae) in 1095. Of his two sons, the elder, Ridwān, established himself at Aleppo (d. 1113); the younger, Duqaq, took possession of Damascus, and died in 1103. The sons of the former, Alp Arslān and Sultān Shāh, reigned a short time nominally, though the real power was exercised by Lūlū till 1117.

After the great victory of Alp Arslān in which the Greek emperor was taken prisoner (1071), Asia Minor lay open to the inroads of the Turks. Hence it was easy for Suleimān, the son of Kutulmish,[3] the son of Arslān Pigu (Israil), to penetrate as far as the Hellespont, the more so as after the captivity of Romanus two rivals, Nicephorus Bryennius in Asia and Nicephorus Botaneiates in Europe, disputed the throne with one another. The former appealed to Suleimān for assistance, and was by his aid brought to Constantinople and seated on the imperial throne. But the possession of Asia Minor was insecure to the Seljūks

[1] See Defrémery, *Journ. asiatique* (1853), i. 425 seq., ii. 217 seq.

[2] An outline of the history of this branch of the Seljūks is given in *Z.D.M.G.* (1885), pp. 362-401.

[3] This prince rebelled against Alp Arslān in 1064, and was found dead after a battle.

as long as the important city of Antioch belonged to the Greeks, so that we may date the real foundation of this Seljūk empire from the taking of that city by the treason of its commander Philaretus in 1084, who afterwards became a vassal of the Seljūks. The conquest involved Suleimān in war with the neighbouring Mahommedan princes, and he met his death soon afterwards (1086), near Shaizar, in a battle against Tutush. Owing to these family discords the decision of Malik Shāh was necessary to settle the affairs of Asia Minor and Syria; he kept the sons of Suleimān in captivity, and committed the war against the unbelieving Greeks to his generals Bursuk (Προσουχ) and Buzān (Πουζανος). Barkiyāroq, however, on his accession (1092), allowed Kilij Arslān, the son of Suleimān, to return to the dominions of his father. Acknowledged by the Turkish amirs of Asia Minor, he took up his residence in Nicaea, and defeated the first bands of crusaders under Walter the Penniless and others (1096); but, on the arrival of Godfrey of Bouillon and his companions, he was prudent enough to leave his capital in order to attack them as they were besieging Nicaea. He suffered, however, two defeats in the vicinity, and Nicaea surrendered on the 23rd of June 1097. As the crusaders marched by way of Dorylaeum and Iconium towards Antioch, the Greeks subdued the Turkish amirs residing at Smyrna, Ephesus, Sardis, Philadelphia, Laodicea, Lampes and Polybotus;[1] and Kilij Arslān, with his Turks, retired to the north-eastern parts of Asia Minor, to act with the Turkish amirs of Sivās (Sebaste), known under the name of the Danishmand.

The history of the dynasty of the Danishmand is still very obscure, notwithstanding the efforts of Mordtmann, Schlumberger, Karabaçek, Sallet and others to fix some chronological details, and it is almost impossible to harmonize the different statements of the Armenian, Syriac, Greek and Western chronicles with those of the Arabic, Persian and Turkish. The coins are few in number, very difficult to decipher, and often without date. The founder of the dynasty was a certain Tailu, who is said to have been a schoolmaster (danishmand), probably because he understood Arabic and Persian. His descendants, therefore, took the style of "Ibn Danishmand," often without their own name. They took possession of Sivās, Tokāt, Niksār, Ablastān, Malatia, probably after the death of Suleimān, though they may have established themselves in one or more of these cities much earlier, perhaps in 1071, after the defeat of Romanus Diogenes. During the first crusade the reigning prince was Kumushtegīn (Ahmed Ghāzi), who defeated the Franks and took prisoner the prince of Antioch, Bohemund, afterwards ransomed. He died probably in 1106, and was succeeded by his son Mahommed (d. 1143), after whom reigned Jaghi Basān; but it is very probable that other members of the same dynasty reigned at the same time in the cities already named, and in some others, *e.g.* Kastamuni.

Afterwards there arose a natural rivalry between the Seljūks and the Danishmand, which ended with the extinction of the latter about 1175. Kilij Arslān took possession of Mosul in 1107, and declared himself independent of the Seljūks of Irak; but in the same year he was drowned in the Khaboras through the treachery of his own amirs, and the dynasty seemed again destined to decay, as his sons were in the power of his enemies. The sultan Mahommed, however, set at liberty his eldest son Malik Shāh, who reigned for some time, until he was treacherously murdered (it is not quite certain by whom), being succeeded by his brother Masūd, who established himself at Konia (Iconium), from that time the residence of the Seljūks of Rūm. During his reign—he died in 1155—the Greek emperors undertook various expeditions in Asia Minor and Armenia; but the Seljūk was cunning enough to profess himself their ally and to direct them against his own enemies. Nevertheless the Seljūkian dominion was petty and unimportant and did not rise to significance till his son and successor, Kilij Arslān II., had subdued the Danishmands and appropriated their possessions, though he thereby risked the wrath of the powerful atabeg of Syria, Nureddin, and afterwards that of Saladin. But as the sultan grew old his numerous sons, who held each the command of a city of the empire, embittered his old age by their mutual rivalry, and the eldest, Ḳutb ed-dīn, tyrannized over his father in his own capital, exactly at the time that Frederick I. (Barbarossa) entered his dominions on his way to the Holy Sepulchre (1190). Konia itself was taken and the sultan forced to provide guides and provisions for the crusaders. Kilij Arslān lived two years longer, finally under the protection of his youngest son, Kaikhosrau, who held the capital after him (till 1199) until his elder brother, Rukneddin Suleimān, after having vanquished his other brothers, ascended the throne and obliged Kaikhosrau to seek refuge at the Greek emperor's court. This valiant prince saved the empire from destruction and conquered Erzerūm, which had been ruled during a considerable time by a separate dynasty, and was now given in fief to his brother, Mughīt ud-dīn Toghrul Shāh. But, marching thence against the Georgians, Suleimān's troops suffered a terrible defeat. After this Suleiman set out to subdue his brother Masūd Shāh, at Angora, who was finally taken prisoner and treacherously murdered. This crime is regarded by Oriental authors as the reason of the premature death of the sultan (in 1204); but it is more probable that he was murdered because he displeased the Mahommedan clergy, who accused him of atheism. His son, Kilij Arslān III., was soon deposed by Kaikhosrau (who returned), assisted by the Greek Maurozomes, whose daughter he had married in exile. He ascended the throne the same year in which the Latin empire was established in Constantinople, a circumstance highly favourable to the Turks, who were the natural allies of the Greeks (Theodore Lascaris) and the enemies of the crusaders and their allies, the Armenians. Kaikhosrau, therefore, took in 1207 from the Italian Aldobrandini the important harbour of Attalia (Adalia); but his conquests in this direction were put an end to by his attack upon Lascaris, for in the battle that ensued he perished in single combat with his royal antagonist (1211). His son and successor, Kaikāūs, made peace with Lascaris and extended his frontiers to the Black Sea by the conquest of Sinope (1214). On this occasion he was fortunate enough to take prisoner the Comnenian prince (Alexius) who ruled the independent empire of Trebizond, and he compelled him to purchase his liberty by acknowledging the supremacy of the Seljūks, by paying tribute, and by serving in the armies of the sultan. Elated by this great success and by his victories over the Armenians, Kaikāūs was induced to attempt the capture of the important city of Aleppo, at this time governed by the descendants of Saladin; but the affair miscarried. Soon afterwards the sultan died (1219) and was succeeded by his brother, Alā ud-dīn Kaikobād I., the most powerful and illustrious prince of this branch of the Seljūks, renowned not only for his successful wars but also for his magnificent structures at Konia, Alaja, Sivās and elsewhere, which belong to the best specimens of Saracenic architecture. The town of Alaja was the creation of this sultan, as previously there existed on that site only the fortress of Candelor, at that epoch in the possession of an Armenian chief, who was expelled by Kaikobād, and shared the fate of the Armenian and Frankish knights who possessed the fortresses along the coast of the Mediterranean as far as Selefke (Seleucia). Kaikobād extended his rule as far as this city, and desisted from further conquest only on condition that the Armenian princes would enter into the same kind of relation to the Seljūks as had been imposed on the Comnenians of Trebizond. But his greatest military fame was won by a war which, however glorious, was to prove fatal to the Seljūk empire in the future: in conjunction with his ally, the Ayyubite prince Ashraf, he defeated the Khwārizm shāh Jalāl ud-dīn near Erzingān (1230). This victory removed the only barrier that checked the progress of the Mongols. During this war Kaikobād put an end to the collateral dynasty of the Seljūks of Erzerūm and annexed its possessions. He also gained the city of Khelāt with dependencies that in former times had belonged to the Shāh-i-Armen, but shortly before had been taken by Jalāl ud-dīn; this aggression was the cause of the war just mentioned. The acquisition of Khelāt led, however, to a new war, as Kaikobād's ally, the Ayyubite prince, envied him this conquest. Sixteen Mahommedan princes, mostly Ayyubite, of Syria and Mesopotamia, under the leadership of Malik al-Kāmil, prince of Egypt, marched with considerable forces into Asia Minor against him. Happily for Kaikobād, the princes mistrusted the power of the

[1] The Turkmans who dwelt in these western parts of Asia Minor, which were never regained by the Seljūks, were called Utch (Outsiders).

Egyptian, and it proved a difficult task to penetrate through the mountainous, well-fortified accesses to the interior of Asia Minor, so that the advantage rested with Kaikobād, who took Kharput, and for some time even held Ḥarrān, Ar Roha and Rakka (1232). The latter conquests were, however, soon lost, and Kaikobād himself died in 1234 of poison administered to him by his son and successor, Ghiyāss ed-dīn Kaikhosrau II. This unworthy son inherited from his father an empire embracing almost the whole of Asia Minor, with the exception of the countries governed by Vatatzes (Vataces) and the Christian princes of Trebizond and Lesser Armenia, who, however, were bound to pay tribute and to serve in the armies—an empire celebrated by contemporary reports for its wealth.[1] But the Turkish soldiers were of little use in a regular battle, and the sultan relied mainly on his Christian troops, so much so that an insurrection of dervishes which occurred at this period could only be put down by their assistance. It was at this epoch also that there flourished at Konia the founder of the order of the Mevlevis or Mawlawis, Jelāl ed-dīn Rūmī (see RŪMĪ), and that the dervish fraternities spread throughout the whole country and became powerful bodies, often discontented with the liberal principles of the sultans, who granted privileges to the Christian merchants and held frequent intercourse with them. Notwithstanding all this, the strength and reputation of the empire were so great that the Mongols hesitated to invade it, although standing at its frontiers. But, as they crossed the border, Kaikhosrau marched against them, and suffered a formidable defeat at Kuzadāg (between Erzingān and Sivās), in 1243, which forced him to purchase peace by the promise of a heavy tribute. The independence of the Seljūks was now for ever lost. The Mongols retired for some years; but, Kaikhosrau II. dying in 1245, the joint government of his three sons gave occasion to fresh inroads, till one of them died and Hulagu divided the empire between the other two, Izz ed-dīn (Kaikaus II.) ruling the districts west of the Halys, and Rukneddin (Kilij Arslan IV.) the eastern provinces (1259). But Izz ed-dīn, intriguing with the Mameluke sultans of Egypt to expel his brother and gain his independence, was defeated by a Mongol army and obliged to flee to the imperial court. Here he was imprisoned, but afterwards released by the Tatars of the Crimea, who took him with them to Sarai, where he died. Rukneddin was only a nominal ruler, the real power being in the hands of his minister, Muīn ed-dīn Suleimān, who in 1267 procured an order of the Mongol Khān Abaka for his execution. The minister raised his infant son, Ghiyāss ed-dīn Kaikhosrau III., to the throne, and governed the country for ten years longer, till he was entangled in a conspiracy of several amirs, who proposed to expel the Mongols with the aid of the Mameluke sultan of Egypt, Bibars (Beibars or Beybars). The latter marched into Asia Minor and defeated the Mongols in the bloody battle of Ablastān, the modern Albistan (1277); but, when he advanced farther to Caesarea, Muīn ed-dīn Suleimān retired, hesitating to join him at the very moment of action. Bibars, therefore, in his turn fell back, leaving Suleimān to the vengeance of the khān, who soon discovered his treason and ordered a barbarous execution. Kaikhosrau III. continued to reign in name till 1284, though the country was in reality governed by a Mongol viceroy. Masūd, the son of Izz ed-dīn, who on the death of his father had fled from the Crimea to the Mongol khān and had received from him the government of Sivās, Erzingān and Erzerūm during the lifetime of Kaikhosrau III., ascended the Seljūk throne on the death of Kaikhosrau. But his authority was scarcely respected in his own residence, for several Turkish amirs assumed independence and could only be subdued by Mongol aid, when they retired to the mountains, to reappear as soon as the Mongols were gone. Masūd fell, probably about 1295, a victim to the vengeance of one of the amirs, whose father he had ordered to be put to death. After him Kaikobād, son of his brother Farāmarz, entered Konia as sultan in 1298, but his reign is so obscure that nothing can be said of it; some authors assert that he governed only till 1300, others till 1315. With him ended the dynasty of the Seljūks; but the Turkish empire founded by them continued to exist under the rising dynasty of the Ottomans. (See TURKEY.)

[1] See the details in Vincent of Beauvais, *Speculum Historiale*, bk. xxx. chaps. 143, 144.

BIBLIOGRAPHY.—The best, though insufficient, account of the Seljūks is still de Guignes, *Histoire générale des Huns*, bks. x.-xii., from whom Gibbon borrowed his dates. Among translations from original sources (of which the most trustworthy are yet unedited), comp. Mirkhond's *Geschichte der Seldschuken* (ed. Vullers), Giessen, (1838); *Tarikh-i-Guzideh*, French translation by Defrémery in the *Journal asiatique*, 1848, i. 417 sqq., ii. 259 sqq., 334 sqq.; *Seid Locmani ex libro Turcico qui Oghuzname inscribitur excerpta* (ed. J. H. W. Lagus, Helsingfors, 1854) (on the Seljūks of Asia Minor exclusively, but of little value). Information respecting certain periods is given incidentally in the works of von Hammer and d'Ohsson (see bibliography to TURKEY: *History*), and in Stanley Lane Poole's *Mahommedan Dynasties* (1894). (M. T. H.)

SELKIRK (or SELCRAIG), **ALEXANDER** (1676–1721), Scottish sailor, the prototype of "Robinson Crusoe," seventh son of John Selcraig, shoemaker and tanner of Largo, Fifeshire, was born in 1676. In his youth he displayed an unruly disposition, and, having been summoned on the 27th of August 1695 before the kirk-session for his indecent behaviour in church, "did not compear, being gone away to the seas." In May 1703 he joined Dampier in a privateering expedition to the South Seas, going with the "Cinque Ports" galley as sailing master. In September 1704 the "Cinque Ports" put in at Juan Fernandez Island, west of Valparaiso; here Selkirk had a dispute with his captain, Thomas Stradling, and at his own request was put ashore with a few ordinary necessaries. Before the ship left he begged to be readmitted, but this was refused, and Selkirk remained alone in Juan Fernandez four years and four months, till on the 31st of January 1709 he was found, and on the 12th of February following taken off, by Captain Woodes Rogers, commander of the "Duke" privateer (with Dampier as pilot), who made him his mate and afterwards gave him command of one of his prizes, "The Increase" (March 29th). Selkirk returned to the Thames on the 14th of October 1711: he was back at Largo in 1712, in 1717 we find him again at sea, and in 1721 he died as master's mate of H.M.S. "Weymouth" (December 12th).

See Woodes Rogers, *Cruising Voyage round the World* (1712), and Edward Cooke, *Voyage in the South Sea and round the World* (1712), the earliest descriptions of Selkirk's adventures; also *Providence Displayed, or a Surprising Account of one Alexander Selkirk . . . written by his own Hand* (reprinted in *Harl. Miscell.* for 1810, v. 429); and Funnell's *Voyage round the World* (1707). Steele made Selkirk's acquaintance, and gave a sketch of the adventurer and his story in the *Englishman* for the 3rd of December 1713. In 1719, shortly after a second edition of Rogers' *Voyage* had appeared (1718), Defoe published *Robinson Crusoe*. While this is clearly indebted in its main outlines to Selkirk's story, most of its incidents are, of course, fairly independent of the latter; thus the decidedly tropical description of Crusoe's island and the whole narrative of the cannibals' visits, &c., agree rather with one of the West Indies than with Juan Fernandez.

The best modern biography is the *Life and Adventures of Alexander Selkirk* by John Howell (1829). In 1868 a tablet was put up on Juan Fernandez at a point on the hill road called "Selkirk's Look-out," where in a gap in the trap rock a magnificent view may be had of the whole island, and of the sea north and south, over which the exile must have often watched for an approaching sail. It bears the following inscription:—"In memory of Alexander Selkirk, mariner, a native of Largo in the county of Fife, Scotland, who was on this island in complete solitude for four years and four months. He was landed from the 'Cinque Porte' (*sic*) galley, 96 tons, 16 guns, 1704 A.D., and was taken off in the 'Duke' privateer, 12th February 1709. He died lieutenant of the 'Weymouth' 1723 A.D., aged forty-seven years. This tablet is erected near Selkirk's look-out by Commodore Powell and officers of H.M.S. 'Topaze,' 1868 A.D."

SELKIRK, THOMAS DOUGLAS, 5TH EARL OF (1771–1820), was born at St Mary's Isle, Kirkcudbrightshire, on the 20th of June 1771. He succeeded his father in 1799, his six elder brothers having predeceased him. At this time the Highlands of Scotland were being changed into grazing land and deer forests. Selkirk took deep interest in the evicted peasants, and tried to organize emigration to the British colonies. In 1803–1804 he founded a large and prosperous settlement in Prince Edward Island, and at about the same time a smaller one at Baldoon in Upper Canada. He later turned his attention to the Canadian west, and gradually

acquired control of the Hudson's Bay Company. In May 1811 an immense tract was granted to him in the Red River valley, and he at once proceeded to send out settlers; but the hostility of the North-West Fur Company, with its headquarter at Montreal, eventually ruined the colony (see RED RIVER SETTLEMENT), and the influence of his rivals led to the defeat of Selkirk in various legal proceedings. On the 8th of April 1820 he died broken-hearted at Pau. One of the most generous and disinterested men in the history of colonization, he fell a victim to the predatory selfishness of his rivals.

Copies of his papers, most of which are unpublished, are in the Canadian Archives Department at Ottawa.

SELKIRK, a royal and police burgh and the county town of Selkirkshire, Scotland. Pop. (1901) 6292. It lies on Ettrick Water, about 3 m. above its confluence with the Tweed, 6¼ m. S. of Galashiels by the North British Railway Company's branch line, of which it is the terminus. It is picturesquely situated on a hill on the right bank of the river, close to which are the mills and factories. The public buildings include the county buildings, public hall, library and the town hall (with a spire 110 ft. high). There are statues of Sir Walter Scott in his sheriff's robes, and Mungo Park, the African explorer, who was educated at the grammar school. Woollen manufactures (tweeds, tartans, plaids and shawls) are the principal industry, but the town is also an important agricultural centre. With Galashiels and Hawick it belongs to the Hawick or Border group of parliamentary burghs. Immediately south of the town are the beautiful grounds of the Haining.

As its early name (Scheleschyrche) indicates, Selkirk originally consisted of a number of *shiels* (huts), in the forest beside which a church had been planted by the Culdees of Old Melrose. David I., while prince of Cumbria, founded in 1113 the abbey, which was removed fifteen years afterwards to Kelso, and also erected a castle. Captured by Edward I., by whom it was enlarged and strengthened, the fortress was retaken by Wallace in 1297, and remained in the hands of the Scots till the battle of Halidon Hill (1333), when it was delivered to the English. It was probably destroyed in 1417 when Sir Robert Umfraville, governor of Berwick, set fire to the town, and nothing remains of it save some green mounds and the name Peel Hill. It is significant of the havoc wrought during the Border warfare that there is not in Selkirk, in spite of its antiquity, any building two hundred years old. Of the eighty burghers who marched to Flodden (1513) under William Brydone, the town clerk, only the leader survived, with a banner captured from the English; he was knighted by James V. This banner is locally supposed to be the one borne by the Weavers' Corporation in the annual ceremony of Riding the Common, but the claim cannot be verified. The charter granted by David I. and other muniments having perished, James V. renewed the charter in 1533, with the right to enclose 1000 acres of the common and leave to elect a provost. After the battle of Philiphaugh (1645), David Leslie, the Covenanters' general, had some prisoners confined in the tolbooth of Selkirk and afterwards massacred in the market-place. From an early period the souters (shoemakers) were a flourishing craft, and in the rebellions of 1715 and 1746 were required to furnish the Jacobites with several thousand pairs of shoes. Though shoemaking is extinct, "the souters of Selkirk" is still a nickname for the inhabitants. Tradition of the ancient craft yet survives also in connexion with the enrolment of burgesses, when the burgess elect has to go through the ceremony of "licking the birse" (*i.e.* bristles). When the loving-cup reaches the candidate he dips in the wine a brush of bristles like that used by shoemakers and passes it through his lips.

SELKIRK MOUNTAINS, a range in the S.E. of British Columbia, Canada, extending N. for about 200 m. from the American frontier with a breadth of about 80 m. and bounded E., W. and N. by the Columbia river. Though often spoken of as part of the Rocky Mountain system, they are really distinct, and belong to an older geological epoch, consisting mainly of crystalline or highly metamorphosed rocks, granites, gneiss, schists; their outline too is rounder and less serrated than that of the Rockies. On the S.E. is the Purcell range, with the main chain of the Rockies still farther E., and on the W. the Gold range, prolonged northward as the Cariboo Mountains. They do not rise much above 10,000 ft., the highest peaks being Sir Donald (named after Lord Strathcona), 10,645 ft.; Macdonald (named after Sir John Macdonald), 9440 ft.; and Mount Tupper (after Sir Charles Tupper), 9030 ft. The scenery is wild and magnificent; below the snow-line, especially on the western side, the slopes are densely wooded, and enormous glaciers fill the upper valleys; of these the most celebrated is that of the Illecillewaet, near Glacier House, on the Canadian Pacific railway. The Selkirks are crossed by the railway at Rogers Pass, discovered in 1883. The engineering difficulties overcome are greater than at any other portion of the line, and the grades are in places very steep. A magnificent series of caverns, called the Nakimu Caves, occur in the Glacier Park Reserve not far from Glacier on the Canadian Pacific railway. These caves are formed by the Cougar Creek, and were first comprehensively surveyed in 1905–1906 (see the Canadian Surveyor-General's *Report* for that year).

SELKIRKSHIRE, a southern county of Scotland, bounded N. by the shires of Peebles and Midlothian, E. and S.E. by Roxburghshire, S. and S.W. by Dumfriesshire and W. by Peeblesshire. Its area is 170,762 acres or 266·8 sq. m. Almost the whole of the surface is hilly, the only low-lying ground occurring in the valleys of the larger streams. The highest hills are found in the extreme west and south-west. On the confines of Peeblesshire the chief heights are Dun Rig (2433 ft.), Black Law (2285), Broad Law (2723) and Lochcraig Head (2625); and on the Dumfriesshire borders, Bodesbeck Law (2173), Capel Fell (2223), Wind Fell (2180) and Ettrick Pen (2269). In the north, close to the Midlothian boundary, is Windlestraw Law (2161). The principal rivers are the Ettrick (32 m.) and its left-hand affluent the Yarrow (14 m.), but for a few miles the Tweed traverses the north of the county. Gala Water (21 m.), though it joins the Tweed a little below Galashiels, belongs rather to Midlothian, since it rises in the Moorfoot Hills and for most of its course flows in that shire. St Mary's Loch and its adjunct, the Loch of the Lornes, in the uplands, are the chief lakes, and of numerous small lakes in the south-east the two lochs of Shaws, Clearburn, Akermoor and Essenside may be mentioned. The vales of the Tweed and Yarrow and Ettrickdale are the principal valleys.

Geology.—This county is entirely occupied by Silurian and Ordovician rocks which are very much folded and crumpled; the axes of the folds run in a south-westerly, north-easterly direction. The Ordovician rocks, represented by the Glenkiln and Hartfell shales, appear in the crests of the anticlinal folds; in the western part of the county they are frequently sandy in character. Above the black Ordovician shales come the Birkhill graptolitic shales followed by the Queensberry grits, a series of greywackes, grits, flags and shales, which pass upwards into the Hawick rocks, shales with brown-weathering greywackes. Some of the Queensberry grits and underlying greywackes in the Ordovician are used as building stones. Igneous rocks are represented by the Tertiary basalt dikes of Bowerhope Law and dikes of quartz-felsite near Windlestraw Law and Caddon Water; dikes of minette occur near Todrig. A great deal of boulder-clay covers the older rocks; the ice-borne material travelled from west to east, and many of the hills show steep and bare slopes towards the west, but have gentle slopes covered with glacial deposits on the eastern side.

Climate and Agriculture.—The rainfall for the year, based on observations at Bowhill, between the confluence of the Yarrow and Ettrick, at a height of 537 ft. above the sea, averages 33·65 in. The mean temperature for the year, calculated at Galashiels (416 ft. above the sea), is 46·3° F., for January 36·2° F., and for July 58·2° F. The climate is thus cold and wet on the whole, and as the soil is mostly thin, over a subsoil of clayey till, agriculture is carried on at a disadvantage. About one-sixth of the surface is under cultivation, oats being almost the only grain crop and turnips the chief green crop. Live stock is pursued more profitably, the sheep walks carrying heavy stocks. Blackfaced are the principal breed on the higher ground, but on the lower pure Cheviots and a cross of Cheviot with Leicester are common. Cattle also are raised, and horses (mainly for agricultural operations) and pigs to only a moderate extent. There are comparatively few small holdings, farms between 100 and 300 acres being the most usual. More than one-third of the county (upwards of 60,000 acres) belongs to the duke of Buccleuch. The land between the Ettrick and the Tweed was formerly covered with forest to such an extent that the sheriffdom was described as Ettrick

Forest. The chief trees were oak, birch and hazel; and the wood being well stocked with the finest breed of red deer in the kingdom became the hunting-ground of the Stuarts. James V., however, to increase his revenues, let the domain for grazing, and it was soon converted into pasture for sheep, with the result that now only about 5000 acres in the shire are under wood.

Manufactures and Communications.—Woollen manufactures (tweeds, tartans, plaiding, yarn and hosiery) are the predominant industry at Galashiels and Selkirk. Tanning, dyeing, engineering, iron-founding and bootmaking also are carried on at Galashiels, and there are large vineries at Clovenfords.

The only railway communication is in the north, where there is a branch line from Galashiels to Selkirk, besides part of the track of the Waverley route from Edinburgh to the south and the line from Galashiels to Peebles. There are coaches from Selkirk to St Mary's Loch and periodically to Moffat.

Population and Administration.—In 1891 the population numbered 27,712, and in 1901 it was 23,356, or 88 to the sq. m., a decrease of 15·78 %, much the largest for the decade in Scotland. Fifty-seven persons spoke Gaelic and English, none Gaelic only. The chief towns are Galashiels (pop. 13,615) and Selkirk (6292). Selkirkshire combines with Peeblesshire to return a member to Parliament, and the county town and royal burgh of Selkirk and the municipal burgh of Galashiels unite with Hawick (in Roxburghshire) to constitute the Border or Hawick group of parliamentary burghs. The shires of Selkirk, Roxburgh and Berwick form a sheriffdom, and a resident sheriff-substitute sits at Selkirk and Galashiels. There is a combination poorhouse at Galashiels. The county is under school board jurisdiction, and there are high schools at Selkirk and Galashiels, while some of the other schools in the shire earn grants for higher education. Part of the "residue" grant is spent in supporting short courses of instruction in dairying, and Selkirk town council subsidizes popular science classes in the burgh school.

History and Antiquities.—There are no Roman remains in Selkirkshire, the natives probably being held in check from the station at Newstead near the Eildons. The Standing Stone near Yarrow church bearing a Latin inscription is ascribed to the 5th or 6th century and is only a quasi-Roman relic. No so-called British camps have been found on the upper and middle waters of the Ettrick and Yarrow, and of the few situated in the lower valleys of these streams the most important is the large work on Rink Hill in the parish of Galashiels, the district containing various interesting prehistoric remains. At Torwoodlee, 2 m. north-west of Galashiels, are the ruins of the only example of a *broch* (round tower) in the Border counties. The diameter of the structure measures 75 ft., and that of the enclosed court 40 ft., giving a thickness for the wall of 17½ ft. The *broch* stands in an enclosure of mounds and a ditch, the whole being protected by an outer entrenchment at a considerable distance, of which only a fragment survives. Locally the works are called Torwoodlee Rings, or Eye Castle. The barrier known as the Catrail, or Picts' Work, starts near Torwoodlee, whence it runs southwards to Rink Hill. There it sweeps round to the south-west as far as Yarrow church, from which it again takes a due south direction to the valley of the Rankle, where it passes into Roxburghshire. Some Arthurian romance touches the shire at points, for the field of the battle of Coit Celidon (the Wood of Celidon) was probably in Ettrick Forest, and that of Guinnion in the vale of Gala. The history of the shire for six centuries following the retreat of the Romans is that of the whole of south-eastern Scotland. The country formed part, first, of the British kingdom of Strathclyde, then of the Saxon kingdom of North-umbria, and finally, about 1020, was annexed to Scotland. The first sheriff of whom there is record was Andrew de Synton, appointed by William the Lion (d. 1214). After Edward I. had overrun Scotland substantial burgesses of Selkirk were among those who took the oath of allegiance to him at Berwick in 1296, but next year William Wallace sought the covert of the forest to organize resistance. To the north of Hangingshaw in the country between the Yarrow and Tweed he constructed an earthwork, still called Wallace's Trench, 1000 ft. long and deep enough to conceal a moss horse and his rider, and paved in part with flat whinstones laid on edge. At the higher end on the top of a hill it terminated in a large square enclosure. Here he lay till his plans were completed and at last departed, his forces including a body of Selkirk archers, for a raid into the north of England. During the prolonged strife that followed the death of Robert Bruce (1329) the foresters were constantly fighting, and the county suffered more heavily at Flodden (1513) than any other district. The lawlessness of the Borderers was at length put down by James V. with a strong hand. He parcelled out the forest in districts, and to each appointed a keeper to enforce order and protect property. In 1529 the ringleaders, including William Cockburn of Henderland, Adam Scott of Tushielaw and the notorious Johnnie Armstrong, were arrested and promptly executed. This severity gradually had the desired effect, though after the union of the crowns in 1603 the freebooters and mosstroopers again threatened to be troublesome, until James VI.'s lieutenants ruthlessly stamped out disaffection. The Covenanters held many conventicles in the uplands, and their general, David Leslie, routed the marquis of Montrose at Philiphaugh in 1645.

The manufacture of woollen goods was introduced into Selkirk and Galashiels and attained great success, thus adding largely to the prosperity of the neighbourhood. In another direction the beauty and romance of Yarrow and Ettrick have proved a most stimulating force in modern Scottish literature.

BIBLIOGRAPHY.—Sir George Douglas, *Roxburgh, Selkirk and Peebles* (Edinburgh, 1899); T. Craig-Brown, *History of Selkirkshire*; George Reaveley, *History of Galashiels* (Galashiels, 1875); William Angus, *Ettrick and Yarrow* (Selkirk, 1894); W. S. Crockett, *The Scott Country* (Edinburgh, 1902); *In Praise of Tweed* (Selkirk, 1899); J. Russell, *Reminiscences of Yarrow* (2nd ed., Selkirk, 1894).

SELLA, QUINTINO (1827–1884), Italian statesman and financier, was born at Mosso, near Biella, on the 7th of July 1827. After studying engineering at Turin, he was sent in 1843 to study mineralogy at the Parisian school of mines. In Paris he witnessed the revolution of 1848, and only returned to Turin in 1852, when he taught applied geometry at the technical institute. In 1853 he became professor of mathematics at the university, and in 1860 professor of mineralogy in the school of applied engineering. In 1860 he was elected deputy for Cossato. A year later he was selected to be secretary-general of public instruction, and in 1862 received from Rattazzi the portfolio of finance. The Rattazzi cabinet fell before Sella could efficaciously provide for the deficit of £17,500,000 with which he was confronted; but in 1864 he returned to the ministry of finance in the La Marmora cabinet, and dealt energetically with the deficit of £8,000,000 then existing. Persuading the king to forgo £120,000 of his civil list, and his colleagues in the cabinet to relinquish part of their ministerial stipends, he effected savings amounting to £2,400,000, proposed new taxation to the extent of £1,600,000, and induced landowners to pay one year's instalment of the land tax in advance. A vote of the chamber compelled him to resign before his preparations for financial restoration were complete; but in 1869 he returned to the ministry of finance in a cabinet formed by himself, but of which he made over the premiership to Giovanni Lanza. By means of the grist tax (which he had proposed in 1865, but which the Menabrea cabinet had passed in 1868), and by other fiscal expedients necessitated by the almost desperate condition of the national exchequer, he succeeded, before his fall from power in 1873, in placing Italian finance upon a sound footing, in spite of fierce attacks and persistent misrepresentation. In 1870 his great political influence turned the scale against interference in favour of France against Prussia, and in favour of an immediate occupation of Rome. From 1873 until his premature death on the 14th of March 1884, he acted as leader of the Right, and was more than once prevented by an ephemeral coalition of personal opponents from returning to power as head of a Moderate Conservative cabinet. After the failure of an attempt to form a cabinet in May 1881 he practically retired from public life, devoting himself to his studies and his linen factory.

His *Discorsi parlamentari* were published (5 vols., 1887–1890) by order of the Chamber of Deputies. An account of his life and his scientific labours was given by A. Cossa in the *Proceedings of the Accademia dei Lincei* (1884–1885).

SELLAR, WILLIAM YOUNG (1825–1890), Scottish classical scholar, was born at Morvich, Sutherlandshire, on the 22nd of February 1825. Educated at the Edinburgh Academy and afterwards at Glasgow University, he entered Balliol College, Oxford, as a scholar. Graduating with a first-class in classics, he was elected fellow of Oriel, and, after holding assistant professorships at Durham, Glasgow and St Andrews, was appointed professor of Greek at St Andrews (1857). In 1863 he was elected professor of humanity in Edinburgh University, and occupied that chair down to his death on the 12th of October 1890. Sellar was one of the most brilliant of modern classical scholars, and was remarkably successful in his endeavours to reproduce the spirit rather than the letter of Roman literature.

His chief works, *The Roman Poets of the Republic* (3rd ed., 1889) and *The Roman Poets of the Augustan Age* (Virgil, 3rd ed., 1897), and *Horace and the Elegiac Poets* (2nd ed., by W. P. Ker, 1899), with memoir by Andrew Lang, are standard authorities. Sellar contributed to the 9th edition of the *Ency. Brit.* a series of brilliant articles on the Roman poets, the substance of which has been retained in the present edition.

SELMA, a city and the county-seat of Dallas county, Alabama, U.S.A., altitude 126 ft., on the right bank of the Alabama river, a little S. of the centre of the state, and known as the Central City. Pop. (1900) 8713, of whom 4429 were negroes; (1906, estimate) 12,047. It is served by the Louisville & Nashville, the Southern and the Western of Alabama railways. It has a Carnegie library, two parks and two Y.M.C.A. buildings. In the city are the Selma Military Institute (1907), and the Alabama Baptist Colored University (opened in 1878), which is one of the largest schools in the South owned and controlled by negroes, and has industrial, domestic, normal, collegiate and (especially) theological courses. The Society of United Charities supports the Selma Hospital (1889) for negroes and the Selma Infirmary (1890). The city has a large trade, principally in cotton (the chief crop of the surrounding country), and in lumber from the great pineries. There are cotton compresses, cotton warehouses, &c.; in 1905 the value of the factory products was $1,138,817. The water supply is obtained from artesian wells. The site was originally called Moore's Bluff, from one Thomas Moore, who owned a steamboat landing here about 1815. A town was established about 1817, and in 1820 was incorporated under its present name (from the Ossianic legend). Selma was first chartered as a city in 1852. During the Civil War it was the seat of Confederate arsenals, shipyards and military factories. On the 2nd of April 1865 it was captured by Federal troops under General James H. Wilson (b. 1837) and much of the city was destroyed by fire. Near Selma lived William Rufus King (1786–1853), a Democratic representative in Congress from North Carolina in 1811–1816, a member of the United States Senate from Alabama in 1819–1844 and 1846–1853, minister to France in 1844–1846, and vice-president of the United States from the 4th of March 1853 until his death on the 18th of April; and Selma was the home of John Tyler Morgan (1824–1907), a brigadier-general in the Confederate army in 1863–1865 and a prominent Democratic member of the United States Senate in 1877–1907; and of Edmund Winston Pettus (1821–1907), also a brigadier-general in the Confederate Army and, in 1897–1907, a Democratic member of the United States Senate.

SELMECZBÁNYA, officially called SELMECZ-ÉS BÉLABÁNYA (Ger. *Schemnitz*), the capital of the county of Hont, Hungary, 152 m. N. of Budapest by rail. Pop. (1900) 16,370, about two-thirds Slovaks. It is an old mining town, situated at an altitude of 1945 ft. in a deep ravine in the Hungarian Ore Mountains, and is built in terraces. Selmeczbánya is encircled by high mountains, notably the isolated peak of the Calvarienberg (2385 ft.) on the S.W., on which are situated a castle and a church, and the Paradiesberg (2400 ft.) on the N.W. It possesses a famous academy of mining and forestry, founded by Maria Theresa in 1760, to which are attached a remarkable collection of minerals, and a chemical laboratory. Among other buildings are a picturesque old castle dating from the 13th century, now in ruins with the exception of a few rooms used as a prison; the new castle, used as a fire watch-tower; and the town hall. The mines, chiefly the property of the state and of the corporation, yield silver, gold, lead, copper and arsenic. The town contains also flourishing potteries, where well-known tobacco pipes are manufactured. About 7 m. to the S.W. of the town lie the baths of Vihnye, with springs of iron, lime and carbonic acid, and about the same distance to the W. are the baths of Szkleno with springs of sulphur and lime.

Selmeczbánya is an old town whose mines existed in the 8th century. In the 12th century, together with the whole mining region of northern Hungary, it was colonized by German settlers, who later embraced the Reformation. Owing to the counter-reformation the German element was driven out during the 18th century, and its place taken by the actual Slovak population.

SELOUS, FREDERICK COURTNEY (1851–), British explorer and hunter, was born in London on the 31st of December 1851, and was educated at Rugby and in Germany. His love for natural history led to the resolve to study the ways of wild animals in their native haunts. Going to South Africa when he was nineteen he travelled from the Cape to Matabeleland, reached early in 1872, and was granted permission by Lobengula to shoot game anywhere in his dominions. From that date until 1890, with a few brief intervals spent in England, Selous hunted and explored over the then little-known regions north of the Transvaal and south of the Congo basin, shooting elephants, and collecting specimens of all kinds for museums and private collections. His travels added largely to the knowledge of the country now known as Rhodesia. He made valuable ethnological investigations, and throughout his wanderings—often among people who had never previously seen a white man—he maintained cordial relations with the Kaffir chiefs and tribes, winning their confidence and esteem, notably so in the case of Lobengula. In 1890 Selous entered the service of the British South Africa Company, acting as guide to the pioneer expedition to Mashonaland. Over 400 m. of road were constructed through a country of forest, mountain and swamp, and in two and a half months Selous took the column safely to its destination. He then went east to Manica, concluding arrangements there which brought the country under British control. Coming to England in December 1892 he was awarded the Founder's medal of the Royal Geographical Society "in recognition of his extensive explorations and surveys," of which he gave a summary in "Twenty Years in Zambesia" (*Geo. Journ.* vol. i., 1893). He returned to Africa to take part in the first Matabele War (1893), being wounded during the advance on Bulawayo. While back in England he married, but in March 1896 was again settled with his wife on an estate in Matabeleland when the native rebellion broke out. He took a prominent part in the fighting which followed, and published an account of the campaign entitled *Sunshine and Storm in Rhodesia* (1896). On the restoration of peace Selous settled in England. He continued, however, to make shooting and hunting expeditions—visiting Asia Minor, Newfoundland, the Canadian Rockies and other parts of the world. In none of his expeditions was his object the making of a "big bag," but as a hunter-naturalist and slayer of great game he ranks with the most famous of the world's sportsmen.

Besides the works mentioned he published *A Hunter's Wanderings in Africa* (1881, 5th ed., 1907), *Travel and Adventure in South-East Africa* (1893), *Sport and Travel, East and West* (1900), *Recent Hunting Trips in British North America* (1907), *African Nature Notes and Reminiscences* (1908), a valuable addition to the knowledge of African fauna, and made numerous contributions to *The Geographical Journal*, the *Field* and other journals.

SELVE, ODET DE (*c.* 1504–1563), French diplomatist, was the son of Jean de Selve, first president at the parlements of Rouen and Bordeaux, vice-chancellor of Milan, and ambassador of the king of France. In 1540 Odet was appointed councillor at the parlement of Paris and in 1542 at the grand council. In 1546, after the signature of the treaty of Ardres, he was sent on an embassy to England, in 1550 to Venice, and afterwards to Rome, where he obtained the election of Pope Paul IV. in 1555.

SELWYN, ALFRED RICHARD CECIL (1824-1902), British geologist, son of the Rev. Townshend Selwyn, Canon of Gloucester, was born at Kilmington in Somerset on the 28th of July 1824. Educated in Switzerland, he there became interested in geology, and in 1845 he joined the staff of the Geological Survey of Great Britain. He was actively engaged in the survey of North Wales and bordering portions of Shropshire, and a series of splendid geological maps resulted from his joint work with A. C. Ramsay and J. B. Jukes. In 1852 he was appointed director of the Geological Survey of Victoria, Australia, where he gave special attention to the gold-bearing rocks, until in 1869 the Colonial Legislature brought the Survey to an abrupt termination. At this date Sir W. E. Logan had just retired from the office of director of the Geological Survey of Canada, and Selwyn was appointed his successor. In this new sphere of activity he continued his geological work with marked success, devoting particular attention to the Pre-Cambrian rocks of Quebec. He retired in 1894. Meanwhile in 1874 he had been elected F.R.S., in 1876 he was awarded the Murchison Medal of the Geological Society of London, and he was created C.M.G. in 1886 for his distinguished work as assistant to the Canadian Commissioners at the exhibitions in Philadelphia (1876), Paris (1878) and London (1886). He retired to Vancouver in British Columbia, where he died on the 19th of October 1902.

See memoir with portrait in *Geol. Mag.* (Feb. 1899).

SELWYN, GEORGE AUGUSTUS (1719–1791), English wit, son of Colonel John Selwyn (d. 1751) of Matson, Gloucestershire, was born on the 11th of August 1719. Educated at Eton and Oxford, he became member of parliament for the family borough of Ludgershall in 1747, and from 1754, three years after he inherited Matson, to 1780 he represented Gloucester. In parliament he took no part in debate, but he managed to obtain two or three lucrative sinecures; in society he was very popular and won a great reputation as a wit. He is said to have been very fond of seeing corpses, criminals and executions, and Horace Walpole says he loved "nothing upon earth so well as a criminal, except the execution of him." He died in London on the 25th of January 1791. Like the eccentric duke of Queensberry Selwyn claimed to be the father of Maria Fagniani, who became the wife of Francis Charles Seymour, 3rd marquess of Hertford.

See J. H. Jesse, *George Selwyn and his Contemporaries* (1843–1844; new ed., 1882); and S. P. Kerr, *George Selwyn and the Wits* (1909).

SELWYN, GEORGE AUGUSTUS (1809-1878), English bishop, second son of William Selwyn (1775–1855), a distinguished legal writer, was born at Hampstead, London, on the 5th of April 1809. He was educated at Eton and at St John's College, Cambridge, where in 1829 he rowed in the first university boat-race. He took his degree (second in the classical tripos) in 1831. He returned to Eton as private tutor, was ordained deacon in 1833, and devoted himself with characteristic energy to work in the parish of Windsor. In 1841 it was proposed that he should go out as first bishop to New Zealand, then just beginning to be colonized. Despite the advice of his friends he accepted the offer. He studied navigation and the Maori language on the voyage, and gave himself up to a life of continual strain and hardship. He spent days and sometimes nights in the saddle, swam broad rivers and provided himself with a sailing vessel. Unfortunately, just when he had gained the confidence of the natives, his ascendancy was rudely shaken by the first Maori war. Selwyn endeavoured to mediate, but incurred the hostility of both parties. He went to the battlefield to minister to the sick and wounded in both camps; but the Maoris were persuaded that he had gone out to fight against them, and years afterwards one of them pointed out a scar on his leg to an Anglican bishop which he declared had been inflicted by Selwyn's own hands. It was long before he regained the confidence he had forfeited by his strict adherence to duty. In 1854 he returned to England for a short furlough; but he spent much of it in pleading the needs of his diocese. He returned to New Zealand with a band of able associates, including J. C. Patteson, and began to divide his large diocese into sees of more manageable proportions. The colonists came to respect his uprightness, and the Maoris learned to regard him as their father. In 1868, while he was in England to attend the first pan-Anglican synod, the bishopric of Lichfield became vacant, and after some hesitation he accepted it. In his new sphere of work he displayed the same unselfish activity as before, and in the "Black Country" portion of his diocese he won the hearts of the working classes. He called his clergy and laity together for consultation in the diocesan conference, an innovation the value of which he had proved by his colonial experience. On his death, on the 11th of April 1878, his great work for the church was celebrated by a remarkable memorial, Selwyn College, Cambridge, being erected by public subscription and incorporated in 1882.

See *Lives* by H. W. Tucker (2 vols., 1879) and G. H. Curteis (1889).

His son, JOHN RICHARDSON SELWYN (1844–1898), bishop of Melanesia, was born in New Zealand on the 20th of May 1844. He was educated at Eton and at Trinity College, Cambridge, and was ordained deacon in 1869. At first he laboured with energy and tact as vicar of Wolverhampton in his father's diocese of Lichfield; but the martyrdom of John Coleridge Patteson, bishop of Melanesia, led him to volunteer for service in the Australasian Archipelago. After three years' service, during which the bishopric remained vacant, he was nominated as Patteson's successor (1877). For twelve years he threw himself with intense energy into his arduous work, but his health broke down and he returned to England in 1890. There he found an appropriate sphere in the mastership of Selwyn College, where he remained until his death on the 12th of February 1898.

SEMANG, an aboriginal people of the Malay peninsula, found in northern Perak, Kedah, Kelantan, Trengganu and the northern districts of Pahang. They are a fairly pure branch of the woolly-haired Negrito race, which includes the natives of the Andaman islands, the Aetas of the Philippines and the dwarfs of Central Africa. The men average about 4 ft. 9 or 10 in., while the women are 3½ in. shorter. Their colour is a very dark brown or black. The shape of the head is round, or intermediate between round and long. The forehead is low and rounded, and projects over the root of the nose, which is short, depressed and pyramid-shaped. The eyes are wide open and round, showing no obliquity, the iris being of a very rich, deep brown. Lips vary from moderate to full, the mouth is rather large, the chin feebly developed, and the jaws are often slightly projecting. The hair is very dark-brown black, never blue-black as among Chinese and Malays. It grows in short, spiral tufts, curling closely all over the head. The arm-stretch is almost always greater than their height. The feet are usually short and splayed, with a remarkable inward curve of the great toe, and are very prehensile. The Semangs live in caves or leaf-shelters formed between branches. A waistcloth for the men, made of tree bark hammered out with a wooden mallet from the bark of the terap, a species of wild bread-fruit tree, and a short petticoat of the same for the women, is the only dress worn; many go naked. Tattooing, or rather scarring, is practised, by drawing the finely serrated edge of a sugar-cane leaf across the skin and rubbing in charcoal powder. They have bamboo musical instruments, a kind of Jews' harp and a nose flute. On festive occasions there is song and dance, both sexes decorating themselves with leaves. The Semangs bury their dead simply, food and drink being placed in the grave.

SEMAPHORE, a town of Adelaide county, South Australia, 9½ m. by rail from the city of Adelaide. It is one of the chief watering-places of the state, with a pier 1800 ft. long. Pop. about 8000.

SEMAPHORE (Gr. σῆμα, sign, and φορά, carrying, from φέρειν, to bear), the name of an apparatus or mechanical device by which information or messages can be signalled to a distance. It consists of movable arms or blades of wood, worked by levers and affixed to a high post or pole. The most familiar semaphore is that used in railway signalling on the block system, where the blade if horizontal signifies danger, if dropped safety. Used with a code, the semaphore is still used in the navy for signalling

from ship to ship. Until the invention of the electric telegraph, the semaphore was used for transmitting messages over long distances.

SEMELĒ, in Greek mythology, daughter of Cadmus and Harmonia, and mother of Dionysus by Zeus. It is said that Hera, having assumed the form of Semelē's nurse, persuaded her rival to ask Zeus to show himself to her in all his glory. The god, who had sworn to refuse Semelē nothing, unwillingly consented. He appeared seated in his chariot surrounded by thunder and lightning; Semelē was consumed by the flames and gave birth prematurely to a child, which was saved from the fire by a miraculous growth of ivy which sprang up round the palace of Cadmus. Dionysus afterwards descended to the nether world, and brought up his mother, henceforth known as Thyōnē (the raging one), to Olympus. Zeus and Semelē probably represent the fertilizing rain of spring, and the earth, afterwards scorched by the summer heat. Another tradition represents Actaeon as the lover of Semelē, and his death as due to the jealousy of Artemis. A statue and grave were to be seen in Thebes.

See Apollodorus iii. 4; Pausanias iii. 24. 3, ix. 2. 3; Ovid, *Metam.* iii. 260.

SEMENDRIA (*Smederevo*), an important commercial town and capital of the Smederevo department, Servia, on the Danube, between Belgrade and the Iron Gates. Pop. (1900) 6912. It is believed to stand on the site of the Roman settlement *Mons aureus*, and there is a tradition that its famous vineyards—supplying Budapest and Vienna with some of the finest table grapes—were planted by the Roman emperor Probus (A.D. 276–282). In the 15th century, when the Servian prince George Brankovich became lord of Tokay, in Hungary, he planted vines from Semendria on his estates there; and from these came the famous white wine *Tokay*. At the eastern end of the town, close to the river, there is a picturesque triangular castle with twenty-four square towers, built by George Brankovich in 1430 on the model of the Constantinople walls. Semendria was the residence of that Servian ruler and the capital of Servia from 1430 to 1459. It is the seat of the district prefecture and a tribunal, and has a garrison of regular troops. Besides the special export of grapes and white wine, a great part of the Servian export of pigs, and almost all the export of cereals, pass through Semendria. In 1886 the town was connected with the Belgrade-Nish railway by a branch line.

SEMINARY (Lat. *seminarium*, from *semen*, seed), a term originally applied to a nursery-garden or place where seeds are sown to produce plants for transplanting. It was early used in its present sense of a place of education. Its most frequent use is for a training college for the Roman Catholic priesthood, and in a transferred sense for a priest who has been trained in a foreign seminary, also often termed a "seminarist." A German usage, adopted in America, applies the term *seminar* to a class for advanced study or research.

SEMINOLE (properly *Simanoli*, "renegade," "runaway," in allusion to their secession from the Creek confederacy), a tribe of North American Indians of Muskhogean stock. They originally formed part of the Creek confederacy, but separated from it early in the 18th century, and occupied the greater part of Florida. In 1817–1818 their attacks on the Georgian and Alabama settlements resulted in the invasion of their territory by General Andrew Jackson, who defeated them and hanged two British traders, named Arbuthnot and Ambrister, who were alleged to be the instigators of the raids. The long Seminole War of 1835–42, the hardest-fought of all the Indian wars, was due to the tribe's refusal to cede their lands and remove to Arkansas in accordance with the treaty (see OSCEOLA) of Payne's Landing (1832). At the close of this struggle, costing thousands of lives and millions of dollars, the Seminoles were removed to Arkansas. They were recognized as "the Seminole Nation," and as one of the "Five Civilized Tribes," and granted autonomy upon the scale permitted the other four, the Cherokee, Chickasaw, Choctaw and Creek. They live now mainly in Oklahoma, and a few in Florida.

SEMIPALATINSK, a province of the Russian dominions in Central Asia; administratively it forms a part of the general-governorship of the Steppes, although its northern portions really belong to the Irtysh plains of West Siberia. It is bounded on the N. by Tobolsk and Tomsk, on the S.E. by China, on the S. by Semiryechensk, and on the W. by Akmolinsk. As regards configuration, it differs widely in its northern and southern parts. The snow-clad ranges (9000 to 10,000 ft.) of the Altai and Narym enter it in the S.E., stretching S. to Lake Zaisan. Another complex of mountains, Kalbin, rising 5000 and 6000 ft. above the sea, continues them towards the west. A broad valley intervenes, through which the Irtysh finds its way from the Zaisan terrace to the lowlands of Siberia. Many extensions of these mountains and subordinate ranges stretch towards the north. The still lower but wild Chinghiz-tau mountains diversify the south-western part of Semipalatinsk, sending out their rocky spurs into the steppe region. In the south, the Tarbagatai (Marmots') range (9000 to 10,000 ft.) separates Semipalatinsk from Semiryechensk and Dzungaria. Wide steppes fill up the spaces between the mountains: *e.g.* the Zaisan steppe (1200 to 1500 ft.), between the Tarbagatai and the Altai ranges; the plains of Lake Balkash, some 300 ft. lower, to the south of the Chinghiz-tau; and the plains of the Irtysh, which hardly rise 600 ft. above the sea. All kinds of crystalline rocks—granites, syenites, diorites and porphyries, as also slates of all descriptions—are met with in the mountainous tracts. There also occur rich gold-bearing sands, silver and lead mines, graphite, coal and the less valuable precious stones. The geology of the region and even its topography are still but imperfectly known. Numerous boulders scattered over the mountains testify to a much wider extension of glaciers in former times. The chief river of the province, the Irtysh, which issues from Lake Zaisan, flows north and north-west and drains Semipalatinsk for more than 760 m. Between Bukhtarma and Ust-Kamenogorsk it cuts its way through the Altai by a wild gorge, with dangerous rapids, through which, however, boats are floated. Lake Zaisan, 80 m. long and 10 to 20 m. wide, has depth sufficient for steamboat navigation; steamers traverse also for some 100 m. the lower course of the Black Irtysh, which flows from Kulja to Lake Zaisan. The Kurchum, the Narym and the Bukhtarma are the chief right-hand tributaries of the Irtysh, while the Char-urban, Chagan and many smaller streams join it from the left; none are navigable; neither are the Kokpekty and Bugaz, which enter Lake Zaisan on the west. Lake Balkash, which borders Semipalatinsk on the south-west, formerly received several tributaries from the Chinghiz-tau. Many smaller lakes (some of them merely temporary) occur on the Irtysh plain, and yield salt.

The climate is severe. The average yearly temperature reaches 43° in the south and 34° in the north; the winter is very cold, and frosts of −44° F. are not uncommon, while the thermometer rises to 122° in the shade in the summer. The yearly amount of rain and snow is trifling, although snow-storms are very common; strong winds prevail. Forests are plentiful in the hilly districts and on the Irtysh plain, the flora being Siberian in the north and more Central Asiatic towards lakes Balkash and Zaisan.

The area of the province is 183,145 sq. m., and in 1906 its population was estimated at 767,500. Only about 6 % of the population is settled, the remainder, chiefly Kirghiz, being nomads. The province is divided into five districts, the chief towns of which are Semipalatinsk, Pavlodar, Kokpekty, Karkaralinsk and Ust-Kamenogorsk. The Russians are chiefly agriculturists, and have wealthy settlements on the right bank of the Irtysh, as well as a few patches in the south, at the foot of the mountains. The Kirghiz are almost exclusively live-stock breeders and keep large flocks of sheep, horses and cattle, as also camels. Hunting is a favourite and profitable occupation with the Cossacks and the Kirghiz. Bee-keeping is extensively followed, especially among the Cossacks. Fishing, which is carried on in lakes Zaisan and Balkash, as also in the Black Irtysh, is of considerable importance. Gold is mined, also silver, copper, salt and coal. There are two ironworks, but the only other industrial establishments of any size are a steam flour-mill and a distillery. A considerable amount of trade is carried on within the province, in which twenty fairs are held every year.

SEMIPALATINSK, a town of Asiatic Russia, capital of the province of the same name, on the right bank of the Irtysh, and on the highway from Dzungaria to Omsk, 683 m. by river S.E. of the latter. Pop. (1881) 17,820, (1897) 26,353. It carries on a

considerable trade, especially with the Kirghiz, and has a flour-mill, distillery and tanneries. Steamers ply on the Irtysh down to Omsk and up to Lake Zaisan.

SEMĪRAMIS (*c.* 800 B.C.), a famous Assyrian princess, round whose personality a mass of legend has accumulated. It was not until 1910 that the researches of Professor Lehmann-Haupt of Berlin restored her to her rightful place in Babylonian-Assyrian history. The legends derived by Diodorus Siculus, Justin and others from Ctesias of Cnidus were completely disproved, and Semīramis had come to be treated as a purely legendary figure. The legends ran as follows: Semīramis was the daughter of the fish-goddess Atargatis (*q.v.*) of Ascalon in Syria, and was miraculously preserved by doves, who fed her until she was found and brought up by Simmas, the royal shepherd. Afterwards she married Onnes, one of the generals of Ninus, who was so struck by her bravery at the capture of Bactra that he married her, after Onnes had committed suicide. Ninus died, and Semīramis, succeeding to his power, traversed all parts of the empire, erecting great cities (especially Babylon) and stupendous monuments, or opening roads through savage mountains. She was unsuccessful only in an attack on India. At length, after a reign of forty-two years, she delivered up the kingdom to her son Ninyas, and disappeared, or, according to what seems to be the original form of the story, was turned into a dove and was thenceforth worshipped as a deity. The name of Semīramis came to be applied to various monuments in Western Asia, the origin of which was forgotten or unknown (see Strabo xvi. 1. 2). Ultimately every stupendous work of antiquity by the Euphrates or in Iran seems to have been ascribed to her —even the Behistun inscriptions of Darius (Diod. Sic. ii. 3). Of this we already have evidence in Herodotus, who ascribes to her the banks that confined the Euphrates (i. 184) and knows her name as borne by a gate of Babylon (iii. 155). Various places in Media bore the name of Semīramis, but slightly changed, even in the middle ages, and the old name of Van was Shamiramagerd, Armenian tradition regarding her as its founder. These facts are partly to be explained by observing that, according to the legends, in her birth as well as in her disappearance from earth, Semīramis appears as a goddess, the daughter of the fish-goddess Atargatis, and herself connected with the doves of Ishtar or Astartē. The same association of the fish and dove is found at Hierapolis (Bambyce, Mabbog), the great temple at which, according to one legend, was founded by Semīramis (Lucian, *De dea Syria*, 14), where her statue was shown with a golden dove on her head (33, 39). The irresistible charms of Semīramis, her sexual excesses (which, however, belong only to the legends: there is no historical groundwork), and other features of the legend, all bear out the view that she is primarily a form of Astartē, and so fittingly conceived as the great queen of Assyria.

Professor Lehmann-Haupt, by putting together the results of archaeological discoveries, has arrived at the following conclusions. Semīramis is the Greek form of Sammuramat. She was probably a Babylonian (for it was she who imposed the Babylonian cult of Nebo or Nabu upon the Assyrian religion). A column discovered in 1909 describes her as "a woman of the palace of Samsi-Adad, King of the World, King of Assyria, . . . King of the Four Quarters of the World." Ninus was her son. The dedication of this column shows that Semīramis occupied a position of unique influence, lasting probably for more than one reign. She waged war against the Indo-Germanic Medes and the Chaldaeans. The legends probably have a Median origin. A popular etymology, which connected the name with the Assyrian *summat*, "dove," seems to have first started the identification of the historical Semīramis with the goddess Ishtar and her doves.

See F. Lenormant, *La Légende de Sémiramis* (1873); A. H. Sayce, "The Legend of Semiramis," in *Hist. Rev.* (January, 1888).

SEMIRYECHENSK, a province of Russian Turkestan, including the steppes south of Lake Balkash and parts of the Tian-shan Mountains around Lake Issyk-kul. It has an area of 147,300 sq. m., and is bounded by the province of Semipalatinsk on the N., by China (Dzungaria, Kulja, Aksu and Kashgaria) on the E. and S., and by the Russian provinces of Ferghana, Syr-darya, and Akmolinsk on the W. It owes its name (*Jity-su, Semiryechie, i.e.* "Seven Rivers") to the rivers which flow from the south-east into Lake Balkash. The Dzungarian Ala-tau Mountains, which separate it from Kulja, extend south-west towards the river Ili, with an average height of 6000 ft. above the sea, several isolated snow-clad peaks reaching 11,000 to 14,000 ft. In the south Semiryechensk embraces the intricate systems of the Ala-tau and the Tian-shan. Two ranges of the former, the Trans-Ili Ala-tau and the Kunghei Ala-tau, stretch along the north shore of Lake Issyk-kul, both ranging from 10,000 to 15,000 ft. and both partially snow-clad. South of the lake two ranges of the Tian-shan, separated by the valley of the Naryn, stretch in the same direction, lifting up their icy peaks to 16,000 and 18,000 ft.; while westwards from the lake the precipitous slopes of the Alexander chain, 9000 to 10,000 ft. high, with peaks rising 3000 to 4000 ft. higher, extend into the province of Syr-darya. Another mountain-complex of much lower elevation runs north-westwards from the Trans-Ili Ala-tau towards the southern extremity of Lake Balkash. In the north, where the province borders Semipalatinsk, it includes the western parts of the Tarbagatai range, the summits of which (10,000 ft.) do not reach the limit of perpetual snow. The remainder of the province consists of a fertile steppe in the north-east (Sergiopol), and vast uninhabitable sand-steppes on the south of Lake Balkash. Southwards from the last-named, however, at the foot of the mountains and at the entrance to the valleys, there are rich areas of fertile land, which are being rapidly colonized by Russian immigrants, who have also penetrated into the Tian-shan, to the east of Lake Issyk-kul.

The climate is thoroughly continental. In the Balkash steppes the winter is very cold; the lake freezes every year, and the thermometer falls to 13° F. In the Ala-kul steppes the winds blow away the snow. The passage from winter to spring is very abrupt, and the prairies are rapidly clothed with vegetation, which, however, is soon scorched up by the sun. The average temperatures are: at Vyernyi (2405 ft. high), for the year 46·4° F., for January 17°, for July 74°; at Przhevalsk (5450 ft.), for the year 36·5°, for January 23°, for July 63°; still higher in the mountains, at Naryn (6900 ft.) the average temperatures are only, for the year 43·7°, for January 1·4°, for July 64·4°. The yearly rainfall at these three places is 21·0, 16·0, and 11·8 in. respectively.

The most important river is the Ili, which enters the province from Kulja and drains it for 250 m. before it enters Lake Balkash. The Chu rises in the Tian-shan Mountains and flows north-westwards through Akmolinsk; and the Naryn flows south-westwards along a longitudinal valley of the Tian-shan, and enters Ferghana to join the Syr-darya. Lake Balkash, or Denghiz, Lake Ala-kul (which was connected with Balkash in the post-Pliocene period, but now stands some hundred feet higher, and is connected by a chain of smaller lakes with Sissyk-kul), Lake Issyk-kul and the alpine lakes of Son-kul and Chatyr-kul are the principal sheets of water.

The population was estimated in 1906 as 1,080,700. Kirghiz form 76 % of the population, Taranchis 5·7 %, Russians 14 % and Dzungans most of the remainder. The province is divided into six districts, the chief towns of which are Vyernyi (the capital), Jarkent, Kopal, Pishpek, Przhevalsk and Sergiopol. The chief occupation of the Russians, the Taranchis and the Dzungans, and partly also of the Kirghiz, is agriculture. The most important crops are wheat, barley, oats, millet, rice and potatoes. A variety of oil-bearing plants and green fodder, as also cotton, hemp, flax and poppies, are grown. Live-stock breeding is very extensively carried on by the Kirghiz, namely, horses, cattle, sheep, camels, goats and pigs. Orchards and fruit gardens are well developed; the crown maintains two model gardens. Bee-keeping is widely spread. The factories consist of flour-mills, distilleries, tanneries and tobacco works; but a great many domestic trades, including carpet-weaving and the making of felt goods, saddlery and iron goods, are carried on, among both the settled inhabitants and the nomad Kirghiz. There is a trade with China, valued at less than half a million sterling annually. Previous to 1899 this province formed part of the general-governorship of the Steppes.

SEMITIC LANGUAGES, the general designation of a group of Asiatic and African languages, some living and some dead, namely Assyrian, Hebrew, Phoenician, Aramaic, Arabic, Ethiopic, Mahri-Socotri. The name, which was introduced by Schlözer, is derived from the fact that most nations which speak or spoke these languages are descended, according to Genesis,

from Shem, son of Noah.[1] But the classification of nations in Genesis x. is founded neither upon linguistic nor upon ethnographical principles: it is determined rather by geographical and political considerations. For this reason Elam and Lud are also included among the children of Shem; but neither the Elamites (in Susiana) nor the Lydians appear to have spoken a language connected with Hebrew. On the other hand, the Phoenicians (Canaanites), whose dialect closely resembled that of Israel, are not counted as children of Shem. Moreover, the compiler of the list in Genesis x. had no clear conceptions about the peoples of south Arabia and Ethiopia. Nevertheless it would be undesirable to give up the universally received terms "Semites" and "Semitic."

Mutual connexion.

The connexion of the Semitic languages with one another is somewhat close, in any case closer than that of the Indo-European languages. The more ancient Semitic tongues differ from one another scarcely more than do the various Teutonic dialects. Hence even in the 17th century such learned Orientalists as Hottinger, Bochart, Castell and Ludolf had a tolerably clear notion of the relationship between the different Semitic languages with which they were acquainted; indeed the same may be said of some Jewish scholars who lived many centuries earlier, as, for instance, Jehuda ben Koreish. It is not difficult to point out a series of characteristic marks common to these languages,—the predominance of triconsonantal roots, or of roots formed after the analogy of such, similarity in the formation of nominal and verbal stems, a great resemblance in the forms of the personal pronouns and in their use for the purpose of verbal inflection, the two principal tenses, the importance attached to the change of vowels in the interior of words, and lastly, considerable agreement with regard to order and the construction of sentences. Yet even so ancient a Semitic language as the Assyrian appears to lack some of these features, and in certain modern dialects, such as New Syriac, Mahri and more particularly Amharic, many of the characteristics of older Semitic speech have disappeared. And the resemblance in vocabulary generally diminishes in proportion to the modernness of the dialects. Still we can trace the connexion between the modern and the ancient dialects, and show, at least approximately, how the former were developed out of the latter. Where a development of this kind can be proved to have taken place, there a relationship must exist, however much the individual features may have been effaced. The question here is not of logical categories but of organic groups.

All these languages are descendants of a primitive Semitic language which has long been extinct. Of course this should not be taken literally as implying an absolute unity. If, in the strictest sense of the words, no two men ever speak the same language, it must apply with still greater force to any considerable mass of men not living in the closest conjunction; and as such we must conceive the ancient Semites, so soon as they had severed themselves from other races. As long as the primitive Semitic people occupied no great extent of territory, many linguistic differences existent in their midst might still be reconciled. Other differences, however, might even then have formed the germs of the subsequent dialectical distinction. Thus, if the gradual, or sudden, separation of individual sections of the people led to alienation on a large scale, their dialects must necessarily have developed decided lines of cleavage and become finally distinct languages. With all this, it is still possible that, even in that pre-historic era, peaceful or warlike intercourse may have exercised an influence tending to assimilate these languages once again. Within the limitations which we have intimated rather than discussed, the expression "proto-Semitic language" is thoroughly justifiable.

Many of its most important features may be reconstructed with at least tolerable certainty, but we must beware of attempting too much in this respect. When the various cognate languages of a group diverge in essential points, it is by no means always possible to determine which of them has retained the more primitive form. The history of the development of these tongues during the period anterior to the documents which we possess is often extremely obscure in its details. Even when several Semitic languages agree in important points of grammar we cannot always be sure that in these particulars we have what is primitive, since in many cases analogous changes may have taken place independently. To one who should assert the complete reconstruction of the primitive Semitic language to be possible, we might put the question, Would the man who is best acquainted with all the Romance languages be in a position to reconstruct their common mother, Latin, if the knowledge of it were lost? And yet there are but few Semitic languages which we can know as accurately as the Romance languages are known. As far as the vocabulary is concerned, we may indeed maintain with certainty that a considerable number of words which have in various Semitic languages the form proper to each were a part of primitive Semitic speech. Nevertheless even then we are apt to be misled by independent but analogous formations and by words borrowed at a very remote period.[2] Each Semitic language or group of languages has, however, many words which we cannot point out in the others. Of such words a great number no doubt belonged to primitive Semitic speech, and either disappeared in some of these languages or else remained in use, but not so as to be recognizable by us. In the case of certain proto-Semitic words, we can even yet observe how they gradually recede from the foreground. So, for instance, in Hebrew, Aramaic and Arabic, the common designation of the lion, *laith*, has disappeared, almost before our eyes, in order to make room for other expressions. Yet many isolated words and roots may in very early times have been borrowed by the Hebrew, the Aramaic, the Ethiopic, &c., perhaps from wholly different languages, of which no trace is left. To what extent the separate languages created new roots is an extremely obscure problem.

Primitive Semitic language.

The question which of the known Semitic dialects most resembles the primitive Semitic language is less important than one might at first suppose, since the question is one not of absolute but only of relative priority. After scholars had given up the notion (which, however, was not the fruit of scientific research) that all Semitic languages, and indeed all the languages in the world, were descendants of Hebrew or of Aramaic, it was long the fashion to maintain that Arabic bore a close resemblance to the primitive Semitic language.[3] But, just as it is now recognized with ever-increasing clearness that Sanskrit is far from having retained in such a degree as was even lately supposed the characteristics of primitive Indo-European speech, so in the domain of the Semitic tongues we can assign to Arabic only a relative antiquity. It is true that in Arabic very many features are preserved more faithfully than in the cognate languages,—for instance, nearly all the original abundance of consonants, the short vowels in open syllables, particularly in the interior of words, and many grammatical distinctions which in the other languages are more or less obscured. On the other hand, Arabic has coined, simply from analogy, a great number of forms which, owing to their extreme simplicity, seem at the first glance to be primitive, but which nevertheless are only modifications of the primitive forms; whilst perhaps the other Semitic languages exhibit modifications of a different kind. In spite of its great wealth, Arabic is characterized by a certain monotony, which can scarcely have existed from the beginning. Both Hebrew and even Aramaic are in many respects more ancient than Arabic. This would no doubt be far more apparent if we knew Hebrew more completely and according to the original pronunciation of its vowels, and if we could discover how Aramaic was pronounced about the 13th century before our era. It must always be borne in mind that we are far more fully and accurately

[1] In Eichhorn's *Repertorium*, viii. 161 (1781). Universally accepted from Eichhorn's *Einleitung in das Alte Testament*, 2nd ed., i. 15 (Leipzig, 1787).

[2] The more alike two languages are the more difficult it usually is to detect, as borrowed elements, those words which have passed from one language into the other.

[3] This theory is carried to its extreme limit in Olshausen's very valuable *Hebrew Grammar* (Brunswick, 1861).

acquainted with Arabic than with the other Semitic languages of antiquity. The opinion sometimes maintained by certain over-zealous Assyriologists, that Assyrian is the "Sanskrit of the Semitic world," has not met with the approval even of the Assyriologists themselves, and is unworthy of a serious refutation.

A comparative grammar of the Semitic languages must of course be based upon Arabic, but must in every matter of detail take into consideration all the cognate languages, as far as they are known to us. In the reconstruction of the primitive Semitic tongue Hebrew might perhaps afford more assistance than Ethiopic; but Aramaic, Assyrian, and even the less known and the more modern dialects might furnish valuable materials.

The method by which these younger languages, especially the dialects of to-day, have received their present form, may be traced with tolerable comprehensiveness. Thus we gain valuable analogies for determining the genetic process in the older tongues. At the same time, a conscientious investigation forces upon us the conviction that there are many and important phenomena which we are powerless to explain; and this applies, in part, to cases where, at first, the solution appears perfectly simple. So, although we have seen that the main features of the correspondence between the Semitic languages have long been definitely established—years before Bopp scientifically demonstrated the connexion of the Indo-European tongues—still in our domain it is a task of extreme difficulty to create a comparative grammar which shall be minutely exact and yield permanent results. Only the most accomplished philologist could attempt the task, and it is very doubtful whether the time is yet ripe for such an attempt.[1] Much careful and minute investigation is still indispensable. One great obstacle lies in the fact, that, in most Semitic languages, the sounds are very inadequately transmitted. It would probably be easier to give a comparative presentment of Semitic syntax than of Semitic phonetics and the theory of Semitic forms.

Character of Semitic mind.

It is not a formidable undertaking to describe in general terms the character of the Semitic mind, as has been done, for example, by Lassen (*Indische Altertumskunde*, i. 414 sq.) and by Renan in the introduction to his *Histoire des langues sémitiques*.[2] But still there is a danger of assuming that the most important characteristics of particular Semitic peoples, especially of the Israelites and of the Arabs, are common to all Semites, and of ascribing to the influence of race certain striking features which are the result of the external conditions of life, and which, under similar circumstances, are also developed among non-Semitic races. And, though it is said, not without reason, that the Semites possess but little talent for political and military organization on a large scale, yet we have in the Phoenicians, especially the Carthaginians, in Hamilcar and in Hannibal, a proof that under altered conditions the Semites are not incapable of distinguishing themselves in these domains. It is a poor evasion to deny that the Phoenicians are genuine Semites, since even our scanty sources of information suffice to show that in the matter of religion, which among Semites is of such supreme importance, they bore a close resemblance to the ancient Hebrews and Aramaeans. In general descriptions of this kind it is easy to go too far. But to give in general terms a correct idea of the Semitic languages is a task of very much greater difficulty. Renan's brilliant and most interesting sketch is in many respects open to serious criticism. He cites, for example, as characteristic of the Semitic tongues, that they still retain the practice of expressing psychological processes by means of distinct imagery. In saying this he is taking scarcely any language but Hebrew into account. But the feature to which he here alludes is owing to the particular stage of intellectual development that had been reached by the Israelites, is in part peculiar to the poetical style, and is to be found in like manner among wholly different races. That the Semitic languages are far from possessing the fixity which Renan attributes to them we shall see below. But, however this may be, certain grammatical peculiarities of the Semitic languages—above all, the predominance of triliteral roots—are so marked that it is scarcely possible to doubt whether any language with which we are tolerably well acquainted is or is not Semitic. Only when a Semitic language has been strongly influenced not only in vocabulary but also in grammar by some non-Semitic speech, as is the case with Amharic, can such a doubt be for a moment entertained.

Relations with other families of speech.

Many attempts have been made, sometimes in a very superficial fashion and sometimes by the use of scientific methods, to establish a relationship between the Semitic languages and the Indo-European. It was very natural to suppose that the tongues of the two races which, with the single exceptions of the Egyptians and the Chinese, have formed and moulded human civilization, who have been near neighbours from the earliest times, and who, moreover, seem to bear a great physical resemblance to one another, can be nothing else than two descendants of the same parent speech. But all these endeavours have wholly failed. It is indeed probable that the languages, not only of the Semites and of the Indo-Europeans, but also those of other races, are derived from the same stock, but the separation must have taken place at so remote a period that the changes which these languages underwent in prehistoric times have completely effaced what features they possessed in common; if such features have sometimes been preserved, they are no longer recognizable. It must be remembered that it is only in exceptionally favourable circumstances that cognate languages are so preserved during long periods as to render it possible for scientific analysis to prove their relationship with one another.[3]

On the other hand, the Semitic languages bear so striking a resemblance in some respects to certain languages of northern Africa that we are forced to assume the existence of a tolerably close relationship between the two groups. We allude to the family of languages known in modern times as the "Hamitic," and composed of the Egyptian, Berber, Beja (Bishārī, &c.), and a number of tongues spoken in Abyssinia and the neighbouring countries (Agaw, Galla, Danḳali, &c.). It is remarkable that some of the most indispensable words in the Semitic vocabulary (as, for instance, "water," "mouth" and certain numerals) are found in Hamitic also, and that these words happen to be such as cannot well be derived from triliteral Semitic roots, and are more or less independent of the ordinary grammatical rules. We notice, too, important resemblances in grammar—for example, the formation of the feminine by means of a *t* prefixed or affixed, that of the causative by means of *s*, similarity in the suffixes and prefixes of the verbal tenses, and, generally, similarity in the personal pronouns, &c. It must be admitted that there is also much disagreement—for instance, the widest divergence in the mass of the vocabulary; and this applies to the Semitic languages as compared not only with those Hamitic languages that are gradually becoming known to us at the present day, but with the Egyptian, of which we possess documents dating from the fourth and perhaps fifth millennium before the Christian era. The question is here involved in great difficulties. Some isolated resemblances may, improbable as it appears, have been produced by the borrowing of words. Uncivilized races, as has been proved with certainty, sometimes borrow from others elements of speech in cases where we should deem such a thing impossible—for example, numerals and even personal suffixes. But the great resemblances in grammatical formation cannot be reasonably explained as due to borrowing on the part of the

[1] By this we do not wish to call in question the merits of the following works: William Wright, *Lectures on the Comparative Grammar of the Semitic Languages* (Cambridge, 1890, a posthumous work); O. E. Lindberg, *Vergleichende Grammatik d. semitischen Sprachen* (pt. 1, Göteborg, 1897); Heinr. Zimmern, *Vergl. Gramm. d. semit. Sprachen* (Berlin, 1898); C. Brockelmann, *Semitische Sprachwissenschaft* (Leipzig, 1906) and *Grundriss der vergl. Gramm. d. semit. Sprachen*, vol. 1. (Berlin, 1908).

[2] Cf. Th. Nöldeke, *Some Characteristics of the Semitic Races, in Sketches from Eastern History* (London and Edinburgh, 1892), 1 ff.

[3] The following is an instance of the manner in which we may be deceived by isolated cases. "Six" is in Hebrew *shēsh*, almost exactly like the Sanskrit and modern Persian *shash*, the Latin *sex*, &c. But the Indo-European root is *sweks*, or perhaps even *ksweks*, whereas the Semitic root is *shidth*, so that the resemblance is a purely accidental one, produced by phonetic change.

Hamites, more especially as these points of agreement are also found in the language of the Berbers, who are scattered over an enormous territory, and whose speech must have acquired its character long before they came into contact with the Semites. We are even now but imperfectly acquainted with the Hamitic languages; and the relation in which Egyptian stands to Berber on the one hand and to the south Hamitic languages on the other requires further elucidation. The attempt to write a comparative grammar of the Semitic and Hamitic languages would be, to say the least, very premature.[1]

Original seat of Semites.

The connexion between the Semitic languages and the Hamitic appears to indicate that the primitive seat of the Semites is to be sought in Africa; for it can scarcely be supposed that the Hamites, amongst whom there are gradual transitions from an almost purely European type to that of the Negroes, are the children of any other land than "the dark continent." There seems, moreover, to be a considerable physical resemblance between the Hamites and the Semites, especially in the case of the southern Arabs; we need mention only the slight development of the calf of the leg, and the sporadic appearance amongst Semites of woolly hair and prominent jaws.[2] But both Semites and Hamites have been mingled to a large extent with foreign races, which process must have diminished their mutual similarity. All this, however, is offered not as a definite theory, but as a modest hypothesis.

It was once the custom to maintain that the Semites came originally from certain districts in Armenia. This supposition was founded on the book of Genesis, according to which several of the Semitic nations are descended from Arphaxad, *i.e.* the eponym of the district of Arrapachitis, now called Albak, on the borders of Armenia and Kurdistan. It was also thought that this region was inhabited by the primitive race from which both the Semites and the Indo-Europeans derived their origin. But, as we saw above, this ancient relationship is a matter of some doubt; in any case, the separation does not date from a period so recent that the Semites can be supposed to have possessed any historical tradition concerning it. There cannot be a greater mistake than to imagine that nations have been able to preserve during long ages their recollection of the country whence their supposed ancestors are said to have emigrated. The fantastic notion once in vogue as to the permanence of historical memories among uncivilized races must be wholly abandoned. The period in which the Hebrews, the Arabs and the other Semitic nations together formed a single people is so distant that none of them can possibly have retained any tradition of it. The opinion that the Hebrews and the tribes most closely related to them were descendants of Arphaxad is apparently due to the legend that Noah's ark landed near this district. The notion has therefore a purely mythical origin. Moreover, in Genesis itself we find a totally different account of the matter, derived from another source, which represents all nations, and, therefore, the Semites among them, as having come from Babylon. Scarcely any man of science now believes in the northern origin of the Semites.

Some prominent scholars consider the birthplace of the Semitic race to have been in Arabia. There is much that appears to support this theory. History proves that from a very early period tribes from the deserts of Arabia settled on the cultivable lands which border them and adopted a purely agricultural mode of life. Various traces in the language seem to indicate that the Hebrews and the Aramaeans were originally nomads, and Arabia with its northern prolongation (the Syrian desert) is the true home of nomadic peoples. The Arabs are also supposed to display the Semitic character in its purest form, and their language is, on the whole, nearer the original Semitic than are the languages of the cognate races. To this last circumstance we should, however, attach little importance. It is by no means always the case that a language is most faithfully preserved in the country where it originated. The Romance dialect spoken in the south of Sardinia is far more primitive than that spoken at Rome; and of all living Teutonic languages the most ancient is the Icelandic. Besides, we cannot unreservedly admit that the Arabs display the Semitic character in its purest form; it would be more correct to say that, under the influence of a country indescribably monotonous and of a life ever changing yet ever the same, the inhabitants of the Arabian deserts have developed most exclusively certain of the principal traits of the Semitic race. All these considerations are indecisive; but we willingly admit that the theory which regards Arabia as the primitive seat of all Semites is by no means untenable.

Finally, one of the most eminent of contemporary Orientalists, Ignazio Guidi,[3] has attempted to prove that the home of the Semites is on the lower Euphrates. He contends that the geographical, botanical and zoological conceptions which are expressed in the various Semitic languages by the same words, preserved from the time of the dispersion, correspond to the natural characteristics of no country but the above-mentioned. Great as are the ingenuity and the caution which he displays, it is difficult to accept his conclusions. Several terms might be mentioned which are part of the common heritage of the northern and the southern Semites, but which can scarcely have been formed in the region of the Euphrates. Moreover, the vocabulary of most Semitic languages is but very imperfectly known, and each dialect has lost many primitive words in the course of time. It is therefore very unsafe to draw conclusions from the fact that the various Semitic tongues have no one common designation for many important local conceptions, such as "mountain." The ordinary words for "man," "old man," "boy," "tent," "block," "to beat," &c., are quite different in the various Semitic languages, and yet all these are ideas for which the primitive Semites must have had names.

Connexions between the Semitic languages.

It is not very easy to settle what is the precise connexion between the various Semitic languages, considered individually. In this matter one may easily be led to hasty conclusions by isolated peculiarities in vocabulary or grammar. Each of the older Semitic languages occasionally agrees in grammatical points with some other to which in most respects it bears no very close resemblance, while dialects much more nearly related to it are found to exhibit different formations. Each Semitic tongue also possesses features peculiar to itself. For instance, the Hebrew-Phoenician group and the Arabic have a prefixed definite article (the etymological identity of which is, however, not very probable); the dialect nearest to Arabic, the Sabaean, expresses the article by means of a suffixed *n*; the Aramaic, which in general more closely resembles Hebrew than does the Arabic group, expresses it by means of a suffixed *ā*; whereas the Assyrian in the north and the Ethiopic in the south have no article at all. Of the termination *n* for the definite article there is no certain trace in either Arabic or Hebrew; the Sabaean, the Ethiopic, and the Aramaic employ it to give emphasis to demonstrative pronouns; and the very same usage has been detected in a single Phoenician inscription.[4] In this case, therefore, Hebrew and Arabic have, independently of one another, lost something which the languages most nearly related to them have preserved. In like manner, the strengthening of the pronoun of the third person by means of *t* (or *tū*) is only found in Ethiopic, Sabaean and Phoenician and perhaps in some Arabic particles too. Aramaic alone has no certain trace of the reflexive conjugation formed with prefixed *n*; Hebrew alone has no certain trace of the causative with *sha*.[5] In several of the Semitic languages we can see how the formation of the passive by means of internal vocal change (as *kullima*, "he was addressed," as distinguished from *kallama*, "he addressed") gradually dropped out of use; in Ethiopic this process was already complete when the language first became literary; in Aramaic it was not wholly so and in most modern Arabic dialects the old passive forms have nearly or totally disappeared. In a few cases phonetic resemblances have been the result of later growth. For example, the termination of the plural masculine of nouns is in Hebrew *īm*, in Aramaic *īn*, as in Arabic. But we know that Aramaic also originally had *m*, whereas the ancient Arabic forms have after the *n* an *a*, which appears to have been originally a long *ā* (*ūna*, *īna*); in this latter position (that is, between two vowels) the change of *m* into *n* is very improbable.[6] These two similar terminations were therefore originally distinct. We must indeed be very cautious in drawing conclusions from points of agreement between the vocabularies of the various Semitic tongues. The

[1] This of course applies yet more strongly to Benfey's work, *Über das Verhältnis der ägyptischen Sprache zum semitischen Sprachstamm* (Leipzig, 1844); but his book has the permanent merit of having for the first time examined this relationship in a scientific manner. The investigation of the relationship between Egyptian and Semitic has been greatly advanced by the distinguished Egyptologist Ad. Erman: cf. especially his treatise, "Die Flexion des ägyptischen Verbums," in the *Sitzungsberichte der Berliner Akademie der Wissenschaften* (1900), xix., especially p. 34 sq. See also HAMITIC LANGUAGES.

[2] Cf. G. Gerland, *Atlas der Ethnographie* (Leipzig, 1876), p. 40 of the text.

[3] "Della sede primitiva dei popoli semitici," in the *Proceedings* of the Accademia dei Lincei (1878–1879).

[4] Viz. the great inscription of Byblus, *C.I.S.*, fasc. i. No. 1.

[5] *Shalhebeth*, "flame," is borrowed from Aramaic.

[6] Arabic seems to have transplanted the termination from the verb to the noun, or to have at least modified the substantival termination in accordance with the verbal.

Ethiopians and the Hebrews have the same word for many objects which the other Semites call by other names—for instance, "stone," "tree," "enemy," "enter," "go out"; and the same may be said of Hebrew as compared with Sabaean. But to build theories upon such facts would be unsafe, since the words cited are either found, though with some change of meaning, in at least one of the cognate languages, or actually occur, perhaps quite exceptionally and in archaic writings, with the same signification. The sedentary habits of the Ethiopians and the Sabaeans may possibly have rendered it easier for them to retain in their vocabulary certain words which were used by the civilized Semites of the north, but which became obsolete amongst the Arabian nomads. To the same cause we may attribute the fact that in religion the Sabaeans seem to resemble the northern Semites more closely than do the tribes of central Arabia; but these considerations prove nothing in favour of a nearer linguistic affinity.

One thing at least is certain, that Arabic (with Sabaean, Mahri and Socotri) and Ethiopic stand in a comparatively close relationship to one another, and compose a group by themselves, as contrasted with the other Semitic languages, Hebraeo-Phoenician, Aramaic and Assyrian. Only in these southern dialects do we find, and that under forms substantially identical, the important innovation known as the "broken plurals," consisting in the employment of certain forms, denoting abstracts, for the expression of plurals. They agree, moreover, in employing a peculiar development of the verbal root, formed by inserting an *ā* between the first and second radicals (*qātala*, *taqātala*), in using the vowel *a* before the third radical in all active perfects—for example, (*h*)*aqtala*, *qattala*, instead of the *haqtil*, *qattil* of the northern dialects—and in many other grammatical phenomena. This is not at all contradicted by the fact that certain aspirated dentals of Arabic (*th*, *dh*, *ẓ*) are replaced in Ethiopic, as in Hebrew and Assyrian, by pure sibilants—that is, *s* (Hebrew and Assyrian *sh*), *z*, *ṣ*—whereas in Aramaic they are replaced by simple dentals (*t*, *d*, *ṭ*), which seem to come closer to the Arabic sounds. Still, after the separation of the northern and the southern groups, we suppose, the Semitic languages possessed all these sounds, as the Arabic does, but afterwards simplified them, for the most part, in one direction or the other. Hence there resulted, as it were by chance, occasional similarities. Even in many modern Arabic dialects *th*, *dh* become *t*, *d*.[1] Ethiopic, moreover, has kept *ḍ*, the most peculiar of Arabic sounds, distinct from *ṣ*, whereas Aramaic has confounded it with the guttural *'ain*, and Hebrew and Assyrian with *ṣ*. It is therefore evident that all these languages once possessed the consonant in question as a distinct one. One sound, *sīn*, appears only in Hebrew, in Phoenician, and in the older Aramaic. It must originally have been pronounced very like *sh*, since it is represented in writing by the same character; in later times it was changed into an ordinary *s*. Assyrian does not distinguish it from *sh*.[2] The division of the Semitic languages into the northern group and the southern is therefore justified by facts. Even if we were to discover really important grammatical phenomena in which one of the southern dialects agreed with the northern, or vice versa, and that in cases where such phenomena could not be regarded either as remnants of primitive Semitic usage or as instances of parallel but independent development, we ought to remember that the division of the two groups was not necessarily a sudden and instantaneous occurrence, that even after the separation intercourse may have been carried on between the various tribes who spoke kindred dialects and were therefore still able to understand one another, and that intermediate dialects may once have existed, perhaps such as were in use amongst tribes who came into contact sometimes with the agricultural population of the north and sometimes with the nomads of the south (see below). All this is purely hypothetical, whereas the division between the northern and the southern Semitic languages is a recognized fact. It is perfectly certain, moreover, that Hebraeo-Phoenician and Aramaic are closely related with each other, and form a group of their own, distinct even from Assyrian. In fact, Assyrian seems to be so completely *sui generis* that we should be well advised to separate it from all the cognate languages, as an independent scion of proto-Semitic. We should classify these languages consequently in the following order: (1) Assyrian; (2) the remaining Semitic languages, viz.: *A*. Hebraeo-Phoenician and Aramaic, *B*. the southern Semitic tongues.

Northern and Southern groups.

Although we cannot deny that there may formerly have existed Semitic languages quite distinct from those with which we are acquainted, yet that such was actually the case cannot be proved. Nor is there any reason to think that the domain of the Semitic languages ever extended very far beyond its present limits. Some time ago many scholars believed that they were once spoken in Asia Minor and even in Europe, but, except in the Phoenician colonies, this notion rested upon no solid proof. It cannot be argued with any great degree of plausibility that even the Cilicians, who from a very early period held constant intercourse with the Syrians and the Phoenicians, spoke a Semitic language.

Lost Semitic languages.

Assyrian.

Long before there existed any other Semitic culture, there flourished on the Lower Euphrates a sister language which has been preserved to us in the cuneiform inscriptions. It is usually called the Assyrian, after the name of the country where the first and most important excavations were made; but the term "Babylonian" would be more correct, as Babylon was the birthplace of this language and of the civilization to which it belonged. Certain Babylonian inscriptions go back to the fourth millennium before our era; but the great mass of these cuneiform inscriptions date from between 1000 and 500 B.C.

Assyrian differs in many respects from all the cognate languages. The ancient perfect has wholly disappeared, or left but few traces, and the gutturals, with the exception of the hard *kh*, have been smoothed down to a degree which is only paralleled in modern Aramaic dialects. So at least it would appear from the writing, or rather from the manner in which Assyriologists transcribe it. The Babylonian form *bēl* (occurring in Isa. xlvi. 1; Jer. l. 2 and li. 44—passages all belonging to the 6th century B.C., and in many other ancient monuments), the name of the god who was originally called *ba'l*, is a confirmation of this; but, on the other hand, the name of the country where Babylon was situated, viz. Shin'ar, and that of a Babylonian god, 'Anammelek (2 Kings xvii. 31), as well as those of the tribes Shō'a and Qō'a (Ezek. xxiii. 23) who inhabited the Assyrio-Babylonian territory, seem to militate against this theory, as they are spelt in the Old Testament with *'ain*. So, too, is the biblico-Aramaic word *ṭe'em*, *ṭa'am*, "order," "decree," which is derived from the Assyrian; and we may also compare some Babylonian local names, *e.g.* *'Anat*. *H* is found in the name of the town *Hīt*, and in the name of a man, written in Aramaic characters but formed quite in the Babylonian manner, *Hadadnadinakh*. Thus the Babylonians may have pronounced some gutturals, though they did not write them, precisely as the Persian cuneiform inscriptions omit many *h's*, which, no doubt, were audible. The Assyrian system of writing is so complicated, and, in spite of its vast apparatus, is so imperfect an instrument for the accurate representation of sounds, that we are hardly yet bound to regard the transcriptions of contemporary Assyriologists as being in all points of detail the final dictum of science. However this may be, the present writer does not feel able to speak at greater length upon Assyrian. Attention may, however, be called to the fact, that, as might have been expected from the important rôle played by the Babylonians and Assyrians in the history of civilization and of peoples, many words passed over from their language into Hebrew and, more especially, into Aramaic, some of which attained a still wider vogue.[3] (Compare the article CUNEIFORM.)

Assyrian.

Hebrew.

Hebrew and Phoenician are but dialects of one and the same language. It is only as the language of the people of Israel that Hebrew can be known with any precision. Since in the Old

[1] In words borrowed from the literary language, *s*, *z* habitually appear in place of *th*, *dh*.

[2] It is not quite certain whether all the Semitic languages originally had the hardest of the gutturals *gh* and *kh* in exactly the same places that they occupy in Arabic. In the case of *kh* we may assume so; since not only Arabic here agrees with Ethiopic, but Assyrian, also, has a particular guttural in roots which in Arabic have *kh*. But it would appear that in Hebrew and Aramaic the distinction between *gh* and *'ayin*, between *kh* and *ḥ* was often different from what it is in Arabic.

[3] So the Assyrian *mashkēnū* was adopted into Hebrew and Aramaic as *miskēn*; from the Aramaic it was borrowed by Arabic and Ethiopic (*mishēn*), and from Arabic it found its way into the Romance languages (*mesquinho*, *mezquino*, *meschino*, *mesquin*).

Testament a few of the neighbouring peoples are represented as being descended from Eber, the eponym of the Hebrews, that is, are regarded as nearly related to the latter, it was natural to suppose that they likewise spoke Hebrew—a supposition which, at least in the case of the Moabites, has been fully confirmed by the discovery of the Mesha inscription (date, soon after 900 B.C.). The language of this inscription scarcely differs from that of the Old Testament; the only important distinction is the occurrence of a reflexive form (with *t* after the first radical), which appears also in Arabic and Assyrian. We may remark in passing that the style of this inscription is quite that of the Old Testament, and enables us to maintain with certainty that a similar historical literature existed amongst the Moabites. But it must be remembered that ancient Semitic inscriptions exhibit, in a sense, nothing but the skeleton of the language, since they do not express the vowels at all, or do so only in certain cases; still less do they indicate other phonetic modifications, such as the doubling of consonants, &c. It is therefore very possible that *to the ear* the language of Moab seemed to differ considerably from that of the Judaeans.

The Mesha inscription is the only non-Israelite source from which any knowledge of ancient Hebrew can be obtained. Still several Hebrew words occur even in the Tellel-Amarna letters, discovered in Egypt, and written in the Babylonian language by princes of Palestine during the second millennium B.C. They clearly show that the "Hebrew" language existed in Palestine even before the migration of the Israelites into Canaan. Some fragments in the Old Testament belong to the last centuries of the second millennium before our era—particularly the song of Deborah (Judges v.), a document which, in spite of its many obscurities in matters of detail, throws much light on the condition of the Israelites at the time when the Canaanites were still contending with them for the possession of the country. The first rise of an historical literature may very probably date from before the establishment of the monarchy. Various portions of the Old Testament belong to the time of the earlier kings; but it was under the later kings that a great part of extant Hebrew literature came into shape. To this age also belong the Gezer and the Siloam inscriptions and a daily increasing number of seals and gems bearing the names of Israelites.

Ancient Hebrew.

The Hebrew language is thus known to us from a very ancient period. But we are far from being acquainted with its real phonetic condition in the time of David or Isaiah. For, much as we owe to the labours of the later Jewish schools, which with infinite care fixed the pronunciation of the sacred text by adding vowels and other signs, it is evident that even at the best they could only represent the pronunciation of the language in its latest stage, not that of very early ages. Besides, their object was not to exhibit Hebrew simply as it was, but to show how it should be read in the solemn chant of the synagogue. Accordingly, the pronunciation of the older period may have differed considerably from that represented by the punctuation. Such differences are now and then indicated by the customary spelling of the ancient texts,[1] and sometimes the orthography is directly at variance with the punctuation.[2] In a few rare cases we may derive help from the somewhat older tradition contained in the representation of Hebrew words and proper names by Greek letters, especially in the ancient Alexandrine translation of the Bible (the so-called Septuagint). It is of particular importance to remark that this older tradition still retains an original *a* in many cases where the punctuation has the later *i* or *e*. We have examined this point somewhat in detail, in order to contradict the false but ever-recurring notion that the ordinary text of the Bible represents without any essential modification the pronunciation of ancient Hebrew, whereas in reality it expresses (in a very instructive and careful manner, it is true) only its latest development, and that for the purpose of solemn public recitation. A clear trace of dialectal differences within Israel is found in Judges xii. 6, which shows that the ancient Ephraimites pronounced *samek* instead of *shin*.

Pronunciation.

The destruction of the Judaean kingdom dealt a heavy blow to the Hebrew language. But it is going too far to suppose that it was altogether banished from ordinary life at the time of the exile, and that Aramaic came into use among all the Jews. In the East even small communities, especially if they form a religious body, often cling persistently to their mother-tongue, though they may be surrounded by a population of alien speech; and such was probably the case with the Jews in Babylonia. See HEBREW LANGUAGE. Even so late as the time of Ezra, Hebrew was in all probability the ordinary language of the new community. In Neh. xiii. 24 we find a complaint that the children of Jews by wives from Ashdod and other places spoke half in the "Jewish" language and half in the language of Ashdod, or whatever else may have been the tongue of their mothers. No one can suppose that Nehemiah would have been particularly zealous that the children of Jews should speak an Aramaic dialect with correctness. He no doubt refers to Hebrew as it was then spoken—a stage in its development of which Nehemiah's own work gives a very fair idea.

Period of exile in Babylon.

After the time of Alexander large bodies of the Jewish population were settled in Alexandria and other western cities, and were very rapidly Hellenized. Meanwhile the principal language of Syria and the neighbouring countries, Aramaic, which had already become the language of the older Jewish colonies in Egypt (see below), and the influence of which may be perceived even in some pre-exilic writings, began to spread more and more among the Jews of Palestine. Hebrew gradually ceased to be the language of the people and became that of religion and the schools. The book of Daniel, written in 167 or 166 B.C., begins in Hebrew, then suddenly passes into Aramaic, and ends again in Hebrew. Similarly the redactor of Ezra (or more correctly of the Chronicles, of which Ezra and Nehemiah form the conclusion) borrows large portions from an Aramaic work, in most cases without translating them into Hebrew. No reason can be assigned for the use of Aramaic in Jewish works intended primarily for Jerusalem, unless it were already the dominant speech, whilst, on the other hand, it was very natural for a pious Jew to write in the ancient "holy" language even after it had ceased to be spoken. Esther, Ecclesiastes, and a few Psalms, which belong to the 3rd and 2nd centuries before our era, are indeed written in Hebrew, but are so strongly tinctured by the Aramaic influence as to prove that the writers usually spoke Aramaic. It is certain, of course, that there were still many Jews capable both of writing and speaking Hebrew. So the Book of Sirach, composed shortly after 200 B.C., was written in an almost absolutely pure Hebrew, as is proved by the portions of the original, amounting to about two-thirds of the whole, which have come to light in our day. But we are not likely to be far wrong in saying that in the Maccabean age Hebrew had died out among the Jews as a current popular language, and there is nothing to show that it survived longer among any of the neighbouring peoples.

Hebrew supplanted by Aramaic.

But in the last period of the history of Jerusalem, and still more after the destruction of the city by Titus, the Jewish schools played so important a part that the life of the Hebrew language was in a manner prolonged. The lectures and discussions of the learned were carried on in that tongue. We have very extensive specimens of this more modern Hebrew in the Mishnah and other works, and scattered pieces throughout both Talmuds. But, just as the "classical" Sanskrit, which has been spoken and written by the Brahmans during the last twenty-five centuries, differs considerably from the language which was once in use among the people, so this "language of the learned" diverges in many respects from the "holy language"; and this distinction is one of which the rabbis were perfectly conscious. The "language of the learned" borrows a great part of its vocabulary from Aramaic,[3] and this exercises a strong influence upon the grammatical forms. The grammar is perceptibly modified by the peculiar style of these writings, which for the most part treat of legal and ritual questions in a strangely laconic and pointed manner. But, large as is the proportion of foreign words and artificial as this language is, it contains a considerable number of purely Hebrew elements which by chance do not appear in the Old Testament. Although we may generally assume, in the case of a word occurring in the Mishnah but not found in the Old Testament, that it is borrowed from Aramaic, there are several words of this class which, by their radical consonants, prove themselves to be genuine Hebrew. And even some grammatical phenomena of this language are to be regarded as a genuine development of Hebrew, though they are unknown to earlier Hebrew speech.

From the beginning of the middle ages down to our own times the Jews have produced an enormous mass of writings in Hebrew, sometimes closely following the language of the Bible, sometimes that of the Mishnah, sometimes introducing in a perfectly inorganic manner a great quantity of Aramaic forms, and occasionally imitating the Arabic style. The study of these variations has but little interest for the linguist, since they are nothing but a purely artificial imitation, dependent upon the greater or less skill of the individual. The language of the Mishnah stands in much closer connexion with real life, and has a definite *raison d'être*; all later Hebrew is to be classed with medieval and modern Latin. The dream of some Zionists, that Hebrew—a would-be Hebrew, that is to say—will again become a living, popular language in Palestine, has still less prospect of realization than their vision of a restored Jewish empire in the Holy Land. Much Hebrew also was written in the middle ages by the hostile brethren of the Jews, the Samaritans; but for the student of language these productions have, at the most, the charm attaching to curiosities.

Medieval and Modern Hebrew.

[1] For example, we may conclude with tolerable certainty, from the presence and absence of the vowel-letters *y* and *w*, that in older times the accented *e* and *o* were not pronounced long, and that, on the other hand, the diphthongs *au* and *ai* were used for the later *ô* and *ê*.

[2] The very first word of the Bible contains an Aleph (*spiritus lenis*), which is required by etymology and was once audible, but which the pronunciation represented by the point-system ignores.

[3] It is a characteristic feature that "my father" and "my mother" are here expressed by purely Aramaic forms. Even the learned did not wish to call their "papas" and "mammas" by any other names than those to which they had been accustomed in infancy.

The ancient Hebrew language, especially in the matter of syntax, has an essentially primitive character. Parataxis of sentences prevails over hypotaxis to a greater extent than in any other literary Semitic language with which we are well acquainted. The favourite method is to link sentences together by means of a simple "and." There is a great lack of particles to express with clearness the more subtle connexion of ideas. The use of the verbal tenses is in a great measure determined by the imagination, which regards things unaccomplished as accomplished, and the past as still present. There are but few words or inflexions to indicate slight modifications of meaning, though in ancient times the language may perhaps have distinguished certain moods of the verb somewhat more plainly than the present punctuation does. But in any case this language was far less suited for the definite expression of studied thought, and less suited still for the treatment of abstract subjects, than for poetry. We must remember, however, that as long as Hebrew was a living language it never had to be used for the expression of the abstract. Had it lived somewhat longer it might very possibly have learnt to adapt itself better to the formulating of systematic conceptions. The only book in the Old Testament which attempts to grapple with an abstract subject in plain prose—namely, Ecclesiastes—dates from a time when Hebrew was dying out or was already dead. That the gifted author does not always succeed in giving clear expression to his ideas is partly due to the fact that the language had never been employed for any scientific purposes whatsoever. With regard to grammatical forms, Hebrew has lost much that is still preserved in Arabic; but the greater richness of Arabic is in part the result of later development.

Character of ancient Hebrew.

The vocabulary of the Hebrew language is, as we have said, known but imperfectly. The Old Testament is no very large work; it contains, moreover, many repetitions, and a great number of pieces which are of little use to the lexicographer. On the other hand, much may be derived from certain poetical books, such as Job.[1] The numerous ἅπαξ λεγόμενα are a sufficient proof that many more words existed than appear in the Old Testament, the writers of which never had occasion to use them. Were we in possession of the whole Hebrew vocabulary in the time of Jeremiah, for example, we should be far better able to determine the relation in which Hebrew stands to the other Semitic languages, the Old Testament would be far more intelligible to us, and it would be very much easier to detect the numerous corrupt passages in our text.

Vocabulary.

Phoenician.

The Phoenician dialect closely resembles Hebrew, and is known to us from only one authentic source, namely, inscriptions, some of which date from about 600 B.C. or earlier; but the great mass of them begin with the end of the 5th century before our era. These inscriptions[2] we owe to the Phoenicians of the mother-country and the neighbouring regions (Cyprus, Egypt and Greece), as well as to the Phoenicians of Africa, especially Carthage. Inscriptions are, however, a very insufficient means for obtaining the knowledge of a language. The number of subjects treated in them is not large; many of the most important grammatical forms and many of the words most used in ordinary life do not occur. Moreover, the "lapidary style" is often very hard to understand. The repetition of obscure phrases, in the same connexion, in several inscriptions does not help to make them more intelligible. Of what use is it to us that, for instance, thousands of Carthaginian inscriptions begin with the very same incomprehensible dedication to two divinities? The difficulty of interpretation is greatly increased by the fact that single words are very seldom separated from one another, and that vowel-letters are used extremely sparingly. We therefore come but too often upon very ambiguous groups of letters. In spite of this, our knowledge of Phoenician has made considerable progress of late. Some assistance is also got from Greek and Latin writers, who cite not only many Phoenician proper names, but single Phoenician words: Plautus in particular inserts in the *Poenulus* whole passages in Punic, some of which are accompanied by a Latin translation. This source of information must, however, be used with great caution. It was not the object of Plautus to exhibit the Punic language with precision, a task for which the Latin alphabet is but ill adapted, but only to make the populace laugh at the jargon of the hated Carthaginians. Moreover, he had to force the Punic words into Latin *senarii*; and finally the text, being unintelligible to copyists, is terribly corrupt. Much ingenuity has been wasted on the Punic of Plautus; but the passage yields valuable results to cautious investigation which does not try to explain too much.[3]

Phoenician.

In its grammar Phoenician closely resembles Hebrew. In both dialects the consonants are the same, often in contrast to Aramaic and other cognate languages.[4] As to vowels, Phoenician seems to diverge rather more from Hebrew. The connecting of clauses is scarcely carried farther in the former language than in the latter. A slight attempt to define the tenses more sharply appears once at least in the joining of *kān* (fuit) with a perfect, to express complete accomplishment (or the pluperfect).[5] One important difference is that the use of *wāw* conversive with the imperfect—so common in Hebrew and in the inscription of Mesha—is wanting in Phoenician. The vocabulary of the language is very like that of Hebrew, but words rare in Hebrew are often common in Phoenician. For instance, "to do" is in Phoenician not *'asā* but *pa'al* (the Arabic *fa'ala*), which in Hebrew occurs only in poetry and elevated language. "Gold" is not (*zahab* as in most Semitic languages), but *ḥarūṣ* (Assyrian *ḫurāṣ*), which is used occasionally in Hebrew poetry. Traces of dialectical distinctions have been found in the great inscription of Byblus, the inhabitants of which seem to be distinguished from the rest of the Phoenicians in Josh. xiii. 5 (and 1 Kings v. 32 ?[A.V. v. 18]). It is probable that various differences between the language of the mother-country and that of the African colonies arose at an early date, but our materials do not enable us to come to any definite conclusion on this point. It is tolerably certain that the language of Carthage possessed many dull vowels which were strange to Greek and Latin, so that the manner in which they are reproduced in proper names by the Greeks and Romans shows great diversity. In the later African inscriptions there appear certain phonetic changes, especially in consequence of the softening of the gutturals,—changes which show themselves yet more plainly in the so-called Neo-Punic inscriptions (beginning with the 1st, if not the 2nd, century before our era). In these the gutturals, which had lost their real sound, are frequently interchanged in writing; and other modifications may also be perceived. Unfortunately the Neo-Punic inscriptions are written in such a debased indistinct character that it is often impossible to discover with certainty the real form of the words. This dialect was still spoken about 400, and perhaps long afterwards, in those districts of North Africa which had once belonged to Carthage. It would seem that in the mother-country the Phoenician language withstood the encroachment of Greek on the one hand and of Aramaic on the other somewhat longer than Hebrew did.

Aramaic.

Aramaic is nearly related to Hebraeo-Phoenician; but there is nevertheless a sharp line of demarcation between the two groups. Of its original home nothing certain is known. In the Old Testament "Aram" appears at an early period as a designation of certain districts in Syria ("Aram of Damascus," &c.) and in Mesopotamia ("Aram of the Two Rivers"). The language of the Aramaeans gradually spread far and wide, and occupied all Syria, both those regions which were before in the possession of the Kheta, probably a non-Semitic people, and those which were most likely inhabited by Canaanite tribes; last of all, Palestine became Aramaized. Towards the east this language was spoken on the Euphrates, and throughout the districts of the Tigris south and west of the Armenian and Kurdish mountains; the province in which the capitals of the Arsacids and the Sassanids were situated was called "the country of the Aramaeans." In Babylonia and Assyria a large, or perhaps the larger, portion of the population were most probably Aramaeans, even at a very early date, whilst Assyrian was the language of the government.

Geographical extent of Aramaic.

The oldest extant Aramaic documents consist of inscriptions on monuments and on seals, weights and gems. Latterly, a very remarkable inscription of a king of Ḥamāth[6] belonging to the 8th century B.C. has been found in Central Syria, and a few years before excavations in the extreme north of Syria (Zengirli and district; Nĕrab) brought to light some not less remarkable inscriptions which go back to the same century. The language of all these inscriptions is Aramaic, though in certain places it agrees with Hebrew. It is especially surprising that in the case of the Arabic sounds *th*, *dh*, *ẓ*, they have not *t*, *d*, *ṭ*,—as Aramaic generally has,—but *sh*, *z*, *ṣ*, as is the rule in Hebrew and Assyrian. It is extremely strange, however, that, in place of the Arabic *ḳ*, *'ain* does not appear, as elsewhere in Aramaic, nor yet *ṣ* as in Hebrew and Assyrian,—and, in isolated cases, even in Aramaic,—but *q*. These phenomena may be observed on several smaller monuments. We have no entirely satisfactory explanation at our disposal: perhaps Assyrian influence has been at work. Individual monuments prove, however, that the phonetic system of general Aramaic was already in existence

[1] The Siloam inscription affords us one new word, the original of Sirach some others. In the Gezer inscription there seem to be some new words of dubious interpretation.

[2] The scattered materials are being collected in the *Corpus inscriptionum Semiticarum* of the Paris Academy.

[3] See Gildemeister, in Ritschl's *Plautus* (vol. ii. fasc. v., Leipzig, 1884).

[4] At an early period the Phoenician pronunciation may have distinguished a greater number of original consonants than are distinguished in writing. It is at least remarkable that the Greeks render the name of the city of Ṣur (Hebrew Ṣōr), which must originally have been pronounced Ṯhurr, with a τ (Τύρος), and the name of Ṣīdōn (where the radical *ṣ* runs through all the Semitic languages, with a σ (Σιδών). Distinctions of this kind, justified by etymology, have perhaps been obscured in Hebrew by the imperfection of the alphabet. In the case of *sīn* and *shīn* this can be positively proved.

[5] *Kān nadar*, "had vowed," Idal. 5 (*C.I.S.* Phoen. No. 93).

[6] The consonants of his name are ZKR; the pronunciation, perhaps, was *Zakkūr*.

in the period of our inscriptions: it would seem, therefore, that we must assume a dialectical cleavage, perhaps originated by the influence of Hebrew or Canaanean. Particularly remarkable is the use of the *waw consecutivum* in the inscriptions of the king of Ḥamāth hitherto only known from Hebrew. Traces of the divergent phonetic treatment are found in the Hellenistic era, and—here and there—even later. Still, at the most, these can scarcely be more than conscious archaisms,—a view which is particularly corroborated by the fact, that, in certain Aramaic documents of the Persian period, both forms are used interchangeably, *e.g.* *arqā*, "earth," and *ar'ā*. The latter orthography doubtless represents the actual pronunciation of the writer. It is to be observed, however, that *zi* for *dī*, held its ground with especial tenacity as a form of the relative pronoun and in other capacities. In the Persian period Aramaic was the official language of the provinces west of the Euphrates; and this explains the fact that coins which were struck by governors and vassal princes in Asia Minor, and of which the stamp was in some cases the work of skilled Greek artists, bear Aramaic inscriptions, whilst those of other coins are Greek. This, of course, does not prove that Aramaic was ever spoken in Asia Minor and as far north as Sinope and the Hellespont. In Egypt some Aramaic inscriptions have been found of the Persian period, one bearing the date of the fourth year of Xerxes (482 B.C.). We possessed, even before this, a few official documents and other written pieces in Aramaic, inscribed upon papyrus, and dating from this period, but unfortunately in a very dilapidated condition. Latterly, however, we have had a whole series of similar documents of the 5th century B.C., in a very good state of preservation, bearing upon the affairs of Jewish colonists in the far south of Egypt. In that country, where the native writing was so formidable to the learner, the Aramaic language and script may well have appeared peculiarly serviceable. Thus they were employed, and frequently, even by indigenous Egyptians. But we need not doubt that, in Egypt, Aramaic was also spoken by many who had migrated from Syria; and this must be assumed to have been the case with the Jewish colonists mentioned. The fact is now established that these Jews who had come to Egypt before the Persian period were military colonists, and were often referred to in documents as "Aramaeans." According to Deut. xvii. 16, the kings of Judah sold their subjects to the kings of Egypt, who at that time obtained numbers of warriors from foreign countries, instead of employing their own unwarlike subjects. The Syrian kings also sent soldiers to Egypt, from whom the Jews learned Aramaic. That this was used not only as an official language, but also as a vernacular, is shown by the fact that fragments of ordinary speech are found in Judaeo-Aramaic papyri. That the Egyptian-Aramaic documents exhibit traces of Hebrew and Phoenician influence is a matter for no surprise. Probably the preference shown by the Persians for Aramaic originated under the Assyrian empire, in which a very large proportion of the population spoke Aramaic, and in which this language would naturally occupy a more important position than it did under the Persians. We therefore understand why it was taken for granted that a great Assyrian official could speak Aramaic (2 Kings xviii. 26; Isa. xxxvi. 11), and for the same reason the dignitaries of Judah appear to have learned the language (*ibid.*), namely, in order to communicate with the Assyrians. The short dominion of the Chaldaeans very probably strengthened this preponderance of Aramaic. A few ancient Aramaic inscriptions have been discovered far within the limits of Arabia, in the palm oasis of Teimā (in the north of the Ḥijāz); the oldest and by far the most important of these was very likely made before the Persian period. We may presume that Aramaic was introduced into the district by a mercantile colony, which settled in this ancient seat of commerce, and in consequence of which Aramaic may have remained for some time the literary language of the neighbouring Arabs.

Biblical Aramaic.

The Aramaic portions of the Old Testament show us the form of the language which was in use among the Jews of Palestine. Isolated passages in Ezra perhaps belong to the Persian period, but have certainly been remodelled by a later writer.[1] Yet in Ezra we find a few antique forms which do not occur in Daniel. The Aramaic pieces contained in the Bible have the great advantage of being furnished with vowels and other orthographical signs, though these were not inserted until long after the composition of the books, and are sometimes at variance with the text itself. But, since Aramaic was still a living language when the punctuation came into existence, and since the lapse of time was not so very great, the tradition ran less risk of corruption than in the case of Hebrew. Its general correctness is further attested by the innumerable points of resemblance between this language and Syriac, with which we are accurately acquainted. The Aramaic of the Bible still exhibits various antique features, found in the Egyptian papyri too, which afterwards disappeared,—for example, the formation of the passive by means of internal vowel-change, and the causative with *ha* instead of with *a*,—phenomena which have been falsely explained as Hebraisms. Biblical Aramaic agrees in all essential points with the language used in the numerous inscriptions of Palmyra (beginning soon before the Christian era and extending to about the end of the 3rd century, and on the Nabataean coins and stone monuments (concluding about the year 100). Aramaic was the language of Palmyra, the aristocracy of which were to a great extent of Arabian extraction. In the northern portion of the Nabataean kingdom (not far from Damascus) there was probably a large Aramaic population, but farther south Arabic was spoken. At that time, however, Aramaic was highly esteemed as a cultivated language, for which reason the Arabs in question made use of it, as their own language was not reduced to writing, just as in those ages Greek inscriptions were set up in many districts where no one spoke Greek. That the Nabataeans were Arabs is sufficiently proved by the fact that, with the exception of a few Greek names, almost all the numerous names which occur in the Nabataean inscriptions are Arabic, in many cases with distinctly Arabic terminations. A further proof of this is that in the great inscriptions over the tombs of Ḥejr (not far from Teimā) the native Arabic continually shows through the foreign disguise,—for instance, in the use of Arabic words whenever the writer does not happen to remember the corresponding Aramaic terms, in the use of the Arabic *ghair*, "other than," and in several syntactic features. The great inscriptions cease with the overthrow of the Nabataean kingdom by Trajan (105); but the Arabian nomads in those countries, especially in the Sinaitic peninsula, often scratched their names on the rocks down to a later period, adding some benedictory formula in Aramaic. We know hundreds of these Sinaitic inscriptions[2] In any case Aramaic then exercised an immense influence. This is also proved by the place which it occupies in the strange Pahlavi writing, various branches of which date from the time of the Parthian empire (see PAHLAVI). Biblical Aramaic, as also the language of the Palmyrene and Nabataean inscriptions, may be described as an older form of Western Aramaic. The opinion that the Palestinian Jews brought their Aramaic dialect direct from Babylon—whence the incorrect name "Chaldee"—is altogether untenable.

Aramaic of Targums, etc.

We may now trace somewhat farther the development of Western Aramaic in Palestine; but unhappily few of the sources from which we derive our information can be thoroughly trusted. In the synagogues it was necessary that the reading of the Bible should be followed by an oral "targum" or translation into Aramaic, the language of the people. The Targum was at a later period fixed in writing, but the officially sanctioned form of the Targum to the Pentateuch (the so-called Targum of Onkelos) and of that to the prophets (the so-called Jonathan) was not finally settled till the 4th or 5th century, and not in Palestine, but in Babylonia. The redactors of the Targum preserved on the whole the older Palestinian dialect; yet that of Babylon, which differed considerably from the former, exercised a vitiating influence. The text of the Targums was punctuated later in Babylonia, in the supra-linear system there prevalent. Although this task was performed carefully, the punctuation is hardly as trustworthy as that of the Aramaic pieces of the Bible,—much less the transcriptions in the known Tiberian system used in the European Targum manuscripts. The language of Onkelos and Jonathan differs but little from Biblical Aramaic. The language spoken some time afterwards by the Palestinian Jews, especially in Galilee, is exhibited in a series of rabbinical works, the so-called Jerusalem Targums (of which, however, those on the Hagiographa are in some cases of later date), a few Midrashic works, and the Jerusalem Talmud. Unfortunately all these books, of which the Midrashim and the Talmud contain much Hebrew as well as Aramaic, have not been handed down with care, and require to be used with great caution for linguistic purposes. Moreover, the influence of the older language and orthography has in part obscured the characteristics of these popular dialects; for example, various gutturals are still written, although they are no longer pronounced. The adaptation of the spelling to the real pronunciation is carried farthest in the Jerusalem Talmud, but not in a consistent manner. Besides, all these books are without vowel-points; but the frequent use of vowel-letters in the later Jewish works renders this defect less noticeable. Attempts have been made latterly to utilize the above-mentioned books as a means of reconstructing to some extent the dialect spoken by Jesus and the Apostles, and of retranslating the utterances of Jesus into their original Galilaean form. This, however, is a far too venturesome undertaking. How far these Jewish works actually exhibit the Galilean language can hardly be definitely determined; and to this must be added the inexactitude of the traditional text, and, finally, the by no means inconsiderable difference in time.

Christian-Palestine dialect.

Not only the Jews, but also the Christians of Palestine retained their native dialect for some time as an ecclesiastical and literary language. We possess translations of the Gospels and fragments of other works in this dialect by the Palestinian Christians dating from about the 5th century, partly accompanied by a scanty punctuation which was not added till some time later. This dialect closely resembles that of the Palestinian Jews, as was to be expected from the fact that those who spoke it were of Jewish origin.

[1] The decree which is said to have been sent by Ezra (vii. 12 sqq.) is in its present form a comparatively late production.

[2] Even to the *Cosmas Indicopleustes* (first half of the 6th century) the Sinaitic inscriptions, the latest of which were then no more than 200–300 years old, were described as memorials of the Israelite exodus under Moses. And similar views have been propounded down to a short while ago!

Finally, the Samaritans, among the inhabitants of Palestine, translated their only sacred book, the Pentateuch, into their own dialect. The critical study of this translation proves that the language which lies at its base was very much the same as that of the neighbouring Jews. Perhaps, indeed, the Samaritans may have carried the softening of the gutturals a little farther than the Jews of Galilee. Their absurd attempt to embellish the language of the translation by arbitrarily introducing forms borrowed from the Hebrew original has given rise to the false notion that Samaritan is a mixture of Hebrew and Aramaic. The introduction of Hebrew and even of Arabic words and forms was practised in Samaria on a still larger scale by copyists who lived after Aramaic had become extinct. The later works written in the Samaritan dialect are, from a linguistic point of view, as worthless as the compositions of Samaritans in Hebrew; the writers, who spoke Arabic, endeavoured to write in languages with which they were but half acquainted.

Samaritan dialect.

All these Western Aramaic dialects, including that of the oldest inscriptions, have this feature among others in common, that they form the third person singular masculine and the third person plural masculine and feminine in the imperfect by prefixing *y*, as do the other Semitic languages. And in these dialects the termination *ā* (the so-called "status emphaticus") still retained the meaning of a definite article down to a tolerably late period.

As early as the 7th century the conquests of the Moslems greatly circumscribed the domain of Aramaic and a few centuries later it was almost completely supplanted in the west by Arabic. For the Christians of those countries, who, like every one else, spoke Arabic, the Palestinian dialect was no longer of importance, and they adopted as their ecclesiastical language the dialect of the other Aramaean Christians, the Syriac (or Edessene). The only localities where a Western Aramaic dialect, much changed from the old language, still survives are a few villages in Anti-Libanus.

The popular Aramaic dialect of Babylonia from the 4th to the 6th century of our era is exhibited in the Babylonian Talmud, in which, however, as in the Jerusalem Talmud, there is a constant mingling of Aramaic and Hebrew passages. To a somewhat later period, and probably not to exactly the same district of Babylonia, belong the writings of the Mandaeans (*q.v.*), a strange sect, half Christian and half heathen, who from a linguistic point of view possess the peculiar advantage of having remained almost entirely free from the influence of Hebrew, which is so perceptible in the Aramaic writings of Jews as well as of Christians. The orthography of the Mandaeans comes nearer than that of the Talmud to the real pronunciation, and in it the softening of the gutturals is most clearly seen. In other respects there is a close resemblance between Mandaean and the language of the Babylonian Talmud. The forms of the imperfect which we have enumerated above take in these dialects *n* or *l*. In Babylonia, as in Syria, the language of the Arabic conquerors rapidly drove out that of the country. The latter has long been totally extinct, unless possibly a few surviving Mandaeans still speak among themselves a more modern form of their dialect.

Babylonian and Mandaean dialects.

At Edessa, in the west of Mesopotamia, the native dialect had already been used for some time as a literary language, and had been reduced to rule through the influence of the schools (as is proved by the fixity of the grammar and orthography) even before Christianity acquired power in the country in the 2nd century. At an early period the Old and New Testaments were here translated, with the help of Jewish tradition. This version and its transformations became the Bible of Aramaean Christendom, and Edessa became its capital. Thus the Aramaean Christians of the neighbouring countries, even those who were subjects of the Persian empire, adopted the Edessan dialect as the language of the church, of literature, and of cultivated intercourse. Since the ancient name of the inhabitants, "Aramaeans," just like that of "Ἕλληνες, had acquired in the minds of Jews and Christians the unpleasant signification of "heathens," it was generally avoided, and in its place the Greek terms "Syrians" and "Syriac" were used. But "Syriac" was also the name given by the Jews and Christians of Palestine to their own language, and both Greeks and Persians designated the Aramaeans of Babylonia as "Syrians." It is therefore, properly speaking, incorrect to employ the word "Syriac" as meaning the language of Edessa alone; but, since it was the most important of these dialects, it has the best claim to this generally received appellation. It has, as we have said, a shape very definitely fixed; and in it the above-mentioned forms of the imperfect take an *n*. As in the Babylonian dialects, the termination *ā* has become so completely a part of the substantive to which it is added that it has wholly lost the meaning of the definite article, whereby the clearness of the language is perceptibly impaired. The influence exercised by Greek is very apparent in Syriac. From the 3rd to the 7th century an extensive literature was produced in this language, consisting chiefly, but not entirely, of ecclesiastical works. In the development of this literature the Syrians of the Persian empire took an eager part. In the eastern Roman empire Syriac was, after Greek, by far the most important language; and under the Persian kings it virtually occupied a more prominent position as an organ of culture than the Persian language itself. The conquests of the Arabs totally changed this state of things. But meanwhile, even in Edessa, a considerable difference had arisen between the written language and the popular speech, in which the process of modification was still going on. About the year 700 it became a matter of absolute necessity to systematize the grammar of the language and to introduce some means of clearly expressing the vowels. The principal object aimed at was that the text of the Syriac Bible should be recited in a correct manner. But, as it happened, the eastern pronunciation differed in many respects from that of the west. The local dialects had to some extent exercised an influence over the pronunciation of the literary tongue; and, on the other hand, the political separation between Rome and Persia, and yet more the ecclesiastical schism—since the Syrians of the east were mostly Nestorians, those of the west Monophysites and Catholics—had produced divergencies between the traditions of the various schools. Starting, therefore, from a common source, two distinct systems of punctuation were formed, of which the western is the more convenient, but the eastern the more exact and generally the more in accordance with the ancient pronunciation; it has, for example, *ā* in place of the western *ō*, and *ō* in many cases where the western Syrians pronounce *ū*. In later times the two systems have been intermingled in various ways.

Syriac or Edessan Aramaic.

Arabic everywhere put a speedy end to the predominance of Aramaic—a predominance which had lasted for much more than a thousand years—and soon began to drive Syriac out of use. At the beginning of the 11th century the learned metropolitan of Nisibis, Elias bar Shinnāyā, wrote his books intended for Christians either entirely in Arabic or in Arabic and Syriac arranged in parallel columns, that is, in the spoken and in the learned language. Thus, too, it became necessary to have Syriac-Arabic glossaries. Up to the present day Syriac has remained in use for literary and ecclesiastical purposes, and may perhaps be even spoken in some monasteries and schools; but it has long been a dead language. When Syriac became extinct in Edessa and its neighbourhood is not known with certainty (see SYRIAC LANGUAGE).

This language, called Syriac *par excellence*, is not the immediate source whence are derived the Aramaic dialects still surviving in the northern districts. In the mountains known as the Ṭūr 'Abdīn in Mesopotamia, in certain districts east and north of Mosul, in the neighbouring mountains of Kurdistan, and again beyond them on the western coast of the Lake of Urmia, Aramaic dialects are spoken by Christians and occasionally by Jews, and some of these dialects we know with tolerable precision. The dialect of Ṭūr 'Abdīn differs considerably from all the rest; the country beyond the Tigris is, however, divided, as regards language, amongst a multitude of local dialects. Among these, that of Urmia has become the most important, since American missionaries have formed a new literary language out of it. Moreover, the Roman Propaganda has printed books in two of the Neo-Syriac dialects. All these dialects exhibit a complete transformation of the ancient type, to a degree incomparably greater than is the case, for example, with Mandaean. In particular, the ancient verbal tenses have almost entirely disappeared, but have been successfully replaced by new forms derived from participles. There are also other praiseworthy innovations. The dialect of Ṭūr 'Abdīn has, for instance, again coined a definite article. By means of violent contractions and phonetic changes some of these dialects, particularly that of Urmia, have acquired a euphony scarcely known in any other of the Semitic languages, with their "stridentia anhelantiaque verba" (Jerome). These Aramaeans have all adopted a motley crowd of foreign words, from the Arabs, Kurds, Persians and Turks, on whose borders they live and of whose languages they can often speak at least one.

Aramaic is frequently described as a *poor* language. This is an opinion which we are unable to share. It is quite possible, even now, to extract a very large vocabulary from the more ancient Aramaic writings, and yet in this predominantly theological literature a part only of the words that existed in the language have been preserved. It is true that Aramaic, having from the earliest times come into close contact with foreign languages, has borrowed many words from them, firstly from Assyrian, later from Persian and Greek; but, if we leave out of consideration the fact that many Syrian authors are in the habit of using, as ornaments or for convenience (especially in translations), a great number of Greek words, some of which were unintelligible to their readers, we shall find that the proportion of really foreign words in older Aramaic books is smaller than the proportion of Romance words in German or Dutch. The influence of Greek upon the syntax and phraseology of Syriac is not so great as that which it has exercised, through the medium of Latin, upon the literary languages of modern Europe. The literal reproduction of Greek phraseology and Greek construction is contrary to the whole spirit of the language. With regard to sounds, the most characteristic feature of Aramaic (besides its peculiar treatment of the dentals) is that it is poorer in vowels than Hebrew, not to speak of Arabic, since nearly all short vowels in open syllables either wholly disappear or leave but a slight trace behind them (the so-called *shĕwā*). In this respect the punctuation of Biblical Aramaic agrees with Syriac, in which we are able to observe from very early times the number of vowels by examining the metrical pieces constructed according to the number of syllables, and with the Mandaean, which expresses every vowel by means of a vowel-letter.

Characteristics of Aramaic.

When several distinct dialects so agree, the phenomenon in question must be of great antiquity. There are nevertheless traces which prove that the language once possessed more vowels, and the Aramaeans, for instance, with whom David fought may have pronounced many vowels which afterwards disappeared. Another peculiarity of Aramaic is that it lends itself far more readily to the linking together of sentences than Hebrew and Arabic. It possesses many conjunctions and adverbs to express slight modifications of meaning. It is also very free as regards the order of words. That this quality, which renders it suitable for a clear and limpid prose style, is not the result of Greek influence may be seen by the Mandaean, on which Greek has left no mark. In its attempts to express everything clearly Aramaic often becomes prolix,—for example, by using additional personal and demonstrative pronouns. The contrast between Aramaic as the language of prose and Hebrew as the language of poetry is one which naturally strikes us, but we must beware of carrying it too far. Even the Aramaeans were not wholly destitute of poetical talent. Although the religious poetry of the Syrians has but little charm for us, yet real poetry occurs in the few extant fragments of Gnostic hymns. Moreover, in the modern dialects popular songs have been discovered which, though very simple, are fresh and full of feeling. It is therefore by no means improbable that in ancient times Aramaic was used in poems which, being contrary to the theological tendency of Syrian civilization, were doomed to total oblivion.

Arabic.

The southern group of Semitic languages consists of Arabic, Ethiopic and Mahri-Socotri. Arabic, again, is subdivided into the dialects of the larger portion of Arabia and those of the south (the Sabaean). At a very much earlier time than we were but lately justified in supposing, some of the northern Arabs reduced their language to writing. For travellers have recently discovered at al Ula in the northern Ḥijāz inscriptions in a hitherto unknown character, derived from the Sabaean (see below), which appear to have been written before our era. Since it is probable that TLMJ, the name of two kings mentioned in them, is Πτολεμαῖος, we are directed to the Hellenistic period, and other circumstances confirm this conjecture. These inscriptions have been called "Thamudic," because they were found in the country of the Thamūd; but this designation is scarcely a suitable one, because during the period when the power of the Thamūd was at its height, and when the buildings mentioned in the Koran were hewn in the rocks, the language of this country was Nabataean (see above). A more commendable proposal is to call the inscriptions Lihyānī, since the tribe of Lihyān is sometimes mentioned in them. Unfortunately the inscriptions hitherto discovered are all short and for the most part fragmentary, and consequently furnish but little material to the student of languages. But there can be no doubt that they are written in an Arabic dialect. The treatment of the dentals, among other things, is a sufficient proof of this.

Early Arabic Inscriptions.

Thamudic (Lihyānī) Inscriptions.

In some districts of the northern Ḥijāz and the neighbouring portion of Nejd, other brief inscriptions, for the most part cursorily scratched upon rocks, have been discovered. These have been—not very happily—named "Proto-Arabic," while the title Thamudic has been proposed for them also. Their writing is a somewhat later form of the Lihyānī, and the dialect, as well, seems to be very similar to Lihyānī. Unfortunately, the brevity of the inscriptions, which generally contain only proper names, together with the incertitude of the meaning of many, does not allow an accurate insight into their language.

To the first centuries of the Christian era belong the thousands of Arabic inscriptions, found in the wild, rocky districts south-east of Damascus, which are commonly termed Safaitic, after Safa, a locality in their neighbourhood. For the most part, these also are short fugitive pieces scratched on rough stones, though a few of them show more careful execution. Their writing is, again, a later stage of development of the Sabaean. The task of decipherment was at first rendered extremely difficult by the scanty number of exemplars and the lack of perfectly exact facsimiles. To this must be added the fact that the Safaites insert extraordinarily few vowel letters. But the zeal of several scholars and the ever increasing number of good copies have rapidly brought us farther towards the goal; and we now know the language of the Safa inscriptions much better than that of the Lihyānī and "Proto-Arabic,"—to which it stands in a close relationship. Although the inscriptions yield us no information as to unknown events of importance, still they teach us much with regard to the life and occupation of Arabian tribes who seem to have been subsequently displaced by others. The great mass of proper names, alone, is enough to make them of value to the philologist.

The Arabs who inhabited the Nabataean kingdom wrote in Aramaic, but, as has been remarked above, their native language, Arabic, often shows through the foreign disguise. We are thus able to satisfy ourselves that these Arabs, who lived a little before and a little after Christ, spoke a dialect closely resembling the later classical Arabic. The nominative of the so-called "triptote" nouns has, nearly as in classical Arabic, the termination *ū* or *ō*; the genitive has *ī* (the accusative therefore probably ended in *ā*), but without the addition of *n*. Generally speaking, those proper names which in classical Arabic are "diptotes" are here devoid of any inflexional termination. The *ū* of the nominative appears also in Arabic proper names belonging to more northern districts, as, for example, Palmyra and Edessa. All these Arabs were probably of the same race. It is possible that the inscription of Nemāra, south-east of Damascus, Arabic, but in Nabataean letters, dating from A.D. 328, and the two oldest known specimens of distinctively Arabic writing—namely, the Arabic portion of the trilingual inscription of Zabad, south-east of Haleb (Aleppo), written in Syriac, Greek and Arabic, and dating from 512 or 513 A.D., and that of the bilingual inscription of Harrān, south of Damascus, written in Greek and Arabic, of 568—represent nothing but a somewhat more modern form of this dialect. In these inscriptions proper names take in the genitive the termination *ū*, which shows that the meaning of such inflexions was no longer felt. The three inscriptions have not yet been satisfactorily interpreted in all their details.

During the whole period of the preponderance of Aramaic this language exercised a great influence upon the vocabulary of the Arabs. The more carefully we investigate the more clearly does it appear that numerous Arabic words, used for ideas or objects which presuppose a certain degree of civilization, are borrowed from the Aramaeans. Hence the civilizing influence of their northern neighbours must have been very strongly felt by the Arabs, and contributed in no small measure to prepare them for playing so important a part in the history of the world.

In the 6th century the inhabitants of the greater part of Arabia proper spoke everywhere essentially the same language, which, as being by far the most important of all Arabic dialects, is known simply as the Arabic language. Arabic poetry, at that time cultivated throughout the whole of central and northern Arabia as far as the lower Euphrates and even beyond it, employed one language only. The extant Arabic poems belonging to the heathen period were not indeed written down till much later, and meanwhile underwent considerable alterations; but the absolute regularity of the metre and rhyme is a sufficient proof that on the whole these poems all obeyed the same laws of language. It is indeed highly probable that the rhapsodists and the grammarians have effaced many slight dialectical peculiarities; in a great number of passages, for example, the poets may have used, in accordance with the fashion of their respective tribes, some other case than that prescribed by the grammarians, and a thing of this kind may afterwards have been altered, unless it happened to occur in rhyme; but such alterations cannot have extended very far. A dialect that diverged in any great measure from the Arabic of the grammarians could not possibly have been made to fit into the metres. Moreover, the Arabic philologists recognize the existence of various small distinctions between the dialects of individual tribes and of their poets, and the traditions of the more ancient schools of Koran readers exhibit very many dialectical *nuances*. It might indeed be conjectured that for the majority of the Arabs the language of poetry was an artificial one,—the speech of certain tribes having been adopted by all the rest as a *dialectus poëtica*. And this might be possible in the case of wandering minstrels whose art gained them their livelihood, such as Nābigha and A'shā. But, when we find that the Bedouin goat-herds, for instance, in the mountainous district near Mecca composed poems in this very same language upon their insignificant feuds and personal quarrels, that in it the proud chiefs of the Taghlibites and the Bekrites addressed defiant verses to the king of Hīra (on the Euphrates), that a Christian inhabitant of Hīra, Adī b. Zaid, used this language in his serious poems,—when we reflect that, as far as the Arabic poetry of the heathen period extends, there is nowhere a trace of any important linguistic difference, it would surely be a paradox to assume that all these Arabs, who for the most part were quite illiterate and yet extremely jealous of the honour of their tribes, could have taken the trouble to clothe their ideas and feelings in a foreign, or even a perfectly artificial, language. The Arabic philologists also invariably regarded the language of the poets as being that of the Arabs in general. Even in the 3rd century after Mahomet the Bedouins of Arabia proper, with the exception of a few outlying districts, were considered as being in possession of this pure Arabic. The most learned grammarians were in the habit of appealing to any uneducated man who happened to have just arrived with his camels from the desert, though he did not know by heart twenty verses of the Koran, and had no conception of theoretical grammar, in order that he might decide whether in Arabic it were allowable or necessary to express oneself in this or that manner. It is evident that these profound scholars knew of only one classical language, which was still spoken by the Bedouins. The tribes which produced the principal poets of the earlier period belonged for the most part to portions of the Ḥijāz, to Najd and its neighbourhood, and to the region which stretches thence towards the Euphrates. A great part of the Ḥijaz, on the other hand, plays a very unimportant part in this poetry, and the Arabs of the north-west, who were under the Roman dominion, have no share whatever in it. The dialects of these latter tribes probably diverged farther from the ordinary language. The fact that they were Christians does not explain this, since the Taghlibites and other tribes who produced eminent poets

Classical Arabic.

also professed Christianity. Moreover, poets from the interior were gladly welcomed at the court of the Ghassānian princes, who were Christian vassals of the emperor residing near Damascus; in this district, therefore, their language was at least *understood*. It may be added that most of the tribes which cultivated poetry appear to have been near neighbours at an epoch not very far removed from that in question, and afterwards to have been scattered in large bands over a much wider extent of country. And nearly all those who were not Christians paid respect to the sanctuary of Mecca.

Dialect of the Koraish.

It is a total mistake, but one frequently made by Europeans, to designate the Arabic language as "the Koraishite dialect." This expression never occurs in any Arabic author. True, in a few rare cases we do read of the dialect of the Koraish, by which is meant the peculiar local tinge that distinguished the speech of Mecca; but to describe the Arabic language as "Koraishite" is as absurd as it would be to speak of English as the dialect of London or of Oxford. This unfortunate designation has been made the basis of a theory very often repeated in modern times—namely, that classical Arabic is nothing else but the dialect of Mecca, which the Koran first brought into fashion. So far from this being the case, it is certain that the speech of the *towns* in the Ḥijāz did not agree in every point with the language of the poets, and, as it happens, the Koran itself contains some remarkable deviations from the rules of the classical language. This would be still more evident if the punctuation, which was introduced at a somewhat later time, did not obscure many details. The traditions which represent the Koraish as speaking the purest of all Arabic dialects are partly the work of the imagination and partly compliments paid to the rulers descended from the Koraish, but are no doubt at variance with the ordinary opinion of the Arabs themselves in earlier days. In the Koran Mahomet has imitated the poets, though, generally speaking, with little success; the poets, on the other hand, never imitated him. Thus the Koran and its language exercised but very little influence upon the poetry of the following century and upon that of later times, whereas this poetry closely and slavishly copied the productions of the old heathen period. The fact that the poetical literature of the early Moslems has been preserved in a much more authentic form than the works of the heathen poets proves that our idea of the language of its pattern, the ancient poetry, is on the whole just.

The Koran and Islam raised Arabic to the position of one of the principal languages of the world. Under the leadership of the Koraish the Bedouins subjected half the world to both their dominion and their faith. Thus Arabic acquired the additional character of a sacred language. But soon it became evident that not nearly all the Arabs spoke a language precisely identical with the classical Arabic of the poets. The north-western Arabs played a particularly important part during the period of the Omayyads. The ordinary speech of Mecca and Medina was, as we have seen, no longer quite so primitive as that of the desert. To this may be added that the military expeditions brought those Arabs who spoke the classical language into contact with tribes from out-of-the-way districts, such as 'Omān, Baḥrain (Bahrein), and particularly the north of Yemen. The fact that numbers of foreigners, on passing over to Islam, became rapidly Arabized was also little calculated to preserve the unity of the language. Finally, the violent internal and external commotions which were produced by the great events of that time, and stirred the whole nation, probably accelerated linguistic change. In any case, we know from good tradition that even in the 1st century of the Flight the distinction between correct and incorrect speech was in places quite perceptible. About the end of the 2nd century the system of Arabic grammar was constructed, and never underwent any essential modification in later times. The theory as to how one should express oneself was now definitely fixed. The majority of those Arabs who lived beyond the limits of Arabia already diverged far from this standard; and in particular the final vowels which serve to indicate cases and moods were no longer pronounced. This change, by which Arabic lost one of its principal advantages, was no doubt hastened by the fact that even in the classical style such terminations were omitted whenever the word stood at the end of a sentence (in pause); and in the living language of the Arabs this dividing of sentences is very frequent. Hence people were already quite accustomed to forms without grammatical terminations. But in the language of certain Bedouin tribes remnants of those terminations have been preserved down to our time.

Changes in classical Arabic.

Through the industry of Arabic philologists we are able to make ourselves intimately acquainted with the system, and still more with the vocabulary of the language. Although they have not always performed their task in a critical manner, we are obliged to thank them sincerely. We should be all the more disposed to admire the richness of the ancient Arabic vocabulary when we remember how simple are the conditions of life amongst the Arabs, how painfully monotonous their country, and consequently how limited the range of their ideas must be. Within this range, however, the slightest modification is expressed by a particular word. It must be confessed that the Arabic lexicon has been greatly augmented by the habit of citing as words by themselves such rhetorical phrases as an individual poet has used to describe an object: for example, if one poet calls the lion the "tearer" and another calls him the "mangler," each of these terms is explained by the lexicographers as equivalent to "lion." One branch of literature in particular, namely, lampoons and satirical poems, which for the most part have perished, no doubt introduced into the lexicon many expressions coined in an arbitrary and sometimes in a very strange manner. Moreover, Arabic philologists seem to have underrated the number of words which, though they occur now and then in poems, were never in general use except among particular tribes. But in spite of these qualifications it must be admitted that the vocabulary is surprisingly rich, and the Arabic dictionary will always remain the principal resource for the elucidation of obscure expressions in all the other Semitic tongues. This method, if pursued with the necessary caution, is a perfectly legitimate one.

Vocabulary.

Poems seldom enable us to form a clear idea of the language of ordinary life, and Arabic poetry happens to have been distinguished from the very beginning by a certain tendency to artificiality and mannerism. Still less does the Koran exhibit the language in its spoken form. This office is more performed by the prose of the ancient normative traditions (*Ḥadīth*). And the genuine accounts of the deeds of the Prophet and of his companions, and especially the stories concerning the battles and adventures of the Bedouins in the heathen period and in the earlier days of Islam, are excellent models of a prose style, although in some cases their redaction dates from a later time.

Classical Arabic is rich not only in words but in grammatical forms. The wanton development of the broken plurals, and sometimes of the verbal nouns, must be regarded as an excess of wealth. The sparing use of the ancient terminations which mark the plural has somewhat obscured the distinction between plurals, collectives, abstract nouns, and feminines in general. In its manner of employing the verbal tenses genuine Arabic still exhibits traces of that poetical freedom which we see in Hebrew; this characteristic disappears in the later literary language. In connecting sentences Arabic can go much further than Hebrew, but the simple parataxis is by far the most usual construction. Arabic has, however, this great advantage, that it scarcely ever leaves us in doubt as to where the apodosis begins. The attempts to define the tenses more clearly by the addition of adverbs and auxiliary verbs lead to no very positive result (as is the case in other Semitic languages also), since they are not carried out in a systematic manner. The arrangement of words in a sentence is governed by very strict rules. As the subject and object, at least in ordinary cases, occupy fixed positions, and as the genitive is invariably placed after the noun that governs it, the use of case-endings loses much of its significance.

Grammatical forms and rules.

This language of the Bedouins had now, as we have seen, become that of religion, courts and polished society. In the streets of the towns the language already diverged considerably from this, but the upper classes took pains to speak "Arabic." The poets and the *beaux esprits* never ventured to employ any but the classical language, and the "Atticists," with pedantic seriousness, convicted the most celebrated among the later poets (for instance, Motanabbī) of occasional deviations from the standard of correct speech. At the same time, however, classical Arabic was the language of business and of science, and at the present day still holds this position. There are, of course, many gradations between the pedantry of purists and the use of what is simply a vulgar dialect. Sensible writers employ a kind of κοινή, which does not aim at being strictly correct and calls modern things by modern names, but which, nevertheless, avoids coarse vulgarisms, aiming principally at making itself intelligible to all educated men. The reader may pronounce or omit the ancient terminations as he chooses. This language lived on, in a sense, through the whole of the middle ages, owing chiefly to the fact that it was intended for educated persons in general and not only for the learned, whereas the poetical schools strove to preserve exactly the grammar and the lexicon of the long extinct language of the Bedouins. As might be expected, this κοινή, like the κοινή of the Greeks, has a comparatively limited vocabulary, since its principle is to retain only those expressions from the ancient language which were generally understood, and it does not borrow much new material from the vulgar dialects.

Arabic of educated society.

It is entirely a mistake to suppose that Arabic is unsuited for the treatment of abstract subjects. On the contrary, scarcely any language is so well adapted to be the organ of scholasticism in all its branches. Even the tongue of the ancient Bedouins had a strong preference for the use of abstract verbal nouns (in striking contrast to the Latin, for example); thus they oftener said "Needful is thy sitting" than "It is needful that thou shouldest sit." This tendency was very advantageous to philosophical phraseology. The strict rules as to the order of words, though very unfavourable to the development of a truly eloquent style, render it all the easier to express ideas in a rigidly scientific form.

In the meantime Arabic, like every other widely spread language, necessarily began to undergo modification and to split up into dialects. The Arabic scholars are mistaken in attributing this development to the influence of those foreign languages with which Arabic came into contact. Such influences can have had but little to do with the matter; for were it otherwise the language of the interior of Arabia must have remained unchanged, yet even in this region the inhabitants are very far from

Minor Arabic dialects.

speaking as they did a thousand years back. A person who in Arabia or elsewhere should trust to his knowledge of classical Arabic only would resemble those travellers from the north who endeavour to make themselves understood by Italian waiters through the medium of a kind of Latin. The written language has, it is true, greatly retarded the development of the dialects. Every good Moslem repeats at least a few short sūras several times a day in his prayers. Nor is this all: the sacred book meets him everywhere. Now the majority of Arabian Moslems understand something at least of the passages they recite or hear; so that the Koran was bound to exercise, on the language of the widest circles, an influence such as has been exercised by no other book in the world. The idiom of the church, of learning and of diplomacy was brought—partially at least—nearer to the average man, with the result that many of its words and locutions passed, with more or less correctitude, into the language of common life, or that its mode of expression was taken as a model, precisely as Latin, the language of the church, science and the state, exerted a powerful influence on the living Romance tongues, even before the Renaissance. Yet, in spite of this, the Arabic dialects have developed on their own lines and have diverged widely from each other. Our knowledge of them has made rapid progress in late years, and we have now good grammars of several dialects. We are best acquainted with the present speech of Egypt, and we are well posted in the dialects of the Maghrib—the African coastal lands from Tripoli to Morocco. To the Maghrib group of dialects belonged that once spoken in Sicily, of which we know little in especial, together with the Spanish Arabic of former times, which is better known to us through several literary monuments and the Grammar and Lexicon of Pedro de Alcala (1505). The shibboleth of these Western dialects is that, in the imperfect, they pronounce the 1st person plural with the ending *u* (as the 2nd and 3rd), and give to the 1st person singular the prefix *n* (as in the plural form). Maltese, also, is of the Maghrib family. This Arabic dialect, the only one spoken exclusively by Christians, is of peculiar interest to the philologist, owing to the fact that for some 900 years it has been completely withdrawn from the action of literary Arabic. On the other hand, it has been exposed to the influence of Italian. Nevertheless, it has developed in a very similar manner to the dialects of the neighbouring African coast: still it possesses many features which are peculiar to itself. Of the dialects of Syria, inner and southern Arabia, and other oriental countries, we also know more than was the case a short while ago; but the gaps in our knowledge are still too great to allow us to classify them in fixed groups. For the most part the Bedouin language is somewhat strongly distinguished from that of the sedentary tribes; but we should hardly be justified in believing that the Bedouin dialects form a contrasting unity as against the other idioms.

There can be no doubt that the development of these dialects is in part the result of older dialectical variations which were already in existence in the time of the Prophet. The histories of dialects which differ completely from one another often pursue an analogous course. In general, the Arabic dialects still resemble one another more than we might expect when we take into consideration the immense extent of country over which they are spoken and the very considerable geographical obstacles that stand in the way of communication. But we must not suppose that people, for instance, from Mosul, Morocco, Ṣan'ā, and the interior of Arabia would be able to understand one another without difficulty. It is a total error to regard the difference between the Arabic dialects and the ancient language as a trifling one, or to represent the development of these dialects as something wholly unlike the development of the Romance languages. No living Arabic dialect diverges from classical Arabic so much as French or Rouman from Latin; but, on the other hand, no Arabic dialect resembles the classical language so closely as the Lugodoric dialect, which is still spoken in Sardinia, resembles its parent speech, and yet the lapse of time is very much greater in the case of the latter. Side by side with the poetry of the old literary language there arose, in quite early days, another school of poetry which availed itself of the younger, living dialects. So, even in the 12th century, dialectic poetry was flourishing in Spain; and down to the present day, in the most diverse quarters of the vast linguistic domain of Arabic, songs have been composed in the various dialects. But this poetry, probably with the sole exception of Maltese, stands in some connexion or other with the antique, and is subject, more or less, to the influence of the classical language. And this is still more the case in other departments of literature. *Märchen*, and other tales, written by the uneducated, merely show a dialectic colouring, frequently combined with a catachrestic use of the grammatical forms of classical Arabic, not the genuine aspect of the dialect itself. These features are particularly evident in works by Jews and Christians. Purely "vulgar" texts, of any magnitude, would be hard to discover. The isolated Maltese alone has succeeded in producing a new written language distinct from the classical tongue; and in this a fair amount of material has already been printed in Latin characters. In recent years, however, earnest attempts have been made to elevate the Egyptian dialect to the rank of a literary language: whether these attempts will be crowned with permanent success is a question to be resolved by time. In any case, the ancient written language, though with all kinds of modifications, will long continue to exist. The very fact that it does not express the vocalization with exactitude is an advantage; for thus the Arabs, from the Persian Gulf to the Atlantic, can recognize the same word, although they may pronounce it with different vowels.

Sabaean.

Sabaean inscriptions.

Long before Mahomet, a peculiar and highly developed form of civilization had flourished in the table-land to the south-west of Arabia. The more we become acquainted with the country of the ancient Sabaeans and with its colossal edifices, and the better we are able to decipher its inscriptions, which are being discovered in ever-increasing numbers, the easier it is for us to account for the haze of mythical glory wherewith the Sabaeans were once invested. The Sabaean inscriptions (which till lately were more often called by the less correct name of "Himyaritic") begin long before our era and continue till the 6th century. The somewhat stiff character is always very distinct; and the habit of regularly dividing the words from one another renders decipherment easier, which, however, has not yet been performed in a very satisfactory manner, owing in part to the fact that the vast majority of the documents in question consist of religious votive tablets with peculiar sacerdotal expressions, or of architectural notices abounding in technical terms. These inscriptions fall into two classes, distinguished partly by grammatical peculiarities and partly by peculiarities of phraseology. One dialect, which forms the causative with *ha*, like Hebrew and others, and employs, like nearly all the Semitic languages, the termination *h* (*hū*) as the suffix of the third person singular, is the Sabaean properly speaking. The other, which expresses the causative by *sa* (corresponding to the Shaphel of the Aramaeans and others), and for the suffix uses *s* (like the Assyrian *sh*), is the Minaic. To this latter branch belong the numerous South Arabic inscriptions recently found in the north of the Ḥijāz, near Ḥejr, where the Minaeans must have had a commercial settlement. On the other hand, the very old inscriptions, emanating from a colony at Jeha in Abyssinia, are Sabaean. The difference between the two classes of inscriptions is no doubt ultimately based upon a real divergence of dialect. But the singular manner in which districts containing Sabaean inscriptions and those containing Minaic alternate with one another seems to point in part to a mere hieratic practice of clinging to ancient modes of expression. Indeed it is very probably due to conscious literary conservatism that the language of the inscriptions remains almost entirely unchanged through many centuries. A few inscriptions from districts rather more to the east exhibit certain linguistic peculiarities, which, however, may perhaps be explained by the supposition that the writers did not, as a rule, speak this dialect, and therefore were but imperfectly acquainted with it.

Grammatical forms.

A great hindrance to the completion of our knowledge of the Sabaean language lies in the paucity of vowel-letters in the inscriptions. The unvarying style of the inscriptions excludes further a great number of the commonest grammatical forms. Not a single occurrence of the first or second person has yet been detected, with the possible exception of one proper name, in which "our god" apparently occurs. But the knowledge which we already possess amply suffices to prove that Sabaean is closely related to Arabic as we are acquainted with it. The former language possesses the same phonetic elements as the latter. It possesses the broken plural, a dual form resembling that used in Arabic, &c. It is especially important to notice that Sabaean expresses the idea of indefiniteness by means of an appended *m*, just as Arabic expresses it by means of an *n*, which in all probability is a modification of the former sound. But we may maintain that, in the later centuries, the *m* had fallen away in the pronunciation, either completely or in the majority of cases. Both in this point and in some others Sabaean appears more primitive than Arabic, as might be expected from the earlier date of its monuments. The article is formed by appending an *n*. In its vocabulary also Sabaean bears a great resemblance to Arabic, although, on the other hand, it often approaches more nearly to the northern Semitic languages in this respect; and it possesses much that is peculiar to itself.

Soon after the Christian era Sabaean civilization began to decline, and completely perished in the wars with the Abyssinians, who several times occupied the country, and in the 6th century remained in possession of it for a considerable period. In that age the language of central Arabia was already penetrating into the Sabaean domain. It is further possible that many tribes which dwelt not far to the north of the civilized districts had always spoken dialects resembling central Arabic rather than Sabaean. About the year 600 "Arabic" was the language of all Yemen, with the exception perhaps of a few isolated districts, and this process of assimilation continued in later times. True, a few echoes of Sabaean have survived in certain grammatical forms and the vocabulary of present-day dialects in those districts; but these dialects are, on the whole, thoroughly "Arabic." Several centuries after Mahomet, learned Yemenites were acquainted with the characters of the inscriptions which abounded in their country; they were also able to decipher the proper names and a small number of Sabaean words the meaning of which was still known to them, but they could no longer understand

the inscriptions as a whole. Being zealous local patriots, they discovered in those inscriptions which they imagined themselves to be capable of deciphering many fabulous stories respecting the glory of the ancient Yemenites.

Mahrī and Socotrī.

Farther to the east, in the sea-coast districts of Shihr and Mahra, up to the borders of the barren desert of the interior, and also in the island of Socotra, dialects very unlike Arabic are still spoken. Allusions to this fact are found in Arabic writers of the 10th century. Mahrī, from which Shkhaurī forms a distinct dialect, and Socotrī are probably scions of dialects which were related to Sabaean and Minaean; but they have developed on altogether independent lines, and we can scarcely hope that they will render us any great assistance in the interpretation of the inscriptions. They certainly show the southern Semitic type in a most pronounced manner. The strange form of the words is produced, *inter alia*, by all manner of vowel lengthenings and violent mutations of consonants (*e.g.* in Socotrī *s* frequently becomes *h*, a phonetic change otherwise unknown in Semitic philology). Exact investigation will undoubtedly still discover an old acquaintance in many a strange-seeming word. Here and there, however, in Mahrī we discover words which at the first glance we recognize as common in Hebrew or Aramaic, while Arabic knows them either not at all or only in derivative significations. Still, a very large part—perhaps the preponderating part—of the Mahrī vocabulary is formed by words which have been borrowed from the Arabic at different periods. Many of them have subsequently undergone drastic phonetic alterations, so that at first they might be taken for genuine Mahrī. In Socotrī, which has been more protected by its insular position, the borrowed Arabic words are rarer, but even here they are not lacking. These languages, however, especially Socotrī, still contain a number of words, with regard to which we may well doubt whether they are Semitic at all. The conjecture that Hamites also were once settled in those districts and have left traces of themselves in the language, appears to be favoured by the bodily characteristics of the inhabitants.[1]

Ethiopic.

In Abyssinia, too, and in the neighbouring countries we find languages which bear a certain resemblance to Arabic. The Geez, or Ethiopic[2] proper, the language of the ancient kingdom of Axūm, was reduced to writing at an early date. At first Sabaean letters were employed. But even the monument of King Aeizanas (*c.* A.D. 350), as is now well established, bears, in addition to the Greek inscription, one in Ethiopian. This, however, is both in Sabaean and in Geez characters, *i.e.* in a systematic transformation of the Sabaean. Here the Geez is still unvocalized; and some few inscriptions besides, without vowel signs, have been discovered. But two great inscriptions of the same king of Axūm—so it appears to be after the newest researches already have the full vocalization which obtains in the Ethiopian Bible and the remaining literature: the language, too, is identically the same. The indication of the vowels gives Ethiopic an advantage over all other Semitic scripts. By whom it was introduced is unknown. Not long after the time of the inscriptions the Bible was translated into Geez from the Greek, in part by Jews; for Jews and Christians were at that time actively competing with one another, both in Arabia and in Abyssinia; nor were the former unsuccessful in making proselytes. The missionaries who gave the Bible to the Abyssinians must, at least in some cases, have spoken Aramaic as their mother-tongue, for this alone can explain the fact that in the Ethiopic Bible certain religious conceptions are expressed by Aramaic words. During the following centuries various works were produced by the Abyssinians in this language; they were all, so far as we are able to judge, of a more or less theological character, almost invariably translations from the Greek. We cannot say with certainty when Geez ceased to be the language of the people, but it was probably about a thousand years ago. From the time when the Abyssinian kingdom was reconstituted, towards the end of the 13th century, by the so-called Solomonian dynasty (which was of southern origin), the language of the court and of the government was Amharic; but Geez remained the ecclesiastical and literary language, and Geez literature even showed a certain activity in numerous translations from those Arabic and Coptic works which were in use amongst the Christians of Egypt; besides these, original writings were composed by monks and priests, namely, lives of saints, hymns, &c. This literary condition lasted till modern times. The language, which had long become extinct, was by no means invariably written in a pure form: we may often observe, *inter alia*, a servile imitation of Arabic modes of expression. Even in manuscripts of more ancient works we find many linguistic corruptions, which have crept in partly through mere carelessness and ignorance, partly through the influence of the later dialects. On points of detail we are still sometimes left in doubt, as we possess no manuscripts belonging to the older period.

Geez, or Ethiopic proper.

Geez is more nearly related to Sabaean than to Arabic, though scarcely to such a degree as we might expect. The historical intercourse between the Sabaeans and the people of Axūm does not, however, prove that those who spoke Geez were simply a colony from Sabaea; the language may be descended from an extinct cognate dialect of south Arabia, or may have arisen from a mingling of several such dialects. And this colonization in Africa probably began much sooner than is usually supposed. In certain respects Geez represents a more modern stage of development than Arabic; we may cite as instances the loss of some inflexional terminations and of the ancient passive, the change of the aspirated dentals into sibilants, &c. In the manuscripts, especially those of later date, many letters are confounded, namely, *h*, *ḥ*, and *kh*, *s* and *sh*, *ṣ* and *ḍ*; this, however is no doubt due only to the influence of the modern dialects. To this same influence, and indirectly perhaps to that of the Hamitic languages, we may ascribe the very hard sound now given to certain letters, *q*, *ṭ*, *ṣ*, and *ḍ*, in the reading of Geez. The last two are at present pronounced something like *ṭs* and *ts* (the German *z*). A peculiar advantage possessed by Geez and by all Ethiopic languages is the sharp distinction between the imperfect and the subjunctive: in the former a vowel is inserted after the first radical, a formation which exists also in Mahrī and Socotrī, and—though in another signification in Assyrian as well. Geez has no definite article, but is very rich in particles. In the ease with which it joins sentences together and in its freedom as to the order of words it resembles Aramaic. The vocabulary is but imperfectly known, as the theological literature, which is for the most part very arid, supplies us with comparatively few expressions that do not occur in the Bible, whereas the more modern works borrow their phraseology in part from the spoken dialects, particularly Amharic. With regard to the vocabulary, Geez has much in common with the other Semitic tongues, but at the same time possesses many words peculiar to itself; of these a considerable proportion may be of Hamitic origin. However, the grammar shows, at most, some slight and dubious traces of Hamitic influence. Geez seems to have been originally the language of a tribe almost exempt from non-Semitic blood. But we must not suppose that all the inhabitants of the ancient kingdom of Axum were pure Semites. The immigration of the Semites from Arabia was, in all probability, a slow process, beginning at a very ancient period, and under such circumstances there is every reason to assume that they largely intermingled with the aborigines. This opinion seems to be confirmed by anthropological facts.

Characteristics of Geez.

Tigrē and Tigriña.

Not only in what is properly the territory of Axūm (namely, Tigrē, north-eastern Abyssinia), but also in the countries bordering upon it to the north, including the islands of Dahlak, dialects are still spoken which are but more modern forms of the linguistic type clearly exhibited in Geez, viz. that spoken in Tigrē proper and that of the neighbouring countries. In reality, the name of Tigrē belongs to both, and it would be desirable to distinguish them from one another as Northern and Southern Tigrē. But it is the custom to call the northern dialect Tigrē simply, whilst that spoken in Tigrē itself bears the name of Tigrai or, with an Amharic termination, Tigriña. Tigrē bears a somewhat closer resemblance to Geez than does Tigriña, although this latter is spoken in the very home of Geez, for Tigriña has during several centuries been very strongly influenced by Amharic, which has not been the case with Tigrē, which is spoken mostly by nomads. But Tigrē, on the other hand, seems to have been greatly influenced by Hamitic dialects. In late years careful observations on both languages have been made by scholars *in loco*, and we already have a number of printed texts, comprising partly original works, partly translations of Biblical books and so forth. But in this domain our knowledge still stands in great need of being perfected.

Amharic.

Although Tigrē and Tigriña are not free from foreign influences, yet at the core they are purely Semitic. This is not fundamentally the case with Amharic, a language of which the domain extends from the left bank of the Takkazē into regions far to the south. Although by no means the only language spoken in these countries, it always tends to displace those foreign tongues which surround it and with which it is interspersed. We here refer especially to the Agaw dialects. Although Amharic has been driven back by the invasions of the Galla tribes, it has already compensated itself to some extent for this loss, as the Yedju and Wollo Gallas, who penetrated into eastern Abyssinia, have adopted it as their language. With the exception, of course, of Arabic, no Semitic tongue is spoken by so large a number of human beings as Amharic. The very fact that the Agaw languages are being gradually, and, as it were, before our own eyes, absorbed by Amharic makes it appear probable that this language must be spoken chiefly by people who are not of Semitic race.[3] This supposition is confirmed by a study of the language

[1] What certain knowledge we possess of Mahrī and Socotrī is almost wholly based on the researches of Vienna scholars. We hope to receive from them still more light on these strange tongues.

[2] This name is due to the fact that the Abyssinians, under the influence of false erudition, applied the name Αἰθιοπία to their own kingdom.

[3] Only an advanced guard of the Agaw languages, the Bilin or dialect of the Bogos, is being similarly absorbed by the Tigrē.

itself. Amharic has diverged from the ancient Semitic type to a far greater extent than any of the dialects which we have hitherto enumerated. Many of the old formations preserved in Geez are completely modified in Amharic. Of the feminine forms there remain but a few traces; and that is the case also with the ancient plural of the noun. The strangest innovations occur in the personal pronouns. And certainly not more than half the vocabulary can without improbability be made to correspond with that of the other Semitic languages. In this, as also in the grammar, we must leave out of account all that is borrowed from Geez, which, as being the ecclesiastical tongue, exercises a great influence everywhere in Abyssinia. On the other hand, we must make allowance for the fact that in this language the very considerable phonetic modifications often produce a total change of form, so that many words which at first have a thoroughly foreign appearance prove on further examination to be but the regular development of words with which we are already acquainted. But the most striking deviations occur in the syntax. Things which we are accustomed to regard as usual or even universal in the Semitic languages, such as the placing of the verb before the subject, of the governing noun before the genitive, and of the attributive relative clause after its substantive, are here totally reversed. Words which are marked as genitives by the prefixing of the relative particle, and even whole relative clauses, are treated as one word, and are capable of having the objective suffix added to them. It is scarcely going too far to say that a person who has learnt no Semitic language would have less difficulty in mastering the Amharic construction than one to whom the Semitic syntax is familiar. What here appears contrary to Semitic analogy is sometimes the rule in Agaw. Hence it is probable that in this case tribes originally Hamitic retained their former modes of thought and expression after they had adopted a Semitic speech, and that they modified their new language accordingly. And it is not certain that the partial Semitization of the southern districts of Abyssinia (which had scarcely any connexion with the civilization of Axum during its best period) was entirely or even principally due to influences from the north.

In spite of its dominant position, Amharic did not for several centuries show any signs of becoming a literary language. The oldest documents which we possess are a few songs of the 15th and 16th centuries, which were not, however, written down till a later time, and are very difficult to interpret. There are also a few Geez-Amharic glossaries, which may be tolerably old. Since the 17th century various attempts have been made, sometimes by European missionaries, to write in Amharic, and in modern times this language has to a considerable extent been employed for literary purposes; nor is this to be ascribed exclusively to foreign influence. A literary language, fixed in a sufficient measure, has thus been formed. Books belonging to a somewhat earlier period contain tolerably clear proofs of dialectical differences. Scattered notices by travellers seem to indicate that in some districts the language diverges in a very much greater degree from the recognized type.

The Abyssinian chronicles have for centuries been written in Geez, largely intermingled with Amharic elements. This "language of the chronicles," in itself a dreary chaos, often enables us to discover what were the older forms of Amharic words. A similar mixture of Geez and Amharic is exemplified in various other books, especially such as refer to the affairs of the government and of the court.

Hararī and Gurāguē.

The town of Harar, situated at some distance east of Shoa, forms a Semitic island; for its language is extremely similar to Amharic. In comparison with this, it exhibits sometimes later, sometimes older formations. A few centuries ago, Hararī was perhaps a dialect only slightly divergent from Amharic. To-day, Amharians and the inhabitants of Harar can no longer understand each other, especially as the latter have drawn largely on the languages of the surrounding Hamites (Galla, Somāl, and probably also Danākil), and on Arabic, which exercises a strong influence upon them as Moslems. We may fairly regard them as an old colony of Abyssinians. As the case is with Hararī, so it is probably with the dialects of Gurāguē (south of Shoa). These dialects, which are markedly divergent from one another and have assumed a highly peculiar form, placed as they are in the midst of entirely alien idioms, yet give unmistakable signs of an origin either from Amharic or a dialect extremely close to Amharic. It is certainly a matter for desire that we should soon receive some really comprehensive and at the same time trustworthy account of Hararī and the language of Gurāguē. We repeat that the immigration of the Semites into these parts of Africa was probably no one single act, that it may have taken place at different times, that the immigrants perhaps belonged to different tribes and to different districts of Arabia, and that very heterogeneous peoples and languages appear to have been variously mingled together in these regions. (TH. N.)

SEMLER, JOHANN SALOMO (1725–1791), German church historian and biblical critic, was born at Saalfeld in Thuringia on the 18th of December 1725, the son of a clergyman in poor circumstances. He grew up amidst pietistic surroundings, which powerfully influenced him his life through, though he never became a Pietist. In his seventeenth year he entered the university of Halle, where he became the disciple, afterwards the assistant, and at last the literary executor of the orthodox rationalistic professor S. J. Baumgarten (1706–1757). In 1749 he accepted the position of editor, with the title of professor, of the Coburg official *Gazette*. But in 1751 he was invited to Altdorf as professor of philology and history, and in 1752 he became a professor of theology in Halle. After the death of Baumgarten (1757) Semler became the head of the theological faculty of his university, and the fierce opposition which his writings and lectures provoked only helped to increase his fame as a professor. His popularity continued undiminished for more than twenty years, until 1779. In that year he came forward with a reply (*Beantwortung der Fragmente eines Ungenannten*) to the *Wolfenbuttel Fragments* (see REIMARUS) and to K. F. Bahrdt's confession of faith, a step which was interpreted by the extreme rationalists as a revocation of his own rationalistic position. Even the Prussian government, which favoured Bahrdt, made Semler painfully feel its displeasure at this new but really not inconsistent aspect of his position. But, though Semler was really not inconsistent with himself in attacking the views of Reimarus and Bahrdt, his popularity began from that year to decline, and towards the end of his life he felt the necessity of emphasizing the apologetic and conservative value of true historical inquiry. His defence of the notorious edict of July 9, 1788, issued by the Prussian minister for ecclesiastical affairs, Johann Christoph von Wollner (1732–1800), the object of which was to enforce Lutheran orthodoxy, might with greater justice be cited as a sign of the decline of his powers and of an unfaithfulness to his principles. He died at Halle on the 14th of March 1791, worn out by his labours, and disappointed at the issue of his work.

The importance of Semler, sometimes called "the father of German rationalism," in the history of theology and the human mind is that of a critic of biblical and ecclesiastical documents and of the history of dogmas. He was not a philosophical thinker or theologian, though he insisted, with an energy and persistency before unknown, on certain distinctions of great importance when properly worked out and applied, *e.g.* the distinction between religion and theology, that between private personal beliefs and public historical creeds, and that between the local and temporal and the permanent elements of historical religion. His great work was that of the critic. He was the first to reject with sufficient proof the equal value of the Old and the New Testaments, the uniform authority of all parts of the Bible, the divine authority of the traditional canon of Scripture, the inspiration and supposed correctness of the text of the Old and New Testaments, and, generally, the identification of revelation with Scripture. Though to some extent anticipated by the English deist Thomas Morgan, Semler was the first to take due note of and use for critical purposes the opposition between the Judaic and anti-Judaic parties of the early church. He led the way in the task of discovering the origin of the Gospels, the Epistles, the Acts of the Apostles, and the Apocalypse. He revived previous doubts as to the direct Pauline origin of the Epistle to the Hebrews, called in question Peter's authorship of the first epistle, and referred the second epistle to the end of the 2nd century. He wished to remove the Apocalypse altogether from the canon. In textual criticism Semler pursued further the principle of classifying MSS. in families, adopted by R. Simon and J. A. Bengel. In church history Semler did the work of a pioneer in many periods and in several departments. Friedrich Tholuck pronounces him "the father of the history of doctrines," and F. C. Baur "the first to deal with that history from the true critical standpoint." At the same time, it is admitted by all that he was nowhere more than a pioneer.

Tholuck gives 171 as the number of Semler's works, of which only two reached a second edition, and none is now read for its own sake. Amongst the chief are: *Commentatio de demoniacis* (Halle, 1760, 4th ed. 1779), *Umständliche Untersuchung der dämonischen Leute* (1762), *Versuch einer biblischen Dämonologie* (1776), *Selecta capita historiae ecclesiasticae* (3 vols., Halle, 1767–1769), *Abhandlung von freier Untersuchung des Kanon* (Halle, 1771–1775), *Apparatus ad liberalem N.T. interpretationem* (1767; *ad V.T.*, 1773), *Institutio ad doctrinam Christ. liberaliter discendam* (Halle, 1774), *Über historische, gesellschaftliche, und moralische Religion der Christen* (1786), and his autobiography, *Semler's Lebensbeschreibung, von ihm selbst abgefasst* (Halle, 1781–1782).

For estimates of Semler's labours, see W. Gass, *Gesch. der prot. Dogmatik* (Berlin, 1854–1867); Isaak Dorner, *Gesch. der prot. Theol.* (Munich, 1867); the art. in Herzog's *Realencyklopädie*; Adolf Hilgenfeld, *Einleitung in das Neue Test.* (Leipzig, 1875); F. C. Baur, *Epochen der kirchlichen Geschichtsschreibung* (1852); and Albrecht Ritschl, *Gesch. des Pietismus* (Bonn, 1880–1884).

SEMLIN (Hungarian, *Zimony*; Servian, *Zemun*), a town of Croatia-Slavonia, in the county of Syrmia, situated beside the south bank of the Danube, on a tongue of land between that river and the Save. Pop. (1900) about 15,079; the majority being Serbs, the remainder Croats, Jews, Germans, Magyars and Gipsies. Semlin is the seat of an Orthodox archbishop; but most of the inhabitants are Roman Catholic. Apart from numerous churches, its chief buildings are the law-courts, prison, theatre, synagogue, a higher grade school or real-gymnasium, and two technical schools, one being for girls. Much of the town is modern, but its suburb Franzenthal near the Danube consists partly of mud huts thatched with reeds. Standing at the confluence of two navigable rivers, and on the main line from Buda-Pest to Constantinople and Salonica, Semlin is the principal customs and quarantine station for travellers between Austria-Hungary and the Balkan states. It communicates with Vienna and the Black Sea, by the Danube; with Sissek, by the Save; and with Belgrade by a steam-ferry and a bridge over the Save. There are a few factories, but far more important is the transit trade in grain, fruit, livestock and timber.

Various Roman remains have been discovered near Semlin. On the top of Zigeunerberg, a hill overlooking the Danube, are the ruins of the castle of Hunyadi János, who died here in 1456. Until 1881 the town belonged to the Military frontier (*q.v.*).

SEMMELWEISS, IGNATZ PHILIPP (1818–1865), Hungarian physician, was born at Buda on the 1st of July 1818, and was educated at the universities of Pest and Vienna. At first he intended to study law, but soon abandoned it for medicine; and such was his promise that, even as an undergraduate, he attracted the attention of men like Joseph Skoda and Carl Rokitansky. He graduated M.D. at Vienna in 1844, and was then appointed assistant professor in the maternity department, under Johann Klein. In Klein's time the deaths in this department from what was then known as "puerperal fever" became portentous, the ratio being rarely under 5·03 and sometimes exceeding 7·45 %. Between October 1841 and May 1843, of 5139 parturient women 829 died; giving the terrible death-rate of 16 %, not counting those of patients transferred to other wards. It was observed that this rate of mortality prevailed in the students' clinic; in the midwives' clinic it ruled much lower. Semmelweiss found no satisfactory explanations of this mortality in such causes as overcrowding, fear, mysterious atmospheric influences or even contaminated wards; yet that the cause lay in some local conditions he felt certain. The patients would die in rows, others escaping; and women delivered before arrival, or prematurely, would escape. At last, he tells us, the death of a colleague from a dissection wound "unveiled to my mind an identity" with the fatal puerperal cases; and the beginning of a scientific pathology of septicaemia was made. The students often came to the lying-in wards from the dissecting-room, their hands cleansed with soap and water only. In May 1847 Semmelweiss prescribed ablutions with chlorinated lime water: in that month the mortality stood at 12·24 %; before the end of the year it had fallen to 3·04, and in the second year to 1·27; thus even surpassing the results in the midwives' clinic. Skoda and other eminent physicians were convinced by these results (*Zeitschrift d. k. k. Gesellschaft der Ärzte in Wien*, J. vi. B. i. p. 107). Klein, however, apparently blinded by jealousy and vanity, supported by other reactionary teachers, and aided by the disasters which then befell the Hungarian nation, drove Semmelweiss from Vienna in 1849. Fortunately, in the following year Semmelweiss was appointed obstetric physician at Pest in the maternity department, then as terribly afflicted as Klein's clinic had been; and during his six years' tenure of office he succeeded, by antiseptic methods, in reducing the mortality to 0·85 %. Semmelweiss was slow and reluctant as an author, or no doubt his opinions would have obtained an earlier vogue; moreover, he was not only tender-hearted, but also irascible, impatient and tactless. Thus it cannot be said that the stupidity or malignity of his opponents was wholly to blame for the tragical issue of the conflict which brought this man of genius within the gates of an asylum on the 20th of July 1865. Strange to say, he brought with him into this retreat a dissection wound of the right hand, and on the 17th of the following August he died, a victim of the very disease for the relief of which he had already sacrificed health and fortune.

His chief publication was *Die Ätiologie der Begriff und die Prophylaxis des Kindbettfiebers* (Vienna, 1861). There are biographies by Hegar (Freiburg, 1882), Bruck (Vienna and Tischen, 1887), Duka (Hertford, 1882), Grosse (Vienna, 1898) and Schürer von Waldheim (Vienna, 1905). For the relations in the order of discovery of Semmelweiss to Lister see LISTER. (T. C. A.)

SEMMERING PASS, the lowest of all the great passes across the Alps. The hospice, near the summit, was founded about 1160, but the pass was certainly used at a much earlier date. Between 1848 and 1854 a railway line (the first in any sense to cross the Alps) was constructed, but passes 282 ft. below the summit of the pass (3225 ft.) by a tunnel about 1 m. long. The line runs from Wiener Neustadt (30½ m. from Vienna) past Bruck to Graz (139 m. from Vienna), the capital of Styria, whence it is 227 m. by rail to Trieste.

SEMOIS (also spelt SEMOY and SEMOYS), a river of less than 120 m. in length rising near Arlon in Belgium, and flowing into the Meuse near Monthermé in France. It is Belgian for about 100 m. and French for the remainder, entering France a short distance west of the village of Bohan. It passes through the most picturesque scenery in Belgium and is remarkable for its sinuous course, its length of 120 m. representing only 47 in a straight line. Bouillon is the only town on its banks, and since it is not navigable it has escaped the contamination of manufacturing life; its valley remains an ideal specimen of sylvan scenery and medieval tranquillity.

SÉMONVILLE, CHARLES LOUIS HUGUET, MARQUIS DE (1759–1839), French diplomat, was born in Paris on the 9th of March 1759, the son of one of the royal secretaries. Minister and envoy extraordinary of France at Genoa in 1790–1791, he was instructed by Dumouriez to go to Turin to detach Victor Amadeo III. of Sardinia from the Austrian alliance, but was not permitted to cross the Sardinian frontier. In 1793 he had started with H. B. Maret (afterwards duc de Bassano) for Italy where they had missions to Florence and Naples respectively, when the two envoys were kidnapped by Austrian orders in the Valtelline. They remained in a Tirolese prison until December 1795, when there was an exchange of prisoners on the release of Madame Royale, daughter of Louis XVI., from the Temple. In 1799 Bonaparte, through whose influence his release had been obtained, sent him to the Hague to consolidate the alliance between France and the Batavian Republic. In this mission he was entirely successful, and he is credited with another diplomatic success in the inception of the Austrian marriage. He accepted the Restoration and sat on the commission which drew up the charter. Sémonville, who enjoyed a great measure of Louis XVIII.'s confidence, took no part in the Hundred Days. A frank opponent of the extremist policy of Charles X., he tried to save him in 1830; in company with Antoine d'Argout he visited the Tuileries and persuaded the king to withdraw the ordinances and to summon the Council. He had been made a count of the Empire in 1808, and marquis in 1819. He died in Paris on the 11th of August 1839.

SEMO SANCUS, an Italian divinity worshipped by the Sabines, Umbrians and Romans, also called Dius Fidius and (perhaps wrongly) identified with the Italian Hercules. His dual nature, as a god of light and good faith, is indicated by the names Dius Fidius. *Sancus* is obviously from *sancire*, meaning one who hallows the acts in which he takes part. *Semo* has been variously explained as: (1) one who presides over seed-time and harvest (*serere*, cf. the female Semonia); (2) a being apart from and superior to man (*se-homo*); (3) a demi-god (*semis*). The priests called *bidentales*, whose existence is attested by inscriptions, were specially connected with his worship, since lightning which fell from heaven during the day was looked upon as sent by Dius Fidius, and a special class of birds (*sanquales*) was under his protection. As the god of oaths, he protected the sanctity of the marriage tie, the rights of hospitality, international treaties and alliances. In his sanctuary on the Quirinal, the foundation

of which was celebrated on the 5th of June, there were shown the distaff and spindle of Tanaquil, the wife of Tarquinius Priscus, and in the eyes of Roman matrons the embodiment of all wifely virtues. Dionysius of Halicarnassus (iv. 58) states that the treaty concluded between Tarquinius Superbus and the town of Gabii was deposited in the same temple of Sancus, whose name he translates by Ζεὺς πίστιος. He could only be invoked under the open sky, as partaking of the nature of a god of light and day; hence a round opening was made in the roof of his temple through which prayers might ascend to heaven. If he was invoked in a private house, those who called upon his name stood beneath the opening in the roof called *compluvium*. The bronze orbs mentioned by Livy (viii. 20. 8) as having been set up in his temple are also supposed to have some connexion with this, although they may be merely symbols of the eternal power of Rome. There was a second chapel of Semo Sancus on the island in the Tiber with an altar, the inscription on which led Christian writers (Justin Martyr, Tertullian, Eusebius) to confuse him with Simon Magus, and to infer that the latter was worshipped at Rome as a god. The cult of Semo Sancus never possessed very great importance at Rome; authorities differ as to whether it was of Sabine origin or not. The plural Semones was used of a class of supernatural beings, a kind of tutelary deities of the state.

See Preller, *Romische Mythologie*; article "Dius Fidius," by Wissowa, in Roscher's *Lexikon der Mythologie*, and his *Religion und Kultus der Römer* (1902), who rejects the identity of Semo Sancus Dius Fidius with Hercules; W. W. Fowler, *The Roman Festivals* (1899); E. Jannettaz, *Étude sur Semo Sancus Fidius* (Paris, 1885), according to whom he was a Sabine fire god.

SEMPACH, a small town in the Swiss canton of Lucerne, built above the eastern shore of the lake of the same name, and about 1½ m. by road north of the Sempach railway station (9 m. N.W. of Lucerne) on the main line between Lucerne and Olten. In 1900 it had 2592 inhabitants, German-speaking and Romanists. It has retained some traces of its medieval appearance, especially the main gateway, beneath a watch tower, and reached by a bridge over the old moat. About half an hour distant to the north-east, on the hillside, is the site of the famous battle of Sempach (9th July 1386), in which the Swiss defeated the Austrians, whose leader, Duke Leopold, lost his life. The legendary deed of Arnold of Winkelried (*q.v.*) is associated with this victory. The spot is now marked by an ancient and picturesque Battle Chapel (restored in 1886) and by a modern monument to Winkelried. Some miles north of Sempach is the quaint village of Münster or *Beromünster* (973 inhabitants in 1900), with a collegiate church founded in the 10th century and dating, in parts, from the 11th and 12th centuries (fine 17th-century choir stalls and altar frontals), the chapter of secular canons now consisting of invalided priests of the canton of Lucerne: it was in Beromünster that the first dated book was printed (1470) in Switzerland, by care of the canons, while thence came Gering who introduced printing into France.

See Th. von Liebenau, *Die Schlacht bei Sempach* (Lucerne, 1886).

(W. A. B. C.)

SEMPER, GOTTFRIED (1803–1879), German architect and writer on art, was born at Altona on the 29th of November 1803. His father intended him for the law, but his impulses towards an artistic career were irresistible. His early mastery of classical literature led him to the study of classic monuments in classic lands, while his equally conspicuous talent for mathematics gave him the laws of form and proportion in architectural design. At the university of Göttingen he fell under the influence of K. O. Müller. His architectural education was carried out successively in Hamburg, where later, upon his return from Greece, he built the Donner Museum, in Berlin, in Dresden, in Paris under Gau and in Munich under Gärtner; afterwards he visited Italy and Greece. While in Greece he made observations which showed that in ancient architecture the use of polychrome was frequent. In the diffusion of this discovery he was much aided by Jacques Ignace Hittorff. In 1834 he was appointed professor of architecture in Dresden, and during fifteen years received many important commissions from the Saxon court. He built the opera-house in Renaissance style, the new museum and picture gallery, and a Byzantine synagogue. In 1848 his turbulent spirit led him to side with the revolution against his royal patron; he furnished the rebels with military plans, and was eventually driven into exile. Semper came to London at the time of the Great Exhibition of 1851, and Prince Albert found him an able ally in carrying out his plans. He was appointed teacher of the principles of decoration; his lectures in manuscript are preserved in the art library, South Kensington. He was also employed by the prince consort to prepare a design for the Kensington Museum; and he made the drawings for the Wellington funeral car. In 1853 Semper left London for Zurich on his appointment as professor of architecture, and with a commission to build in that town the polytechnic school and the hospital. He also built the observatory and the railway station in that city. Here, too, he made plans for a large theatre in Rio Janeiro. In 1870 he was called to Vienna to assist in the great architectural projects since carried out round the Ring. A year later, after an exile of over twenty years, he received a summons to Dresden, on the rebuilding of the first opera-house, which had been destroyed by fire in 1869; his second design was a modification of the first. The closing years of his life were passed in comparative tranquillity between Venice and Rome, and in the latter city he died on the 15th of May 1879. In 1892 a bronze statue of Semper, by Johannes Schelling, was unveiled on the Brühlsche Terrasse in Dresden.

Semper's style was a growth from the classic orders through the Italian Cinque Cento. He forsook the base and rococo forms he found rooted in Germany, and, reverting to the best historic examples, fashioned a purer Renaissance. He stands as a leader in the practice of polychrome, since widely diffused, and by his writings and example did much to reinstate the ancient union between architecture, sculpture and painting. Among his numerous literary works are *Über Polychromie u. ihren Ursprung* (1851), *Die Anwendung der Farben in der Architektur u. Plastik bei den Alten*, *Der Stil in den technischen u. tektonischen Künsten* (1860–1863). His *Notes of Lectures on Practical Art in Metals and Hard Materials: its Technology, History and Style*, were left in MS.

SEMPILL, the name of a Scottish family long seated in Renfrewshire. An early member, Sir Thomas Sempill (d. 1488), was killed whilst fighting for James III. at the battle of Sauchieburn, and his son John (d. 1513), who was made a lord of parliament about 1489, fell at Flodden. John's grandson, Robert, 3rd Lord Sempill (*c.* 1505–1572), assisted the Scottish regent, Mary of Lorraine, in her struggle with the lords of the congregation, and was afterwards one of the partisans of Mary, queen of Scots; about 1566, however, he deserted the queen, against whom he fought at Carberry Hill and at Langside. His grandson, Robert (d. 1611), became the 4th Lord Sempill, and another grandson was Sir James Sempill of Beltrees (*q.v.*).

The title of Lord Sempill descended to Francis, the 8th lord (d. 1684), who was succeeded by his sister Anne (d. 1695), the wife of Francis Abercromby (d. 1703), who was created a peer for life as Lord Glassford. Their sons, Francis, John and Hugh, who took the surname of Sempill, succeeded in turn to the title. Hugh, 12th Lord Sempill (d. 1746), fought in Spain and in Flanders, and held a command in the English army at Culloden; in 1747 he was made colonel of the Black Watch. His title descended to Selkirk Sempill, the 15th lord (1788–1835), who was succeeded by his sister, Maria Janet (1790–1884). She was succeeded by a cousin, William Forbes (1836–1905), a descendant of the 13th lord, who took the name of Forbes-Sempill; in 1905 his son, John Forbes-Sempill (b. 1863), became the 18th lord.

A certain Robert Sempill, who served James Edward, the Old Pretender, in France, and is described as a captain in Dillon's famous Irish regiment, was created Lord Sempill by this prince after 1723. This circumstance has given rise to a certain amount of confusion between the different holders of the title.

SEMPILL (or SEMPLE), **SIR JAMES, ROBERT AND FRANCIS,** three Scottish ballad-writers, known as the Sempills of Beltrees from their place in Renfrewshire.

SIR JAMES SEMPILL (1566–1626) was the son of John Sempill of Beltrees, and Mary Livingstone, one of the "four Marys," companions of Mary, queen of Scots. He was brought up with James VI. under George Buchanan, and later assisted the king

in the preparation of his *Basilikon Doron*. Ambassador to England 1590–1600, he was made a knight bachelor, and in 1601 was sent to France. He died at Paisley in 1626. His wife was Egidia or Geillis Elphinstone of Blythswood. He wrote some theological works in prose, but is chiefly remembered for the poem "The Packman's Pater Noster," a vigorous attack upon the Church of Rome. An edition was published at Edinburgh in 1669 entitled "A Pick-tooth for the Pope, or the Packman's Pater Noster, translated out of Dutch by S. I. S., and newly augmented and enlarged by his son R. S." (reprinted by Paterson). Seven poems, chiefly of an amorous character, are printed in T. G. Stevenson's edition of *The Sempill Ballates*.

ROBERT SEMPILL [the younger] (1595?–1665?), son of the above, was educated at the university of Glasgow, having matriculated in March 1613. During the Civil War he fought for the Stuarts, and seems to have suffered heavy pecuniary losses under the Commonwealth. He died between 1660 and 1669. He married Mary, daughter of Sir Thomas Lyon of Auldbar. His reputation is based on the ballad, "The Life and Death of Habbie Simpson, Piper of Kilbarchan," written *c.* 1640. It is an interesting picture of the times; and it gave fresh vogue to the popular six-lined stanza which was much used later by Ramsay, Fergusson and Burns (see particularly, Burns's "Poor Mailie's Elegy"). Two broadside copies were printed before 1700, and it appeared in James Watson's *Collection of Poems* (1706–1710). Sempill is supposed to be the author also of an epitaph on "Sawney Briggs, nephew to Habbie Simpson," written in the same stanza. He wrote a continuation of his father's "Packman's Pater Noster."

FRANCIS SEMPILL (1616?–1682) was a son of Robert Sempill the younger. No details of his education are known. His fidelity to the Stuarts involved him in money difficulties, to meet which he alienated portions of his estates to his son. Before 1677 he was appointed sheriff-depute of Renfrewshire. He died at Paisley in March 1682. Sempill wrote many occasional pieces, and his fame as a wit was widespread. Among his most important works is the "Banishment of Poverty," which contains some biographical details. "The Blythsome Wedding," long attributed to Francis Sempill, has been more recently asserted to be the work of Sir William Scott of Thirlestane. Sempill's claim to the authorship of the celebrated song "She raise and let me in," and of the ballad "Maggie Lauder," has been discussed at considerable length. It seems probable that he had some share in both.

See the works mentioned below in the article on the elder Robert Sempill, and *The Poems of the Sempills of Beltrees*, ed. James Paterson (Edinburgh, 1849); *A Literary History of Scotland*, by J. H. Millar (1903); and *Notes and Queries*, 9th series (xi., 1903, pp. 436-437).

SEMPILL, ROBERT [the elder] (*c.* 1530–1595), Scottish ballad-writer, was in all probability a cadet of illegitimate birth of the noble house of Sempill or Semple. Very little is known of his life. He appears to have spent some time in Paris. He was probably a soldier, and must have held some office at the Scottish court, as his name appears in the lord treasurer's books in February 1567–1568, and his writings show him to have had an intimate knowledge of court affairs. He was a bitter opponent of Queen Mary and of the Catholic Church. Sempill was present at the siege of Leith (1559–1560), was in Paris in 1572, but was driven away by the massacre of St Bartholomew. He was probably present at the siege of Edinburgh Castle (1573), serving with the army of James Douglas, earl of Morton. He died in 1595. His chief works are: "The Ballat maid vpoun Margret Fleming callit the Flemyng bark"; "The defence of Crissell Sandelandis"; "The Claith Merchant or Ballat of Jonet Reid, ane Violet and Ane Quhyt," all three in the Bannatyne MS. They are characterized by extreme coarseness, and are probably among his earlier works. His chief political poems are "The Regentis Tragedie," a broadside of 1570; "The Sege of the Castel of Edinburgh" (1573), interesting from an historical point of view; "Ane Complaint vpon fortoun . . ." (1581), and "The Legend of the Bischop of St Androis Lyfe callit Mr Patrik Adamsone" (1583).

See *Chronicle of Scottish Poetry* (ed. James Sibbald, Edinburgh, 1802); and "Essays on the Poets of Renfrewshire," by William Motherwell, in *The Harp of Renfrewshire* (Paisley, 1819; reprinted 1872). Modern editions of Sempill are: "Sege of the Castel of Edinburgh," a facsimile reprint with introduction by David Constable (1813); *The Sempill Ballates* (T. G. Stevenson, Edinburgh, 1872) containing all the poems; *Satirical poems of the Reformation* (ed. James Cranstoun, Scottish Text Soc., 2 vols., 1889–1893), with a memoir of Sempill and a bibliography of his poems.

SEMUR-EN-AUXOIS, a town of eastern France, capital of an arrondissement in the department of Côte-d'Or, 45 m. W.N.W. of Dijon on the Paris-Lyon railway. Pop. (1906) 3278. Semur occupies one of the finest sites in France, on the extremity of a plateau dominating the river Armançon, which surrounds the town on three sides. The river forms this extremity into a peninsula which is occupied by the old town, once surrounded by ramparts, the remains of which are still to be seen. An isthmus, on which stands the castle, unites the older to the newer quarter, in which are situated an old gateway of the 15th century and the church of Notre-Dame. This building, which belongs mainly to the 13th century, is one of the purest examples of Gothic architecture in Burgundy, though the narrowness of the nave, to some degree, spoils its proportions. The portal with its three arched openings projects from the façade, which is flanked by two square towers surmounted by balustrades. Of the artistic features of the interior one of the most noteworthy is the sculptured keystone of the vaulting of the apse, representing the crowning of the Virgin. The castle (13th and 14th centuries) consists of a rectangular keep flanked by four towers. Portions of it are still in use. Among the numerous old houses in the town is one belonging to the time of Louis XIV. of which the last proprietor was Florent Claude du Châtelet, husband of the friend of Voltaire. It is now used as a hospital. Semur possesses a sub-prefecture, a tribunal of first instance and a communal college. It is an important market centre for the Auxois and Morvan, and has trade in horses, grain, sheep, fruit and vegetables. Cement, leather, oil, and chemical manures are among its industrial products.

Semur (*Sinemurum*) was a Gallic fortress in the dark ages and in feudal times a castle of the dukes of Burgundy. In the 11th century it became capital of Auxois. Its communal charter dates from 1276. The incorporation of Burgundy with France was resisted by the town, which was taken and pillaged by the royal troops in 1478. During the wars of religion in the 16th century it served as refuge for the Leaguers, and though it submitted to Henry IV. at his accession its fortifications were destroyed in 1602.

SÉNAC DE MEILHAN, GABRIEL (1736–1803), French writer, son of Jean Sénac, physician to Louis XV., was born in Paris in 1736. He entered the civil service in 1762; two years later he bought the office of master of requests, and in 1766 further advanced his position by a rich marriage. He was successively intendant of La Rochelle, of Aix and of Valenciennes. In 1776 he became intendant-general for war, but was soon compelled to resign. He had hoped to be made minister of finance, and was disappointed by the nomination of Necker, of whom he became a bitter opponent. He was intimate with the comtesse de Tessé, sister of the duc de Choiseul, and in 1781 met Madame de Créquy, then sixty-seven years of age, and began a long friendship with her. His first book was the fictitious *Mémoires d'Anne de Gonzague, princesse palatine* (1786), thought by many people at the time to be genuine. In the next year followed the *Considérations sur les richesses et le luxe*, combating the opinions of Necker; and in 1788 the more valuable *Considérations sur l'esprit et les mœurs*, a book which abounds in sententious, but often excessively frank, sayings. Sénac witnessed the beginnings of the Revolution in Paris, but emigrated in 1790, making his way first to London, and then, in 1791, to Aix-la-Chapelle, where he met Pierre Alexandre de Tilly, who asserts in his *Memoirs* that Sénac attributed the misfortunes of Louis XVI. to the refusal of his own services. In 1793, while his recollections of the Revolution were still fresh, he wrote a novel, *L'Émigré* (Hamburg, 4 vols., 1797), which shows perspicacity and good judgment in its treatment of events. It was reprinted in 1904 in an abridged form by Casimir Stryienski and Frantz Funck-Brentano. At the invitation of Catherine II. Sénac went in 1792 to Russia, where he hoped to become imperial historiographer, but his manners displeased Catherine, who contented herself with dismissing him with a pension. From Russia he went to Hamburg,

and thence to Vienna, where he found a friend in the prince de Ligne. He died on the 16th of August 1803. Sénac also wrote a moderate exposition of the causes that led to the revolution, entitled *Du gouvernement, des mœurs et des conditions en France avant la Révolution, avec les caractères des principaux personnages du règne de Louis XVI*; the last part was reprinted (1813) by the duc de Levis with a notice of the author as *Portraits et caractères*. Sénac collected his own *Œuvres philosophiques et littéraires* (2 vols.) at Hamburg in 1795.

See his *Œuvres choisies*, edited by M. de Lescure in 1862; *Lettres inédites de Madame de Créqui à Sénac de Meilhan* (1856), edited by Édouard Fournier; Louis Legrand, *Sénac de Meilhan et l'intendance du Hainaut et du Cambrésis* (1868); and the notice by Fernand Caussy prefixed to his edition (1905) of the *Considérations sur l'esprit et les mœurs*.

SENANCOUR, ÉTIENNE PIVERT DE (1770–1846), French author, was born in Paris in November 1770. His father desired him to enter the seminary of Saint-Sulpice preparatory to becoming a priest, but Senancour, to avoid a profession for which he had no vocation, went on a visit to Switzerland in 1789. At Fribourg he married in 1790 a young Frenchwoman, Mademoiselle Daguet, but the marriage was not a happy one. His wife refused to accompany him to the Alpine solitude he desired, and they settled in Fribourg. His absence from France at the outbreak of the Revolution was interpreted as hostility to the new government, and his name was included in the list of emigrants. He visited France from time to time by stealth, but he only succeeded in saving the remnants of a considerable fortune. In 1799 he published in Paris his *Rêveries sur la nature primitive de l'homme*, a book containing impassioned descriptive passages which mark him out as a precursor of the romantic movement. His parents and his wife died before the close of the century, and Senancour was in Paris in 1801 when he began *Obermann*, which was finished in Switzerland two years later, and printed (Paris, 2 vols.) in 1804. This singular book, which has never lost its popularity with a limited class of readers, was followed in the next year by a treatise *De l'amour*, in which he attacked the accepted social conventions. *Obermann*, which is to a great extent inspired by Rousseau, was edited and praised successively by Sainte-Beuve and by George Sand, and had a considerable influence both in France and England. It is a series of letters supposed to be written by a solitary and melancholy person, whose headquarters are placed in a lonely valley of the Jura. The idiosyncrasy of the book in the large class of Wertherian-Byronic literature consists in the fact that the hero, instead of feeling the vanity of things, recognizes his own inability to be and do what he wishes. Professor Brandes has pointed out that while *René* was appreciated by some of the ruling spirits of the century, *Obermann* was understood only by the highly gifted, sensitive temperaments, usually strangers to success. Senancour was tinged to some extent with the older *philosophe* form of free-thinking, and had no sympathy with the Catholic reaction. Having no resources but his pen, Senancour was driven to hack-work during the period which elapsed between his return to France (1803) and his death at St Cloud (10th of January 1846); but some of the charm of *Obermann* is to be found in the *Libres Méditations d'un solitaire inconnu*. Thiers and Villemain successively obtained for Senancour from Louis Philippe pensions which enabled him to pass his last days in comfort. He wrote late in life a second novel in letters entitled *Isabelle* (1833). He composed his own epitaph; *Éternité, sois mon asile*.

Senancour is immortalized for English readers in the *Obermann* of Matthew Arnold. *Obermann* itself was translated into English, with biographical and critical introduction, by A. G. Waite (1903). See the preface by Sainte-Beuve to his edition (1833, 2 vols.) of *Obermann*, and two articles *Portraits contemporains* (vol. i.); *Un Précurseur* and *Sénancour* (1867) by J. Levallois, who received much information from Sénancour's daughter, Eulalie de Sénancour, herself a journalist and novelist; and a biographical and critical study *Sénancour*, by J. Merlant (1907).

SENARMONT, ALEXANDRE ANTOINE HUREAU DE (1769–1810), French artillery general, was born at Strassburg, and educated at the Metz school for engineer and artillery cadets. In 1785 he was commissioned in the artillery, in which he served as a regimental officer for fifteen years. In 1800 he won great credit both by his exertions in bringing the artillery of the Army of Reserve over the Alps and by his handling of guns in the battle of Marengo. In 1806, as a general of brigade, and commander of the artillery of an army corps, he took part in the Jena and Eylau campaigns. But he is remembered chiefly in connexion with the "caseshot attack" which was the central feature of Napoleon's matured tactical system, and which Senarmont put into execution for the first time at Friedland (*q.v.*). For this feat he was made a baron, and in 1808 he was promoted general of division by Napoleon on the field of battle in front of Madrid. He was killed at the siege of Cadiz on the 26th of October 1810.

SENARMONT, HENRI HUREAU DE (1808–1862), French mineralogist and physician, was born at Broué, Eure et Loire, on the 6th of September 1808. He became engineer-in-chief of mines, and professor of mineralogy and director of studies at the École des Mines at Paris. He was distinguished for his researches on polarization and on the artificial formation of minerals. He also wrote essays and prepared maps on the geology of Seine et Marne and Seine et Oise for the Geological Survey of France (1844). He died in Paris on the 30th of June 1862.

SENATE (Lat. *senatus*, from root *sen-*, as in *senex*, old; the root is the Sanskrit *sana*, cf. Gr. ἕνος; the same element appears in *señor, seigneur, seneschal*) literally the assembly of old men,[1] originally the heads of the chief families, and hence, in general, the upper council in a governmental system. The Latin word corresponds with the Greek *gerousia* (*q.v.*), the name of the similar body at Sparta; it must not be used of the Cleisthenic council (see BOULĒ) at Athens, which was in all respects a different body. The Athenian Areopagus (*q.v.*) represents the Roman senate. The word is applied primarily to the aristocratic Roman assembly (see below). It is also used to designate the second chamber in the legislatures of France, Italy and the United States, as also in those of the separate states composing the Union; in the British legislature it is represented by the House of Lords. By analogy the title is used for the governing bodies of various educational institutions, *e.g.* in the universities of Cambridge and London, and also in certain American colleges and universities, where it denotes an advisory body composed of representatives of the students as well as members of the faculty. So in the Scottish colleges the governing body is the Senatus Academicus. In Scottish law, the lords of session (*i.e.* judges) are called senators of the College of Justice, which is itself spoken of as a senate.

The Ancient Roman Senate. (A) *History.*—The senate or council of elders formed the oldest and most permanent element in the Roman constitution. The authorities are unanimous in ascribing the origin of the senate to Romulus, who chose out 100 of the best of his subjects to form his advising body. They are, however, far from unanimous in their account of the subsequent history of the senate down to the foundation of the republic. The only facts on which they are all agreed are that in 509 B.C. it already contained 300 members, and that a distinction already existed within it between *patres maiorum gentium* and *minorum gentium* (Livy i. 35; Cic. *De rep.* ii. 20. 35; Dionys. ii. 47). Moreover, with one exception they agree in asserting that throughout the monarchical period the senate consisted entirely of patricians. There is undoubtedly some connexion between the increase in the numbers of the senate by the admission of new members and the distinction between two classes of *patres*. The most probable view seems to be that the rise in the number of the senators was due to the gradual incorporation of fresh elements into the patrician community, with a consequent increase of *gentes*; and that the new clans, out of which new members came into the senate, were the *gentes minores*. The exclusively patrician character of the senate at this period seems an inevitable inference from all that we know of the political position of the *plebs* at the

Under the monarchy.

[1] With the idea of age is conjoined that of superior wisdom and experience, worthy of respect and qualified to decide; cf. the Anglo-Saxon Witanagemot, the assembly of the wise men. Originally the members were the advisers of the king, and their spirit was generally aristocratic and conservative.

time, and the evidence of Zonaras to the contrary is universally discredited. The appointment of senators depended entirely upon the king. They were not appointed for life, but at the pleasure of the king who summoned them. It is possible that a king might change his advisers during his reign, and a new king could certainly abstain from summoning some of those convened by his predecessors.[1] The powers of the senate at this time were very indefinite. Tradition ascribes to it the control of the *interregnum* and a power of sanctioning acts of state (*patrum auctoritas*), to which it is difficult to give any significance for this early period. It seems also to have possessed a customary right of controlling foreign policy, for the ancient formula of the Fetiales refers to the sanction of the *patres* (Livy i. 32). From the senate also must have been chosen the delegates appointed by the king either to be his executive representative when he was absent in the field (*praefectus urbi*), or to assist him in jurisdiction (*IIviri perduellionis, quaestores parricidii*).

Under the Republic.

The abolition of monarchy, and the substitution of two annually elected consuls did not at first bring any important change in the position of the senate. It was the consulting body of the consuls, meeting only at their pleasure, and owing its appointment to them, and remained a power distinctly secondary to the magistrates, as it had been formerly to the king. The magistrates at this time were chosen entirely from the patrician houses, and the senate long remained a stronghold of patrician prejudice. Tradition ascribes to the first consuls some change in the class from which senators were drawn, but various accounts of the change are given (Livy ii. 1; Festus, p. 254; Dionys. v. 13; cf. Tac. *Ann.* xi. 25). Whatever the exact nature of the change, we may be certain that plebeians were not introduced into the senate at this time. Such a change is utterly improbable at the crisis of a patrician *coup d'état*, such as the expulsion of the Tarquins certainly was; and there is no evidence for the existence of a plebeian senator before the year 401 B.C. The statement that some modification in the original principle of selection was made in this year is invariably introduced as an explanation of the title *patres conscripti*, which is held to imply a distinction of rank within the senate, as derived from the formula of summons "qui patres, qui conscripti (*estis*)."[2] But either this formula is not as early as 509 B.C. or the term *conscripti* does not refer only to plebeians. In one respect the substitution of consuls for kings tended to the subordination of the chief magistrates to the senate. The consuls held office only for one year, while the senate was a permanent body; in experience and prestige its individual members were often superior to the consuls of the year. It was therefore improbable that the magistrate would venture to disregard the advice of his *consilium*, especially as he himself would pass into the senate at the close of his year of office, according to a recognized custom which was gradually modifying the theoretical freedom of choice that the consuls possessed with regard to their *consilium*. It was probably in their capacity of ex-magistrates that plebeians first entered the senate; for the first plebeian senator mentioned by Livy, P. Licinius Calvus, was also the first plebeian consular tribune. This is hardly likely to be mere coincidence. Of the two standing powers which the senate inherited from the monarchy, the *interregnum* and the *patrum auctoritas*, the first had become even rarer of exercise than before; for if either consul existed to nominate a successor, *interregnum* could not be resorted to. The *patrum auctoritas*, on the other hand, developed into a definite right claimed by the senate to give or withhold its consent to any legislative or elective act of the *comitia*, which could not be valid without such consent. The control, too, which it had long exercised over foreign policy must have increased the importance of the senate in a period of constant warfare with the nations of Italy. But in the early republic the senate remained primarily an advising body, and had as yet assumed no definite executive powers.

In the last two centuries of the republic we find that a great change has taken place in the position of the senate. It is now a self-existent, automatically constituted body, independent of the magistrates, a recognized factor in the constitution and the wielder of extensive powers. Its self-existence could only be secured by a transference of the selection of the senate from the magistrate to some other authority, and was actually effected by entrusting the selection to the recently instituted college of censors. The censorship was instituted in 443 B.C., and some time before the year 311 it was placed in charge of the *lectio senatus*. Conditions of selection had also been imposed by 311, which made the constitution of the senate practically automatic. Ex-curule magistrates were now admitted as a matter of course, together with any other persons who had done conspicuous public service in the lower grades of the magistracy or the higher ranks of the army; and for some time before Sulla's dictatorship little power of choice can really have rested with the censors. L. Cornelius Sulla, while abolishing the censorship (immediately revived), also secured an entirely automatic composition for the senate by increasing the number of quaestors, and enacting that all ex-quaestors should pass at once into the senate. This enactment provided for the maintenance even of the increased number of 600 senators, twenty quaestorians passing into the senate every year. The senate's powers had now extended far beyond its two ancient prerogatives of appointing an interrex, and ratifying decisions of the comitia. The first of these powers, as has been shown above, had fallen into practical disuse, and the second had for some reason become a mere form by the last century of the republic. It is improbable that the change was entirely the result of the *lex Publilia* of 287 B.C., which decreed that the senate should exercise its *auctoritas* before the voting instead of after, though this law may have formed part of a process very imperfectly known to us by which senatorial control of legislation in this form was gradually nullified. But the senate had acquired a far more effective control over the popular vote through the observance of certain unwritten rules regulating the relation between senate and magistrates. It was generally understood that the magistrate should not question the people on any important matter without the senate's consent, nor refuse to do so at its request; that one magistrate should not employ his veto to quash the act of another except at the senate's bidding, nor refuse to do so when directed. Such was the situation which had developed out of the tendency noticed above for the magistrate to be advised by his council in all important matters. Again, the earlier control of foreign policy developed into a definite claim put forward by the senate and recognized by the constitution to conduct all negotiations with a foreign power and frame an alliance which should merely be offered to the people for ratification. For the organization of a new Roman province even this formal ratification was dispensed with, and a commission of senators alone aided the victorious general in the organization of his conquests. The senate also held an important power in its right to distribute spheres of rule among the various magistrates. It seems also to have had entire control over the external relations of the free cities which were scattered throughout the provinces, but formed no administrative parts of those provinces, holding their rights by charter for which they depended upon the senate. The control of finance was also entirely in the senate's hands. Three circumstances had combined to bring about this result. The censors, who were only occasional officials, were entrusted with the leasing of the public revenues; the senate not only directed the arrangements made by them, and received appeals against oppressive contracts, but also controlled any financial assignments that had to be made during the vacancy in the censorship. Again, the details of public expenditure had been in very early times entrusted to the quaestors, who, when the magistracies were multiplied, occupied an entirely subordinate position; this strengthened the position of the senate as the natural director of a young and inexperienced magistrate. Thirdly, the general control exercised by the senate

[1] For other views on this point see Dionys. ii. 12, who maintains that the senators were elected by the clans, and T. Mommsen, *Staatsrecht*, iii. 844, 854, who maintains an automatic composition of the early senate.

[2] For another view, however, see Willems, *Le Sénat*, i. p. 37 seq.

over provincial affairs implied its direction of the income derived from the provinces, which in the later republic formed the chief property of the state. It had also claimed a right, unchallenged till the time of Tiberius Gracchus, of granting occupation and decreeing alienation of public lands, or of accepting or rejecting gifts and bequests to the state. Every branch of state finance was therefore in its hands. In matters of criminal jurisdiction the senate claimed the right to set free by its decree in case of emergency the full powers of *coercitio* contained in the imperium of a magistrate, but limited normally in capital cases by successive laws of appeal. The exercise of this right amounted to a declaration of martial law, and had the effect of giving the consul the same powers of summary jurisdiction which had resided in the dictatorship. It was only resorted to in cases of special urgency, such as the epidemic of poisoning in 331 B.C. (Livy viii. 18), the prevalence of Bacchanalian licence in the city in 186 B.C. (*id.* xxxix. 18) and the formidable preponderance of the revolutionary tribune Tiberius Gracchus in 133 B.C. The action of the senate on this last occasion evoked a vigorous protest from the people, on the ground that the senate was not acting on behalf of the state against its enemies, but in the interest of one party in the state against the other; and a law of C. Gracchus subsequently forbade any such exercise of capital jurisdiction on the part of a magistrate, whether authorized by the senate or not. The senate continued, however, to make use of this decree, and the question of its right to do so was one of the chief points at issue in the final struggle between the senatorial and democratic parties. The best known instance of this *decretum ultimum* in the last century of the republic is that of 63 B.C., when Cicero took summary action against the Catilinarians, and justified his action on the plea that this decree had authorized him to do so. The senate also exercised a police control in Rome in sudden emergencies. It dissolved by a decree passed in 64 B.C. a number of trade gilds which had become the centres of political disturbance, and framed decrees from time to time dealing with bribery and corruption. The chief feature of the democratic revolution at Rome which occupied the century following the tribunate of T. Gracchus was an uncompromising opposition to the tenure of these extensive powers by the senate. Sulla's enactments in 81 B.C., which aimed at restoring its ascendancy, show clearly how much power it had already lost; and his attempts to reinstate it were short-lived (see ROME: *History* II. "The Republic"). The Gracchi and Caesar alike found themselves obliged to override senatorial prerogative in the interests of progressive legislation, and though the senate, owing to its strong hold over the magistracy, succeeded repeatedly in dealing death to its opponents, it never regained the popular confidence; and the practical extinction of the old senate in 49 B.C. was hardly lamented.

Under the Empire.

Caesar's revision of the senatorial list and his increase of the senate to 900 was a return to the old practice by which kings and the early magistrates had chosen their own body of councillors. And though after this revision Sulla's arrangement for the automatic replenishing of the senate was restored, yet the growing influence exercised by Caesar and his successors over elections secured their control over the *personnel* of the senate. Still, the senate was regarded in the early principate as the great representative of republican institutions, and Augustus took elaborate pains to divide his authority with the senate. In legislation, indeed, the senate was supreme under the principate. The legislative powers of the comitia became very gradually extinct; but long before they had disappeared *senatus consulta* had come to take the place of *leges* in ordinary matters, and with this prerogative of the senate the princeps never directly interfered. Jurisdiction remained largely in the hands of the republican courts, but such cases as did not come under their cognizance were divided between princeps and senate. The senate, moreover, was left at the head of the ordinary administration of Rome and Italy, together with those provinces which, not requiring any military force nor presenting special administrative difficulties, were left to the care of the Roman people. It also retained control of the public treasury (see AERARIUM), while Caesar administered his own treasury (*fiscus*). It gradually became the electing body for the annual magistracies; and, as entrance to it was still won chiefly through the magistracy, co-optation became practically the principle of admission. But the power the senate theoretically possessed of creating and deposing a princeps was, formally at least, the chief of its prerogatives at this time, though considerably limited in practice. It had, on the other hand, lost all its control of foreign administration, which had once been the bulwark of its power; and though occasionally consulted by the princeps, it was entirely subordinate to him in this department. It was clearly to the advantage of the early Caesars to pay an apparent deference to the senate, and so give to their rule an appearance of constitutionalism. But even in this capacity the senate did not long survive the overthrow of republican government. Though occasionally roused into activity during the 2nd and 3rd centuries, it ceased after the period of the Julian emperors to have any real control of affairs. Vespasian had admitted Italians and provincials into the senate, with a view, no doubt, to increasing its value as a representative council of the empire; but this widening was counterbalanced by the institution of an hereditary senatorial order by Augustus, who thus gave recognition to the practical exclusiveness which had grown up in the later republican period, while reserving to himself the right of recruiting the order.

B. *Procedure.*—Senatorial procedure remained comparatively unchanged throughout the republic and the first three centuries of the empire. The right of summoning the senate belonged originally to the consuls, and later to the consuls, praetors, and tribunes of the plebs. In the Ciceronian period, when all these were entitled to summon the meeting, the right belonged to them in the above order of precedence. The magistrate who summoned the senate also presided and brought business before it. He first made statements to the house on important public affairs, and might then at his discretion ask the opinion of the house on points arising out of them, or invite other senators to speak without himself putting forward any definite proposition. In both of these cases he was expected to follow a regular order of precedence in asking for votes or speeches, and the magistrates of the year were precluded from expressing their opinion. When the chief senators had expressed their opinion on the motion of the president, or made proposals of their own, in the former case the house divided on the motion, in the latter the president put to the house in succession the various proposals made. The only important modification of this procedure introduced by the principate was the extension of all the presiding magistrate's rights to the princeps, who, however, enjoyed also the right of giving his opinion as a private senator.

C. *Insignia.*—The senatorial *insignia* were not at first distinguished from those of ex-curule magistrates. But by degrees the broad stripe (*latus clavus*) on the tunic and the red shoe (*calceus mulleus*) became distinctive of the senator (hence *laticlavius*, a senator). Seats in the theatre were reserved for senators; and even the sons of senators adopted the *latus clavus* as early as the reign of Augustus, and probably at an earlier time. Certain disqualifications were attached to senators in republican times, chief of which was their exclusion from trade; and these were increased under the principate. Failure to observe these disqualifications, or any public disgrace or gross misconduct, was punished by removal from the senate by the censors, until that office fell into abeyance after the time of Sulla. The censorial right of removing unworthy members from the senate was revived by Augustus, and was exercised by subsequent emperors at a yearly revision of the list, which supplemented the formal *lectiones senatus* periodically held by the princeps in his capacity of censor.

It has been questioned whether the two traditional prerogatives of the senate, the control of the *interregnum* and the *patrum auctoritas*, belonged in historical times to the senate as a body, or to its patrician members only, or, as some have maintained, to the whole body of patricians. For conflicting views on this subject, see P. Willems, *Le Sénat*, vol. ii. p. 1; T. Mommsen, *Staatsrecht*, iii. 1037 et seq.; and *Röm. Forschungen*, i. 218-249; C. C. L. Lange, *De patrum auct. comm.* (Leipzig, 1876–1877); O. Clason, *Kritische Erörterungen über den röm. Staat* (Rostock, 1817), p. 41 et seq. In favour of the view that the words *patres* and *patricii* are used in this connexion as the equivalent of senators may be cited the parallel use of the term patrician magistrates as the equivalent of curule magistrates, a usage due to the fact that these magistracies were for more than a century reserved for patricians.

GENERAL BIBLIOGRAPHY.—T. Mommsen, *Staatsrecht*, iii. 2 (3rd edition, Leipzig, 1887); P. Willems, *Le Sénat de la république romaine* (2nd ed., Louvain, 1883); J. Rubino, *Untersuchungen* (iii. "von dem Senate und dem Patriciate," Cassel, 1839); A. H. J. Greenidge, *Roman Public Life*, p. 261 et seq. (1901); G. W. Botsford, *Roman Assemblies* (1909); also art. ROME, *History*. (A. M. CL.)

SENEBIER, JEAN (1742–1809), Swiss pastor and voluminous writer on vegetable physiology, was born at Geneva on the 6th of May 1742. He is remembered on account of his contributions to our knowledge of the influence of light on vegetation. Though Marcello Malpighi and Stephen Hales had shown that a great part of the substance of plants must be obtained from the atmosphere, no progress was made until Charles Bonnet observed on leaves plunged in aerated water bubbles of gas, which Joseph Priestley recognized as oxygen. Jan Ingenhousz proved the simultaneous disappearance of carbonic acid; but it was Senebier who clearly showed that this activity was confined to the green parts, and to these only in sunlight, and first gave a connected view of the whole process of vegetable nutrition in strictly chemical terms. He died at Geneva on the 22nd of July 1809.

See Sachs, *Geschichte d. Botanik*, and *Arbeiten*, vol. ii.

SENECA, the name of two famous men (father and son), natives of Corduba (Cordova) in Spain, who attained eminence in Rome under the Early Empire.

LUCIUS ANNAEUS SENECA (*c.* 54 B.C.–A.D. 39), called Seneca "the elder" or "the rhetorician," belonged to a well-to-do equestrian family of Corduba. His praenomen is uncertain, but in any case Marcus is an arbitrary conjecture of Raphael of Volterra. During a lengthy stay on two occasions at Rome he attended the lectures of famous orators and rhetoricians, to prepare for an official career as an advocate. His ideal orator was Cicero, and he disapproved of the florid tendencies of the oratory of his time. During the civil wars (which kept him in Spain and thus prevented him from ever hearing Cicero speak) his sympathies, like those of his native place, were probably with Pompey, as were those of his son and his grandson (the poet Lucan). By his wife Helvia of Corduba he had three sons: L. Annaeus Novatus, adopted by his father's friend, the rhetorician Junius Gallio, and subsequently called L. Junius Gallio; L. Annaeus Seneca, the philosopher; Annaeus Mela, the father of the poet Lucan. As he died before his son was banished by Claudius (41; Seneca, *ad Helviam*, ii. 4), and the latest references in his writings are to the period immediately after the death of Tiberius, he probably died about A.D. 39. At an advanced age, at the request of his sons, he prepared, it is said from memory, a collection of various school themes and their treatment by Greek and Roman orators. These he arranged in ten books of *Controversiae* (imaginary legal cases) in which 74 themes were discussed, the opinions of the rhetoricians upon each case being given from different points of view, then their division of the case into different single questions (*divisio*), and, finally, the devices for making black appear white and extenuating injustice (*colores*). Each book was introduced by a preface, in which the characteristics of individual rhetoricians were discussed in a lively manner. The work is incomplete, but the gaps can be to a certain extent filled up with the aid of an epitome made in the 4th or 5th century for the use of schools. The romantic elements were utilized in the collection of anecdotes and tales called *Gesta Romanorum* (*q.v.*). For books i., ii., vii., ix., x. we possess both the original and the epitome; for the remainder we have to rely upon the epitome alone. Even with the aid of the latter, only seven of the prefaces are available. The *Controversiae* were supplemented by the *Suasoriae* (exercises in hortatory or deliberative oratory), in which the question is discussed whether certain things should or should not be done. The whole forms the most important authority for the history of contemporary oratory. Seneca was also the author of a lost historical work, containing the history of Rome from the beginning of the civil wars almost down to his own death, after which it was published by his son. Of this we learn something from the younger Seneca's *De vita patris* (H. Peter, *Historicorum Romanorum fragmenta*, 1883, pp. 292, 301), of which the beginning was discovered by B. G. Niebuhr. The father's claim to the authorship of the rhetorical work, generally ascribed to the son during the middle ages, was vindicated by Raphael of Volterra and Justus Lipsius.

EDITIONS.—N. Faber (Paris, 1587); J. F. Gronovius (Leiden, 1649, Amsterdam, 1672); (critical) C. Bursian (Leipzig, 1857); A. Kiessling (Leipzig, 1872); H. J. Muller (Prague, 1887, with many unnecessary conjectures). See also article by O. Rossbach in Pauly-Wissowa's *Realencyklopädie*, i. pt. 2 (1894); Teuffel-Schwabe *Hist. of Roman Literature* (Eng. trans., 1900), 269; M. Schanz, *Geschichte der römischen Litteratur*, ii. 1 (1899); and the chapter on "The Declaimers," in G. A. Simcox, *History of Latin Literature*, i. (1883). On Seneca's style, see Max Sander, *Der Sprachgebrauch des Rhetor A. S.* (Waren, 1877–1880); A. Ahlheim, *De Senecae rhetoris usu dicendi* (Giessen, 1886); E. Norden, *Die antike Kunstprosa* (1898), p. 300; on his influence upon his son the philosopher, E. Rolland, *De l'influence de Sénèque le père et des rhéteurs sur Sénèque le philosophe* (1906). On the use of Seneca in the *Gesta Romanorum*, see L. Friedländer, *Darstellungen aus der Sittengeschichte Roms* (Eng. trans., iii. p. 16 and appendix in iv.).

LUCIUS ANNAEUS SENECA (*c.* 3 B.C.–A.D. 65), statesman and philosopher, was the second son of the rhetorician. His teachers were Attalus, a Stoic, and Sotion, a pupil of the Sextii. In his youth he was a vegetarian and a water-drinker, but his father checked his indulgence in asceticism. He devoted himself to rhetorical and philosophical studies and early won a reputation at the bar. Gaius criticised his style as mere mosaic (*commissuras meras*) or "sand without lime," yet being in reality jealous of his successes he would have put him to death had he not been assured that he was too consumptive to live long (Suet. *Calig.* 63; Dio Cassius lix. 19. 7). Under Claudius his political career (he had been quaestor) received a sudden check, for the influence of Messallina having effected the ruin of Julia, the sister of Gaius, Seneca, who was compromised by her downfall, was banished to Corsica, A.D. 41. There eight weary years of waiting were relieved by study and authorship, with occasional attempts to procure his return by such gross flattery of Claudius as is found in the work *Ad Polybium de consolatione* or the panegyric on Messallina which he afterwards suppressed. At length the tide turned; the next empress, Agrippina, had him recalled, appointed praetor, and entrusted with the education of her son Nero, then (48) eleven years old. Seneca became in fact Agrippina's confidential adviser; and his pupil's accession increased his power. He was consul in 57, and during the first bright years of the new reign, the *quinquennium Neronis*, he shared the administration of affairs with Burrus, the praetorian prefect. The government in the hands of these men was wise and humane; their influence over Nero, while it lasted, was salutary, though sometimes maintained by doubtful means (see NERO). We must, however, regard the general tendency of Seneca's measures; to judge him as a Stoic philosopher by the counsels of perfection laid down in his writings would be much the same thing as to apply the standard of New Testament morality to the career of a Wolsey or Mazarin. He is the type of the man of letters who rises into favour by talent and suppleness (*comitas honesta*), and is entitled as such to the rare credit of a beneficent rule. In course of time Nero got to dislike him more and more; the death of Burrus in 62 gave a shock to his position. In vain did he petition for permission to retire. Even when he had sought privacy on the plea of ill-health he could not avert his doom; on a charge of being concerned in Piso's conspiracy he was forced to commit suicide. His manly end might be held in some measure to redeem the weakness of his life but for the testimony it bears to his constant study of effect and ostentatious self-complacency. His second wife, Pompeia Paulina, of noble family, attempted to die with him. His enormous wealth was estimated at 300 millions of sesterces. He had 500 ivory tables inlaid with citron wood (Dio lxi. 10, lxii. 2). Some of the Fathers, probably in admiration of his ethics, reckoned Seneca among the Christians; this assumption in its turn led to the forgery of a correspondence between St Paul and Seneca which was known to Jerome (cf. Augustin, *Ep.* 153: "Seneca . . . cujus etiam ad Paulum apostolum leguntur epistolae"). This has given rise to an interesting historical problem, most thoroughly discussed in many works on the Church in the Roman Empire.

Seneca is at once the most eminent among the Latin writers of the Silver Age and in a special sense their representative, not least because he was the originator of a false style. The affected and sentimental manner which gradually grew up in the first century A.D. became ingrained in him, and appears equally in everything which he wrote, whether poetry or prose, as the most finished product of ingenuity concentrated upon declamatory exercises, substance being sacrificed to form and thought to point. Every variety of rhetorical conceit in turn contributes to the dazzling effect, now

tinsel and ornament, now novelty and versatility of treatment, or affected simplicity and studied absence of plan. But the chief weapon is the epigram (*sententia*), summing up in terse incisive antithesis the gist of a whole period. "Seneca is a man of real genius," writes Niebuhr, "which is after all the main thing; not to be unjust to him, one must know the whole range of that literature to which he belonged and realize how well he understood the art of making something even of what was most absurd." His works were upon various subjects. (1) His *Orations*, probably the speeches which Nero delivered, are lost, as also a biography of his father, and (2) his earlier scientific works, such as the monographs describing India and Egypt and one upon earthquakes (*Nat. Qu.* vi. 4. 2). The seven extant books of *Physical Investigations* (*Naturales Quaestiones*; trans. John Clarke, with introd. by Sir Archibald Geikie, 1910) treat in a popular manner of meteorology and astronomy; the work has little scientific merit, yet here and there Seneca, or his authority, has a shrewd guess, *e.g.* that there is a connexion between earthquakes and volcanoes, and that comets are bodies like the planets revolving in fixed orbits. (3) The *Satire on the Death* (and deification, literally "pumpkinification") *of Claudius* (ed. Bücheler, Berlin, 1882) is a specimen of the "satira Menippea" or medley of prose and verse. The writer's spite against the dead emperor before whom he had cringed servilely shows in a sorry fashion when he fastens on the wise and liberal measure of conferring the franchise upon Gaulish nobles as a theme for abuse. (4) The remaining prose works are of the nature of moral essays, bearing various titles—twelve so-called *Dialogues*, three books *On Clemency* dedicated to Nero, seven *On Benefits*, twenty books of *Letters to Lucilius* (ed. Hense, Leipzig, 1898; W. C. Summers published a selection in 1910). They are all alike in discussing practical questions and in addressing a single reader in a tone of familiar conversation, the objections he is supposed to make being occasionally cited and answered. Seneca had the wit to discover that conduct, which is after all "three-fourths of life," could furnish inexhaustible topics of abiding universal interest far superior to the imaginary themes set in the schools and abundantly analysed in his father's *Controversiae* and *Suasoriae*, such as poisoning cases, or tyrannicide, or even historical persons like Hannibal and Sulla. The innovation took the public taste,—plain matters of urgent personal concern sometimes treated casuistically, sometimes in a liberal vein with serious divergence from the orthodox standards, but always with an earnestness which aimed directly at the reader's edification, progress towards virtue and general moral improvement. The essays are in fact Stoic sermons; for the creed of the later Stoics had become less of a philosophical system and more of a religion, especially at Rome, where moral and theological doctrines alone attracted lively interest. The school is remarkable for its anticipation of modern ethical conceptions, for the lofty morality of its exhortations to forgive injuries and overcome evil with good; the obligation to universal benevolence had been deduced from the cosmopolitan principle that all men are brethren. In Seneca, in addition to all this, there is a distinctively religious temperament, which finds expression in phrases curiously suggestive of the spiritual doctrines of Christianity. Yet the verbal coincidence is sometimes a mere accident, as when he uses *sacer spiritus*; and in the same writings he sometimes advocates what is wholly repulsive to Christian feeling, as the duty and privilege of suicide.

In the tragedies which bear Seneca's name (*Hercules Furens, Thyestes, Phoenissae, Phaedra, Oedipus, Troades, Medea, Agamemno, Hercules Oetaeus*) the defects of his prose style are exaggerated: as specimens of pompous rant they are probably unequalled; and the rhythm is unpleasant owing to the monotonous structure of the iambics and the neglect of synapheia in the anapaestic systems. The praetexta *Octavia*, also ascribed to him, contains plain allusions to Nero's end, and must therefore be the product of a later hand. The doubt as to his authorship of the tragedies is due to a blunder of Sidonius Apollinaris (ix. 229-231); against it must be set Quintilian's testimony ("ut Medea apud Senecam," ix. 2. 8). The judgment of Tacitus (*Ann.* xiii. 4, 13, 42 sq., xiv. 52-56, xv. 60 sq.) is more favourable than that of Dio, who may possibly derive his account from the slanders of some personal enemy like Suilius. At least eighteen prose works have been lost, among them *De superstitione*, an attack upon the popular conceptions of the gods, and *De matrimonio*, which, to judge by the extant fragments, must have been interesting reading. Since Gellius (xii. 2. 3) cites a book xxii. of the *Letters to Lucilius*, some of these have been lost.

The best text of the prose works, that of Haase in Teubner's series (1852), was re-edited in 1872–1874 and 1898. More recently Gertz has revised the text of *Libri de beneficiis et de clementia* (Berlin, 1876), H. A. Koch that of the *Dialogorum libri xii.* (completed by Vahlen, Jena, 1879), and Gertz the *Dialogi* (Copenhagen, 1886). There is no complete exegetical commentary, either English or German. Little has been done systematically since the notes of Lipsius and Gronovius. There is, however, Ruhkopf's ed. with Latin notes, 5 vols. (Leipzig, 1797–1811), and Lemaire's variorum ed. (Paris, 1827–1832, 8 vols., prose and verse). The text of the tragedies was edited by Peiper and Richter, 1867, 2nd ed. 1902, and by F. Leo (2 vols., Berlin, 1878–1879); verse trans. by F. J. Miller (Chicago and London, 1908). Nisard, *Études de mœurs et de critique sur les poètes de la décadence* (4th ed., Paris, 1878), has criticized them in detail. Of some 300 monographs enumerated in Engelmann may be mentioned, in addition to the above, G. Boissier, *Les Tragédies de Sénèque ont-ils été représentés?* (Paris, 1861); A. Dörgens, *Senec. disciplinae moralis cum Antoniniana comparatio* (Leipzig, 1857); E. F. Gelpke, *De Senec. vita et moribus* (Bern, 1848); Holzherr, *Der Philosoph Seneca* (Rastadt, 1858). See also Sir S. Dill, *Roman Society from Nero to Marcus Aurelius* (1904).

(R. D. H.; X.)

SENECA, a tribe of North American Indians of Iroquoian stock. They call themselves *Tshoti-nondawaga*, "people of the mountain." The French called them *Tsonnontouan*. Their former range was in western New York state between Seneca lake and the Genesee river. They were one of the Six Nations League of the Iroquois, and eventually became the most important tribe of the league. They were foremost in all the Iroquoian wars, and were the official guardians of the western frontier of the league. On the defeat of the Erie and Neuter tribes they occupied the county west of Lake Erie and south along the Alleghany to Pennsylvania. They fought on the English side in the War of Independence. About 2700 are now on reservations in New York State, while a few are in Oklahoma and on Grand river reservation, Ontario.

For Seneca Cosmology see *21st Ann. Report Bureau Amer. Ethnol.* (1899–1900).

SENECA FALLS, a village of Seneca county, New York, U.S.A., in the township of Seneca Falls, on Seneca Outlet, or river (which connects Lake Seneca and Lake Cayuga), about 42 m. W.S.W. of Syracuse. Pop. (1900), 6519, of whom 801 were foreign-born; (1905 state census) 6733; of the township, including the village (1905), 7544. The village is served by the New York Central & Hudson River, the Lehigh Valley and electric suburban railways, and by the Seneca & Cayuga Canal. In the village are the Mynderse (public) Library and the Johnson Home for Old Ladies (1868). Cayuga Lake Park, a pleasure resort, is 3 m. distant and is reached by electric railway. The village is the shipping point for a farming and dairying region. The river here falls 50 ft. and provides a good water power; among the manufactures are pumps and hydraulic machinery, woollen goods, wagons and farm implements. Seneca Falls was settled about 1790, and was first incorporated as a village in 1831, its charter as revised in 1902 being similar in some respects to that of a city. In Seneca Falls on the 19th and 20th of July 1848 was held a Woman's Rights Convention, the first in the United States.[1]

SENEFELDER, ALOIS (1771–1834), German inventor of lithography, was born at Munich on the 6th of November 1771, his father Peter being an actor at the Theatre Royal. Owing to the death of his father he was unable to continue his legal studies at the university of Ingolstadt, and tried to support himself as a performer and author, but without success. In order to accelerate the publication of one of his works, he frequently spent whole days in the printing office, and found the process of printing so simple that he conceived the idea of purchasing a small printing press, thus enabling himself to print and publish his own compositions. Unable to pay for the engraving of his compositions, he attempted to engrave them himself. He made numerous experiments with little success; tools and skill were alike wanting. Copper-plates were expensive, and the want of a sufficient number entailed the tedious process of grinding and polishing afresh those he had used. About this period his attention was accidentally directed to a fine piece of Kellheim stone which he had purchased for the purpose of grinding his ink. His first idea was to use it merely for practice in his exercises in writing backwards, the ease with which the stone could be ground and polished afresh being the chief inducement. While he was engaged one day in polishing a stone slab on which to continue his exercises, his mother entered the room and desired him to write

[1] The convention, under the leadership of Lucretia Mott and Elizabeth Cady Stanton, adopted a "Declaration of Sentiments" modelled after the American Declaration of Independence, and resolved "that it is the duty of the women of this country to secure to themselves their sacred right to the elective franchise," and "that the same amount of virtue, delicacy and refinement of behaviour that is required of woman in the social state should also be required of man, and the same transgressions should be visited with equal severity on both man and woman."

her a bill for the washer-woman, who was waiting for the linen. Neither paper nor ink being at hand, the bill was written on the stone he had just polished. The ink used was composed of wax, soap and lamp-black. Some time afterwards, when about to wipe the writing from the stone, the idea all at once struck him to try the effect of biting the stone with aqua fortis. Surrounding the stone with a border of wax, he covered its surface with a mixture of one part of aqua fortis and ten parts of water. The result of the experiment was that at the end of five minutes he found the writing elevated about the tenth part of a line ($\frac{1}{120}$ in.). He then proceeded to apply the printing ink to the stone, using at first a common printer's ball, but soon found that a thin piece of board covered with fine cloth answered better, communicating the ink more equally. He was able to take satisfactory impressions, and, the method of printing being new, he hoped to obtain a patent for it, or even some assistance from the government. For years Senefelder continued his experiments, until the art not only became simplified, but reached a high degree of excellence in his hands. In later years the king of Bavaria settled a handsome pension on Senefelder. He died at Munich in 1834, having lived to see his invention brought to comparative perfection.

SENEGA, the dried root of the Polygala Senega, which is official in the British and United States pharmacopoeias. Senega contains an active principle, saponin. Senega is used chiefly as a stimulating expectorant in chronic bronchitis. It is occasionally used as a diuretic in renal dropsy. It is a cardiac depressant, and is contra-indicated in diseased conditions of the heart. It has a tendency to upset the digestion, and is therefore only used in combination with other drugs in what are termed expectorant mixtures.

SENEGAL, a river of West Africa, entering the Atlantic about 16° N., some 10 m. below St Louis, after a course of fully 1000 m. It is formed by the junction of the Bafing or Black river and the Bakhoy or White river, and its chief affluent is the Faleme. North of the Senegal the Sahara reaches the coast, and for over 1000 miles no river enters the ocean.

The Bafing rises in the Futa Jallon highlands about 2400 ft. above sea-level, in 10° 28′ N., 10° 5′ W., its source being within 125 m. of Konakry on the Gulf of Guinea. It is joined in about 11° 10′ N. and 11° 45′ W. by the Tene, which rises in 13° W. and 10° 37′ N. and flows north-east. A little south of 12° N. the Bafing is a large stream 250 yds. wide, and is here separated from the sources of the Faleme by a line of hills 2600 ft. high, which send to the latter river four important streams rising in about 12° N. The Bafing follows a northward course for about 350 m., during which it descends by a series of rapids till it reaches a level of 360 ft. above the sea. The headstreams of the Bakhoy rise between 11° 30′ and 12° N. and 9° 20′ and 9° 50′ W. on the N.E. versant of the hills which here form a narrow divide between the basin of the Senegal and that of the upper Niger. The Bakhoy, in its upper course much interrupted by rapids, flows N.E., but about 12° 15′ N. turns north-westward. Its principal affluent, the Baule (Red river), and its headstreams rise farther east on the northern slopes of the hills which above Bamako shut in the Niger. The eastern headwaters of the Senegal thus drain a large area adjacent to the upper Niger. The Baule flows north and in a series of loops reaches 14° 20′ N., where it turns westward and in about 13° 30′ N. and 10° W. joins the Bakhoy. After receiving the Baule, the Bakhoy, now a river of fine proportions, flows W. by N. through rocky country in a narrow valley. In 11° 55′ W. and 13° 48′ N. it unites with the Bafing. At the confluence the Bakhoy is 800 ft. wide, the Bafing at this point having a width of 360 ft.

After the junction of the Black and White rivers the united stream is known as the Senegal. The confluence is called Bafulabé, *i.e.* "meeting of the waters." Below Bafulabé the river flows N.W. through a valley bordered on either side by hills which throw out rocky spurs, over which the Senegal descends in a succession of falls, those of Guina (160 ft.) and of Felu (50 or 60 ft.) being the most important. It receives from the north several intermittent streams, the chief, usually carrying a fair amount of water, being the Khulu or Kolimbine, coming from the Kaarta plateau. From the south it is joined by the Faleme, a considerable river which rises in hilly country in about 11° 50′ N. and 11° 30′ W. The first rise in the lower Senegal is due to the rains in the source region of the Faleme, the flood water passing down that stream more quickly than down the Bafing owing to its shorter course. A short distance below the Felu Falls is the town of Kayes on the left bank of the river. Between the falls and Bakel (85 m.) there are twenty-seven "narrows," of which several, such as that at Kayes, are difficult. Kayes is the limit of navigability from the sea. From that town a railway connects with the navigable waters of the upper Niger at Bamako (see SENEGAL: *Country, I.*).

Below Bakel the river passes through flatter country and presents a series of great reaches. It sends off numbers of divergent channels (called *marigots*) forming several islands, the largest being that of Morfil, 110 m. long. The river attains its most northerly point, 16° 30′ N., in about 15° 10′ W. Thereafter it runs S.W. and finally due S. In the last 10 m. of its course it runs parallel to the sea, from which it is separated by a narrow line of dunes. On an island at the head of this 10 m. is St Louis, the capital of the colony of Senegal. At this point the right branch of the river is only 500 ft. from the open Atlantic. A marigot, called the Ndiadier or Maringuins, leaves the river 40 m. above St Louis, pierces the dunes at flood time and reaches the sea, 50 m. N. of the mouth of the river. The Senegal indeed has what is styled an interior delta, but, with the exception of the marigot named, all the divergent branches rejoin the main stream before the sea is reached.

The comparative scantiness of its sources, the steepness of its upper course and the rapid evaporation which takes place after the short rainy season would make the Senegal an insignificant stream for more than half the year; but natural dams cross the channel at intervals and the water accumulates behind them in deep reaches, which thus act as reservoirs. In the rainy season the barriers are submerged in succession, the reaches are filled and the plains of the lower Senegal are changed into immense marshes. Lake Cayor on the right side of the lower Senegal and Lake Panieful (Guier) on the left constitute reserve basins, receiving the surplus waters of the river during flood and restoring them in the dry season. In the upper part of the river the reservoirs are partially protected by curtains of verdure from the effects of the evaporation which makes itself so severely felt on the treeless seaboard. Owing to these natural "locks," the Senegal never discharges less than 1700 or 1800 cubic ft. per second. The lower Senegal forms the boundary between the Sahara and the western Sudan; the line of its inundations is an ethnographic march between the nomadic Berber and the settled Negro.

From July to October the level of the Senegal shows a series of fluctuations, with, however, a general increase till the end of August or beginning of September, when the maximum occurs. Boats drawing from 1 ft. to 2 ft. 6 in. can ascend to Kayes from the beginning of June to the middle of November; steamers drawing 4 ft. 3 in., from July to October inclusive; and ocean steamers, lightened so as to draw 11-13 ft., during August and September. From Mafu to the sea, a distance of 215 m., the Senegal is navigable all the year round by vessels drawing not more than 10 ft.

The existence of the Senegal appears to have been known to the ancients. It is usually regarded as the Chretes or Chremetes of Hanno, and the Nachyris and Bambotus of the Greeks and Romans, but it is not possible definitely to identify it with any of the rivers on Ptolemy's map. Idrisi and other medieval Arabian geographers undoubtedly refer to it. The seamen of Dieppe are said to have discovered the river about 1360, and even to have built a fort which became the nucleus of the town of St Louis, but this claim is unproved (see GUINEA). The mouth of the Senegal, then called Senaga, was entered in 1445 by the Portuguese navigator Dinas Diaz (who thought it a western arm of the Nile), and in 1455 Cadamosto ascended the river for some distance. Leo Africanus rightly describes its lower course as "severing by its winding channel the barren and naked soil from the green and fruitful." It was not until 1637 that the explorations of the upper river began, Jannequin, Sieur de Rochfort, in that year ascending the river some 200 m. above St Louis. In 1697 André Brüe reached the island of Morfil, while in 1698 he penetrated past the Felu Falls. At that period geographers regarded the Senegal as the termination of the Niger, a theory held until Mungo Park's demonstration of the eastward course of that stream. Park himself added much to the knowledge of the upper basin of the Senegal. It was not until 1818 that the source (*i.e.* of the Bafing) was located, by Gaspard Mollien.

See G. Mollien, *Découverte des sources du Sénégal et de la Gambie* (Paris, ed. 1889), with introduction by L. Ravaisson-Mollien; J. Ancelle, *Les Explorations au Sénégal et dans les contrées voisines* (Paris, 1886); M. Olivier, *Le Sénégal* (Paris, 1908); Captain Fromaget, "L'Hydrographie du fleuve Sénégal," in *B.S.G. Comm. Bordeaux*, xxxii. (1909).

SENEGAL, a country of West Africa belonging to France. As a geographical expression it is the land watered by the Senegal river; politically it has a much wider significance. The French possessions in this region are divided into (1) the colony of Senegal, and dependent native states; (2) the colony of Upper Senegal and Niger, with a dependent Military Territory; (3) the Territory of Mauretania. The first colony includes the most westerly coast region of Africa; a large part of the second colony is the country enclosed in the great bend of the Niger; while the Military Territory is east of that river. The Territory of Mauretania is part of the western Sahara, stretching indefinitely north from the Senegal river. It includes the oasis of Adrar Temur (see ADRAR) and the coast regions between Cape Blanco and the Senegal river. In the present article the two colonies are dealt with in separate sections (I. and II. below), the story of French conquest and colonization throughout this vast region forming section III.

I. SENEGAL

Senegal is bounded N. by the Territory of Mauretania, W. by the Atlantic, S. by Portuguese Guinea and French Guinea, and E. by the Faleme, which separates it from Upper Senegal and Niger. Wedged into Senegal and surrounded by it save seawards is the British colony of the Gambia. Senegal colony proper consists of the towns of Dakar, St Louis, Goree and Rufisque, a narrow strip of territory on either side of the Dakar-St Louis railway, and a few detached spots, and has an area of 438 sq. m. with a population (census of 1904) of 107,826. The rest of the country consists of native states under French protection, and includes, since 1909, the northern bank of the river Senegal below Bakel. In this larger sense, which is that employed in this article, Senegal covers about 74,000 sq. m., with an estimated population of 1,800,000. Among the protected states is Bondu (*q.v.*) lying immediately west of the lower Faleme.

Physical Features.—The coast follows a S.S.W. direction from the mouth of the Senegal to Cape Verde, the most western point of the African continent; thence it bends south as far as Cape Roxo, where the Portuguese frontier begins. The only gulf on the coast is that which lies to the south of Cape Verde and contains the island of Goree (*q.v.*). The coast in the northern part is low, arid, desolate and dune-skirted, its monotony relieved only here and there by cliffs and plateaus. Further south it becomes marshy, and clothed with luxuriant vegetation. A little to the north of the Gambia the coast-line is much broken by the archipelago of islands formed by the Salum estuary, whilst south of the Gambia is the broad estuary of the Casamance. Between the Senegal and the Gambia and as far east as about 13° W., the country behind the seaboard is a slightly elevated and, for the most part, barren plain. Further east is a mountainous and fertile region with altitudes of over 4000 ft. The mountains sink abruptly towards the Niger valley, while southwards they join the Futa Jallon highlands. On the north they extend to the left bank of the Senegal and throw out spurs into the desert beyond. The Senegal (*q.v.*), its tributary the Faleme, and the upper course of the Gambia (*q.v.*) are the chief rivers which drain the country. The Salum, already mentioned, is a river-like estuary which penetrates fully 100 m. and is split into many channels. It is navigable from the sea for 60 m. The Casamance flows between the Gambia to the north and the Cacheo to the south, and has a drainage area of some 6000 sq. m. Rising in the Futa Jallon, the river has a course of about 212 m., and at Sedhiu, 105 m. from the sea, is 1½ m. broad. Forty miles lower down it is joined by a northern tributary, the Songrogu, and thence to the ocean forms, with its numerous lateral channels, an estuary. The mouth of the river is fully 6 m. wide. Six to seven feet of water cover the bar at low tide, the river being navigable by shallow draught vessels for the greater part of its length.

Geology.—The low region of the seaboard has a very uniform character. It consists of sandstones or clay rocks and loose beds of reddish soil, containing marine shells. At certain points, such as Cape Verde and Cape Roxo (or Rouge), the red sandstones crop out, giving to the latter its name. Clay slates also occur, and at intervals these sedimentary strata are interrupted by basaltic amygdaloid and volcanic rocks. For instance, the island of Goree is basaltic. The base of the mountains is formed in certain places of clay slate, but more generally of granite, porphyry, syenite or trachyte. In those districts mica-schists and iron ores occur. Iron and gold are found in the mountains and the alluvial deposits. Many of the valleys are covered with fertile soils; but the rest of the country is rather arid and sterile.

Climate.—There are two seasons, the dry and the rainy or winter, the latter contemporaneous with the European summer. In the rainy season the wind blows from the sea, in the dry season the harmattan sweeps seaward from the Sahara. Along the seaboard the dry season is cool and agreeable; in the interior it is temperate in the three months which correspond to the European winter, for the rest of the year the heat is excessive. The maximum readings (90° to 100° F.), which are exceptional at St Louis, become almost the rule at Bakel on the upper Senegal. The mean temperature at St Louis is 68° to 70° F. The rainy season begins at Goree between the 27th of June and the 13th of July. During this period storms are frequent and the Senegal overflows and floods the lowlands, the heat and humidity rendering the country affected very unhealthy. Several districts formerly covered with forest, to which fact Cape Verde owed its name, are now treeless, a continual slow diminution in the rainfall being the result.[1] No part of the country is suited for permanent occupation by Europeans. Yellow fever, malaria, &c., once prevalent in the towns, have been successfully combated by attention to sanitation.

Flora.—The principal tree is the baobab (*Adansonia digitata*), which sometimes at the height of 24 ft. has a diameter of 34 and a circumference of 104 ft. Acacias are numerous, one species, *A. adansonia*, being valuable for ship-timber. Among the palm-trees is the *ronier*, whose wood resists moisture and the attacks of insects; in some places, as in Cayor, it forms magnificent forests. The mampatas grows sometimes 100 ft. high, its branches beginning at a height of about 25 ft. *Landolphia* and other rubber plants, and the oil-palm, grow luxuriantly in the Casamance district. The karite, or shea-butter tree, is common. Wild indigo is abundant, and the cotton plant is indigenous.

Fauna.—The lion of Senegal and the neighbouring countries differs from the Barbary lion; its colour is a deeper and brighter yellow, and its mane is neither so thick nor so long. Other beasts of prey are the leopard, the wild cat, the cheetah, the civet and the hyena. The wild boar is clumsier than the European variety. Antelopes and gazelles occur in large herds; the giraffe is found in the region of the upper Senegal; the elephant is rare; the hippopotamus is gradually disappearing. Crocodiles swarm in the upper Senegal. Monkeys and apes of different species (the chimpanzee, the colobus, the cynocephalus, &c.), the squirrel, rat and mouse abound. The hedgehog, marmot, porcupine, hare, rabbit, &c., are also met with. Among the more noteworthy birds are the ostrich, which migrates to the Sahara; the bustard, found in desert and uncultivated districts; the marabout, a kind of stork, with its beak black in the middle and red at the point, which frequents the moist meadowlands and the lagoons; the brown partridge, the rock partridge and the quail in the plains and on the mountain sides; and the guinea-fowl in the thickets and brushwood. Along the coast are caught the sperm whale, the manatee and the cod-fish.

Inhabitants.—The inhabitants of Senegal are, mainly, "Moors" and allied Berber races, and Negroids. The Moors, or rather Berbers (Trarzas, Braknas and Duaish), inhabit the right bank of the Senegal. Fula (Peuls) are found in various parts of the country. Negroids, however, form the bulk of the population. There are few, if any, tribes of unmixed Negro blood, though in most of them the Negro element largely predominates. The best known of these tribes are the Wolofs and Mandingos, the last-named a widespread group of allied peoples bearing many names such as Sarakolés and Bambaras. Mandingos inhabit the basins of the upper Niger and the upper Senegal, and the western slope of the mountains of Futa Jallon. Under the name of Wakore or Wangara they are also found in all the immense tract enclosed in the bend of the Niger. The Berbers, Fula and Mandingos are Moslems. The Wolofs and the Serers inhabit the seaboard from St Louis to the Gambia, and the left bank of the Senegal from its mouth to Dagana. The Balanta inhabit the left bank of the Casamance; they are allied to the Mandingos. The principal languages spoken are Wolof, Fula, Serer, Mandingo and Arabic. The river Senegal marks the line of separation between Wolof and Arabic. Fula is the language of the Fula and Tukulors (Fula half-breeds); Mandingo comprises several dialects and is widely spoken. Polygamy is generally practised. Slave raiding has been stopped and domestic slavery is not recognized by the French. (See BERBERS, FULA, WOLOF, MANDINGO, &c.)

Towns.—The chief towns of Senegal are St Louis, pop. (1904) 28,469, Dakar (23,452), Goree (1500) (all separately noticed) and Rufisque. Rufisque (12,446; including suburbs, 19,177) is a seaport 14 m. E. of Dakar and is on the railway connecting that town with St Louis. It is the chief place in the colony for the export of groundnuts. Portudal and Joal are small places on the coast south of Rufisque. (Midway between Cape Verde and Cape Blanco is the small port of Marsa or Portendic, a little south of Jeil [Old Portendic],

[1] See A. Knox, "The Isohyets 'twixt Sahara and Western Sudan," in *Geog. Journ.* (June 1909).

which was formerly noted for the export of gum arabic, and on the shores of the bay formed by Cape Blanco is Port Étienne, a fishing station provided with jetties and guarded by a military post. These last-named ports are in the Territory of Mauretania, but are most conveniently mentioned here.) On the river Senegal are the towns of Richard-toll (Richard's garden), Dagana and Bakel, all three founded by the French government in 1821. Carabane, Zighinchor and Sedhiu are settlements on the Casamance river. St Louis, Dakar, Goree and Rufisque are communes, with a franchise exercised by natives and Europeans alike. The total white population of the four towns is about 5000.

Agriculture and Trade.—Senegal's chief commercial product is the ground-nut, which, since 1888, has yielded about 30,000 tons a year. Millet, the staple food of the native population, maize and rice occupy about two-thirds of the cultivated land. Acacia gum is gathered by the Moors in the northern region; the kola nut is cultivated and rubber is collected in the district of Casamance, which projects between Portuguese Guinea and British Gambia. There are large herds of cattle and flocks of sheep and goats, besides numerous camels, asses and horses. Gold, iron, quicksilver and copper are found. The natives carry on weaving, pottery, brickmaking and manufacture trinkets. Cotton goods (chiefly from England) form the most important articles of import, and after them come kola nuts (mainly from Sierra Leone), rice, wines and spirits, tobacco, implements, sugar, coal and fancy goods; the exports are mostly ground-nuts; rubber (much of which comes from the Niger regions), gum and gold coming next in value. The imports and exports of Senegal are not shown separately, the figures for Upper Senegal and Niger being included. The average annual value for the five years ending 1905 was £3,100,000. By 1910 the value had risen to nearly £4,000,000. France takes 75 % of the exports; Belgium, the Netherlands and Denmark the bulk of the remainder. In value ground-nuts form four-fifths of the exports.

Communications. A railway, 163 m. long, goes from Dakar to St Louis, from which point the Senegal river is navigable by steamer from August to November, both inclusive, for about 500 m., the navigable reach terminating at Kayes, whence a railway runs to the Niger. Direct communication between Dakar and the Niger is afforded by a railway starting from Thies, a station on the way to St Louis, and ending at Kayes. The construction of this line began in 1907. Telegraph lines connect the colony with all other parts of French West Africa. Dakar is in direct cable communication with Brest, and another cable connects St Louis with Cadiz. Steamship communication between Europe and Dakar and Rufisque is maintained by several French, British and German lines. Over 50 % of the shipping is French, Great Britain coming second.

II. Upper Senegal and Niger

This colony is bounded N. by the Saharan territories dependent on Algeria, W. by Senegal and the Territory of Mauretania, S. by the French colonies of Guinea and the Ivory Coast, the Northern Territories of the Gold Coast (British), Togoland (German) and Dahomey (French). The Military Territory dependent on the colony extends E. of the Niger to the Lake Chad territory of French Congo, being bounded S. by Nigeria (British). The colony and its dependent territory thus form the link connecting all the possessions of France in north, west and central Africa. Their area is estimated at 210,000 sq. m., with a population of some 3,000,000. Those tribes living north and east of the Niger are mainly of Berber (Tuareg) stock; the inhabitants of the Niger bend are chiefly Negroids, such as the Mandingo, with Fula in certain districts.

The colony, as a whole, consists of a great plateau of granite and sandstone, rarely more than 1600 ft. high, and in its N.W. part, the Kaarta, all but desert. Hydrographically the western portion belongs to the basin of the Senegal, the central to that of the Niger. At Mopti, 200 m. S.W. of Timbuktu, the Niger receives the Mahel Balevel, which rises in about 9½° N. and with its tributaries drains a very large area. In its lower courses its divergent channels, uniting with offshoots from the Niger, form in the flood season an immense lake. This region—apparently the Wangara country of Idrisi—is sometimes called Bambara, the name of the chief race inhabiting it. The lakes or widenings of the Niger itself occupy vast areas; Lake Debo, the Lake of Horo, the Lake of Dauna, Lake Faguibini are all to the south or west of Timbuktu, and are permanent. The greater part of the colony lies within the bend of the Niger, but westward it includes both banks of the Senegal as far as the Faleme confluence. It also extends north of the Niger so as to include the fertile land on the borders of the Sahara. On the S.W. and S. the country is somewhat mountainous, and the general trend of the land and the course of the rivers is south to north. East of the Niger the conditions are mostly Saharan, but there is a belt of fairly fertile country, bordering northern Nigeria and extending to Lake Chad. This region includes the state of Zinder (*q.v.*) and the oases of Air or Asben and Bilma (*q.v.*). The country west of the Niger contains patches of forest, but it consists mainly of open land well adapted to agriculture and stock-raising. The fauna includes the lion, elephant, hippopotamus, wild boar, panther and various kinds of antelope. The climate is tropical, but, apart from the districts inundated by the Niger floods, dry and not unhealthy.

The Protected States.—Of the native states included in the colony Bambuk lies between the Senegal and the Faleme and Bafing. It is traversed from N.W. to S.E. by the steep and wall-like range of the Tamba-Ura Mountains. The soil in a large part of the country is of remarkable fertility; rice, maize, millet, melons, manioc, grapes, bananas and other fruits grow abundantly; the forests are rich in a variety of valuable trees; and extensive stretches are covered with abundant pasturage of the long guinea-grass. The inhabitants, a branch of the Mandingo race, own large herds of cattle and sheep. The reports which reached Europe during the 17th and 18th centuries of a country in Upper Senegal rich in gold referred to this district, where both alluvial and quartz deposits have been found, though the stories of "hills of gold" remain unverified. In all the protected states the native rulers retain a considerable degree of authority and native law is administered.

Towns. The principal towns in the colony are, in Upper Senegal, Kayes, Bafulabé and Kita; in the Niger regions Sikaso, the centre of the rubber trade; Bamako,[1] the seat of government; Kulikoro, Segu, Sansandig, Bambara, Jenné (*q.v.*) and Timbuktu (*q.v.*). Nioro is the capital of the Kaarta country; between it and Timbuktu are Gumbu and Sokolo; Gao (*q.v.*), Zinder or Sinder (not to be confounded with the Zinder mentioned above), Sansanne Hausa, Niamey and Say are towns on the Niger below Timbuktu, Say (*q.v.*) being an entrepôt for the trade of the east Nigerian regions. In the centre of the Niger bend is the important city of Wagadugu, the capital of Mossi, a negroid and pagan state dating from the 14th century. Satadugu is on the upper course of the Faleme. Sati and Leo are towns just north of the British Gold Coast hinterland.

Of these towns Kayes is situated on the Senegal at the point at which that river ceases to be navigable from the sea—a distance of 460 m. from St Louis. Bamako, chosen in 1904 as the capital of the colony, is on the upper Niger at the head of its navigable waters and is in railway communication with Kayes. Segu, where Mungo Park first reached the Niger, is regarded as the capital of Bambara rather than the town of Bambara, which is on a backwater of the Niger some 100 m. S. of Timbuktu. Before the French occupation the possessor of Segu was the ruler of the surrounding country; and the town was the headquarters of the emirs Omar and Ahmadu (see below, *History*). Sansandig stands on the north bank of the Niger below Segu. It was visited by Mungo Park in 1796, and Lieut. E. Mage and Dr Quintin, French officers, witnessed the stand it made in 1865 against a siege by Ahmadu, sultan of Segu, from whom it had revolted. Before its conquest by the Tuareg in the first half of the 19th century Sansandig was an important mart, owing to its position at the upper end of the stretch of the Niger navigable for large vessels all the year round. After its occupation by France in 1900 its commercial importance gradually returned. It possesses good anchorage and landing places.

Communications.—There is regular communication by rail and river between Dakar, the principal port of Senegal, and Timbuktu, the journey occupying ten to twelve days. A railway linking the Senegal and Niger rivers starts at Kayes on the Senegal, passes S.E. through Bafulabé and Kita, whence it goes E. to Bamako on the Niger, and follows the left bank of that river to Kulikoro, the terminus, from which point the Niger is navigable down stream all the year round for a distance of 900 m., while from Bamako the Niger is navigable up stream to Kurussa, a distance of 225 m., for the greater part of the year. The Senegal-Niger railway is 347 m. long, and occupied twenty-four years in construction, owing to bad management and periods of retrogressive policy in Paris. The total cost was upwards of £3,500,000. Construction of the line was sanctioned in 1880; by 1882, when £700,000 had been spent, but 10 m. of rails had been laid. The 33rd mile was reached at a cost of £7,252 per mile for actual construction. Notwithstanding this heavy expense the line was condemned as hopelessly defective. In 1888 it reached Bafulabé (82 m.) when work was suspended, not to be vigorously resumed until 1898. The entire line was opened for traffic in 1905. Steamers ply on the Niger between Kabara, the port of Timbuktu, and Kulikoro and Bamako. Good roads connect Mossi

[1] For a monograph on Bamako see *Quest. dipl. et col.* (1907), pp. 561-576.

and other countries in the Niger bend with the river ports and the colonies on the Gulf of Guinea. There is a complete system of telegraphic communication with all the French colonies in West Africa. The principal line (over 2000 m. long) connects Dakar with Timbuktu and from Timbuktu goes east to Zinder. At Burrem on the Niger, 212 m. below Timbuktu, starts a line across the Sahara to Algeria.

Trade and Agriculture.—The chief exports are gum (which comes largely from the northern districts such as Kaarta), rubber, gold, kola nuts, leather and ostrich feathers. Part of the trade is still done by caravans across the Sahara to Morocco and Algeria, and a goodly proportion of the exports from the middle Niger are shipped from Konakry in French Guinea. Under the direction of French officials, cotton-growing on scientific methods was begun in the Niger basin in 1904. American and Egyptian varieties were introduced, the American varieties proving well adapted to the soil. Indigenous varieties of cotton are common and are cultivated by the natives for domestic use, weaving being a general industry. Gold is found in the basin of the Faleme and of the Tankisso. Rubber is abundant in the southern part of the Niger bend, the latex being extracted by the natives in large quantities. The people are great agriculturists, their chief crops being millet, maize, rice, cotton and indigo. Tobacco is cultivated by the river folk along the banks inundated by the floods. Wheat is grown in the neighbourhood of Timbuktu, the seed having been, in all probability, brought from Morocco at the time of the Moorish invasion (see TIMBUKTU). The oil of the karite or shea-butter tree, common in the southern and western regions, is largely used. Cattle are plentiful; there are several good breeds of horses; donkeys are numerous and largely used as transport animals; wool-bearing sheep—distinct from the smooth-haired sheep of the coast regions—are bred in many districts, the natives using the wool largely in the manufacture of blankets and rugs. Ostriches are fairly numerous in the upper portion of the Niger bend and on the left bank of the Niger east of Timbuktu, and their feathers form a valuable article of trade. Most of the trade of this vast region is with France and through Senegal.

III. History and Administration

The story of the French conquests throughout West Africa is inseparably connected with the history of Senegal. Trading stations were established elsewhere on the coast, but the line of penetration into the interior of the continent was, until the last few years of the 19th century, invariably by way of the river Senegal. Hence there is a peculiar interest in the record of the early settlements on this coast. The Portuguese had some establishments on the banks of the Senegal in the 15th century; they penetrated to Bambuk in search of gold, and were for some time masters of that country, but the inhabitants rose and drove them out. Remains of their buildings are still to be seen. The first French settlement was probably made in 1626 (see SENEGAL, river). Between 1664, when the French settlements were assigned to Colbert's West India Company, and 1758, when the colony was seized by the British, Senegal had passed under the administration of seven different companies, none of which attained any great success, though from 1697 to 1724 affairs were conducted by a really able governor, André Brue, who did not, however, spend the whole of his time in Africa; from 1703 to 1714 he directed the affairs of Senegal from Paris. Brue made many exploring expeditions and was on one occasion (1701) captured by the natives, who extorted a heavy ransom. Under his direction the auriferous regions of Bambuk, long since abandoned by the Portuguese, were revisited (1716) and the first map of Senegal drawn (1724). In the meantime (1677) the French had captured from the Dutch Rufisque, Portudal, Joal and Goree and they were confirmed in possession of these places by the treaty of Nijmwegen (1678). In 1717 the French acquired Portendic, a roadstead half way between capes Verde and Blanco, and in 1724 Arguin, an island off the coast of the Sahara, which still belongs to the colony. Goree and the district of Cape Verde were captured by the British under Commodore Keppel in 1758, but were surrendered to the French in 1763, and by the treaty of peace in 1783 the whole of the Senegal was also restored. The British again captured the colony in the wars of the First Empire (Goree 1800, St Louis 1809) and, though the treaty of Paris authorized a complete restitution, the French authorities did not enter into possession till 1817. At that time the authority of France did not extend beyond the island of Goree and the town of St Louis, whilst up to 1854 little was effected by the thirty-seven governors who followed each other in rapid succession. Of these governors Captain (afterwards Admiral) Bouët-Willaumez had previously explored the Senegal river as far as Médine and was anxious to increase French influence, but his stay in Senegal (1842–1844) was too brief to permit him to accomplish much.

The appointment of General Faidherbe as governor in 1854 proved the turning-point in the history of Senegal. In the meantime the Niger had been explored, Timbuktu visited by Europeans and the riches of the region were attracting attention. General Faidherbe sought to bring these newly opened-up lands under French sway, and dreamed of a French empire stretching across Africa from west to east. As far as concerned West Africa he did much to make that dream a reality. On taking up the governorship he set about subduing the Moorish (Berber) tribes of the Trarzas, Braknas and Duaish, whose "kings," especially the king of the Trarzas, had subjected the French settlers and traders to grievous and arbitrary exactions; and he bound them by treaty to confine their authority to the north bank of the Senegal. In 1855 he annexed the country of Walo and, ascending the river beyond Kayes, erected the fort of Médine for the purpose of stemming the advancing tide of Moslem invasion, which under Omar al-Haji (Alegui) threatened the safety of the colony. In 1857 Médine was brilliantly defended by the mulatto Paul Holle against Omar, who with his army of 20,000 men had to retire before the advance of General Faidherbe and turn his attention to the conquest of the native states within the bend of the Niger. The conquest of the Senegambian region by the French followed. The outbreak of the Franco-Prussian War in 1870 checked the French schemes of penetration for some five or six years, but the delay proved to be no disadvantage, for Great Britain, France's only serious rival in West Africa at the time, remained inert.

Conquest of the upper Niger regions.

The first French expedition into the heart of the Niger country was undertaken in 1863, when General Faidherbe sent Lieut. E. Mage[1] and Dr Quintin to explore the country east of the Senegal. The two travellers pushed as far as Segu on the Niger, then the capital of the almany Ahmadu, a son of Omar al-Haji. At Segu they were forcibly detained from February 1864 to March 1866. During this period they gathered much valuable information concerning the geography, ethnology and history of the middle Niger region. In 1878 the explorer Paul Soleillet (1842–1886) also penetrated to Segu. In 1879 Colonel Brière de l'Isle (governor of Senegal, 1876–1881) appointed Captain Joseph S. Gallieni to investigate the route for a railway and to reopen communications with the almany Ahmadu; and at this time the post of Bafulabé was constructed. The armed conquest began in 1880, and for more than fifteen years was carried on by Borgnis-Desbordes, J. S. Gallieni, H. N. Frey, Louis Archinard, Col. Combes, Tite Pierre Eugène Bonnier and other officers. In 1881 the Niger was reached; the fort of Kita was erected to the south-east of Médine to watch the region between the Senegal and the Joliba (upper Niger); the fort of Bamako on the Niger was built in 1883; a road was made, 400 m. of telegraph line laid down and the work of railway construction begun. In 1887 Ahmadu, who had formerly been anxious to obtain British protection, signed a treaty placing the whole of his country under French protection.[2] Besides Ahmadu the principal opponent of the French was a Malinké (Mandingo) chieftain named Samory, a man of humble origin, born about 1846, who first became prominent as a reformer of Islam, and

[1] Lieut. E. Mage (1837–1869) of the French navy, an officer of brilliant promise, first visited Senegal in 1856 when, under Faidherbe's direction, he went on a mission to the Duaish Moors. The "Gorgone," which he commanded, was wrecked off Brest in December 1869 and Mage was drowned.

[2] It was in this year (1887) that the governor of Senegal took possession of a small uninhabited group of islands, named the Alcatras, lying off the coast of French Guinea. This act had a tragic sequel. By agreement with the governor, a chieftain of the neighbouring mainland sent four of his warriors to the islands to guard the tricolour. These soldiers were, however, like the islands themselves, completely forgotten by the authorities, and, the Alcatras producing nothing but sand, the four men starved to death, after exhausting the supplies with which they had been originally provided.

had by 1880 made himself master of a large area in the upper Niger basin. In 1887, and again in 1889, he was induced to recognize a French protectorate, but peace did not long prevail either with him or with Ahmadu. The struggle was resumed in 1890; Ahmadu lost Segu; Nioro the capital of Kaarta was occupied (1891); Jenné was taken in 1893. Samory proved a veritable thorn in the flesh to his opponents. Wily and elusive, he made and broke promises, tried negotiation, shifted his "empire" to the states of Kong, and after numberless encounters was finally defeated on the Cavalla to the north of Liberia, and taken prisoner in September 1898. He was deported to the Gabun, where he died in 1900. Timbuktu was occupied in December 1893, in defiance of orders from the civil authorities. Colonel Bonnier, who went to the relief of the advance party, after having effected that purpose, was slain by the Tuareg (15th of January 1894), whom he had pursued into the desert. In the meantime France had signed with Great Britain the convention of the 5th of August 1890, which reserved the country east of the Niger and south of the Sahara to Great Britain.

Determined to profit by the convention, the French government despatched Colonel P. L. Monteil to West Africa to visit the countries on the Anglo-French frontier. That officer, starting from St Louis in 1891, traversed the Niger bend from W. to E., visited Sokoto and Zinder and arrived at Kuka on Lake Chad, whence he made his way across the Sahara to the Mediterranean. In the following years French expeditions from Senegal penetrated south-east into the hinterland of the British colonies and protectorates on the Guinea coast and descended the Niger (February 1897) as far as Bussa, the limit of navigation from the ocean. These actions brought them into contact with the British outposts in the Gold Coast, Lagos and Nigeria. A period of tension between the two countries was put an end to by a convention signed on the 14th of June 1898 whereby the territories in dispute were divided between the parties, Great Britain retaining Bussa, while France obtained Mossi and other territories in the Niger bend to which Great Britain had laid claim. In the same year it was determined to send an expedition to Lake Chad, which should co-operate with other expeditions from Algeria and the Congo. The Senegal expedition was entrusted to Captains Voulet and Chanoine, officers who had served many years in West Africa. Reports of the misconduct and cruelty of these officers reaching St Louis, Lieut.-Colonel Klobb of the Marines was sent to supersede them. Colonel Klobb overtook the expedition at a spot east of the Niger on the 14th of July 1899. Voulet, fearing arrest and punishment, ordered his men to fire on Klobb and his escort, and the colonel was killed. Thereupon Voulet, joined by Chanoine, declared his intention to set up an independent state, and with the majority of his troops marched away, leaving the junior officers, who remained loyal to France, with a small remnant. Within a fortnight both Voulet and Chanoine had been killed by their own men, who returned to the French camp. Lieut. Pallier assumed command and led the force to Zinder, reached on the 29th of July. Here, in the November following, they were joined by F. Foureau and Commandant Lamy, who had crossed the Sahara from Algeria. The combined force marched to Lake Chad, and, having been joined by the Congo expedition, met and defeated the forces of Rabah (*q.v.*). Thus was accomplished in fact the linking up of the French possessions in Africa, an object of French ambition since 1880, and theoretically effected by the Anglo-French convention of 1890.

In 1904, in virtue of another convention between Great Britain and France, the Senegal colony obtained a port (Yarbatenda) on the Gambia accessible to sea-going vessels, while the trans-Niger frontier was again modified in favour of France, that country thereby obtaining a fertile tract the whole way from the Niger to Lake Chad. During 1905–1906 the oases of Air and Bilma, in the central Sahara, were brought under French control, notwithstanding a claim by Turkey to Bilma as forming part of the Tripolitan hinterland.

At first the whole of the conquered or protected territories were either administered from Senegal, or placed under military rule. Subsequently the upper Senegal country and the states included in the bend of the Niger were formed into a separate administration and were given the title "French Sudan." As the result of further reorganization (October 18, 1899) the colonies of French Guinea, Ivory Coast and Dahomey were given their geographical hinterlands, and in October 1902 the central portion was created a protectorate under the style of the Territories of Senegambia and of the Niger. A further change was made in 1904 (decree of the 18th of October) when this central portion was changed into "The Colony of Upper Senegal and Niger." The new colony was placed under a lieutenant-governor.

Administrative divisions.

Soon after the reorganization of the country in 1902, the effective area of French control was increased by M. Coppolani, secretary-general of French West Africa, who in February 1903 induced the emirs of certain Trarza and Brakna Moors inhabiting a fertile region on the northern bank of the lower Senegal to place their country under the direct supervision of French officials. In the following year these regions were formally constituted the Territory of Mauretania, being placed under the direct control of the governor-general of French West Africa represented on the spot by a civil commissioner. In 1905 M. Coppolani, the commissioner, was murdered by a band of fanatics at an oasis in the Tagant plateau. During 1908–1909 a force under Colonel Gouraud, after considerable fighting—the natives receiving help from Morocco—made effective French influence in Adrar Temur.

For the history of the native states in this vast region, see TIMBUKTU, JENNE, MANDINGO, GUINEA, &c. Consult also the article NIGERIA.

The general oversight of both colonies is in the hands of the governor-general of French West Africa. Senegal proper has been the subject of special legislation, its government being modelled on that of a department in France. The lieutenant-governor, who controls the military as well as the civil administration, is assisted by a secretary-general and by a privy council (*conseil privé*) consisting of high officials and a minority of unofficial nominated members, but he is not bound to follow its advice. This council corresponds to the prefectural council of a department. There is also a council-general (*conseil général*) with powers analogous to those of the similar councils in France. The Senegal council, however, does not share the right, possessed by the councils of other French colonies, of voting the budget, which is fixed by the governor-general of French West Africa. The inhabitants of "communes with full powers" (*i.e.* St Louis, Dakar, Goree and Rufisque) alone have the right of electing the council-general. The same constituencies—in which no distinction of colour or race is made—elect (law of April 1879) to the French chambers one deputy, who is also a member of the superior council of the colonies, a consultative body sitting in Paris. The communes named have the same municipal rights as in France. There have been, in addition, since 1891, "mixed" and native communes with restricted powers of local government. The judicial system applied to Europeans resembles that of France, and the judicature is independent of the executive. Native laws and customs not repugnant to justice are respected. Education is given in village, commercial and technical schools, all maintained by the state. Arabic is taught in all Mahommedan districts.

Government.

The colony of Upper Senegal and Niger has a more rudimentary constitution. Its administrative council contains three "notables," unofficial members nominated by the lieutenant-governor.

BIBLIOGRAPHY.—*Une Mission au Sénégal* (Paris, 1900), by Dr Lasnet, A. Chevalier, A. Cligny and P. Rambaud, is an authoritative scientific memoir, as is still M. Adanson's *Histoire naturelle du Sénégal* (Paris, 1757); M. Olivier, *Le Sénégal* (Paris, 1908), is an official monograph; A. de la Salle, *Notre vieux Sénégal* (Paris, 1909) is a general survey of the country and its resources. *Sur les routes du Soudan* (Toulouse, 1902), by E. Baillaud, deals with travel, communications, &c.; maps of the country are issued by the Service géographique de l'armée, Paris, on the scale of 1·100,000 (1905–1909); "Étude sur le Sénégal," by Courtet, in the *Revue coloniale*, new series (Paris, 1901–1902 and 1902–1903), deals with economic

questions, and gives a chronological table of leading events. For history, consult "Les Compagnies de colonisation en Afrique occidentale sous Colbert," by P. Chemin-Dupontes, in *Revue coloniale* (1902–1903 and 1903–1904); J. Machat, *Documents sur les établissements français de l'Afrique occidentale au XVIIIe siècle* (Paris, 1906); and J. Ancelle, *Les Explorations au Sénégal et dans les contrées voisines depuis l'antiquité jusqu'à nos jours* (Paris, 1906). For a summary of the military operations see the *Jnl. Roy. United Service Inst.*, vol. 38 (1894) and vol. 44 (1900), containing articles by Capt. S. Pasfield Oliver and Capt. A. Hilliard-Atteridge.

For the countries of the Niger see *Le Haut Sénégal et Niger* (Paris, 1908), an official compilation; H. Barth, *Travels and Discoveries in North and Central Africa* (London, 1857–1858), a standard authority; L. Desplagnes, *Le Plateau central-nigérien: une mission archéologique et ethnographique au Soudan français* (Paris, 1907), another standard work; P. L. Monteil, *De St-Louis à Tripoli . . . voyage au travers du Soudan . . .* [Paris, N.D. (1895)]; G. Binger, *Du Niger au golfe de Guinée par le pays de Kong et le Mossi* (Paris, 1892); Lady Lugard, *A Tropical Dependency* (London, 1905), L. Marc, *Le Pays Mossi* (Paris, 1909). Consult also for native history "Légendes historiques du pays de Nioro (Sahel)" by M. G. Adam in *Revue coloniale* (1903–1904). For Mauretania see *La Mauritanie* (Paris, 1908), an official record of the French protectorate, and A. Gruvel and R. Chudeau, *A Travers la Mauritanie occidentale* (Paris, 1909).

See further the works of Faidherbe and Gallieni quoted in their biographies, and the reports on the trade, &c., of French West Africa issued by the British Foreign Office. (F. R. C.)

SENEGAMBIA, a term used to denote the region between the rivers Senegal and Gambia on the west coast of Africa. The country south of the Gambia as far as Sierra Leone was formerly also regarded as part of Senegambia. As a geographical expression Senegambia fell into disuse towards the end of the 19th century. Part of the hinterland is included in the French colony of Upper Senegal and Niger (see SENEGAL, II.)

SENESCHAL (the O. Fr. form, mod. *sénéchal*, of the Low Lat. *senescalcus*, a word of Teutonic origin, meaning "old or senior servant," Goth. *sini-* old; cf. Lat. *senex* and *scalks*, servant; Du Cange's derivation from *seneste*, flock, herd, must be rejected), the title of an official equivalent to "steward." The seneschal began presumably by being the major-domo of the German barbarian princes who settled in the empire, and was therefore the predecessor of the mayors of the palace of the Merovingian kings. But the name seneschal became prominent in France under the third or Capetian dynasty. The seneschal, called in medieval Latin the *dapifer* (from *daps*, a feast, and *ferre*, to carry), was the chief of the five great officers of state of the French court between the 11th and the 13th centuries, the others being the butler, the chamberlain, the constable and the chancellor. His functions were described by the terms *major regiae domus*, and *regni Franciae procurator*—major-domo of the royal household, and agent of the kingdom of France. The English equivalent was the lord high steward, but the office never attained the same importance in England as in France. Under the earlier Capetian sovereigns the seneschal was the second person in the kingdom. He inherited the power and position of the mayor of the palace—had a general right of supervision over the king's service, was commander-in-chief of the military forces (*princeps militiae regis*, or *Francorum*), was steward of the household and presided in the king's court in the absence of the king. Under weak rulers the seneschal would no doubt have played the same part as the mayors of the palace of the Carolingian line. It was the vast possibilities of the office which must be presumed to have tempted the counts of Anjou of the Plantagenet line to claim the hereditary dapifership of France, and to support their claim by forgeries. A count of Anjou who was also in effective possession of the office would soon have reduced his feudal lord to absolute insignificance. French historical scholars have shown that the pretension of the Anjevins was unfounded, and that the treatise concocted to support it—the *De majoratu et senescalia Franciae*, attributed to Hugues de Clères—is a medieval forgery. At the close of the 11th century the seneschalship was in the hands of the family of Rochefort, and in the early part of the following century it passed from them to the family of Garlande. The power of the office was a perpetual temptation to the vassal, and a cause of jealousy to the king. The Garlandes came to open conflict with the king, and were forcibly suppressed by Louis VI. in 1127. After their fall the seneschalship was conferred only on great feudatories who were the king's kinsmen—on Raoul of Vermandois till 1152, and on Thibaut of Blois till 1191. From that time forward no seneschal was appointed except to act as steward at the coronation of the king. The name of the seneschal was added with those of the other great officers to the kings in charters, and when the office was not filled the words *dapifero vacante* were written instead. The great vassals had seneschals of their own, and when the great fiefs, Anjou, Touraine, Maine, Poitou, Saintonge, Guienne, were regained by the crown, the office was allowed to survive by the king. In the south of France, Périgord, Quercy, Toulouse, Agenais, Rouergue, Beaucaire and Carcassonne were royal *sénéchaussées*. In Languedoc the landlords' agent and judicial officer, known in the north of France as a *bailli*, was called *sénéchal*. The office and title existed till the Revolution.

See Du Cange, *Glossarium mediae et infimae Latinitatis* (Paris, 1840–1850); A. Luchaire, *Histoire des institutions monarchiques de la France sous les premiers Capétiens* (Paris, 1883–1885); *Manuel des institutions françaises* (Paris, 1892); Paul Viollet, *Droit publique—Hist. des institutions politiques et administratives de la France* (Paris, 1890–1898).

SENIGALLIA, or SINIGAGLIA (anc. *Sena Gallica*), a city and episcopal see of the Marches, Italy, in the province of Ancona, on the coast of the Adriatic, 15 m. by rail N. of Ancona. Pop. (1901) 5556 (town), 23,195 (commune). It is situated at 14 ft. above sea-level, and, despite its ancient origin, presents a modern appearance, with wide streets. The Palazzo Comunale dates from the 17th century. The cathedral was erected after 1787. The castle, of Gothic origin, was restored by Baccio Pontelli, a famous military architect, in 1492. The church of S. Maria delle Grazie outside the town is one of the only two churches which he is known to have executed (the other is at Orciano near Mondavio, about 15 m. to the west by road). The small port is formed by the lower reaches of the Misa, a stream which flows through the town between embankments constructed of Istrian marble. The inhabitants are chiefly occupied in fishing, and in the summer the town is greatly frequented by visitors for the good sea-bathing. Senigallia used to hold one of the largest fairs in Italy, which dated originally from 1200, when Sergius, count of Senigallia, received from the count of Marseilles, to whose daughter he was affianced, certain relics of Mary Magdalene; this fair used to be visited by merchants from France, Switzerland, Austria, Germany and especially the Levant. Senigallia is the residence of the Mastai-Ferretti family; the house in which Pope Pius IX. was born is preserved, and contains a few memorials of him.

The ancient *Sena Gallica* was a city of Umbria. A colony was founded there by the Romans after their victory over the Senones, rather before 280 B.C. The place is also mentioned in connexion with Hasdrubal's defeat at the Metaurus (*q.v.*) in 207 B.C. It was destroyed by Pompey in 82 B.C., and is not often mentioned afterwards. No ancient remains and very few inscriptions exist. The name Gallica distinguishes it from Saena (Siena) in Etruria. Ravaged by Alaric, fortified by the exarch Longinus, and again laid waste by the Lombards in the 8th century and by the Saracens in the 9th, Senigallia was at length brought so low by the Guelph and Ghibelline wars, and especially by the severities of Guido de Montefeltro, that it was chosen by Dante as the typical instance of a ruined city. In the 15th century it was captured and recaptured again and again by the Malatesta and their opponents. Sigismondo Malatesta of Rimini erected strong fortifications round the town in 1450–1455. The lordship of Senigallia was bestowed by Pius II. on his nephew Antonio Piccolomini, but the people of the town in 1464 placed themselves anew under Paul II., and Giacomo Piccolomini in 1472 failed in his attempt to seize the place. Sixtus IV. assigned the lordship to the Della Rovere family, from whom it was transferred to Lorenzo de' Medici in 1516. After 1624 it formed part of the legation of Urbino.

SENIOR, NASSAU WILLIAM (1790–1864), English economist, was born at Compton, Berks, on the 26th of September 1790,

the eldest son of the Rev. J. R. Senior, vicar of Durnford, Wilts. He was educated at Eton and Magdalen College, Oxford; at the university he was a private pupil of Richard Whately, afterwards archbishop of Dublin, with whom he remained connected by ties of lifelong friendship. He took the degree of B.A. in 1811, was called to the bar in 1819, and in 1836, during the chancellorship of Lord Cottenham, was appointed a master in chancery. On the foundation of the professorship of political economy at Oxford in 1825 Senior was elected to fill the chair, which he occupied till 1830, and again from 1847 to 1852. In 1830 he was requested by Lord Melbourne to inquire into the state of combinations and strikes, to report on the state of the law and to suggest improvements in it. He was a member of the Poor Law Inquiry Commission of 1832, and of the Handloom Weavers Commission of 1837; the report of the latter, published in 1841, was drawn up by him, and he embodied in it the substance of the report he had prepared some years before on combinations and strikes. He was also one of the commissioners appointed in 1861 to inquire into popular education in England. In the later years of his life, during his visits to foreign countries, he studied with much care the political and social phenomena they exhibited. Several volumes of his journals have been published, which contain much interesting matter on these topics, though the author probably rated too highly the value of this sort of social study. Senior was for many years a frequent contributor to the *Edinburgh, Quarterly, London* and *North British Reviews*, dealing in their pages with literary as well as with economic and political subjects. He died at Kensington on the 4th of June 1864.

His writings on economic theory consisted of an article in the *Encyclopaedia Metropolitana*, afterwards separately published as *An Outline of the Science of Political Economy* (1836), and his lectures delivered at Oxford. Of the latter the following were printed: *An Introductory Lecture* (1827); *Two Lectures on Population*, with a correspondence between the author and Malthus (1831); *Three Lectures on the Transmission of the Precious Metals from Country to Country, and the Mercantile Theory of Wealth* (1828); *Three Lectures on the Cost of obtaining Money and on some Effects of Private and Government Paper Money* (1830); *Three Lectures on Wages and on the Effects of Absenteeism, Machinery and War, with a Preface on the Causes and Remedies of the Present Disturbances* (1830, 2nd ed. 1831); *A Lecture on the Production of Wealth* (1847); and *Four Introductory Lectures on Political Economy* (1852). Several of his lectures were translated into French by M. Arrivabène under the title of *Principes Fondamentaux d'Économie Politique* (1835). Senior also wrote on administrative and social questions -*A Letter to Lord Howick on a Legal Provision for the Irish Poor, Commutation of Tithes and a Provision for the Irish Roman Catholic Clergy* (1831, 3rd ed., 1832, with a preface containing suggestions as to the measures to be adopted in the "present emergency"); *Statement of the Provision for the Poor and of the Condition of the Labouring Classes in a considerable portion of America and Europe, being the Preface to the Foreign Communications in the Appendix to the Poor Law Report* (1835); *On National Property, and on the Prospects of the Present Administration and of their Successors* (anon.; 1835); *Letters on the Factory Act, as it affects the Cotton Manufacture* (1837); *Suggestions on Popular Education* (1861); *American Slavery* (in part a reprint from the *Edinburgh Review*, 1862); *An Address on Education delivered to the Social Science Association* (1863). His contributions to the reviews were collected in volumes entitled *Essays on Fiction* (1864); *Biographical Sketches* (1865, chiefly of noted lawyers); and *Historical and Philosophical Essays* (1865). In 1859 appeared his *Journal kept in Turkey and Greece in the Autumn of 1857 and the Beginning of 1858*; and the following were edited after his death by his daughter: *Journals, Conversations and Essays relating to Ireland* (1868); *Journals kept in France and Italy from 1848 to 1852, with a Sketch of the Revolution of 1848* (1871); *Conversations with Thiers, Guizot and other Distinguished Persons during the Second Empire* (1878); *Conversations with Distinguished Persons during the Second Empire, from 1860 to 1863* (1880); *Conversations and Journals in Egypt and Malta* (1882); also in 1872 *Correspondence and Conversations with Alexis de Tocqueville from 1834 to 1859*.

Senior's literary criticisms do not seem to have ever won the favour of the public; they are, indeed, somewhat formal and academic in spirit. The author, while he had both good sense and right feeling, appears to have wanted the deeper insight: the geniality and the catholic tastes which are necessary to make a critic of a high order, especially in the field he chose—that, namely, of imaginative literature. His tracts on practical politics, though the theses they supported were sometimes questionable, were ably written and are still worth reading, but cannot be said to be of much permanent interest. But his name continues to hold an honourable, though secondary, place in the history of political economy. Senior regards political economy as a purely deductive science, all the truths of which are inferences from four elementary propositions. It is, in his opinion, wrongly supposed by J. S. Mill and others to be a hypothetic science—founded, that is to say, on postulates not corresponding with social realities. The premises from which it sets out are, according to him, not assumptions but facts. It concerns itself, however, with wealth only, and can therefore give no practical counsel as to political action: it can only suggest considerations which the politician should keep in view as elements in the study of the questions with which he has to deal. The conception of economics as altogether deductive is certainly erroneous, and puts the science from the outset on a false path. But deduction has a real, though limited, sphere within it. Hence, though the chief difficulties of the subject are not of a logical kind, yet accurate nomenclature, strict definition and rigorous reasoning are of great importance. To these Senior gave special attention, and, notwithstanding occasional pedantries, with very useful results. In several instances he improved the forms in which accepted doctrines were habitually stated. He also did excellent service by pointing out the arbitrary novelties and frequent inconsistencies of terminology which deface Ricardo's principal work—as, for example, his use of "value" in the sense of "cost of production," and of "high" and "low" wages in the sense of a certain proportion of the product as distinguished from an absolute amount, and his peculiar employment of the epithets "fixed" and "circulating" as applied to capital. He shows, too, that in numerous instances the premises assumed by Ricardo are false. Thus he cites the assertions that rent depends on the difference of fertility of the different portions of land in cultivation; that the labourer always receives precisely the necessaries, or what custom leads him to consider the necessaries, of life; that, as wealth and population advance, agricultural labour becomes less and less proportionately productive; and that therefore the share of the produce taken by the landlord and the labourer must constantly increase, whilst that taken by the capitalist must constantly diminish; and he denies the truth of all these propositions. Besides adopting some terms, such as that of "natural agents," from Say, Senior introduced the word "abstinence"—which, though obviously not free from objection, is for some purposes useful to express the conduct of the capitalist which is remunerated by interest; but in defining "cost of production" as the sum of labour and abstinence necessary to production he does not seem to see that an amount of labour and an amount of abstinence are disparate, and do not admit of reduction to a common quantitative standard. He added some important considerations to what had been said by Smith on the division of labour. He distinguishes usefully between the rate of wages and the price of labour. But in seeking to determine the law of wages he falls into the error of assuming a determinate wage-fund, and states as an economic truth what is only an identical proposition in arithmetic. Whilst entertaining such an exaggerated estimate of the services of Malthus that he extravagantly pronounces him "as a benefactor of mankind on a level with Adam Smith," he yet shows that he modified his opinions on population considerably in the course of his career, regards his statements of the doctrine with which his name is associated as vague and ambiguous, and asserts that, "in the absence of disturbing causes, subsistence may be expected to increase in a greater ratio than population." It is urged by H. X. C. Périn, and must, we think, be admitted, that by his isolation of economics from morals, and his assumption of the desire of wealth as the sole motive-force in the economic domain, Senior, in common with most of the other followers of Smith, tended to set up egoism as the legitimate ruler and guide of practical life. It is no sufficient answer to this charge that he makes formal reserve in favour of higher ends. From the scientific side Cliffe Leslie has abundantly proved the unsubstantial nature of the abstraction implied in the phrase "desire of wealth," and the inadequacy of such a principle for the explanation of economic phenomena. (J. K. I.)

SENLIS, a town of northern France, in the department of Oise, on the right side of the Nonette, a left-hand affluent of the Oise, 34 m. N.N.E. of Paris by the Northern railway on the branch line (Chantilly-Crépy) connecting the Paris-Creil and Paris-Soissons lines. Pop. (1906) 6074. Its antiquity, its historical monuments and its situation in a beautiful valley, in the midst of the three great forests of Hallatte, Chantilly and Ermenonville, render it interesting. Its Gallo-Roman walls, 23 ft. high and 13 ft. thick, are, with those of St Lizier (Ariège) and Bourges, the most perfect in France. They enclose an oval area 1024 ft. long from E. to W. and 794 ft. wide from N. to S. At each of the angles formed by the broken lines of which the circuit of 2756 ft. is composed stands or stood a tower; numbering originally twenty-eight, and now only sixteen, they are semicircular in plan, and up to the height of the wall are unpierced. The Roman city had only two gates; the present number is five. The site of the praetorium was afterwards occupied by a castle occasionally inhabited by the kings of

France from Clovis to Henry IV., and still represented by ruins dating from the 11th, 13th and 16th centuries. In the neighbourhood of Senlis the foundations of a Roman amphitheatre have also been discovered. The old cathedral of Notre Dame (12th, 13th and 16th centuries) was begun in 1155 on a vast scale; but owing to the limited resources of the diocese progress was slow and the transept was finished only under Francis I. The total length is 312 ft. (outside measurement), but the nave (92 ft. high) is shorter than the choir. At the west front there are three doorways and two bell towers. The right-hand tower (256 ft. high) is very striking: it consists, above the belfry stage, of a very slender octagonal drum with open-work turrets and a spire with eight dormer windows. The left-hand tower, altered in the 16th century, is crowned by a balustrade and a sharp roof. In the side portals, especially in the southern, the flamboyant Gothic is displayed in all its delicacy. Externally the choir is extremely simple. In the interior the sacristy pillars with capitals of the 10th century are noteworthy. The episcopal palace, now an archaeological museum, dates from the 13th century; the old collegiate church of St Frambourg was built in the 12th century in the style which became characteristic of the "saintes chapelles" of the 13th and 14th centuries; St Pierre (chiefly of the 15th and 16th centuries) serves as a market. The ecclesiastical college of St Vincent, occupying the old abbey of this name, has an interesting church probably of the 12th century. Its date has, however, been greatly disputed by archaeologists, who sometimes wrongly refer it to Queen Anne of Russia, foundress in the 11th century of the abbey. The town hall (15th century) and several private houses are also of architectural interest.

Senlis has tribunals of first instance and of commerce and a sub-prefecture. The manufacture of bricks and tiles, cardboard, measures and other wares are among the industries. The town is an agricultural market.

Senlis can be traced back to the Gallo-Roman township of the Silvanectes, which afterwards became Augustomagus. Christianity was introduced by St Rieul probably about the close of the 3rd century. During the first two dynasties of France Senlis was a royal residence and generally formed part of the royal domain; it obtained a communal charter in 1173. In the middle ages local manufactures, especially that of cloth, were active. The burgesses took part in the Jacquerie of the 14th century, then sided with the Burgundians and the English; whom, however, they afterwards expelled. The Leaguers were there beaten in 1589 by Henry I., duke of Longueville, and François de La Noue. The bishopric was suppressed at the Revolution, and this suppression was confirmed by the Concordat. Treaties between Louis XI. and Francis II., duke of Brittany (1475), and between Charles VIII. and Maximilian of Austria (1493) were signed at Senlis.

SENNA (Arab. *sanā*), a popular purgative, consisting of the leaves of two species of *Cassia* (natural order Leguminosae), viz. *C. acutifolia* and *C. angustifolia*. These are small shrubs about 2 ft. high, with numerous lanceolate or narrowly lanceolate leaflets arranged pinnately on a main stalk with no terminal leaflet; the yellow flowers are borne in long-stalked racemes in the leaf-axils, and are succeeded by broad flattish pods about 2 in. long. *C. acutifolia* is a native of many districts of Nubia, *e.g.* Dongola, Berber, Kordofan and Senaar, but is grown also in Timbuctoo and Sokoto. The leaflets are collected twice a year by the natives, the principal crop being gathered in September after the rainy season and a smaller quantity in April. The leaves are dried in the simplest manner by cutting down the shrubs and exposing them on the rocks to the burning sun until quite dry. The leaflets then readily fall off and are packed in large bags made of palm leaves, and holding about a quintal each. These packages are conveyed by camels to Assouan and Darao and thence to Cairo and Alexandria, or by ship by way of Massowah and Suakim. The leaflets form the Alexandrian senna of commerce. Formerly this variety of senna was much adulterated with the leaves of *Solenostemma Argel*, which, however, are readily distinguishable by their minutely wrinkled surface. Of late years Alexandrian senna has been shipped of much better quality. Occasionally a few leaves of a similar species with broader obovate leaves, *C. obovata*, may be found mixed with it. *C. angustifolia* affords the Bombay, East Indian, Arabian or Mecca senna of commerce. This plant grows wild in the neighbourhood of Yemen and Hadramaut in the south of Arabia, in Somaliland, and in Sind and the Punjab in India. The leaves are chiefly shipped from Mocha, Aden, Jeddah and other Red Sea ports to Bombay and thence to Europe, the average imports into Bombay amounting to about 250 tons annually, of which one-half is re-exported. Bombay senna is very inferior in appearance to the Alexandrian, as it frequently contains many brown and decayed leaflets and is mixed with leaf-stalks, &c. *C. angustifolia* is also cultivated in the extreme south of India, and there affords larger leaves, which are known in commerce as Tinnevelly senna. This variety is carefully collected, and consists almost exclusively of leaves of a fine green colour, without any admixture of stalks. It is exported from Tuticorin. American senna is *Cassia marilandica*.

The British Pharmacopoeia recognizes both *Senna Alexandrina* and *Senna Indica*. The composition of the leaves is the same in either case. The chief ingredient is cathartic acid, a sulphur containing glucoside of complex formula. It occurs combined with calcium and magnesium to form soluble salts. That this is the active principle of senna is shown by the fact that the cathartate of ammonia, when given separately, acts in precisely the same manner as senna itself. Cathartic acid can easily be decomposed into glucose and cathartogenic acid. The leaves contain at least two other glucosides, sennapicrin and sennacrol, but as these are insoluble in water, they are not contained in most of the preparations of senna. Senna also contains a little chrysophanic acid.

Of the numerous pharmacopoeial preparations three must be mentioned. The *confectio sennae*, an admirable laxative for children, contains senna, coriander fruit, figs, tamarind, cassia, pulp, prunes, extract of liquorice, sugar and water. When coated with chocolate it is known as Tamar Indien. The *pulvis glycerhizae compositus* contains two parts of senna in twelve, the other ingredients being unimportant. A third preparation, rarely employed nowadays, is the nauseous "black draught," once in high favour. It is known as the *mistura sennae composita*, and contains sulphate of magnesium, liquorice, cardamoms, aromatic spirit of ammonia and infusion of senna. All the preparations are made indifferently from either kind of leaflet.

When taken internally, senna stimulates the muscular coat of the bowel in its entire length, the colon being more particularly affected. As some congestion of the rectum is thereby produced, senna is contra-indicated whenever haemorrhoids are present. The secretions of the bowel are not markedly stimulated, and the flow of bile is only slightly accelerated. The drug has the advantage, for most cases, of not producing subsequent constipation. The chief purgative ingredients are the cathartates already described. Partial absorption occurs, so that the colour of the urine may be darkened, and as the drug is also excreted by the active mamma it may cause purgation in a baby to whose mother it has been given.

Senna should not be used alone, as its taste and the pain induced by its muscular stimulation are both objectionable. There are many ways of using it. A few of the leaflets may be put into a dish of prunes, when a convenient aperient for children is desired. It is especially valuable in cases of atony of the colon, and the compound liquorice powder is safe and useful in the treatment of the constipation of pregnancy.

SENNACHERIB (Ass. *Sin-akhi-erba*, "the Moon-god has increased the brethren"), the son and successor of Sargon, mounted the throne on the 12th of Ab 705 B.C. His first campaign was against Babylonia, where Merodach-baladan had reappeared. The Chaldaean usurper was compelled to fly, and Bel-ibni was appointed king of Babylon in his place. Then Sennacherib marched against the Kassi in the northern mountains of Elam and ravaged the kingdom of Ellip where Ecbatana afterwards stood. In 701 B.C. came a great campaign in the west, which had revolted from Assyrian rule. Sidon and other Phoenician cities were captured, but Tyre held out, while its king Lulia (Elulaeus) fled to Cyprus. Ashdod, Ammon, Moab and Edom now submitted, but Hezekiah of Judah with the dependent Philistine princes of Ashkelon and Ekron defied the Assyrian

army, trusting to the fortifications of Jerusalem and Egyptian help. Hezekiah, however, was forced to restore the anti-Jewish Padi to the government of Ekron, from which he had been removed by the Jewish party, and, after the defeat of his Egyptian allies at Eltekeh, to see his country wasted with fire and sword, forty-six fortresses being taken and 200,150 persons carried into captivity. He then endeavoured to buy off the invaders by numerous presents—30 talents of gold, 800 talents of silver, precious stones, couches and thrones inlaid with ivory, girls and eunuchs—but all in vain. Jerusalem was saved eventually by a plague, which decimated the Assyrian army and obliged Sennacherib to return to Nineveh. The following year he was again in Babylonia, where he made his son Assur-nadin-sum king in place of Bel-ibni and drove Merodach-baladan out of the marshes in which he had taken refuge. A few years later he had a fleet of ships built near Birejik on the Euphrates by his Phoenician captives; these were manned by Ionians and transported from Opis overland to the Euphrates and so to the Persian Gulf. Then they sailed to the coast of Elam, and there destroyed the colony of Merodach-baladan's followers at Nagitu. In return for this unprovoked invasion of Elamite territory the Elamites descended upon Babylonia, carried away Assur-nadin-sum (694 B.C.) and made Nergal-yusezib king. Three years later a great battle was fought at Khalulē on the Tigris between the Assyrians on the one side and the Elamites and Babylonians on the other. Both sides claimed the victory, but the advantage remained with Sennacherib, and in 689 B.C. he captured Babylon and razed it to the ground, a deed which excited the horror of all western Asia. Some time previously—the date is not known—he had overrun the mountain districts of Cilicia. On the 20th of Tebet 681 B.C. he was murdered by his two sons, who fled to Armenia after holding Nineveh for forty-two days. Sennacherib was vainglorious and a bad administrator; he built the palace of Kuyunjik at Nineveh, 1500 ft. long by 700 ft. broad, as well as the great wall of the city, 8 m. in circumference.

See George Smith, *History of Sennacherib* (1878). (A. H. S.)

SENNAR, a country of north-east Africa, part of the Anglo-Egyptian Sudan. Its boundaries have varied considerably, but Sennar proper is the triangular-shaped territory between the White and Blue Niles north of 10° N. This region is called by the Arabs "The Island of Sennar" and by the negro inhabitants "Hui." The northern part, where the two Niles approach nearer one another, is also known as El Gezira, *i.e.* "the Island." Whilst Sennar has never been held to extend westward of the White Nile, the term has often been used to embrace "the Island of Meroe," *i.e.* the country between the Blue Nile and the Atbara, and the land between the Blue Nile and its most eastern tributary the Rahad, this latter district being known as the "Isle of Isles." South-east Sennar stretches to the Abyssinian hills. By the Sudan administration this region has been divided into *mudirias* (provinces), one, including the central portion, retaining the name of Sennar. The present article deals with the country as a whole.

In general Sennar is a vast plain, lying for the most part much higher than the river-levels and about 2000 ft. above the sea, its western part, towards the White Nile, being largely wilderness. From the plain rise isolated granitic hills, attaining heights of 1000 to 2000 ft. above the general level. Jebel Segadi is red granite of the finest quality. The plain, sandy in its northern part, is in the south a deep bed of argillaceous marl, scattered over with great granite boulders and fragments of greenstone.

Sennar lies in the region of light rain, increasing in the S.E. districts to as much as 20 in. in the year. The rainy season is from July to September. The climate is generally unhealthy during that period and the months following. The miasmatic exhalations caused by the sun playing on stagnant waters after the floods give rise to the "Sennar fever," which drives even the natives from the plains to the southern uplands. The temperature, which rises at times to over 120° Fahr., is also very changeable, often sinking from 100° during the day to under 60° at night.

The soil, mainly alluvial, is naturally very fertile, and wherever cultivated yields abundant crops, durra being the principal grain grown. Many kinds of vegetables, and cotton, wheat and barley are also grown. The forest vegetation, largely confined to the "Isle of Isles" and the southern uplands, includes the *Adansonia* (baobab), which in the Fazogli district attains gigantic proportions, the tamarind, of which bread is made, the deleb palm, several valuable gum trees (whence the term Sennari often applied in Egypt to gum-arabic), some dyewoods, ebony, ironwood and many varieties of acacia. In these forests are found the two-horned rhinoceros, the elephant, lion, panther, numerous apes and antelopes, while the crocodile and hippopotamus frequent the rivers. The chief domestic animals are the camel, horse, ass, ox, buffalo (used both as a beast of burden and for riding), sheep with a short silky fleece, the goat and the pig, which last here reaches its southernmost limit.

The country is occupied by a partly settled, partly nomad population of an extremely mixed negroid character. There is evidence of the existence of a once dominant fair race, of which the still surviving Sienetjo, a people of a yellow or fair complexion, are regarded as descendants. The great plain of Sennar is mainly occupied by Hassania Arabs in the north, by Abu-Rof (Rufaya) Hamites of Beja stock in the east as far as Fazogli, and elsewhere by the negroid Funj (*q.v.*) and the group of tribes collectively known as Shangalla (the Bertat, Legas, Sienetjo, Gumus, Kadalos, &c.; see SHANGALLA). The chief towns are on the banks of the Blue Nile. They are: Wad Medani (*q.v.*), 148 m. above Khartum, one of the most thriving towns in the eastern Sudan; Sennar, 241 m. above Khartum, the capital of the Funj empire and chief town of the *mudiria* of Sennar; of the ancient city little remains except a mosque with a high minaret; and Roseires, 420 m. from Khartum and the limit of navigation up stream from that city. Near the Abyssinian frontier are Fazogli (left bank) and Famaka (right bank) on a navigable stretch of the Blue Nile above the rapids at Roseires and close to the Tumat confluence and the gold district of Beni Shangul. On the river Dinder is the town of Singa. A railway, built in 1909–1910, connects Khartum, Wad Medani and Sennar with Kordofan, the White Nile being bridged near Goz Abu Guma.

History.—Sennar, lying between Nubia and Abyssinia, was in ancient times under Egyptian or Ethiopian influence and its inhabitants appear to have embraced Christianity at an early period. The capital of Aloa, which appears to have been at one time a powerful Christian state, was at Soba on the Blue Nile. In the 7th or 8th centuries A.D. there was a considerable emigration of Arabs into the country. Christianity very gradually died out (see DONGALA, mudiria). The Funj who had meantime settled in Sennar became the dominant race by the 15th century. They adopted the Mahommedan religion and founded an empire which in the 17th and 18th centuries ruled over a large part of the eastern Sudan. This empire was finally overthrown by the Egyptians in 1821. Since that period Sennar has had no history distinct from that of the rest of the Anglo-Egyptian Sudan (see SUDAN, § ANGLO-EGYPTIAN, *History*). The chief ambition of the people under Anglo-Egyptian rule was to own cattle rather than to improve their houses, food or clothing (vide *Egypt*, No. 1, 1910, p. 79).

The country was visited by few Europeans before the time of the Egyptian conquest. In 1699 a French surgeon, J. C. Poncet, passed through Sennar on his way from Egypt to Abyssinia, and an account of his experiences has been published (*Lettres . . . des missions étrangères*, Paris, ed. of 1870, tome iii.). He was followed by Janus de Noir, le sieur du Roule, who was sent by Louis XIV. to open diplomatic relations with Abyssinia, but was murdered (1703) in Sennar. The most noteworthy, however, of the earlier travellers was James Bruce, the explorer of the Blue Nile. He spent some time in Sennar in 1772, and in his *Travels* has left an interesting account of the kingdom in its decadence. Various Egyptian expeditions added considerably to the knowledge of the district, which between 1854 and 1864 was explored by the Belgian scientist E. Pruyssenaere. Later explorers included the Viennese Ernst Marno (1870) and the Dutchman J. M. Schuver, who in 1881–1882 visited the sources of the Tumat. To this list should be added the names of those who, like Sir Samuel Baker, explored the Blue Nile. Since the establishment of the Anglo-Egyptian condominium (1899) the country has been thoroughly surveyed.

Lists of the kings of Sennar, and of the tributary rulers of Halfaya, Shendi, and Fazokl are given in vol. i. pp. 437-438 of A. M. N. J. Stokvis' *Manuel d'histoire* (Leiden, 1888).

SENONES, in ancient geography, a Celtic people of Gallia Celtica, who in Caesar's time inhabited the district which now includes the departments of Seine-et-Marne, Loiret and Yonne. From 53–51 B.C. they were engaged in hostilities with Caesar, brought about by their expulsion of Cavarinus, whom he had appointed their king. In the last-named year a Senonian named Drappes threatened the Provincia, but was captured and starved

himself to death. From this time the Gallic Senones disappear from history. In later times they were included in Gallia Lugdunensis. Their chief towns were Agedincum (later Senones, whence Sens), Metiosedum (Melun; according to A. Holder, Meudon), and Vellaunodunum (site uncertain).

See Caesar, *Bell. Gall.* v. 54, vii. 75, viii. 30, 44; T. R. Holmes, *Caesar's Conquest of Gaul* (1899), pp. 482-483, 755-766, 819; A. Holder, *Altceltischer Sprachschatz*, ii. (1904).

More important historically was a branch of the above (called Σένωνες, Senŏnes, by Polybius), who about 400 B.C. made their way over the Alps and, having driven out the Umbrians, settled on the east coast of Italy from Ariminum to Ancona, in the so-called *ager Gallicus*, and founded the town of Sena Gallica (Sīnīgaglia), which became their capital. In 391 they invaded Etruria and besieged Clusium. The Clusines appealed to Rome, whose intervention, accompanied by a violation of the law of nations, led to war, the defeat of the Romans at the Allia (18th of July 390) and the capture of Rome. For more than 100 years the Senones were engaged in hostilities with the Romans, until they were finally subdued (283) by P. Cornelius Dolabella and driven out of their territory. Nothing more is heard of them in Italy. It is probable that they formed part of the bands of Gauls who spread themselves over the countries by the Danube, Macedonia and Asia Minor. A Roman colony was established at Sena, called Sena Gallica to distinguish it from Sena Julia (Siena) in Etruria.

For ancient authorities see A. Holder as above; on the subjugation of the Senones by the Romans, Mommsen, *Hist. of Rome* (Eng. trans.), bk. ii. ch. vii.

SENS, a town of north-central France, capital of an arrondissement in the department of Yonne, 71 m. S.E. of Paris on the Paris-Lyon-Méditerranée railway. Pop. (1906) 13,701. It is situated on the right bank of, and on an island in, the Yonne just below its confluence with the Vanne. The streets of the town are narrow, but it is surrounded by fine promenades. The cathedral of St Étienne, one of the earliest Gothic buildings in France, is additionally interesting because the architecture of its choir influenced through the architect, William of Sens, that of the choir of Canterbury cathedral. St Étienne was begun in 1140 and only completed early in the 16th century. It belongs mainly to the 12th century, and it is characterized by solidity rather than by beauty of proportion or richness of ornamentation. The west front is pierced by three portals; that in the middle has good sculptures, representing the parable of the virgins and the story of St Stephen. The right-hand portal contains twenty-two remarkable statuettes of the prophets, which have suffered considerable injuries. Above this portal rises the stone tower, decorated with armorial bearings and with statues representing the principal benefactors of the church. The bells in the campanile by which the tower is surmounted enjoyed immense reputation in the middle ages; the two which still remain, La Savinienne and La Potentienne, weigh respectively 15 tons 7 cwt. and 13 tons 13 cwt. The left portal is adorned with two bas-reliefs, Liberality and Avarice, as well as with the story of John the Baptist. The portal on the north side of the cathedral is one of the finest examples of French 16th-century sculpture, that on the south side is surmounted by magnificent stained-glass windows. Other windows of the 12th to the 16th century are preserved, some of them representing the legend of St Thomas of Canterbury. Among the interior adornments are the tomb of the dauphin (son of Louis XV.) and his consort, Marie Josèphe of Saxony, one of the works of William Coustou the younger, and bas-reliefs representing scenes from the life of Cardinal Duprat, chancellor of France and archbishop of Sens from 1525 to 1535. The mausoleum from which they came was destroyed at the Revolution. The treasury, one of the richest in antiquities in France, contains a fragment of the true cross presented by Charlemagne, and the vestments of St Thomas of Canterbury. It was in the cathedral of Sens that St Louis, in 1234, married Marguerite of Provence, and five years later deposited the crown of thorns. To the south of the cathedral are the official buildings, dating from the 13th century, but restored by Viollet-le-Duc. The old judgment-hall and the dungeons had remained intact; in the former is a collection of fragments of sculpture from the cathedral; on the first story is the synod hall, vaulted with stone and lighted by beautiful grisaille windows. A Renaissance structure connects the buildings with the archiepiscopal palace, which also dates from that period. The oldest of the other churches of Sens is St Savinian, the foundation of which dates from the 3rd century; the crypt and other portions of the church are of Romanesque architecture. The museum of Sens contains, among other antiquities, some precious MSS., notably a famous missal with ivory covers, and a collection of sculptured stones mainly derived from the old Roman fortifications, which were themselves constructed from the ruins of public monuments at the beginning of the barbarian invasions. The town has statues of Baron J. J. Thénard, the famous chemist, and of the sculptor Jean Cousin. Sens is the seat of a sub-prefect, and includes among its public institutions a tribunal of first instance, a tribunal of commerce, a chamber of commerce, a council of trade arbitrators and a lycée for boys. Among the industries are flour-milling, tanning and the manufacture of agricultural implements, boots and shoes, chemicals and cutlery; there is trade in wine, grain, wood, coal and wool, in which the port on the Yonne has some share.

Sens, when the capital of the Senones, one of the most powerful peoples of Gaul, bore the name of *Agedincum*. It was not finally subdued by the Romans till after the defeat of Vercingetorix. On the division of Gaul into seventeen provinces under the emperor Valens, *Agedincum* became the metropolis of the 4th Lugdunensis. Theatres, circuses, amphitheatres, triumphal arches and aqueducts were all built in the town by the Romans. It was the meeting-point of six great highways. The inhabitants, converted to Christianity by the martyrs Savinian and Potentian, held out against the Alamanni and the Franks in 356, against the Saracens in 731 or 738, and finally against the Normans in 886—the last having besieged the town for six months. At the beginning of the feudal period Sens was governed by counts, who had become hereditary towards the middle of the 10th century; and the contests of these counts with the archbishops or with their feudal superiors often led to much bloodshed and disaster, until, in 1055, the countship was united to the royal domain. Several councils were held at Sens, notably that of 1140, at which St Bernard and Abelard met. The burgesses in the middle of the 12th century formed themselves into a commune which carried on war against the clergy. This was suppressed by Louis VIII., and restored by Philip Augustus. In the ardour of its Catholicism Sens massacred the Protestants in 1562, and it was one of the first towns to join the League. Henry IV. did not effect his entrance till 1594, and he then deprived the town of its privileges. In 1622 Paris, hitherto suffragan to Sens, was made an archbishopric, and the bishoprics of Chartres, Orleans and Meaux were transferred to the new jurisdiction. In 1791 the archbishopric was reduced to a bishopric of the department of Yonne. Suppressed in 1801, the see was restored in 1817 with the rank of archbishopric. The town was occupied by the Allies in 1814 and by the Germans in 1870–1871.

SENSATIONALISM, in psychology, the theory that all knowledge comes from sensation (see PSYCHOLOGY). Thus Aristippus the Cyrenaic held that there could be no knowledge save that which the senses give, but the Stoics, while finding the origin of knowledge in the senses, do not restrict it to this. Sensationalism in modern times is chiefly associated with Hobbes, Locke, Hume and the French philosophers of the Enlightenment, Voltaire, Condillac and others. In its extreme sense it has rarely been held, and is practically abandoned by modern philosophers on the plain ground that a sensation as such lasts only as long as the stimulus is applied. Any connexion of sensation is something over and above sensation, and without this connexion there can be no knowledge (see EMPIRICISM, PHENOMENON, &c.).

The term has also come into colloquial use for the practice of appealing—*e.g.* in art, literature and especially in journalism—solely to the emotions, disregarding proportion and fact.

SENTENCE (Lat. *sententia*, a way of thinking, opinion, judgment, vote, *sentire*, to feel, think), a word of which the principal

meanings now are: (*a*) in grammar, a thought expressed in words in complete grammatical form and composed of subject and predicate, and (*b*) in law, a judicial decision. In law, the term signifies either (1) a judgment of a court of criminal jurisdiction imposing a punishment such as a fine or imprisonment, or (2) a decree of certain competent courts, as ecclesiastical and admiralty courts. In sense (1) a sentence may be either *definite* or *final*, *i.e.* one giving finality to the case, or *interlocutory*, determining some point in the progress of the case (see, however, JUDGMENT). The sentences inflicted by the courts of various countries vary according to the gravity of the offence (see CRIMINAL LAW; also CAPITAL PUNISHMENT; and, for the "indeterminate" sentence, RECIDIVISM). Concurrent sentences are those which run from the same date in respect of convictions on various indictments. A cumulative sentence is the sum total of consecutive sentences passed in respect of each distinct offence of which an accused person has been found guilty on several counts of an indictment. A sentence, in the case of trials before a court of assize, commences to run from the first day of the sitting of the court, but in that of courts of quarter sessions from the time the sentence is pronounced.

SENTINEL, or SENTRY, a guard or watch, a soldier posted at a particular spot to challenge all comers, passing those who give a countersign, and refusing those who do not, and giving alarm in case of attack. The etymology has been the subject of much controversy. The original word seems to be Ital. *sentinella*, adapted as Fr. *sentinelle* (the modern French military term is *factionnaire*, and the Ger. *Fachmann*). For the Italian word the source has been suggested in *sentire*, to perceive, but there are philological objections to this, and more plausibility attaches to a connexion with *sentina*, the bilge-water in a ship, figuratively rabble, camp-followers. If an Italian origin, as agreed on by most authorities, be set aside, the French word suggests a more appropriate formation as the diminutive of *sentier*, path, Lat. *semita*, meaning properly the sentry's beat. The O. Fr. *senteret* (a form of *sentier*) would account for the English form "sentry."

SENTINUM, an ancient town of Umbria, Italy, lying to the S. of the modern town of Sassoferrato, in the low ground. The foundations of the city walls are preserved, and a road and remains of houses have been discovered, including several mosaic pavements (T. Buccolini in *Notizie degli scavi*, 1890, 346) and inscriptions of the latter half of the 3rd century A.D., including three important *tabulae patronatus*. In the neighbourhood the battle took place in which the Romans defeated the combined forces of the Samnites and Gauls in 295 B.C. It was taken and destroyed in 41 B.C. by the troops of Octavian, but continued to exist under the Empire. It was, however, only a *municipium*, never (as some wrongly suppose) a *colonia*. Sassoferrato gave its name to Giambattista Salvi, surnamed Sassoferrato (1605–1685), a painter celebrated for his Madonnas.

SENUSSI [SANUSI] and **SENUSSITES,** the names respectively of a Moslem family (and especially its chief member) and of the fraternity or sect recognizing the authority of the Senussi. Considerable diversity of opinion has prevailed among writers and travellers claiming knowledge of the *Senussia*; it is possible, however, to distinguish the main facts in the lives of the Senussi sheiks and to indicate the range of their direct political influence. The extent of their spiritual influence, the ramifications of the fraternity and the aims of its chiefs cannot be gauged so accurately.

Seyyid or Sidi (*i.e.* Lord) Mahommed ben Ali ben Es Senussi el Khettabi el Hassani el Idrissi el Mehajiri, the founder of the order, commonly called the Sheik es Senussi, was born near Mostaganem, Algeria, and was called es Senussi after a much venerated saint whose tomb is near Tlemçen. The date of his birth is given variously as 1791, 1792, 1796 and 1803. He was a member of the Walad Sidi Abdalla tribe of Arabs and his descent is traced from Fatima, the daughter of Mahomet. As a young man he spent several years at Fez, where he studied theology. When about thirty years old he left Morocco and travelled in the Saharan regions of Algeria preaching a reform of the faith. From Algeria he went to Tunisia and Tripoli, gaining many adherents, and thence to Cairo, where he was opposed by the Ulema of El Azhar, who considered him unorthodox. Leaving Egypt Senussi went to Mecca, where he joined Mahommed b. Idris el Fassi, the head of the Khadirites, a fraternity of Moroccan origin. On the death of el Fassi Senussi became head of one of the two branches into which the Khadirites divided, and in 1835 he founded his first monastery at Abu Kobeis near Mecca. While in Arabia Senussi visited the Wahhabites, and his connexion with that body caused him to be looked upon with suspicion by the Ulema of Mecca. It was at Mecca, however, that Senussi gained his most powerful supporter, Mahommed Sherif, a prince of Wadai, who became in 1838 sultan of his native state, the most powerful Mahommedan kingdom in the Central Sudan. Finding the opposition to him at Mecca too powerful Senussi quitted that city in 1843 and settled in the Cyrenaica, where in the mountains near Derna he built the Zawia Baida or White Monastery. There he was in close touch with all the Maghribin, gaining many followers among the Tripolitans and Moroccans. He also maintained a close correspondence with the sultan of Wadai, who greatly favoured the spread of the *Senussia* in his state. The sultan of Turkey viewed with some disfavour the growth of Senussi's influence as likely to become detrimental to his own position as the Khalifa of Islam. Probably with the desire to be independent of pressure from the Turks, Senussi removed in 1855 to Jarabub (Jaghbub), a small oasis some 30 m. N.W. of Siwa. Here he died in 1859 or 1860, leaving two sons, one Mahommed Sherif (named after the sultan of Wadai), born in 1844, and the other, el Mahdi, born in 1845. To the second son was left the succession. It is related that as the younger son showed a spirit in all things superior to that of his brother the father decided to put them to the test. Before the whole zawia at Jarabub he bade both sons climb a tall palm tree and then adjured them by Allah and His Prophet to leap to the ground. The younger lad leapt at once and reached the ground unharmed; the elder boy refused to spring. To El Mahdi, "who feared not to commit himself to the will of God," passed the birthright of Mahommed Sherif. Mahommed appears to have accepted the situation without complaint. He held the chief administrative position in the fraternity under his brother until his death in 1895.

Foundation of the order.

Senussi el Mahdi, only fourteen when his father died, was at first under the guidance of his father's friends Amran, Reefi and others. He enjoyed all his father's reputation for holiness and wisdom, attributes consistent with all that is known of his life. Mahommed Sherif, the sultan of Wadai, had died in 1858, but his successors the Sultan Ali (who reigned until 1874) and the Sultan Yusef (reigned from 1874 to 1898) were equally devoted to the *Senussia*. Under the Senussi el Mahdi the *zawias* of the order extended from Fez to Damascus, to Constantinople and to India. In the Hejaz members of the order were numerous. In most of these countries the Senussites occupied a position in no respect more powerful than that of numbers of other Moslem fraternities. In the eastern Sahara and in the central Sudan the position was different. From the western borders of Egypt south to Darfur, Wadai and Bornu, east to Bilma and Murzuk, and north to the coast lands of Tripoli, Senussi became the most powerful sheik, acquiring the authority of a territorial sovereign. The string of oases leading from Siwa to Wadai—Kufra, Borku, &c.—were occupied and cultivated by the Senussites, trade with Tripoli and Benghazi was encouraged, law and order were maintained among the savage Bedouin of the desert. But the eastern Sahara, though vast (covering approximately about 500,000 sq. m.), is among the most desolate and thinly populated parts of the world, and of more importance to the order was the dominating influence possessed by the sheik at the court of Wadai.

Senussi el Mahdi.

Although named El Mahdi by his father there is no evidence to show that the younger Senussi ever claimed to be *the* Mahdi, though so regarded by some of his followers. When, however, Mahommed Ahmed, the Dongalese, rose against the Egyptians in the eastern Sudan and proclaimed himself *the* Mahdi, Senussi was disquieted. He sent an emissary via Wadai to Mahommed

Ahmed, this delegate reaching the Mahdi's camp in 1883 soon after the sack of El Obeid.

"The moral and industrial training of the Senussi" [delegate], writes Sir Reginald Wingate, "revolted from the slaughter and rapine he saw around him. The sincere conviction of the regeneration of the world by a mahdi whose earnest piety should influence others to lead wholesome and temperate lives, the dignity of honest labour and self-restraint, these were the sentiments which filled the mind of the emissary from Wadai."

The sheik Senussi, there is reason to believe, shared the lofty views which Wingate attributes to his agent. He decided to have nothing to do with the Sudanese Mahdi, though Mahommed Ahmed wrote twice asking him to become one of his four great khalifs. In his second letter, the text of which has been preserved, the mahdi urged Senussi either to attack Egypt or to join him in the Sudan. To neither letter did Senussi reply, and he warned the people of Wadai, Bornu and neighbouring states against the new creed. In 1890 the Mahdists advancing from Darfur were stopped on the frontier of Wadai, the sultan Yusef being firm in his adherence to the Senussi teaching. As evidence of the influence of the sheik may be instanced the appeal made to him in 1888 by the sultan of Borku (or Borgo), a state to the north of Wadai, when invited by the chiefs of Darfur to rise against the khalifa Abdullah. Senussi advised Borku to abstain from Sudan affairs and only to fight against the Mahdists should they attack his kingdom. The Darfurian revolt of 1888–1889 against the khalifa was nevertheless carried out in the name of the Senussi.

The growing fame of the sheik Senussi el Mahdi drew upon him the unwelcome attention of the Turks. In many parts of Tripoli and in Benghazi the power of the sheik was greater than that of the Ottoman governors, and though Abdul Hamid II. looked favourably on an organization which might become actively anti-Christian, he did not desire that a new mahdi should arise to dispute his authority. In 1889 the sheik Senussi was visited at Jarabub by the pasha of Benghazi at the head of some troops. This event showed the sheik the possibility of danger and led him (in 1894) to leave Jarabub and fix his headquarters at Jof in the oases of Kufra, a place sufficiently remote to secure him from any chance of sudden attack. By this time a new danger to Senussia had arisen; the French were advancing from the Congo towards the western and southern borders of Wadai. In 1898 Senussi, in his character of peace-maker, wishing also to range together all the states menaced by the French advance, sought to reconcile Rabah Zobeir (*q.v.*) and the sultan of Bagirmi; neither of those chieftains belonged to the Senussi order and the sheik's appeal was unavailing. At the end of the previous year, at the request of Sultan Yusef, the sheik had sent an envoy to Wadai to be his permanent representative in that country. Yusef's successor Ibrahim, who ascended the throne of Wadai in 1898, showed signs of resenting the advice of the sheik, stirred perhaps by the overthrow of the khalifa Abdullah at Omdurman. Senussi retaliated, says Captain Julien in his history of Wadai, by prohibiting the people of Wadai from smoking tobacco or drinking merissa, the native beer, "which is to the Wadaiin what the skin is to the body." Sultan Ibrahim rejoined that his people would fight and die for merissa; rather than give it up they would renounce Senussiism. The sheik had the wisdom to give way, declaring that in response to his prayers Allah had deigned to make an exception in favour of the faithful Wadaiins. Ibrahim died in 1900 and his successors fell again under the influence of the sheik, who again changed his headquarters, leaving Kufra for Geru, in Dar Gorane, a western province of Wadai, where he was welcomed with veneration. He built and strongly fortified a *zawai* on the top of a rocky hill, difficult of access. His object in taking up this position was, presumably, to prevent the advance of the French. But, as Julien points out, Senussi was too late; Rabah had been slain by the French (April 1900), and Bagirmi was occupied by them. Nevertheless the sheik made an effort to prevent the French obtaining possession of Kanem, a country north-east of Lake Chad and on its northern and eastern frontiers bordering Saharan territory, which the Senussites considered their particular preserve. A *zawai* was built at Bir Allali, in Kanem, that site being chosen as it was an entrepôt for the trade of Tripoli with all the Chad countries. Bir Allali was strongly garrisoned by the Senussites and war with the French followed.[1] After a severe engagement Bir Allali was captured by a French column under Commandant Tétard in January 1902. The sheik Senussi, much affected by the loss of Kanem, died shortly afterwards (May 30, 1902). He was succeeded by his nephew Ahmed-el-Sherif, who in view of the presence of the French on the borders of Dar Gorane removed to Kufra.

Conflict with the French.

The new head of the Senussites maintained the friendly relations of his predecessors with Wadai, and, following the example of his uncle, made advances to Ali Dinar, the sultan of Darfur, which were not reciprocated. To keep in touch with Darfur a *zawai* had been built on the caravan route from Kufra to that country. The adherents of the Senussi el Mahdi in the deserts bordering Egypt maintained for years that he was not dead, and in March 1906 a public declaration was made at Siwa that "Sidi Mahommed-el-Mahdi had returned from his secret journey to Kufra." Commenting on this announcement Sir R. Wingate wrote: "It is well known that the body of the late sheik lies in a tent at Zawia-el-Taj in the identical shrine which was made for it at Geru when he died" (Egypt No. 1 (1907), p. 120).

It will be seen that the Senussites occupy desert fastnesses which could only be attacked by Europeans after overcoming great difficulties. By Henri Duveyrier and other writers of the last half of the 19th century they were regarded as likely to proclaim a *jihad* or holy war against the Christians of North Africa. This view was founded upon the supposed tenets of the order and upon geographical and political considerations. The record of the first and second Senussi sheiks shows them, however, to have acted chiefly on the defensive. A study of all available data up to 1906 led M. L. G. Binger, one of the greatest authorities, to the conclusion that the politics of the sect were subordinated to the material interests of their chief, and that the Senussi sheik was as unable as were other noted Moslem leaders (such as Abd el Kader in Algeria; Samory in the western Sudan and the Dongolese Mahdi in the Egyptian Sudan) to overcome the rivalries and divergence of interests of their own co-religionists. This view received confirmation in the events of 1906–1910 when the French came in conflict with the sultanate of Wadai. Although there was severe fighting the French found less difficulty than had been expected in seizing the capital of Wadai, nor was there any general movement of the Senussites against them. The French also sent flying columns into Borku and Enndi. The comparative ease with which these operations were carried out seemed to demonstrate the weakness of the Senussites (see WADAI). Nevertheless, like any other Moslem fraternity, and perhaps more readily, the Senussites might be speedily transformed into a powerful fighting organization. Through the seaports of Tripoli and Benghazi, with the connivance (or in defiance) of the Turks, the importation of arms and ammunition into the eastern Sahara is a matter of little or no difficulty, and the Bedouin of that region could furnish a numerous and well-armed fighting force. A Senussi sheik would also recruit many followers in the central Sudan. At the same time the Senussi organization is not so widespread in the Sudan and the western Sahara as would appear from the exaggerated reports once current. The Senussi sheiks, with the doubtful exception of Darfur, are without followers in the Anglo-Egyptian Sudan. Bagirmi, Kanem and other states once dependent on Wadai did not embrace Senussiism. In the Hausa States and in the greater part of the western Sudan as far as Timbuktu the Moslems acknowledge the spiritual headship of the Emir of Sokoto,

The power of the Senussites.

[1] In the accounts of the fighting in French equatorial Africa at this period it is necessary to distinguish between the sheik Senussi el Mahdi and the sultan Mahommed el Senussi (b. *c.* 1850) of N'Delé, a prince who had married the sister of Rabah Zobeir. Senussi of N'Delé became an ally of the French. The state of N'Delé lies S. of Wadai and is cut by 9° N., 20° E. (See Karl Kumm in *Geog. Jour.*, Aug. 1910.)

whose influence is believed to be sufficiently strong to prevent the spread of Senussiism among his followers. The general attitude of the Mahommedans in the western Sudan towards the Senussi emissaries was described by European observers in 1907 as one of good-natured tolerance. They are occasionally allowed to preach, but apparently with little effect. In Bornu, which does not acknowledge the spiritual supremacy of Sokoto, the Senussi propaganda meets with less opposition, but the adherents of the order are not numerous. Here and there in the western Sahara are tribes professing Senussiism, but they are regarded as unimportant.

It should, however, be remembered that while other dervish fraternities are mystical and latitudinarian in theology, and only sporadically meddle in politics, the Senussites have exercised a continuous political influence and have sought to revive the faith and usages of the early days of Islam. The order is in a sense an outcome of the Wahhabite movement, but, as gathered from the writings of Mahommed el Hechaish, a Tunisian sheik, and other trustworthy sources, appears to be neither mystical nor puritan. There is less of secrecy about their rites than is usual in Moslem fraternities. The use of tobacco and coffee is forbidden, but the drinking of tea is encouraged, and the wearing of fine clothes is allowed. While they profess to belong to the Malikite rite (one of the four orthodox sects of Islam), the Senussites are charged by the Ulema of Cairo with many deviations from the true faith; chiefly they are accused of interpreting the Koran and Sunna without consulting one of the recognized glosses. Thus the Egyptian theologians regard the Senussites as inaugurating a new rite rather than forming a simple fraternity; in this, if not in puritanism, resembling the Wahhabites. Their great work in the eastern Sahara, apart from proselytism, has been colonization and the encouragement of trade. Wells have been dug and oases cultivated, rest houses built along caravan routes, merchants from Tripoli, Bornu, Wadai and Darfur welcomed. Such at least is the report of Mahommedan writers and of French and British political agents; very few Europeans have had opportunities of making personal observations. Gustav Nachtigal was in Wadai in 1873, Gerhard Rholfs traversed the Cyrenaica and visited Kufra in 1879; but in general the Senussi, supported by the Turks at Tripoli, have closed the regions under their control to Europeans. At the oasis of Siwa (Jupiter Ammon), however, they are in contact with the Egyptian administration. Siwa was visited by Silva White in 1898 and by Freiherr von Grünau in 1899. The last-named reports that he found the representative of Sheik Senussi living in perfect agreement with the Egyptian authorities, the inhabitants of the oasis being divided into two sections, known respectively as the Mussulmans and the Senussites, a distinction which goes to show the special position occupied by the Senussites in Islam.

Tenets.

The missionary zeal of the Senussites is undoubted. Outside the regions adjacent to their headquarters they appear to be most strongly represented in Arabia. In the eastern Sahara and Wadai practically all the population are Senussites; the order in other countries draws its adherents from a higher social rank than the generality of Moslem secret societies. Its chief agents are personages of wealth and importance and highly educated in Oriental lore. They are in general on good terms with the rulers of the countries in which they live, as instanced in 1902 by the conferment of the Legion of Honour on the head of the *zawai* at Hillil in Algeria. These agents make regular tours to the various *zawais* placed under their charge, and expound the Senussi doctrines at the Moslem universities. From all that has been said it is apparent that the Senussi sheik controls a very powerful organization, an organization probably unique in the Moslem world.

BIBLIOGRAPHY.—L. Rinn, *Marabouts et Khouan*, a good historical account up to the year 1884; O. Depont and X. Coppolani, *Les Confréries religieuses musulmanes* (Algiers, 1897), an authoritative work; Si Mohammed el Hechaish, "Chez les Senoussia et les Touareg," in *L'Expansion col. française* for 1900 and the *Revue de Paris* for 1901. These are translations from the Arabic of an educated Mahommedan who visited the chief Senussite centres. An obituary notice of Senussi el Mahdi by the same writer appeared in the Arab journal *El Hadira* of Tunis, Sept. 2, 1902; a condensation of this article appears in the *Bull. du Com. de l'Afr. française* for 1902; "Les Senoussia," an anonymous contribution to the April supplement of the same volume, is a judicious summary of events, a short bibliography being added; Capt. Julien, in "Le Dar Ouadai" published in the same *Bulletin* (vol. for 1904), traces the connexion between Wadai and the Senussi; L. G. Binger, in "Le Péril de l'Islam," in the 1906 volume of the *Bulletin*, discusses the position and prospects of the Senussite and other Islamic sects in North Africa. Von Grunau, in *Verhandl. ges. f. Erdk.* for 1899, gives an account of his visit to Siwa. Sir F. R. Wingate, in *Mahdiism and the Egyptian Sudan* (London, 1891), narrates the efforts made by the Mahdi Mahommed Ahmed to obtain the support of the Senussi; Sir W. Wallace, in his report to the Colonial Office on Northern Nigeria for 1906–1907, deals with Senussiism in that country. Consult also H. Duveyrier, *La Confrérie musulmane de Sidi Mohammed ben Ali es Senoûssi* (Paris, 1884), a book containing much exaggeration, and A. Silva White, *From Sphinx to Oracle* (London, 1898), which, while repeating the extreme views of Duveyrier, contains useful information.

The present writer, in endeavouring to arrive at a just conclusion on an obscure and much controverted subject, is indebted, in addition to the above, to the article by D. A. Cameron in the 10th ed. of this encyclopaedia, and to communications from Prof. D. B. Macdonald. (F. R. C.)

SEONI, a town and district of British India, in the Jubbulpore division of the Central Provinces. The town is 2043 ft. above sea-level, half-way on the road between Nagpur and Jubbulpore. Pop. (1901) 11,864. It was founded in 1774, and contains large public gardens, a fine market place and a handsome tank.

The DISTRICT OF SEONI forms part of the Satpura tableland, containing the headwaters of the Wainganga. It is largely covered with forest, and 40% of the inhabitants belong to aboriginal tribes. Area 3206 sq. m. The district is remarkable for the beauty of its scenery and the fertility of its valleys. The northern and western portions include the plateaus of Lakhnādon and Seoni; the eastern section consists of the watershed and elevated basin of the Wainganga; and in the south-west is a narrow strip of rocky land known as Dongartāl. The plateaus of Seoni and Lakhnādon vary in height from 1800 to 2000 ft.; they are well cultivated and clear of jungle, and their temperature is always moderate and healthy. Geologically the north part of Seoni consists of trap hills and the south of crystalline rock. The soil of the plateaus is the rich black cotton soil formed by disintegrated trap, of which about two-thirds of the district are said to consist; but towards the south, where cliffs of gneiss and other primitive formations occur, the soil is silicious and contains a large proportion of clay. The chief river is the Wainganga, with its affluents the Hirī, Sāgar, Thelī, Bijnā and Thānwar; other streams are the Tīmar and the Sher, tributaries of the Nerbudda. The annual rainfall averages 53 in. The population in 1901 was 327,709, showing a decrease of 12% in the decade due to the effects of famine. The principal crops are wheat, millets, rice, pulse, oil-seeds and cotton. Three lines of the Bengal-Nagpur system traverse the district.

There is also a town called Seoni, or Seoni-Malwa, in the Central Provinces, a railway station in Hoshangabad district. Pop. (1901) 7531.

See R. A. Sterndale, *Seonee*, or Camp Life on the Satpura Range (1877); *Seoni District Gazetteer* (Allahabad, 1907).

SEOUL (*Han-yang*), the capital of Korea (Chosen), situated in 37° 34′ N. and 127° 6′ E., at an altitude of 120 ft., 25 m. from Chemulpo, its seaport, and 4 from Mapu, its river-port. Pop. about 200,000. It lies in a basin among granite hills, nowhere exceeding 2627 ft., remarkable for their denudation and their abrupt black crags and pinnacles. A well-built, crenelated stone wall from 20 to 30 ft. high, about 11 m. in circuit, and pierced by 8 gateways with double-roofed gate towers, surrounds it. The native houses are built of stone or mud, deeply eaved, and either tiled or thatched. Above these rise the towers of the Roman Catholic cathedral, the high curved roofs of the royal audience halls, the palace gateways, and the showy buildings of the Russian and French legations. The antiquities are the Bell Tower, with a huge bronze bell dated 1468, a marble pagoda elaborately carved, but not of Korean workmanship, seven centuries old, and a "Turtle-Stone" of about the same date.

Seoul has some wide streets of shops, hundreds of narrow alleys, and is very fairly clean. It has an electric tramway 4 m. long, and is the centre of the railway system of the country.

SEPIA (Gr. σηπία, cuttlefish), a deep brown pigment obtained from the ink-sacs of various species of cuttlefish (*q.v.*). To obtain sepia the ink-sac, immediately on the capture of the animal, is extracted from the body and speedily dried to prevent putrefaction. The contents are subsequently powdered, dissolved in caustic alkali, and precipitated from the solution by neutralizing with acid. The precipitate after washing with water is ready to make up into any form required for use.

Sepia-bone or *cuttle-bone* consists of the internal "shell" or skeleton of *Sepia officinalis* and other allied species. It is an oblong convex structure from 4 to 10 in. in length and 1 to 3 in. in greatest width, consisting internally of a highly porous cellular mass of calcium carbonate with some animal matters covered by a hard thin glassy layer. It is used principally as a polishing material and for tooth powder, and also as a moulding material for fine castings in precious metals.

SEPOY, the usual English spelling of *sipāhī*, the Persian and Urdū term for a soldier of any kind, cf. *spahi*. The word *sipāh*, "army," from which *sipāhī*, "soldier," is derived, corresponds to the Zend *çpādha*, Old Persian *çpāda*, and has also found a home in the Turkish, Kurdish and Pashto (Pushtu) languages (see Justi, *Handbuch der Zendsprache*, p. 303, 6), while its derivative is used in all Indian vernaculars, including Tamil and Burmese, to denote a native soldier, in contradistinction to *gorā*, "a fair-complexioned (European) soldier." A sepoy is at the present day strictly a private soldier in the native infantry of the Indian army.

SEPPINGS, SIR ROBERT (1767–1840), English naval architect, was born at Fakenham, Norfolk, in 1767, and in 1782 was apprenticed in Plymouth dockyard. In 1800, when he had risen to be master shipwright assistant in the yard, he invented a device which, as compared with the laborious process of lifting then in vogue, greatly reduced the time required for effecting repairs to the lower portions of ships in dry dock. His plan was to make the keel of the ship rest upon a series of supports placed on the floor of the dock and each consisting of three parts—two being wedges arranged one on each side of the keel at right angles to it, with their thin ends together, while the third was a vertical wedge fitting in and supported by the lower pair. The result was that it became possible in a comparatively short time to remove these supporting structures by knocking out the side wedges, when the workmen gained free access to the whole of the keel, the vessel remaining suspended by the shores. For this invention Seppings received £1000 from the Admiralty, and in 1804 was promoted to be a master shipwright at Chatham. There, in spite of the repugnance to innovation displayed by the naval authorities of that period, he was able to introduce important improvements in the methods of ship-construction. In particular he increased the longitudinal strength of the vessels by a system of diagonal bracing, and modified the design of the bows and stern, so that they became stronger, not only offering better protection than the old forms to the crews against the enemy's fire, but also permitting a powerful armament to be fitted. Seppings, who received a knighthood in 1819, was appointed surveyor of the navy in 1813, and held that office till his retirement in 1832. He died at Taunton on the 25th of September 1840.

SEPSIS (Gr. σῆψις, putrefaction), or SEPTIC INFECTION, a term applied in medicine and surgery to indicate the resultant infection of a wound or sore by micro-organisms or by their products. Under this general heading come three great constitutional diseases, differing radically from each other in their aetiology and pathology: *sapraemia*, *septicaemia* and *pyaemia*.

Sapraemia (Gr. σαπρός, rotten, αἷμα, blood), or septic intoxication, is the result of the absorption of a dose of the toxins produced by micro-organisms from some area of infection without the entrance of the micro-organisms themselves into the blood. This condition was for a long time confounded with septicaemia, but is distinguished from it in being a chemical intoxication. The blood in sapraemia if injected into an animal is incapable of reproducing the disease as in septicaemia. Any condition in which there is a mass of decomposing tissue in the neighbourhood of an unhealed wound may give rise to sapraemia. In surgical practice it may be met with in large, deep and badly-drained wounds where a quantity of putrifying material is pent up. When it arises in connexion with wounds accidentally received, it may be unavoidably due to the dirty state of the skin or to foreign bodies entering the wound. Absorption of toxins is notably frequent in portions of decomposing placental tissue which may accidentally have remained behind in the uterus after childbirth, and may give rise to puerperal sapraemia. Sapraemia is acute or subacute directly according to the amount of toxin absorbed. By some writers it is divided as follows: (1) Hectic fever is a chronic blood poisoning with continual absorption of small doses of the toxins. This variety usually arises in long-continued suppuration of bones and joints, and in decomposition occurring in a pulmonary cavity. The marked symptom is a sharp rise of temperature in the evenings; the face becomes flushed and the pulse rapid. After profuse sweating the temperature drops. Diarrhoea and wasting are a usual accompaniment. (2) Septic traumatic fever is a slight form which may follow burns or compound fractures and which tends to subside in a few days. (3) In acute septic intoxication large amounts of the poison are absorbed. It generally starts with a severe rigor followed by a continuous high temperature, dry tongue, rapid pulse and severe headache, together with nausea and vomiting, and in the later stages diarrhoea. If the case be a severe one rapid prostration speedily comes on with low muttering delirium, the temperature may fall to subnormal, and a gradually deepening coma may end in death; other cases pass into a typically "typhoid state," death occurring from exhaustion at the end of about a week. (4) Amyloid (Gr. ἄμυλον, starch, εἶδος, form), or lardaceous disease, usually of the liver, spleen, kidneys or other organs, is one of the results of long-continued septic intoxication. A substance derived from the breaking down of pus and tissue cells is carried in the blood and deposited in the connective tissue of the coats of the smaller arteries, and the viscera become infiltrated with a material looking like lard. The liver and spleen, being the organs most usually affected, become immensely enlarged.

No form of septic infection yields so easily to treatment as sapraemia. The prompt removal of the cause of septic absorption, the flushing out of the wound with weak antiseptic solutions, in order to mechanically remove any decomposing masses, and the establishment of proper drainage in deep wounds, is usually followed by a fall in temperature and an improvement in the general condition. A strong, preferably mercurial, purgative should be given to aid in the elimination of toxic material. For the same purpose the injection into the veins or into the cellular tissue of large quantities of normal saline solution is useful. Heart depression should be overcome by diffusible stimulants and hypodermic injections of strychnine. When the wound has become "surgically clean" recovery is usually rapid.

Septicaemia is an acute infective disease differing from sapraemia in that the micro-organisms themselves are absorbed, entering the general circulation, and may on examination be found in greater or lesser number in the blood-stream itself. The organism or organisms grow and reproduce themselves in the blood or tissues. A number of different organisms have been isolated from the blood-stream in cases of septicaemia. The most frequently found is the *Streptococcus pyogenes*, which is present in 50% of the cases and is common in puerperal septicaemia and in ulcerative endocarditis. The *Staphylococcus pyogenes aureus et albus* is also a frequent cause, but sometimes septicaemia may be due to other pathogenic microbes such as the *Pneumococcus*, the *Bacillus coli communis*, *Bacillus pyocyaneus*, *Bacillus oedematis maligni* and the *Gonococcus*. The micro-organisms are conveyed by the blood-stream to different parts of the body, in which as in the original wound itself they both multiply and set up factories for the production of toxins. The disease commonly follows blows or wounds which have

not been treated on surgical lines. Much laceration of the tissues at the time of the injury offers increased liability to infection. Septicaemia is frequent in spreading gangrene, in diseases of the periosteum, and in fevers such as scarlatina, diphtheria or plague, and in the puerperal state. The period of incubation may be from a few hours to several days. The condition of the wound or site of injury shows marked changes. In severe cases following a prick received in conducting a post-mortem the finger in a few hours becomes greatly swollen and painful, the pain spreading up the lymphatic vessels to the nearest lymphatic glands, which may become enlarged, and sloughing or gangrene of the parts involved may take place. In milder cases the wound remains with reddened and oedematous margins in a more or less unhealthy state. In mild cases of septicaemia the local condition of the wound, high temperature and feeling of illness are the distinguishing features. The treatment of septicaemia may be preventive or active. The preventive side consists in the performance of operations with all due aseptic precautions. Since the days when I. P. Semmelweiss (*q.v.*) of Vienna insisted on cleanliness in his maternity wards, the death-rate of puerperal septicaemia has been enormously reduced. In the British registrar-general's returns for 1868 it was stated that in twenty-two years no less than 23,689 women in England and Wales had died of puerperal septic diseases. In the reports of the Rotunda Hospital, Dublin, the largest maternity hospital in the United Kingdom, we ascertain that of 30,023 women delivered during the ten years 1894–1903 there was only a mortality of 21 due to sepsis, a ratio of 0·066 %, while the registrar-general's returns for England and Ireland for the period have a ratio for sepsis of 0·216 %. When dealing with a wound that is already septic, free incision and swabbing the surface with pure carbolic acid may have to be resorted to, and constitutional treatment must be undertaken at once. Should the infection be due to a *Streptococcus*, an antistreptococcic serum may be injected. There are, however, many strains of *Streptococci*, and a polyvalent serum may give good results. Menzer's antistreptococcic serum has been successful in puerperal septicaemia not of gonococcic origin. Many cases have also now been recorded in which the systemic infection is combated by means of an autogenous vaccine. The first case was described by Sir James Barr before the Liverpool Medical Institute in May 1906. In urgent cases, where time will not allow of the manufacture of a vaccine, quinine in large doses, stimulants and liquid nourishment must be given, and the temperature controlled by tepid sponging.

Pyaemia (Gr. πύον, pus, αἷμα, blood), which got its name from an erroneous idea that the pus passed into the blood, is now understood to mean an acute disease with the formation of metastatic abscesses. The first definite account of the disease was published by Boerhaave in 1720. Virchow in 1846 pointed out that it was not pus in the veins, but altered blood-clot. Jean D'Arcet showed the separate processes of poisoning by products of decomposition and the blocking of the veins with emboli. Any pyogenic organism may give rise to pyaemia, or it may follow any acute abscess. The cause of pyaemia may be said to be any condition favouring the formation of emboli. An occasional cause of pyaemia is infective endocarditis, while puerperal pyaemia may arise from infection of the genital tract. When the emboli lodge in the lung there is a breaking down of the tissue in front of the embolus, a haemorrhagic infarct being formed. The clinical symptoms of acute pyaemia generally start with a rigor repeated at periodic intervals; the skin becomes hot and the patient soon develops an earthy colour, the pulse becomes frequent and weak and the tongue dry. In about a week secondary abscesses appear, most frequently in the region of joints. There may be little or no pain to herald the formation of an abscess, but usually there is intense pain followed by suppuration. Unless early treatment is undertaken the joint may be rapidly destroyed. In acute cases multiple abscesses in the kidney may give rise to pain and albuminuria, abscesses in the lungs to dyspnoea, while acute peritonitis may arise from rupture of a splenic abscess into the peritoneal cavity, and sudden blindness be the result of the plugging of the arteria centralis retinae. The duration of a case of pyaemia depends on the severity of the infection. Death may occur from the formation of abscesses in vital organs such as the brain and heart, or from exhaustion from continued suppuration, or chronic forms may after months pass on to complete recovery. Unfortunately pyaemia cannot be recognized apart from other blood infections until abscesses begin to form. The local treatment is to endeavour to prevent the detachment of infected emboli and the infection of the general blood-stream thereby. An infected limb may be dealt with by amputation above the seat of the lesion, or it may be feasible to dissect out the infected veins. When abscesses have formed they must be dealt with by opening and washing out the cavities. Antistreptococcic serum may be tried, as in septicaemia; and if there be time to prepare a vaccine it offers the best prospects, more particularly in the subacute and chronic forms of pyaemia. The usual administration of nourishing diet and stimulants when required should be undertaken, and every effort made to keep up the patient's strength.

REFERENCES.—Watson Cheyne in Clifford Albutt's *System of Medicine* (1906); Horder in the *Practitioner* (May 1908); Spencer and Gask's *System of Surgery* (1910); Barr, Bell and Douglas, *Lancet* (Feb. 1907); H. Jellett, *Manual of Midwifery* (1905); Whyte in *Edinburgh Medical Journal* (Dec. 1907); Sir A. Wright in the *Lancet* (Nov. 1907); Whitridge Williams in *American Journal of Obstetrics* (May 1909); R. Park, *The Principles of Surgery* (1908); George Taylor in the *Practitioner* (March 1910). (H. L. H.)

SEPT, a clan, the term generally applied to the tribes or families of Ireland, used also sometimes as by Sir H. Maine (*Early History of Institutions*, 231) of the Indian joint undivided family, the "combined descendants of an ancestor long since dead." Wedgwood (*Dict. of Eng. Etym.*), quoted by Skeat, takes the word as a corruption of "sect" (*q.v.*), and cites from the State Papers of 1536 and 1537, where *secte* and *septe* are used respectively. If so, the word must have been influenced by Lat. *saeptum*, fence or enclosure (*saepire*, to enclose, *saepes*, hedge), a word which has been adopted as "septum" into scientific terminology for any partition or wall dividing two cavities—*e.g.* in anatomy, of the partition between the nostrils, *septum naris*, or that between the right and left ventricles of the heart, *septum cordis*.

SEPTEMBER (Lat. *septem*, seven), the seventh month of the old Roman year, in which it had thirty days assigned to it. In the Julian calendar, while retaining its former name and number of days, it became the ninth month. The Ludi Magni (Ludi Romani) in honour of Jupiter, Juno and Minerva began on the 4th of September. The principal ecclesiastical feasts falling within the month are: the Nativity of the Blessed Virgin on the 8th, the Exaltation of the Holy Cross on the 14th, St Matthew the apostle on the 21st, and St Michael the archangel on the 29th. September was called "harvest month" in Charlemagne's calendar, and it corresponds partly to the Fructidor and partly to the Vendémiaire of the first French republic. The Anglo-Saxons called the month *Gerstmonath*, barley month, that crop being then usually harvested. It is still called *Herbstmonat*, harvest month, in Switzerland.

SEPTUAGINT, THE (Gr. οἱ Ο′, Lat. LXX.), or the "Alexandrian version of the Old Testament," so named from the legend of its composition by seventy (Lat. *septuaginta*), or more exactly seventy-two, translators. In the *Letter of Aristeas to Philocrates*[1] this legend is recounted as follows: Demetrius of Phalerum, keeper of the Alexandrian library, proposed to King Ptolemy II. Philadelphus (285–247 B.C.) to have a Greek translation of the Jewish law made for the library. The king consented and, after releasing 100,000 Jewish captives in his kingdom, sent an embassy with rich presents to the high priest Eleazar at Jerusalem asking him to send six ancient, worthy and learned men from each of the twelve tribes to translate the law for him at Alexandria. Eleazar readily sent the seventy-two men with a precious

[1] Edited by H. St J. Thackeray in H. B. Swete's *Introd. to the Old Testament in Greek* (1900), and by P. Wendland in the Teubner series (1900).

roll of the law. They were honourably received at the court of Alexandria and conducted to the island (Pharos), that they might work undisturbed and isolated. When they had come to an agreement upon a section Demetrius wrote down their version; the whole translation was finished in seventy-two days. The Jewish community of Alexandria was allowed to have a copy, and accepted the version officially; indeed a curse was laid upon the introduction of any changes in it.

There is no question that this *Letter* (which is condensed in Josephus, *Ant.* xii. 2) is spurious.[1] Aristeas, an official at Ptolemy's court, is represented as a heathen, but the real writer must have been a Jew and no heathen. Aristeas is represented as himself a member of the embassy to Eleazar; but the author of the *Letter* cannot have been a contemporary of the events he records, else he would have known that Demetrius fell out of favour at the very beginning of the reign of Philadelphus, on a charge of intriguing against his succession to the throne.[2] Nor could a genuine honest witness have fallen into the absurd mistake of making delegates from Jerusalem the authors of the Alexandrian version. There are also one or two passages (§§ 28, 182) where the author seems to forget that he is playing the rôle of Aristeas. The forgery, however, seems to be an early one.[3] "There is not a court-title, an institution, a law, a magistracy, an office, a technical term, a formula, a peculiar phrase in this letter which is not found on papyri or inscriptions and confirmed by them."[4] That in itself would not necessarily imply a very early date for the piece; but what is decisive is that the author limits canonicity to the law and knows of no other holy book already translated into Greek. Nor does he claim any inspiration for the translators. Further, what he tells about Judaea and Jerusalem is throughout applicable to the period when the Ptolemies bore sway there and gives not the slightest suggestion of the immense changes that followed the conquest of Palestine by the Seleucids. It is probable that the Jewish philosopher Aristobulus, who lived under Ptolemy VI. Philometor (180–145 B.C.), derived his account of the origin of the LXX. from this *Letter*, with which it corresponds.[5] There seems good ground for believing that the letter contains some elements derived from actual tradition as to the origin of the LXX. Ptolemy Philadelphus was a king of eclectic literary tastes, and the welcome he gave to a Buddhist mission from India might well have been extended to Jews from Palestine. The letter lays great stress on the point that the LXX. is the official and authoritative Bible of the Hellenistic Jews, having not only been formally accepted by the synagogue at Alexandria, but authorized by the authorities at Jerusalem. This, and the fact that the style of the version is not that of a book intended for literary use, points to the conclusion that the translation was made to satisfy the religious needs of the Jews in Alexandria, and possibly also in the hope of gaining proselytes. In view of the Jewish prejudice against *writing* Scripture in any but the old holy form (the Targum, for instance, was for centuries handed down orally), it is quite possible that some impulse to the Alexandrian version came from without. Philadelphus may have encouraged it both to satisfy his own curiosity and to promote the use of Greek among the large Jewish population of the city. That the work is purely Jewish in character is only what was inevitable in any case. The translators were necessarily Jews, though Egyptian and not Palestinian Jews, and were necessarily and entirely guided by the living tradition which had its focus in the synagogal lessons.[6] And hence it is easily understood that the version was ignored by the Greeks, who must have found it barbarous and largely unintelligible, but obtained speedy acceptance with the Jews, first in private use and at length also in the synagogue service.

The next direct evidence which we have as to the origin of the LXX. is the prologue to Ecclesiasticus, from which it appears that about 130 B.C. not only the law but "the prophets and the other books" were extant in Greek.[7] With this it agrees that the text of Ecclesiasticus and the other ancient relics of Jewish-Greek literature, preserved in the extracts made by Alexander Polyhistor (Eusebius, *Praep. Ev.* ix.), all show acquaintance with the LXX.[8] The experiment on the Pentateuch (of which alone *Aristeas* speaks) had evidently been extended to other rolls as they arrived from Jerusalem. These later translations were not made simply to meet the needs of the synagogue, but express a literary movement among the Hellenistic Jews, stimulated by the favourable reception given to the Greek Pentateuch, which enabled the translators to count on finding an interested public. If a translation was well received by reading circles among the Jews, it gradually acquired public acknowledgment and was finally used also in the synagogue, so far as lessons from other books than the Pentateuch were used at all. But originally the translations were mere private enterprises, as appears from the prologue to Ecclesiasticus and the colophon to Esther. It appears also that it was long before the whole Septuagint was finished and treated as a complete work. We may grant that the Pentateuch (and perhaps part of Joshua) was translated in the 3rd century B.C. The other books followed, generally speaking, in the order in which they occur in the Hebrew Canon. Isaiah perhaps dates from *c.* 180, Jeremiah, Ezekiel and the Twelve Prophets, as also 1 Kings (= 1 Samuel), *c.* 150. Most of the "Writings," together with Judges and 2-4 Kings, were probably translated in the 1st century B.C., while Ecclesiastes and Daniel (the latter incorporated from Theodotion) date only from the 2nd century of the Christian era.

As the work of translation went on so gradually, and new books were always added to the collection, the compass of the Greek Bible came to be somewhat indefinite. The law always maintained its pre-eminence as the basis of the canon; but the prophetic collection changed its aspect by having various Hagiographa incorporated with it according to an arbitrary arrangement by subjects. The distinction made in Palestine between Hagiographa and Apocrypha was never properly established among the Hellenists. In some books the translators took the liberty of making considerable additions to the original, *e.g.* those to Daniel, and these additions became a part of the Septuagint. Nevertheless, learned Hellenists were quite well aware of the limits of the canon and respected them. Philo can be shown to have known the Apocrypha, but he never cites them, much less allegorizes them or uses them in proof of his tenets. And in some measure the widening of the Old Testament canon in the Septuagint must be laid to the account of Christians.

The vocabulary and accidence of the Greek of the Septuagint are substantially those of the κοινὴ διάλεκτος or Hellenistic Greek spoken throughout the empire of Alexander. The language of the Pentateuch attains the higher level shown by the papyri of the early Ptolemaic age, that of the prophets reflects the less literary style of the papyri of *c.* 130–100 B.C. In the latest parts of the translation Mr St John Thackeray notes two opposing influences, (*a*) the growing reverence for the letter of Scripture, tending to a pedantic literalism, (*b*) the influence of the Atticistic school, strongest in free writings like 4 Maccabees but leaving its mark also on 4 Kings. But if in some respects the Septuagint is the great monument of the κοινή, in

[1] Its claims were demolished by Humphry Hody, Regius Professor of Greek at Oxford, in 1684.

[2] Hermippus Callimachius, *ap.* Diog. Laërt. v. 78. Irenaeus indeed, evidently following some other account, fixes the translation in the time of Ptolemy I.

[3] P. Wendland, however, puts it after the Maccabean age (say 96 B.C.) and before the Roman invasion of Palestine (63 B.C.).

[4] G. Lumbroso, *Recherches sur l'écon. pol. de l'Égypte sous les Lagides* (Turin, 1870), p. xiii.

[5] Clem. Alex. *Strom.* i. p. 342, ed. Sylb.; Eusebius, *Praep. Ev.* ix. 6, p. 410 seq.; cf. Valckenaer, *Diatribe de Aristobulo* (Leiden, 1806), reprinted in Gaisford's edition of the *Praep. Ev.* One must not overlook the possibility that Aristobulus's *Interpretation of the Holy Laws* may itself be the pseudonymous work of some otherwise unknown Jewish author. It and the *Letter of Aristeas* seem to be of the same date, if not even by the same hand. And Philo (*Vita Mosis*, ii. § 7, ii. 141) describes an annual festival held at Pharos in honour of the origin of the Greek Bible.

[6] It is quite likely that they worked on rolls newly brought from Jerusalem. There was no desire to found an Alexandrian canon or type of text.

[7] This does not necessarily mean that the whole of the section of the Hebrew Old Testament known as "The Writings" was translated by that date.

[8] Philo seems to have known the Greek version of most of the Old Testament except Esther, Ecclesiastes, Canticles and Daniel.

others, especially in syntax, it is strongly tinged with Hebraisms, and there are many passages where it is difficult, if not impossible, to extract any rational meaning. In some cases a book bears the marks of two hands: thus Jeremiah i.-xxviii. was not translated by the worker that undertook ch. xxix.-li. (the former is indifferent, the latter unintelligible Greek), and in Ezekiel one hand is responsible for ch. i.-xxvii., xl.-xlviii., and another for ch. xxviii.-xxxix. (except xxxvi. 24-38). So 1 Kings stands apart from 2-4 Kings. Isaiah is more akin to classical Greek; like the Pentateuch and 1 Maccabees it is good κοινή. The two chief MSS. of Judges vary so much as to point to different recensions. In some books, especially Jeremiah xxv.-li., the order of the Septuagint is totally different from that of the Massoretic Hebrew text (cf. also Proverbs xxiv.-xxix.). In other cases, notably in Job, the original LXX. text was much shorter than that of the Massoretes; in Esther and Daniel there are numerous additions. The Septuagint does not keep the triple Hebrew division of Law, Prophets and Hagiographa or Writings, but instead of this order of canonization principle it groups its books according to subject matter, Law, History, Poetry, Prophecy, a divergence which had much importance for the history of the Old Testament canon in the Christian church. The early Christians generally accepted the LXX. canon, which through the old Latin, despite Jerome's Vulgate adoption of the Hebrew canon, passed into the West, and into the Latin bibles, where the Apocrypha (except 1 Esdras) are still included. The German and English churches followed Jerome in giving a less honoured place to the impugned books.

The Septuagint came into general use with the Grecian Jews even in the synagogue. Philo and Josephus use it, and so do the New Testament writers. But at an early date small corrections seem to have been introduced, especially by such Palestinians as had occasion to use the LXX., in consequence partly of divergent interpretation, partly of differences of text or of pronunciation (particularly of proper names). The Old Testament passages cited by authors of the first century of the Christian era, especially those in the Apocalypse, show many such variations from the Septuagint, and, curiously enough, these often correspond with the later versions (particularly with Theodotion), so that the latter seem to rest on a fixed tradition. Corrections in the pronunciation of proper names so as to come closer to the Massoretic pronunciation are especially frequent in Josephus. Finally a reaction against the use of the Septuagint set in among the Jews after the destruction of the temple—a movement which was connected with the strict definition of the canon and the fixing of an authoritative text by the rabbins of Palestine. But long usage had made it impossible for the Jews to do without a Greek Bible, and to meet this want a new version was prepared corresponding accurately with the canon and text of the Pharisees. This was the version of Aquila, which took the place of the Septuagint in the synagogues, and long continued in use there. On this, together with the versions of Theodotion and Symmachus, Origen's *Hexapla*, and the recensions of Hesychius and Lucian, see BIBLE (*Old Testament*, "Texts and Versions").

The LXX. is of great importance in more than one respect. "It was the first step towards that fusion of the Hebraic with the Hellenic strain, which has issued in the mind and heart of modern Christendom. Like the opening of the Suez Canal it let the waters of the East mingle with those of the West, bearing with them many a freight of precious merchandise." Again, it is probably the oldest translation of considerable extent that ever was written, and at any rate it is the starting-point for the history of Jewish interpretation and the Jewish view of Scripture. And from this its importance as a document of exegetical tradition, especially in lexical matters, may be easily understood. It was in great part composed before the close of the canon—nay, before some of the Hagiographa were written—and in it alone are preserved a number of important ancient Jewish books that were not admitted into the canon. As the book which created or at least codified the dialect of Biblical Greek, it is the key to the New Testament and all the literature connected with it. To many its chief value lies in the fact that it is the only independent witness for the text of the Old Testament which we have to compare with the Massoretic text. It may seem that the critical value of the LXX. is greatly impaired, if not entirely cancelled, by the corrupt state of the text. If we have not the version itself in authentic form we cannot reconstruct with certainty the Hebrew text from which it was made, and so cannot get at various readings which can be confidently confronted with the Massoretic text; and it may be a long time before we possess a satisfactory edition of the genuine Septuagint. The difficulties in getting behind the confusion of versions and recensions to produce such a result are indeed formidable. The materials at our disposal are of the usual threefold kind, Manuscripts, Versions and Patristic Quotations. The earliest MSS. are about a score of fragments on papyrus, a few of which go back to the 3rd century A.D. The chief uncial MSS. are, as for the New Testament ℵ, A, B, C and others. Of these A and B are largely complete, but though both of Egyptian origin vary considerably. A (with which the quotations in the New Testament generally agree) may represent the edition of Hesychius; B, which is often, especially in the Psalms, in accord with the Bohairic version, resembles the text used by Origen in the Hexapla. Of versions the Bohairic (Lower Egypt), the Sahidic (Upper Egypt), the various Syriac translations (unfortunately we have no Old Syriac for the Old Testament), and the Latin (Old Latin and Vulgate, especially the former) are the most important. The evidence of the Fathers is valuable as helping to distinguish local types of text. The testimony of the earliest patristic quotations seems to be in favour of A rather than B. The immediate aim of textual criticism is a recovery of the three main editions, those of Origen, Lucian and Hesychius, and then of the pre-Origenian LXX. text, which lies behind them all. When this has been accomplished there still remains the problem of the relation of the LXX. to the Hebrew. There is no doubt that the Hebrew text from which the LXX. translators worked was often divergent from that represented by the Massoretic. For the Pentateuch we have additional material in the Samaritan version, but here the variants are least. In view of the palpable mistakes made by the Septuagint translators and their often inadequate knowledge of Hebrew, we must not hastily assume that in cases of difference the Greek is to be preferred. The book of Ecclesiasticus (the Hebrew of which has recently been discovered) furnishes a useful lesson here. Yet there is no doubt that much (*e.g.* in 1 Samuel) may be learned from the Septuagint; all one can say is that each case must be treated on its own merits.

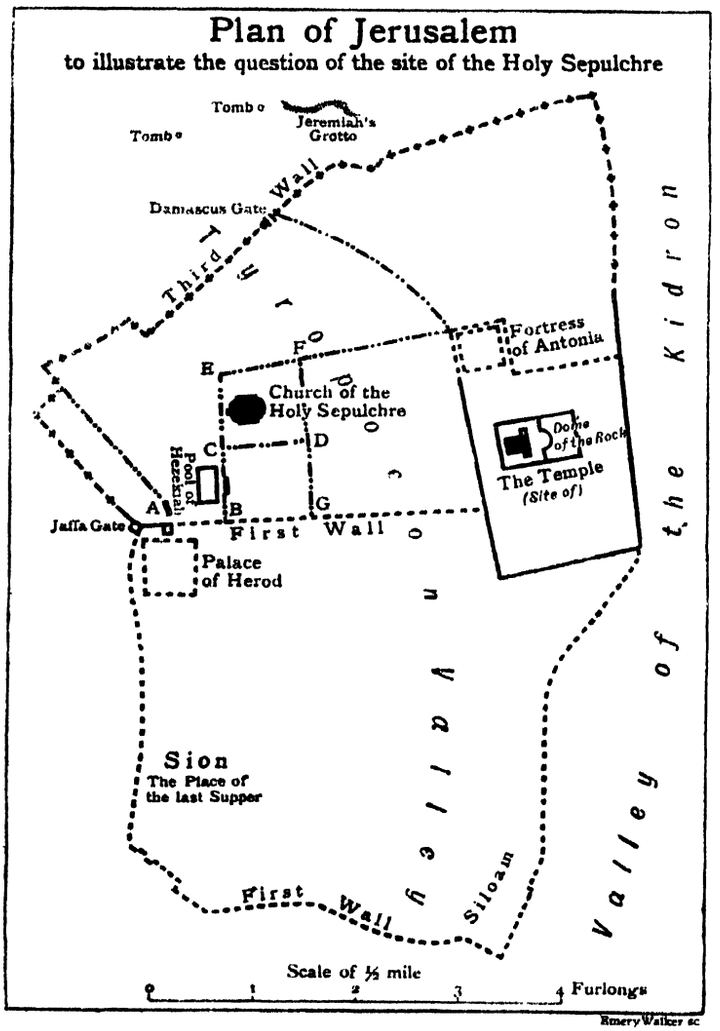
EDITIONS.—The Septuagint was first printed in the Complutensian Polyglot (1514–1517), but before it was published in 1521 Aldus published another edition in 1519. The Textus Receptus issued by Pope Sixtus V. (Rome, 1587) was based mainly on Cod. Vaticanus (B) with some collection of the Venice MS. (V). This edition was the basis of the great work of R. Holmes and J. Parsons (Oxford, 1798–1827), who furnished the Sixtine text with an apparatus (not always accurate) drawn from 20 uncials and nearly 280 minuscule MSS., in addition to versions. In 1707–1720 Grabe had published an edition based on Cod. Alexandrinus (A). C. Tischendorf's text (1850; 7th ed., 1887) was a revision of that of Holmes and Parsons with an apparatus drawn from the chief uncials. H. B. Swete's edition in 3 vols. (1887–1894; revised 1895–1899) gives the text of B, and, where this fails, that of A or ℵ, with variant readings from the chief uncials. The larger Cambridge edition, begun in 1906 by A. E. Brooke and N. McLean, follows the same plan with the text, but its apparatus includes all the uncials, the best and most representative minuscules, and the chief versions and patristic quotations.

LITERATURE.—H. B. Swete, *Introduction to the Old Testament in Greek* (1900); E. Nestle, *Septuagintastudien* (1886-1907); F. G. Kenyon, *Our Bible and the Ancient MSS.*, pp. 48-92 (1898); A. Rahlfs, *Septuaginta-Studien* (1904, Kings; 1907, Psalms); E. Hatch and H. A. Redpath, *A Concordance to the Septuagint* (Oxford, 1897–1906); H. St J. Thackeray, *A Grammar of the Old Testament in Greek*, vol. i. (Cambridge, 1909), containing a useful Septuagint bibliography; F. C. Conybeare and St G. Stock, *Selections from the Septuagint* (Boston and London, 1905); the articles in the various Bible-dictionaries, and other works mentioned in the course of this article. (A. J. G.)

SEPULCHRE, CANONS REGULAR OF THE HOLY, an order said to have been founded in 1114 (or, according to other accounts, during the rule of Godfrey of Bouillon in Jerusalem) on the rule of St Augustine. Pope Celestine III., in 1143, confirms the Church and Canons of the Holy Sepulchre in all their possessions, and enumerates several churches both in the Holy Land and in Italy belonging to the Canons. According to Jacques de Vitry, the canons served the churches on Mount Sion and Mount Olivet in addition to that of the Holy Sepulchre. The canons survived in Europe till the French Revolution. In Italy they seem to have been suppressed by Innocent VIII. in 1489, and their property given to the Knights of St John. The canons are now extinct, but canonesses of the Holy Sepulchre are still to be found in various countries of Western Europe.

SEPULCHRE, EASTER, in church architecture an arched recess, generally in the north wall of the chancel, in which from Good Friday to Easter day were deposited the crucifix and sacred elements in commemoration of Christ's entombment and resurrection. It was generally only a wooden erection, which was placed in a recess or on a tomb. There are throughout England many fine examples in stone, some of which belong to the Decorated period, such as at Navenby and Heckington (1370) in Lincolnshire, Sibthorpe and Hawton (1370) in Nottinghamshire, Patrington in Yorkshire, Bampton in Oxfordshire, Holcombe Burnell in Devonshire, and Long Itchington and other churches in Warwickshire.

SEPULCHRE, THE HOLY, the tomb in which, after His crucifixion, the body of Jesus Christ was laid. Although the facts of the crucifixion and of the interment of the body of Christ in the tomb of Joseph of Arimathea are related in the New Testament with considerable detail, sufficient indications are not supplied to locate the actual position of the tomb with reference to the city of Jerusalem. It would appear that Golgotha, the place of crucifixion, was outside the city, near a public thoroughfare leading to one of the gates, and visible from some distance. There is, however, no reason for supposing that it was a hill, and the expression "Mount Golgotha" was not used until some centuries later. Adjoining the place Golgotha was a garden, in which was a new rock-cut tomb, the property of Joseph of Arimathea. Rock-cut tombs were common in the vicinity of Jerusalem, as, in consequence of the geological



formation, the faces of the hills are frequently broken by low cliffs with terraces between. The comparatively level terraces were used for cultivation while the tombs were excavated in the rock faces. Many instances of tombs so situated can be seen on the hillsides near Jerusalem, and it is not unreasonable to suppose that the tomb of Joseph was of a similar character. As it was outside the city, the question of the validity of the traditional site, upon which the church of the Holy Sepulchre now stands, necessarily depends, to a great extent, upon whether this place was within or without the walls at the date of the crucifixion. At that time, it is clear, judging from the careful description written by Josephus a few years later, that Jerusalem was defended by two walls, as the third wall was not begun by King Herod Agrippa until A.D. 41. Of these, the first, or old wall, ran from the palace of Herod the Great, which was situated at the N.W. corner of the city, and, following an easterly direction, crossed the Tyropoeon Valley and terminated at the west wall of the Temple enclosure. On the other hand, going south from Herod's palace, it encircled the city on the west and south, and then turning at Siloam it followed the direction of the Kidron Valley and ended at the east wall of the Temple enclosure.

The second wall, which was built at some period between the return of the Jews from Babylon and the reign of Herod the Great, was on the north, and in front of the old wall. According to Josephus, it started "from the Gate Genath in the first wall, and, enclosing only the northern quarter of the city, went up to the fortress of Antonia." The site of the Antonia, which was situated on the rising ground north of the Temple, is known with tolerable certainty, but the position of the Gate Genath has not been fixed, and, as no certain traces of the second wall have hitherto been found, the line it followed is purely a matter of conjecture. Various theories on the subject are maintained by different authorities. Some of these are indicated on the plan. One suggestion is that the second wall started from a point in the first wall near the palace of Herod, and that some remains of an old wall, situated at the point A, formed part of it. The wall is then supposed to have been carried in a direction slightly west of north, up to the line of the existing city wall, to have followed this line to the Damascus gate, and then turned south-east to the Antonia. If this theory were correct, it is clear that the traditional site of the Holy Sepulchre would be impossible, as it would be some way within the city wall. The arguments against the proposal are, that, according to the account of the siege of Jerusalem given by Josephus, it is improbable that the second wall started from a point so near to Herod's palace, that the line of the present city wall is more likely to be that of the third wall, and that Josephus states that the second wall went "up to" and not "down to" the fortress of Antonia. Another theory is that the Gate Genath was at a point marked B on plan, and that some ancient masonry which lies east of the so-called Pool of Hezekiah, and over which the houses on the west side of Christian Street are built, represents a portion of the second wall. The wall is then supposed to have been carried north to the point C, and either to have turned east to D, and again north to F, and from this to the Antonia; or to have continued north to E, and thence east to the Antonia. The first supposition excludes the site of the Holy Sepulchre, while the second includes it within the wall. A third theory is that the Gate Genath was at the point G, and that the second wall ran north to F, and thence to the Antonia. This proposal places the site of the Holy Sepulchre outside the wall, but it makes the part of the city protected by the latter smaller than is probable. Speaking generally, it may be stated that there is no certain evidence as to the line followed by the second wall, and it is impossible to say whether the traditional site lies inside or outside this wall. From the description in the Gospels of the burial of Jesus, it is not clear whether the tomb of Joseph was intended to be the final resting-place, or whether the body was only placed in it temporarily because the feast of the Passover was at hand and the disciples intended to remove it to some other place after the Passover. But whatever may have been proposed, the Resurrection of Jesus Christ on the first day of the week, leaving the tomb empty, turned the attention of the disciples from the sepulchre to the living presence of their Master. After He had risen from the dead, the place of His burial does not appear to have had any attraction for His followers, and there is nothing in the writings of the first three centuries to lead us to suppose that the actual rock-cut tomb was regarded with any special feelings of veneration. Whether even a recollection of the site was preserved traditionally is doubtful. There have been many who consider that the early Christians could not have forgotten the exact locality of so important a place; on the contrary, others maintain that to the followers of Jesus Christ it was the fact of the Resurrection that was important and not the empty tomb; and that knowledge of the latter was lost during the vicissitudes from which Jerusalem suffered in the years succeeding the crucifixion. About forty years after the crucifixion, the great revolt of the Jewish people against the Romans took place, and ended with the siege and capture of Jerusalem by Titus. Prior to the siege, the Christians, following the orders of their Master,

had retired to the city of Pella, east of Jordan, and the date of their return to Jerusalem is uncertain. Whether any of the disciples returned after the triumph of the Romans and recognized the tomb of Christ is matter of conjecture.

Among the temples built by Hadrian about A.D. 135 was one dedicated to Aphrodite or Venus; it was erected at that place where the church of the Holy Sepulchre now stands, but it is impossible to say whether it was purposely so placed because it was the site of the tomb of the Lord, or whether the selection of this position was accidental. The extent of the walls of Aelia Capitolina is not known with any accuracy, but it is probable that the northern wall followed the same line as the present north wall of Jerusalem, and therefore that the site of the temple of Aphrodite was then within the walls. Although it is doubtful whether the Christians returned to Jerusalem immediately after the destruction of the city by Titus, they were certainly there when Hadrian built Aelia Capitolina; according to Epiphanius, they had a small place of worship on Sion at the place where Jesus Christ ate the Last Supper. Eusebius also states that the Christians worshipped at the Mount of Olives where Jesus instructed His disciples, but no writer up to the time of Constantine speaks of the tomb, or of worship being performed there.

Constantine the Great became emperor of Rome in A.D. 306, and was converted to Christianity six years afterwards. Embracing his new religion with enthusiasm he attributed his victories to the power of the Divine Cross, which was placed on the ensigns of the army. After the great council of the Church had been held at Nicaea in A.D. 325, the emperor decided to find the sites of the crucifixion and resurrection at Jerusalem, and to build a church at this place. Full descriptions of the discovery of the Holy Sepulchre and of the churches that were built are given by Eusebius in his *Life of Constantine*, but it is difficult to say from his account if the main object of Constantine was to find the sepulchre of the Lord or the cross upon which He suffered. Eusebius does not mention the cross directly and lays more stress on the recovery of the sepulchre; whereas later writers imply that the great wish of the emperor and of his mother Helena, who visited Jerusalem for the purpose, was to find the Holy Cross. The task of searching for the tomb and the cross was entrusted to Bishop Macarius. Whether the bishop was guided in his selection of the site by tradition or not is difficult to say, but he decided that the desired place was under Hadrian's temple of Aphrodite. By imperial order the temple was removed, and a rock-cut Jewish tomb, which lay below, was identified as the sepulchre of the Lord. In another cavity in the rock, 280 ft. to the east, three crosses were discovered, which were assumed to be the crosses upon which Jesus Christ and the two thieves were crucified, the cross of Jesus being identified by its power of healing the sick. Immediately on the receipt of the intelligence of this remarkable discovery, the emperor wrote to Macarius, ordering the erection of magnificent buildings on the site. Two churches were built, one over the tomb, and the second, which was larger and grander, over the place where the crosses had been found. Between the two churches was a small hill, which was identified as Mount Golgotha. The ground surrounding the two churches was levelled and surrounded with porticoes or colonnades. The description of the buildings as detailed by Eusebius is rather obscure, but fortunately there still exists, in the church of Santa Pudenziana at Rome, a mosaic, supposed to have been originally executed in the 4th or 5th century, which shows the buildings clearly. The church of the Anastasis or Holy Sepulchre is herein delineated as a round church with a domed roof; the church of the Martyrion or Holy Cross, as a polygonal building, also with a domed roof; while between the two churches is Mount Golgotha, with the cross erected upon it. In another ancient mosaic, which still exists in a church of Madeba, east of the Jordan, a map of Palestine is represented which contains a rough plan of the walls and gates of Jerusalem. In this plan, also, it is possible to recognize the churches built by Constantine. The Bordeaux pilgrim who visited Jerusalem about A.D. 333, when the church of the Holy Sepulchre was in course of construction, describes the place, which was evidently the same as that on which the existing church of the Holy Sepulchre stands. There can, therefore, be no reasonable doubt that the present site is that which was fixed upon by Bishop Macarius in the time of Constantine.

The churches were completed about A.D. 336, and were doubtless visited by numbers of pilgrims. Among these a lady from the west of Europe, who is supposed to have been St Sylvia of Aquitania and who came to Jerusalem about A.D. 385, fortunately kept a diary of her travels, and she identifies very distinctly the great church of the Cross, the church of the Holy Sepulchre, and Mount Calvary between them. In A.D 614 Jerusalem was captured by the Persians under Chosroes II., who did considerable damage to the churches, but they were repaired by Modestus after the defeat of the Persians by the emperor Heraclius. The caliph Omar, who captured the city in 636, behaved with leniency to the Christians, and left them in undisputed possession of the church of the Holy Sepulchre. In 1010 the third Fatimite caliph Hakim practically destroyed it. It is remarkable that from the beginning of the 8th century, while the church of the Holy Sepulchre is always mentioned in the accounts written by visitors to Jerusalem, the church of the Cross seems to have ceased to exist, although the place where the crosses were found was shown to pilgrims, and a church was built on Mount Calvary. After the capture of Jerusalem by the Crusaders in A.D. 1099, the church of the Holy Sepulchre was repaired and enlarged by the addition of a nave and chancel, and other churches were erected, so that the Holy Sepulchre became the centre of a group of ecclesiastical buildings and has so remained up to the present time.

The Authenticity of the Traditional Site.—From early times doubts have arisen as to whether the tomb discovered by Bishop Macarius was the veritable sepulchre. As early as 754, when the pilgrim Wildebald visited Jerusalem, he remarked, in describing the Holy Places, that "Calvary was formerly outside the city, but that the Empress arranged that place so that it should be within the city Jerusalem." Saewulf in 1102, Wilbrand of Oldenburg in 1211, Jacques de Vitry in 1226, and Burchard of Mount Sion in 1283, had evidently some doubts about the site, and explained the difficulty by suggesting that Hadrian had enclosed it within the walls but that it was outside before he rebuilt the city. Jacques le Saige in 1518, Gretzer in 1598, and F. Quaresmius in 1639, also alluded to the difficulty felt by some in believing in the traditional site. Monconys in 1647 stated that Calvary was formerly outside Jerusalem, but that it was now in the centre of the city, which was smaller than at the time of the crucifixion. In 1738 Jonas Korte of Altona visited Jerusalem and published a book on his travels, in which he expressed the view that the Calvary shown to visitors could not be the true Calvary because it was in the middle of the town. He placed the true site to the west of Jerusalem, near the Birket Mamilla which lies ½ m. west of the Jaffa gate. This view was supported by J. F. Plessing in 1789. Dr E. Clarke in 1812 came to the conclusion that Calvary was outside the Sion gate, while Dr E. Robinson, who published his *Biblical Researches in Palestine* in 1841, expressed himself satisfied that the traditional site could not be the true one, but did not venture to suggest an alternative. In 1842 Otto Thenius asserted that the crucifixion must have taken place on the north of Jerusalem on the rising ground outside the Damascus gate above the quarry known as Jeremiah's Grotto. Thenius considered that the Holy Sepulchre was on the west side of this hill, and his views were adopted by a number of later writers, including Canon Tristram, Dr Selah Merrill, Fisher Howe and General C. G. Gordon. Colonel C. R. Conder, R.E., who carried out the survey of Palestine under the Palestine Exploration Fund, also adopted the same hill as the probable scene of the crucifixion, but considered that the tomb of Christ was an ancient rock-cut tomb, about 200 yds. west of Jeremiah's Grotto. Since General Gordon gave his opinion in favour of the site, it has been adopted by many, and the tomb in the face of the hill is sometimes called "Gordon's Tomb of Christ" or "The Garden Tomb." A careful examination of the question, however, leads to the conclusion

that the sites are not probable either for Calvary or the tomb. The hill in question, though not far outside the present north wall of the city, is at too great a distance from the probable line of the second wall, which was the outside line of fortification at the time of the crucifixion. The quarry, known as Jeremiah's Grotto, is likely to be of later date than the third wall, which was built some years after the crucifixion, and the tomb identified as that of Christ has with good reason been attributed to the Christian rather than to the Jewish period. On the whole, therefore, the balance of argument is against the identification proposed by Thenius.

An entirely different theory regarding the site of the tomb of Christ was proposed by James Fergusson, the architect, who, in 1847, in his *Essay on the Ancient Topography of Jerusalem*, made the startling proposal that the Dome of the Rock, generally believed to have been erected by Abdalmalik (Abd el Melek) in A.D. 691, was the church built by the emperor Constantine over the Holy Sepulchre. He further elaborated his views in the interesting work entitled *The Temples of the Jews and other buildings in the Haram area at Jerusalem* (1878). Fergusson's proposal, which found a considerable number of supporters, was based on architectural evidence, and he maintained that the building must have been designed in the time of Constantine and could not have been constructed by the Mahommedans at the end of the 7th century. Fergusson's views were strongly supported by F. W. Unger in *Die Bauten Constantins des Grossen am Heiligen Grab zu Jerusalem*, published at Göttingen in 1863, but the objections to them on historical and topographical grounds are so considerable that they can hardly now be maintained. The theory involves placing the Temple of the Jews at the S.W. part of the Haram enclosure, and the explorations made by General Sir C. Warren showed conclusively that if the Temple had been in this position, it would have stood over the deepest part of the Tyropoeon Valley, and the foundations must have been of a most unnecessarily gigantic character. Sir C. Warren, in *The Temple and the Tomb*, 1880, replied *seriatim* to Fergusson's proposals. The historical evidence also is entirely against the latter, and the discovery of the Madeba mosaic, which, as has been already explained, shows the church of the Holy Sepulchre in the same position as at present, is another proof that the latter was not placed by Constantine on Mount Moriah.

The final conclusion that may be arrived at with regard to the authenticity of the traditional site of the Holy Sepulchre is as follows. It may be taken as certain that the present site is that which was adopted by Macarius as the correct one early in the 4th century, but there is not sufficient evidence to prove that this tomb was the one in which the body of Christ was laid, or that remembrance of the latter had been preserved during the three centuries that had elapsed between the time of the crucifixion and the conversion of Constantine. No other suggested site, however, has more claim to be the true one than that over which the church of the Holy Sepulchre now stands.

LITERATURE.—By far the most important of the many works which have been published on the subject is *Golgotha and the Holy Sepulchre*, by Sir C. W. Wilson (Palestine Exploration Fund, London, 1906). Sir C. Wilson was employed upon the Ordnance Survey of Jerusalem in 1864–1865, and made careful plans of the church of the Holy Sepulchre; he had an extensive knowledge of the question, and his work forms a valuable index to the topographical and historical considerations which are involved. Among ancient writers, see Eusebius, *The Life of Constantine*, *The Praise of Constantine*, *Theophania*; Rufinus (A.D. 345–410), *Ecclesiastical History*; Sulpicius Severus (A.D. 363–420), *Sacred History*; Sozomen (A.D. 375–450), *Ecclesiastical History*; Socrates (*circa* A.D. 379), *Ecclesiastical History*. The Publications of the Palestine Pilgrims' Text Society contain a collection of translations of the records of pilgrims, who visited the Holy Places after the erection of Constantine's churches; among these are included (the dates are approximate): The Bordeaux Pilgrim, A.D. 333; St Sylvia, A.D. 385; Eucherius, A.D. 440; Theodosius, A.D. 530; Antoninus Martyr, A.D. 530; Arculfus, A.D. 630; Willibald, A.D. 754; Bernard the Wise, A.D. 870; Saewulf, A.D. 1102; Burchard of Mount Sion, A.D. 1283; Ludolph von Suchem, A.D. 1350; Felix Fabri, A.D. 1483. Among the writers of the 16th, 17th and 18th centuries, see J. Gretzer, *Omnia opera* (Ingoldstadt, 1598); F. Quaresmius, *Historica, theologica et moralis Terrae Sanctae elucidatio* (Antwerp, 1639); T. Fuller, *A Pisgah Sight of Palestine* (London, 1650); B. de Monconys, *Journal des voyages* (Paris, 1665); A. Bynœus, *De morte Jesu Christi* (Amsterdam, 1698); J. Korte, *Reise nach dem weiland Gelobten Lande* (2nd ed., Altona, 1743); J. F. Plessing, *Über Golgotha und Christi Grab* (Halle, 1789). Of the numerous writers of the 19th century some of the more important are: E. D. Clarke, *Travels in the Holy Land* (Cambridge, 1823); F. R. de Chateaubriand, *Itinéraire de Paris à Jerusalem* (Paris, 1837); E. Robinson, *Biblical Researches in Palestine* (London, 1841 and 1856); O. Thenius, "Golgatha et Sanctum Sepulchrum" in *Zeitschrift für die historische Theologie* (1842); J. Fergusson, *The Ancient Topography of Jerusalem* (London, 1847), *The Holy Sepulchre and the Temple* (1865), *The Temples of the Jews* (1878); G. Williams, *The Holy City* (2nd ed., London, 1849); Hayter Lewis, *The Holy Places of Jerusalem* (London, 1888); J. T. Barclay, *The City of the Great King* (1857); F. Bovet, *Voyage en Terre Sainte* (Paris, 1862); F. W. Unger, *Die Bauten Constantins des Grossen am Heiligen Grabe zu Jerusalem* (Göttingen, 1863); General Sir C. Warren, G.C.M.G., *The Recovery of Jerusalem* (London, 1871), *The Temple and the Tomb* (1880); Colonel C. R. Conder, R.E., *Handbook to the Bible* (London, 1887); General C. G. Gordon, C.B., *Reflections in Palestine* (London, 1884); C. Clermont Ganneau, *Archaeological Researches in Palestine* (London, 1899); C. Mommert, *Golgatha und das Heilige Grab zu Jerusalem* (Leipzig, 1900). See also articles in *The Quarterly Statement of the Palestine Exploration Fund*; Hasting's *Dictionary of the Bible*; Smith's *Dictionary of the Bible*; *Recueil d'archéologie orientale*; *Zeitschrift des Deutschen Palästina-Vereins*. A large scale plan of the church of the Holy Sepulchre forms part of the *Survey of Jerusalem*, published by the Ordnance Survey, Southampton. (C. M. W.)

SEQUANI, in ancient geography, a Celtic people who occupied the upper basin of the Arar (Saône), their territory corresponding to Franche-Comté and part of Burgundy. Before the arrival of Caesar in Gaul, the Sequani had taken the part of the Arverni against their rivals the Aedui and hired the Germans under Ariovistus to cross the Rhine and help them (71 B.C.). But although his assistance enabled them to defeat the Aedui, the Sequani were worse off than before, for Ariovistus deprived them of a third of their territory and threatened to take another third. The Sequani then appealed to Caesar, who drove back the Germans (58), but at the same time obliged the Sequani to surrender all that they had gained from the Aedui. This so exasperated the Sequani that they joined in the revolt of Vercingetorix (52) and shared in the defeat at Alesia. Under Augustus, the district known as Sequania formed part of Belgica. After the death of Vitellius, the inhabitants refused to join the Gallic revolt against Rome instigated by Julius Civilis and Julius Sabinus, and drove back Sabinus, who had invaded their territory. A triumphal arch at Vesontio (Besançon), which in return for this service was made a colony, possibly commemorates this victory. Diocletian added Helvetia, and part of Germania Superior to Sequania, which was now called Provincia maxima Sequanorum, Vesontio receiving the title of Metropolis civitas Vesontiensium. Fifty years later Gaul was overrun by the barbarians, and Vesontio sacked (355). Under Julian it recovered some of its importance as a fortified town, and was able to withstand the attacks of the Vandals. Later, when Rome was no longer able to afford protection to the inhabitants of Gaul, the Sequani became merged in the newly formed kingdom of Burgundy.

See T. R. Holmes, *Caesar's Conquest of Gaul* (1899), p. 483; A. Holder, *Altceltischer Sprachschatz*, ii. (1904); Mommsen, *Hist. of Rome* (Eng. trans.), bk. v. ch. vii.; Dunod de Charnage, *Hist. des Séquanois* (1735); J. D. Schöpflin, *Alsatia illustrata*, i. (1751; French trans. by L. W. Ravenèz, 1849).

SEQUEIRA, DOMINGO ANTONIO DE (1768–1837), Portuguese painter, was born at Lisbon in 1768, and studied art first at the academy of Lisbon, and subsequently under A. Cavallucci in Rome. By the age of thirteen he had evinced such marked talent that F. de Setubal employed him as assistant in his work for the Joao Ferreiras Palace. Sequeira sojourned in Rome from 1788 to 1794, when he was made honorary member of the Academy of St Luke. After another two years' travel and study in Italy, he returned to his native country preceded by so great a reputation that important commissions for churches and palaces were immediately entrusted to him—scriptural subjects, large historical compositions and cabinet pictures. In 1802 he was appointed first court painter, in which capacity he executed many works

for the prince regent, for Donna Maria Teresa, and for the members of the court. He designed the valuable silver service which was presented by the Portuguese nation to Wellington, and a monument that was erected in 1820 in the Rocio square at Lisbon. In 1823 he visited Paris, where he is known to have tried his skill in lithography and etching. The last years of his life he spent in Rome, devoting himself chiefly to devotional subjects and to his duties as head of the Portuguese Academy. He died in Rome in 1837. His best-known pictures are the "Last Moments of the Poet Camoens," "Flight into Egypt," "Ugolino," the "St Bruno" at the Lisbon Academy, and the "Descent from the Cross." Numerous paintings by Sequeira are in the royal palace at Mafra, the convent of Laveinas, the new palace of Ajuda, and in the principal palaces and churches of Lisbon.

SEQUESTER, VIBIUS (4th or 5th century, A.D.), the supposed author of an alphabetical list of geographical names occurring in the Roman poets, with special reference to Virgil, Ovid and Lucan. Several of the names given cannot be traced; unless this is the result of carelessness or ignorance, the compiler must have had access to sources no longer extant.

Editions by C. Bursian (Zürich, 1867), and in A. Riese, *Geographi Latini minores* (1878); see also Teuffel, *Hist. of Roman Literature* (Eng. trans., 1900), 445, 1.

SEQUESTRATION, the act of removing, separating or seizing anything from the possession of its owner, particularly in law, of the taking possession of property under process of law for the benefit of creditors or the state. The Latin *sequestrare,* to set aside or surrender, a late use, is derived from *sequester,* a depositary or trustee, one in whose hands a thing in dispute was placed till the dispute was settled; this was a term of Roman jurisprudence (cf. *Digest* L. 16,115). By derivation it must be connected with *sequi,* to follow; possibly the development in meaning may be follower, attendant, intermediary, hence trustee. In English "sequestered" means merely secluded, withdrawn. In law, the term "sequestration" has many applications; thus it is applied to the act of a belligerent power which seizes the debts due from its own subject to the enemy power; to a writ directed to persons, "sequestrators," to enter on the property of the defendant and seize the goods (see EXECUTION); to the action of taking profits of a benefice to satisfy the creditors of the incumbent. As the goods of the Church cannot be touched by a lay hand, the writ is issued to the bishop, and he issues the sequestration order to the churchwardens who collect the profits and satisfy the demand. Similarly when a benefice is vacant the churchwardens take out sequestration under the seal of the Ordinary and manage the profits for the next incumbent. In the Scots law of bankruptcy the term "sequestration" is used of the taking of the bankrupt's estate by order of the court for the benefit of the creditors (see BANKRUPTCY, § *Scottish Bankruptcy Legislation*).

SEQUIN (the French form of Ital. *zecchino, zecchino d' oro*), the name of a Venetian gold coin, first minted about 1280, and in use until the fall of the Venetian Republic. It was worth about nine shillings. It bore on the obverse a figure of St Mark blessing the banner of the republic, held by a kneeling doge, and on the reverse a figure of Christ. Milan and Genoa also issued gold sequins. The word in Italian was formed from *zecca,* Span. *zeca,* a mint, an adaptation of Arabic *sikka,* a die for coins. In the sense of "newly-coined," the Hindi or Persian *sikka,* anglicised *sicca,* was specifically used of a rupee, containing more silver than the East India Company's rupee, coined in 1793 by the Bengal government. The "sicca-rupee" ceased to be circulated after 1836. The term "sequin" is now used for small disks made of thin pieces of metal, tinfoil, celluloid or other composite material, highly glazed and brightly coloured, and applied as trimming for ladies' dresses.

SEQUOIA, a genus of conifers, allied to *Taxodium* and *Cryptomeria,* forming one of several surviving links between the firs and the cypresses. The two species are evergreen trees of large size, indigenous to the west coast of North America. Both bear their round or ovoid male catkins at the ends of the slender terminal branchlets; the ovoid cones, either terminal or on short lateral twigs, have thick woody scales dilated at the extremity, with a broad disk depressed in the centre and usually furnished with a short spine; at the base of the scales are from three to seven ovules, which become reversed or partially so by compression, ripening into small angular seeds with a narrow wing-like expansion.

The redwood of the Californian woodsmen, *S. sempervirens,* on which the genus was originally founded by Stephan Endlicher, abounds on the Pacific coast from the southern borders of Oregon southward to about 12 m. south of Punta Gorda, Monterey county, California, forming a narrow mountain forest belt, rarely extending more than 20 or 30 m. from the coast or beyond the influence of ocean fogs, or more than 3000 ft. above sea-level (see C. S. Sargent, *Silva of North America,* vol. x.). It grows to a gigantic size, from 200 to 300 ft. or more in height, with a diameter of from 12 to 15, or rarely 20 to 28 ft. at the much-



Sequoia sempervirens—*a,* Branch with green cones and male catkins; *b,* Section of cone; *c,* Scale of cone. All slightly reduced.

buttressed base. Professor Sargent refers to it as the tallest American tree, which probably occasionally reaches 400 ft. or more in height. In old age the huge columnar trunk rises to a great height bare of boughs, while on the upper part the branches are short and irregular. The bark is red, like that of the Scots fir, deeply furrowed, with the ridges often much curved and twisted. When young the tree is one of the most graceful of the conifers: the stem rises straight and tapering, with somewhat irregular whorls of drooping branches, the lower ones sweeping the ground—giving an elegant conical outline. The twigs are densely clothed with flat spreading linear leaves of a fine glossy green above and glaucous beneath; in the old trees they become shorter and more rigid and partly lose their distichous habit. The cones, from ¾ to 1 in. long, are at first of a bluish-green colour, but when mature change to a reddish brown; the scales are very small at the base, dilating into a broad thick head, with a short curved spine below the deep transverse depression. From the great size of the trunk and the even grain of the red cedar-like wood it is a valuable tree to the farmer and carpenter: it splits readily and evenly, and planes

and polishes well; cut radially, the medullary plates give the wood a fine satiny lustre; it is strong and durable, but not so elastic as many of the western pines and firs. Professor Sargent describes it as the most valuable timber tree of the forests of Pacific North America. In England the tree grows well in warm situations, but suffers much in severe winters—its graceful form rendering it ornamental in the park or garden, where it sometimes grows 30 or 40 ft. in height; its success as a timber tree would be doubtful. In the eastern parts of the United States it does not flourish. It was discovered by Archibald Menzies in 1795 and was first described as *Taxodium sempervirens*, under which name it was known until distinguished by Stephan Endlicher as a new genus in 1847.

The only other member of the genus is the giant tree of the Sierra Nevada, *S. gigantea*, the largest of known conifers; it is confined to the western portion of the great Californian range for a length of about 260 m., at an altitude of from 5000 to 8400 ft. above the sea, and forms extensive forests, or, in the northern part of the area, isolated groves, such as the Calaveras Grove, the Mariposa Grove, and others. The leaves of this species are awl-shaped, short and rigid, with pointed apex; closely adpressed, they completely cover the branchlets. The male catkins are small, solitary, and are borne at the ends of the twigs; the cones are from 1½ to 3 in. long, ovoid, with scales thicker at the base than those of the redwood, and bearing below the depression a slender prickle. The young tree is more formal and rigid in growth than *S. sempervirens*, but when old the outline of the head becomes cylindrical, with short branches sparsely clad with foliage sprays. The bark, of nearly the same tint as that of the redwood, is extremely thick and is channelled towards the base with vertical furrows; at the root the ridges often stand out in buttress-like projections. The average height is about 275 ft. with a diameter near the ground of 20 ft.; but specimens from 300 to 320 ft. tall, with trunks 25-35 ft. thick, are not rare.

The famous group known as the Mammoth Grove of Calaveras in California, containing above ninety large trees, stands in 38° N., about 4370 ft. above the sea, between the San Antonio and Stanislaus rivers. It was discovered by a hunter named Dowd in pursuit of a bear in 1852, but had been visited before by John Bidwill, who crossed the Sierra in 1841. Some trees in the Mariposa Grove rival these in size: one measures 101 ft. round the root, and a cut stump is 31 ft. in diameter. Gigantic as these trees are and imposing from their vast columnar trunks, they have little beauty, owing to the scanty foliage of the short rounded boughs; some of the trees stand very close together; they are said to be about four hundred in number. The age of the trees has been greatly overestimated. A few years ago a full-sized tree was felled in Tresno county, California, and contiguous transverse sections have been set up, one in the Museum of Natural History at New York, the other (upper one) in the British Museum of Natural History at South Kensington; the annual rings of the latter section have been carefully counted and found to indicate an age of 1335 years.

The growth of the "mammoth tree" is fast when young, but old trees increase with extreme slowness. The timber is not of great value, but the heartwood is dense and of deeper colour than that of *S. sempervirens*, varying from brownish red to very deep brown; oiled and varnished, it has been used in cabinet work. *S. gigantea* was brought to England by Lobb in 1853, and received from Dr Lindley the name of *Wellingtonia*, by which it is still popularly known, though its affinity to the redwood is too marked to admit of generic distinction. In America it is sometimes called *Washingtonia*. In the Atlantic States it does not succeed; and, though nearly hardy in Great Britain, it is planted only as an ornament of the lawn or paddock.

In early geological times the sequoias occupied a far more important place in the vegetation of the earth. They occur in the Lower Chalk formations, and in Tertiary times were widely diffused; the genus is represented in the Eocene flora of Great Britain, and in the succeeding Miocene period was widely distributed in Europe and western Asia. It is presumed that in the Glacial epoch the genus was exterminated except in the areas in western North America where it still persists.

SERAING, a town of Belgium in the province of Liége, adjoining the city of that name. Pop. (1904) 39,843. It lies on the right bank of the Meuse above Liége, with which it is connected by rail and tramway. Seraing owes all its prosperity and importance to the firm founded by John Cockerill, an Englishman, in 1817, with the co-operation of King William I. of the Netherlands, who provided half the capital. The Cockerill family has long disappeared, and the enterprise is now known as "the John Cockerill Company." It is one of the largest factories of engines and machinery—apart from war material—on the continent. Its headquarters occupy the old summer palace of the prince-bishops of Liége. In 1890 it established a branch at Hoboken on the Scheldt for the purpose of undertaking shipbuilding. The company employs 14,000 hands.

SERAJEVO (pronounced SERÁJEVO, "the city of palaces"; Turkish, *Bosna Serai*; Ger. *Sarajewo*; Ital. *Seraglio*), the capital of Bosnia, situated on the Miljačka, a small right-hand tributary of the Bosna and on the railway from Bosna-Brod, 167 m. N., to Ragusa. Pop. (1895) 37,713, chiefly Serbo-Croatians, with small colonies of gipsies and Jews. The city, frequently called the "Damascus of the North," spreads over a narrow valley, closed on the east by a semicircle of rugged hills. Though still half oriental, and wholly beautiful, with its Turkish bazaar, its hundred mosques, wooden houses and cypress groves, it was largely rebuilt, after 1878, in western fashion. The river was also canalized, a telephone service introduced, and extensive drainage works carried out. Serajevo is the seat of the provincial government, of a Roman Catholic bishop, an Orthodox metropolitan, the highest Moslem ecclesiastical authority or *Reis-el-ulema*, and the supreme court. It is the centre of Bosnian education, containing the celebrated orphanage founded in 1869 by Miss Irby and Miss Mackenzie (afterwards Lady Sebright); the *Scheriat-Schule*, which derives its name from the Turkish code or *scheri*, and is maintained by the state for Moslem law-students; a gymnasium, a technical institute and a teachers' training-college. The *Begova Djamia* (*Džamia*), or mosque of Husref Bey, is only surpassed, among European mosques, by those of Adrianople and Constantinople. It was founded, in 1465, by Husref or Usref, pasha of Bosnia. The castle and barracks, occupied by an Austrian garrison, stand on a cliff commanding a fine view of the city. Other noteworthy buildings are the *konak* or governor's residence, the Roman Catholic and Orthodox cathedrals, the hospital, the townhall and the museum, with fine antiquarian and natural history collections. In the *Sinan Tekke* or Dervish monastery the ceremonies of the howling and dancing Dervishes may be witnessed. Turkish baths and cafés are numerous. The bazaar, or *čaršija*, is a labyrinth of dark lanes, lined with booths, where embroideries, rugs, embossed fire-arms, filagree-work in gold and silver, and other native wares are displayed. There are also large potteries, silk-mills, a brewery and a tobacco factory. At the mineral baths of Ilidze near the city, where many Roman remains have been found, a hydropathic establishment was opened in 1899. The whole neighbourhood is rich in prehistoric remains.

Founded, in 1262, by the Hungarian General Cotroman, under the name of Bosnavar or Vrhbosna, Serajevo was enlarged by Husref Bey two centuries later, and takes its name from the palace (Turkish, *serai*), which he founded. During the wars between Turkey and Austria, its ownership was often contested; and it fell before King Matthias I. of Hungary in 1480, and before Prince Eugene of Savoy in 1697. Destructive fires laid it waste in 1480, 1644, 1656, 1687 and 1789. It was chosen as the seat of Turkish government in 1850, instead of Travnik. In 1878 it was seized by the Austrians, under Baron Philippović.

SERAMPUR, a town of British India, in the Hugli district of Bengal, on the right bank of the river Hugli, opposite Barrackpore, on the East Indian railway, 12 m. from Howrah. Pop. (1901) 44,451. A Danish factory was established here about the middle of the 17th century, and called by them Frederiksnagar. With the rest of the Danish possessions in India, it was acquired by purchase by the English in 1845. Serampur was the home of the Baptist mission founded by Carey. The mission press has been transferred to Calcutta, but a training college is

still maintained by the mission. There is a jute mill, and paper is manufactured.

SERAO, MATILDA (1856–), Italian novelist, was born at Patras in Greece. Her father was an Italian, a political emigrant, and her mother a Greek. She began by becoming a schoolmistress at Naples, and afterwards she described those years of laborious poverty in the preface to a book of short stories called *Leggende Napolitane* (1881). But attention was first attracted to her name by her *Novelle*, published in a paper of Rocco de Zerbi's, and later by her first novel, *Fantasia* (1883), which definitely established her as a writer full of feeling and analytical subtlety. She spent the years between 1880 and 1886 in Rome, where she published her next five volumes of short stories and novels, all dealing with ordinary Italian, and especially Roman, life, and distinguished by great accuracy of observation and depth of insight: *Cuore Inferno* (1881), *Fior di Passione* (1883), *La Conquista di Roma* (1885), *La Virtù di Checchina* (1884), and *Piccole Anime* (1883). With her husband, Epoardo Scarfoglio, she founded *Il Corriere di Roma*, the first Italian attempt to model a daily journal on the lines of the Parisian press. The paper was short-lived, and when it was given up Matilda Serao established herself in Naples, where she edited *Il Corriere de Napoli*, and in 1891 founded *Il Mattino*, which became the most important and most widely read daily paper of southern Italy. But the stress of a journalistic career in no way limited her literary activity; between 1890 and 1902 she produced *Paese di Cuccagna*, *Ventre di Napoli*, *Addio Amore*, *All' Erta Sentinella*, *Castigo*, *La Ballerina*, *Suor Giovanna della Croce*, *Paese di Gesu*, novels in which the character of the people is rendered with minute sensitive power and sympathetic breadth of spirit. Most of these have been translated into English.

Matilda Serao's place as a contemporary Italian novelist is one apart: she is a naturalist, but her naturalism should be understood in a much wider sense than that which is generally given to it. She is a naturalist because her books reflect life with the utmost simplicity of means, sometimes with an utter neglect of means, and at the same time she is an idealist through her high sense of the beauty and nobility which humanity can attain, and to which her writings continually aspire. All her work is truly and profoundly Italian; it is the literature of a great mass of individuals, rather than of one peculiarly accentuated individual; the joy and pain of a whole class rather than the perplexities of a unique case or type pulsates through her pages. Matilda Serao's defects are always defects of style; her want of sufficient choice of detail often clogs the movement of her narrative and mars the artistic effect of her always animated pages. Like Fogazzaro's, her speech is too often the popular speech of her particular province, in description as well as in dialogue.

SERAPHIM, the imaginary supernatural guardians of the threshold of Yahweh's sanctuary, only mentioned in Isa. vi. (Isaiah's vision). Their form is not described, but they have not only six wings (verse 2), but hands (verse 6) and feet (verse 2). They are of colossal height, for they overtop Him who is seated on the high throne; and with a voice that shakes the thresholds they proclaim the *Trisagion*, like the four "living creatures" (cf. CHERUBIM) in Rev. iv. 6-8. Probably in the lost Hebrew text of Enoch xx. 7 "seraphim" stood where the Ethiopic and the Greek give "the serpents" or "the dragons"; Paradise, serpents and cherubim are here made subject to Gabriel. In late Jewish writings, more recognized than "Enoch," they are classed among the celestials with the cherubim and the 'ophannim ("wheels," cf. Ezek. i.). Now as to their origin and significance. They may originally have had a serpent form, for it is difficult not to regard "seraphim" as originally (as in Num. xxi. 8) = "serpents"; cf. also the flying serpents of Israelitish folklore in Isa. xiv. 29. If so, Isaiah has transformed and ennobled these supernatural guardians of sacred things and persons. The "Nehushtan" broken in pieces under Hezekiah (2 Kings xviii. 4) may have given an impulse to the prophet's imagination. Was it not a greater thing to ennoble them than to destroy their artistic representation? There is no precise Babylonian or Egyptian equivalent, though attempts have been made to produce points of contact with Babylonian or Egyptian beliefs.

See further *Enc. Bib.* "Seraphim," and cf. Duhm's *Jesaia*, ed. 2 (1902), on Isa. vi. (T. K. C.)

SERAPION, or SARAPION (*flor. c.* 350), bishop of Thmuis in the Nile Delta and a prominent supporter of Athanasius in the struggle against Arianism (sometimes called, for his learning, Scholasticus), is best known in connexion with a prayer-book or sacramentary intended for the use of bishops. This document, contained in a collection of Egyptian documents in an 11th-century MS. at the Laura on Mount Athos, was published by A. Dmitrijewskij in 1894, but attracted little attention until independently discovered and published by G. Wobbermin in 1899. It is a celebrant's book, containing thirty prayers belonging to the mass (19-30, 1-6), baptism (7-11, 15, 16), ordination (12-14), benediction of oil, bread and water (17), and burial (18), omitting the fixed structural formulae of the rites, the parts of the other ministers, and almost all rubrication, except what is implied in the titles of the prayers. The name of Serapion is prefixed to the anaphora of the mass (1) and to the group 15-18: but whether this indicates authorship is doubtful; for whereas the whole collection is bound together by certain marks of vocabulary, style and thought, 15-18 have characteristics of their own not shared by the anaphora, while no part of the collection shows special affinities with the current works of Serapion.[1] But his name is at least a symbol of probable date and provenance: the theology, which is orthodox so far as it goes, but "conservative," and perhaps glancing at Arianism, shows no sign that the Macedonian question has arisen; the doxologies, of a type abandoned by the orthodox, and by *c.* 370 treated by Didymus of Alexandria as heretical; the apparent presupposition that the population is mainly pagan (1, 20); the exclusive appropriation of the mass to Sunday (19; cp. Ath. *ap. c. Ar.* 11), whereas the liturgical observance of Saturday prevailed in Egypt by *c.* 380; the terms in which monasticism is referred to—together point to *c.* 350: the occurrence of official interpreters (25) points to a bilingual Church, *i.e.* Syria or Egypt; and certain theological phrases (ἀγέννητος, ἐπιδημία, μόνη καθολικὴ ἐκκλησία) characteristic of the old Egyptian creed, and the liturgical characteristics, indicate Egypt; while the petition for rains (23), without reference to the Nile-rising, points to the Delta as distinguished from Upper Egypt. The book is important, therefore, as the earliest liturgical collection on so large a scale, and as belonging to Egypt, where evidence for 4th-century ritual is scanty as compared with Syria.

The rites form a link between those of the *Egyptian Church Order* (a 3rd- or early 4th-century development of the Hippolytean Canons, which are perhaps Egyptian of *c.* 260) and later Egyptian rites—marking the stage of development reached in Egypt by *c.* 350, while exhibiting characteristics of their own. I. The Mass has the Egyptian notes—a prayer before the lections, elsewhere unknown in the East; an exceptionally weighty body of intercessions after the catechumens' dismissal, followed by a penitential act, probably identical with the ἐξομολόγησις of *Can. Hippol.* 2, which disappeared in later rites; a setting of the Sanctus found in several Egyptian anaphoras; the close connexion of the commemorations of the offerers and of the dead; and the form of the conclusion of the anaphora. The structure of the communion—with a prayer before and prayers of thanksgiving and blessing after—shows that Egypt had already developed the common type, otherwise first evidenced in Syria, *c.* 375 (*Ap. Const.* viii. 13). Among the special characteristics of Serapion are the simplicity of the Sanctus, and of the Institution, which lacks the dramatic additions already found in *Ap. Const.*; the interpolation of a passage containing a quotation from *Didachē* 9 between the institutions of the bread and of the chalice; the form of the ἀνάμνησις; and the invocation of the Word, not of the Holy Ghost, to effect consecration. That the Lord's Prayer before communion is not referred to may be only because it is a fixed formula belonging to the structure of the rite. II. The Order of Baptism has a form for the consecration of the water, and a preliminary prayer for the candidates, perhaps alluding to their exorcism; a prayer

[1] These are: a vigorous and acute refutation of the Manichaeans, and some letters. A book on the titles of the Psalms has not survived.

for steadfastness following the renunciation and the confession of faith; the form of anointing with oil; appropriate prayers preceding and following the act of baptism; and the prayer of confirmation with imposition of the hand, chrism and crossing. All this corresponds to and fills up the outline of the *Church Order* and allusions in 4th-century writers, and is in line with later Egyptian rites. III. Forms of Ordination are provided only for deacons, presbyters and bishops, the orders of divine institution (12). They are concise, but of the normal type. That for deacons (12) commemorates St Stephen, invokes the Holy Ghost, and prays for the gifts qualifying for the diaconate. That for presbyters (13) recalls the Mosaic LXX, invokes the Holy Ghost, and asks for the gifts qualifying for administration, teaching, and the ministry of reconciliation. That for bishops (14) appeals to the mission of our Lord, the election of the apostles, and the apostolic succession, and asks for the "Divine Spirit" conferred on prophets and patriarchs, that the subject may "feed the flock" "unblamably and without offence continue in" his office. The minor orders, interpreters, readers and subdeacons (25) are evidently, as elsewhere in the middle of the 4th century, appointed without sacramental ordination. IV. The use of exorcised or blessed oil, water and bread is fully illustrated by the lives of the fathers of the desert (cp. the Gnostic use, Clem. Al. *Excerpta* 82). Serapion has a form of benediction of oil and water (5) offered in the mass (like *Can. Hippol.* and *Ch. Ord.* for oil), probably for the use of individual offerers. A longer form for all three matters (17) perhaps has in view the general needs of the Church in the visitation of the sick. The occurrence in both prayers of "the Name" and the commemoration of the Passion, Resurrection, &c., corresponds with early allusions, in Origen and elsewhere, to the usual form of exorcism. V. For burial of the dead Serapion gives a prayer for the departed and the survivors (18). But the funeral procession is alluded to (ἐκκομιζομένου), and in the mass (1) the particular commemoration of departed persons is provided for. Hence we have the elements of the 4th-century funeral, as we know it in Egypt and elsewhere: a preliminary office (of readings and psalms) to which the prayer belongs, the procession (with psalmody) to the cemetery, the burial and the mass *pro domitione*.

AUTHORITIES.—Dmitrijewskij in *Trudy* (Journal of the Eccl. Acad. of Kiev, 1894), No. 2; separately (Kiev, 1894); reviewed by A. Pavlov, Χρονικὰ Βυζαντινά, i. 207-213; cp. *Byzant. Zeitschr.* iv. 1 (1895), p. 193; G. Wobbermin in Harnack-Gebhardt, *Texte u. Untersuch.*, new series, ii. 3 *b* (1899); P. Drews, "Über Wobbermins Altchristliche liturgische Stücke aus d. Kirche Ägyptens" in *Zeitschr. f. Kirchen-Geschichte*, xx. 4 (Oct. 1899, Jan. 1900); F. E. Brightman, "The Sacramentary of Serapion of Thmuis" in *Journal of Theological Studies*, i. and ii. (Oct. 1899, Jan. 1900); J. Wordsworth, *Bishop Serapion's Prayer-Book* (London, 1899); P. Batiffol in *Bulletin de lit. ecclés.* p. 69 sqq. (Toulouse, 1899). (F. E. Br.)

SERAPIS, the famous Graeco-Egyptian god. The statue of Serapis in the Serapeum of Alexandria was of purely Greek type and workmanship—a Hades or Pluto enthroned with a basket or corn measure on his head, a sceptre in his hand, Cerberus at his feet, and (apparently) a serpent. According to Plutarch, Ptolemy Soter stole it from Sinope, having been bidden by the unknown god in a dream to bring him to Alexandria. On its arrival the statue was pronounced to be Serapis by two experts in religious matters: the one the Eumolpid Timotheus, the other the Egyptian Manetho. This story may not be true (some contend that Sinope as the provenance of the statue originated in the hill of Sinopeion, *i.e.* place of Apis (?), a name given to the site of the Serapeum at Memphis), but there is little doubt that Ptolemy Soter fixed the iconic type to serve for the god of the new capital of Egypt, where it was soon associated with Isis and Harpocrates in a triad. His policy was evidently to find a deity that should win the reverence alike of Greeks and Egyptians. The Greeks of that day would have had little respect for a grotesque Egyptian figure, while the Egyptians were more willing to accept divinity in any shape. A Greek statue was therefore chosen as the idol, and it was proclaimed as the anthropomorphic equivalent of a much revered and highly popular Egyptian beast-divinity, the dead Apis, assimilated to Osiris. The Greek figure probably had little effect on the native ideas, but it is likely that it served as a useful link between the two religions. The god of Alexandria soon won an important place in the Greek world. The anthropomorphic Isis and Horus were easily rendered in Greek style, and Anubis was prepared for by Cerberus. The worship of Serapis along with Isis, Horus and Anubis spread far and wide, reached Rome, and ultimately became one of the leading cults of the west. The destruction in A.D. 385 of the Serapeum of Alexandria, and of the famous idol within it, after the decree of Theodosius, marked the death-agony of paganism throughout the empire.

It is assumed above that the name Serapis (so written in later Greek and in Latin, in earlier Greek Sarapis) is derived from the Egyptian Userhapi—as it were Osiris-Apis—the name of the bull Apis, dead and, like all the blessed dead, assimilated to Osiris, king of the underworld. There is no doubt that Serapis was before long identified with Userhapi; the identification appears clearly in a bilingual inscription of the time of Ptolemy Philopator (221–205 B.C.), and frequently later. It has, however, been contended by an eminent authority (Wilcken, *Archiv für Papyrusforschung*, iii. 249) that the parallel occurrence of the names Sarapis and Osorapis (Userhapi) points to an independent origin for the former. But doublets, *e.g.* Petisis-Petêsis, are common in Graecisms of Egyptian names. The more accurate form is then generally the later, found in documents written by Greeks in familiar intercourse with Egyptians, the less accurate is traditional from an older date in the mouths of pure Greeks and Hellenists, and is used in literary writings. Thus Sarapis would be the literary and official form of the name; it might be traditional, dating perhaps from the reign of Amasis or from the Persian period. We know that in Herodotus's day, and long before, the discovery of the new Apis was the occasion of universal rejoicing, and his death of universal mourning. The ancient Serapeum (Puserhapi) and the name Userhap would be almost as familiar to early Greek wanderers in Egypt as the Apieum and Apis itself.

But why was a Plutonic Serapis selected rather than another god to furnish the Egyptian element to the chief divinity of Alexandria? According to one account in Tacitus, Sarapis was the god of the village of Rhacotis before it suddenly expanded into a great capital; but it is not very probable that temples were erected to the dead Apis except at his Memphite tomb. Alexander had courted Ammon. But Ammon had little hold on the affections of the Egyptian people. He was the god of Ethiopia and the Thebais which were antagonistic to the progressive north. On the other hand, Osiris with Isis and Horus was everywhere honoured and popular, and while the artificer Ptah, the god of the great native capital of Egypt, made no appeal to the imagination, the Apis bull, an incarnation of Ptah, threw Ptah himself altogether into the shade in the popular estimation. The combination of Osiris and the Apis bull which was found in the dead Apis was thus a most politic choice in naming the new divinity, whose figure represented a god of the underworld wearing an emblem of fruitfulness.

The earliest mention of Sarapis is in the authentic death scene of Alexander, from the royal diaries (Arrian, *Anabasis*, vii. 26). Here Sarapis has a temple at Babylon and is of such importance that he alone is named as being consulted on behalf of the dying king. It would considerably alter our conception of the dead Apis if we were to find that a travelling shrine of his divinity accompanied Alexander on his expedition or was set up for him in Babylon. On the other hand, the principal god of Babylon was Zeus Belus (Bel Marduk), and it is difficult to see why he should have been called Sarapis on this occasion. Evidence has, however, been found to prove that Ea, entitled Šarapsi, "king of the deep (sea)," who was also great in learning and magic, had a temple in the city (Lehmann in *Beiträge zur alten Geschichte*, iv. 396). It seems unwarranted to make this Šarapsi = Sarapis travel to Sinope and thence to Alexandria as the type of the Egyptian god; but whether or no the Egyptian appellation Sarapis was applied to express the Babylonian Šarapsi, the part it played in the last days of Alexander may have determined the choice by which the Egyptian Osiris-Apis supplied the name and some leading characteristics to the god of Alexandria.

See Isis; A. Bouché-Leclercq, *Histoire des Lagides*, i. (1903), ch. iv.; J. G. Milne, *History of Egypt under Roman Rule* (1898), p. 140; G. Lafaye, *Histoire du culte des divinités d'Alexandrie hors de l'Égypte* (Paris, 1884). (F. Ll. G.)

SERENA, or La Serena, a city of Chile, capital of the province of Coquimbo, on the S. bank of the Coquimbo river about 5 m. from the sea. Pop. (1895) 15,712; (1902, estimate) 19,536. As the see of a bishop and the most important town politically of the semi-arid region, it contains a number of important public edifices, including a cathedral (1844–1860; 216 ft. long, 66 ft. wide) built of a light porous stone, an episcopal residence, several convents, a large hospital, an orphans' asylum, a beggars' asylum and a lazaretto. It is the seat of a court of appeal for Atacama and Coquimbo, and has an excellent lyceum and other schools, including a school of mines. It has a good water supply, well-paved streets, gas illumination, tramway service and several small industries, including brewing and the making of fruit conserves. The annual rainfall is only 1·6 in. and its mean annual temperature is 59·2°. Its railway connexions include a line to Coquimbo (9 m.), its port, one to the Tamaya copper mines, and a narrow-gauge line up the valley of the Elqui to Guanta, through a region celebrated for its fruit. It is also in direct railway communication with the national capital.

Serena was founded by Juan Bohon in 1544, on the opposite side of the river, and was named after Pedro Valdivia's birthplace in Estremadura, Spain. It was destroyed by the Indians soon after, and was rebuilt on its present site in 1549 by Francisco de Aguirre.

SERENADE (from Ital. *serenata*, Lat. *serenus*, bright; the Italian term being applied, partly by confusion with *serus*, late, and partly through the use of *Serena* –cf. Gr. σελήνη—as an epithet for the moon, to a form of courting music played at night in the open air; whence also the synonym *Notturno*), in music; a term classically applied to a light kind of symphony, more rarely a piece of chamber music, in a light sonata style with several extra movements, and in a few cases (as in the two serenades of Beethoven) not containing any fully developed examples of first-movement form. The *divertimento* is a similar composition, more often for chamber music, and frequently on a scale altogether too small for the sonata style to show itself, though some examples by Mozart (*e.g.* those for strings and two horns) are very large. The *cassation* is a smaller composition, beginning (like Beethoven's serenade op. 8) with a march. The classics of the serenade forms are among the works of Mozart and Haydn. Mozart's larger and later serenades, from the "Haffner" serenade onwards, are among his most delightful and voluminous lighter instrumental works. His two serenades for eight wind instruments are more serious, and that in C minor (which he afterwards arranged as a string quintet) is a majestic work in four normal movements, which Mozart probably called a serenade only because he did not find the term *octet* then in common use.

The typical scheme of a large serenade or divertimento differs from that of a symphony only in having six movements instead of four, the additions being another slow movement and minuet or scherzo. Beethoven's septet and Schubert's octet are on this plan, and are just as much serenades as Mozart's "Haffner" serenade, which is (not counting introductions) in eight movements with a kind of violin concerto in the middle. The six-movement scheme (though without the serenade style) was adopted by Beethoven in one of the profoundest and most serious works in all music, the string quartet in B flat, Op. 130.

Brahms's first essays in symphonic form took the shape of two orchestral serenades, of which the first was originally sketched for a large group of solo instruments. If it had finally taken that form Brahms would have called it a divertimento.

Other applications of the term in music are merely literary. Even its use, from the 17th century onwards, for a kind of operetta was clearly no more than a natural allusion to the notion of serenades as addressed at night by minstrels to ladies and by clients to patrons. (D. F. T.)

SERENUS, SAMMONICUS, Roman savant, author of a didactic medical poem, *De medicina praecepta* (probably incomplete). The work (1115 hexameters) contains a number of popular remedies, borrowed from Pliny and Dioscorides, and various magic formulae, amongst others the famous Abracadabra (*q.v.*), as a cure for fever and ague. It concludes with a description of the famous antidote of Mithradates VI. of Pontus. It was much used in the middle ages, but is of little value except for the ancient history of popular medicine. The syntax and metre are remarkably correct. It is uncertain whether the author was the famous physician and polymath, who was put to death in A.D. 212 at a banquet to which he had been invited by Caracalla, or his son, the tutor of the younger Gordian. The father, who was one of the most learned men of his age, wrote upon a variety of subjects, and possessed a library of 60,000 volumes, bequeathed to his son and handed on by the latter to Gordian.

The editio princeps (ed. Sulpitius Verulanus, before 1484) is very rare; later ed. by J. G. Ackermann (Leipzig, 1786) and E. Bahrens, *Poetae Latini minores*, iii.; see also A. Baur, *Quaestiones Sammoniceae* (Giessen, 1886); M. Schanz, *Geschichte der römischen Literatur*, iii. (1896); Teuffel, *Hist. of Roman Literature* (Eng. trans., 1900), 374, 4, and 383.

SERENUS "of Antissa," Greek geometer, probably not of Antissa but of Antinoeia or Antinoupolis, a city in Egypt founded by Hadrian, lived, as may be safely inferred from the character and contents of his writings, long after the golden age of Greek geometry, most probably in the 4th century, between Pappus and Theon of Alexandria. Two treatises of his have survived, viz. *On the Section of the Cylinder* and *On the Section of the Cone*, the Greek text of which was first edited by Edmund Halley along with his Apollonius (Oxford, 1710), and has now appeared in a definitive critical edition by J. L. Heiberg (*Serenι Antissensis opuscula*, Leipzig, 1896). A Latin translation by Commandinus appeared at Bologna in 1566, and a German translation by E. Nizze in 1860–1861 (Stralsund). Besides these works Serenus wrote commentaries on Apollonius, and in certain MSS. of Theon of Smyrna there appears a proposition "of Serenus the philosopher, from the Lemmas" to the effect that, if a number of rectilineal angles be subtended, at a point on a diameter of a circle which is not the centre, by equal arcs of that circle, the angle nearer to the centre is always less than the angle more remote (Heiberg, preface, p. xviii.).

The book *On the Section of the Cylinder* had for its primary object the correction of an error on the part of many geometers of the time who supposed that the transverse sections of a cylinder were different from the elliptic sections of a cone. When this has been done, Serenus, in a series of theorems ending with Prop. 19 (ed. Heiberg), shows in Prop. 20 that "it is possible to exhibit a cone and a cylinder cutting one another in one and the same ellipse." He then solves problems such as– "given a cone (cylinder) and an ellipse on it, to find the cylinder (cone) which is cut in the same ellipse as the cone (cylinder)" (Props. 21, 22); "given a cone (cylinder) to find a cylinder (cone), and to cut both by one and the same plane so that the sections thus formed shall be similar ellipses" (Props. 23, 24). In Props. 27, 28 he deals with subcontrary and other similar sections of a scalene cylinder or cone. He then gives the theorems: "All the straight lines drawn from the same point to touch a cylindrical (or conical) surface, on both sides, have their points of contact on the sides of a single parallelogram (or triangle)" (Props. 29, 32). Prop. 31 states indirectly the property of a harmonic pencil.

The treatise *On the Section of the Cone*, though Serenus claims originality for it, is unimportant. It deals with the areas of triangular sections of right or scalene cones by planes through the vertex, finding *e.g.* the maximum triangular section of a right cone and the maximum triangle through the axis of a scalene cone, and solving, in some easy cases, the problem of finding triangular sections of given area. (T. L. H.)

SERERS, a Negroid people, living in Senegambia. They are of the same stock as the Wolof, and in some parts form communities with them. Elsewhere they have mixed with the Mandingo, to which race belong most of their ruling families. The country of the pure Serers lies between the Gambia and Salum rivers to the south of Cape Verde. In this domain of nearly 5000 sq. m. the tribe has two main divisions, the None Serers and the Sine Serers. The Serers are an extraordinarily tall race, even excelling in height their kinsfolk, the Wolof. Men of 6 ft. 6 in., with muscular development in proportion, are by no means rare. They are less black than the Wolof and

have features more purely negroid with coarser lips and heavier jaws. Many Serers are nominally Mahommedans, but nature-worship is still prevalent. Their two chief gods are Takhar, god of justice, and Tiurakh, god of wealth, who are worshipped at the foot of trees. Snakes, too, have their cult, and formerly living animals were sacrificed to them. A belief in transmigration, as shown by their funeral customs, is general among the Serers. They are an honest and industrious people, but are very heavy drinkers.

SÉRES, SERROS or SIROS, chief town of a sanjak in the vilayet of Salonica, European Turkey, on Lake Takhino, a navigable expansion of the river Karasu or Struma (ancient *Strymon*), 43 m. by rail N.E. of Salonica. Pop. (1905) about 30,000, of whom about half are Bulgarians (one-third of them being Mussulmans), nearly one-fourth Greeks, about one-seventh Turks and the remainder Jews. Séres is built in a district so fertile as to bear among the Turks the name of Altin Ovassi, or Golden Plain, and so thickly studded with villages as to appear, when seen from the outliers of Rhodope on the north, like a great city with extensive gardens. It is the seat of a Greek archbishop and patriarch. It consists of the old town, *Varosh*, situated at the foot and on the slope of the hill crowned by the old castle, and of the new town built in the European fashion on the plain, and forming the commercial centre. The principal buildings are the Greek archiepiscopal palace, the Greek cathedral, restored since the great fire of 1879, by which it was robbed of its magnificent mosaics and woodwork, the Greek gymnasium and hospital (the former built of marble), the richly endowed Eski Jami mosque, and the ruins of the once no less flourishing Ahmed Pasha or Hagia Sophia mosque, whose revenues were formerly derived from the Crimea. On a hill above the town are the ruins of a fortress described in a Greek inscription as a "tower built by Helen in the mountainous region." Séres is the headquarters of the Turkish wool trade, and has also manufactures of cloth and carpets. There is a large trade in rice and cereals, and the other exports include tobacco and hides.

Séres is the ancient *Serrs*, *Sirae* or *Sirrhae*, mentioned by Herodotus in connexion with Xerxes's retreat, and by Livy as the place where Aemilius Paulus received a deputation from Perseus. In the 14th century, when Stephen Dushan of Servia assumed the title emperor of Servia, he chose Sirrhae as his capital; and it remained in the hands of the Servians till its capture by Sultan Murad II. (1421–1451).

SERFDOM (from Fr. *serf*, Lat. *servus*, a servant or slave). The notion of serfdom is distinct from those of freedom and of slavery. The serf is not his own master: to perform services for other persons is the essence of his status, but he is not given over to his lord to be owned as a thing or an animal—there are legal limits to the lord's power. Serfdom is very often conceived as a perpetual adherence to the soil of an estate owned by a lord, but this praedial character is not a necessary feature of the condition. Hereditary serfdom may sometimes assume the shape of a personal relation between servant and master. Such being the general features of serfdom, it is sure to appear in very different ages and countries. It will be formed naturally, for instance, in cases when one barbarous community conquers another, but is not able to destroy entirely the latter or to treat its members as mere chattels. This mitigated form of appropriation of human beings by their conquerors may be brought about as well by the paucity or comparative weakness of the victors as by the difficulty for them to draw income from pure slaves. In a state of backward agriculture and natural economy it will sometimes be more profitable for the conquerors as well as for the conquered to leave the dependent population in their own households and on their own plots, at the same time taxing them heavily in the way of tribute and services. Such an arrangement clearly obtained in several of the agricultural states of ancient Greece. The Penestae of Thessaly appear as a remnant of a distinct tribe settled on the confines of Macedonia and at the same time as a class of tributary peasants serving Thessalian aristocrats. The Mnoitae, Klarotae and Aphamiotae of Crete were more or less in the same position. Their chief occupation was the cultivation of the shares (κλᾶροι) of the Dorian aristocracy, but they lived in households of their own and were considered as subjects rather of the Cretan commonwealths than of private men. The relation between both classes is well illustrated by a fragment of the Cretan poet Hybrias, who thus glories in his shield and sword: "I till the land with them, I press the wine from the grapes. On account of them I am called the lord of the Mnoa." Even in the case of the Helots of Sparta, although their condition was very hard and they were made to perform services to any Spartiate who might require them to do so, features of a similar tributary condition are apparent. The chief work of the Helots was to provide a certain quantity of corn, wine and oil for the lords of the shares on which they were settled (roughly 82 medimni of barley a year per share); personal services to other Spartiates were exceptional. Pollux in his account of the Helots places them distinctly in an intermediate position between free men and slaves. The fact that in these instances governments had a good deal to say in the regulation of the status of such serfs is well worth noting: it explains to a great extent the legal limitations of the power of the lords. Even downright slaves belonging to the state or to some great temple corporation were treated better and carefully distinguished from private slaves by the Greeks.

We shall not be astonished to find, therefore, in the Hellenistic states of Asia a population of peasants who seem to have been in a condition of hereditary subjection and adherent to the glebe on the great estates of the Seleucid kings (see Rostowtzew in Lehmann's *Beiträge zur alten Geschichte*, ii.). It is not unlikely that the customs of these λαοὶ βασιλικοί went back to the epoch of the Persian monarchy. In any case these peasants (γεωργοί) were certainly not slaves, while, on the other hand, their condition was closely bound up with the cultivation of the estates where they lived. The regulation by the state of the duties and customary status of peasants on government domains turns out to be one of the roots of serfdom in the Roman world, which in this respect as in many others follows on the lines laid down by Hellenistic culture. It is important for our purpose to notice that the condition of *coloni* was developed as a result of historic necessity by the working of economic and social agencies in the first centuries of the Roman empire and was made the subject of regular legislation in the 4th and 5th centuries. In the enactments of Justinian, summing up the whole course of development (C.J. xi., 48, 23), two classes of coloni are distinguished—the *adscripticii*, representing a more complete state of serfdom, and the free coloni, with property of their own. But the whole class, apart from minor variations, was characterized by the idea that the peasants in question were serfs of the soil (*servi terrae*) on which they were settled, though protected by the laws in their personal and even in their praedial status. Thus the ascription to the soil, although originally a consequence of ascription to the tributes (*adscriptio censibus*), became the mark of the legal status of serfdom. The emperors actually tried in their legislation to prevent the landowners from evicting their coloni and from raising their rents. In this way fixity of tenure and service was aimed at and to a certain degree enforced by the state.

With the break-up of the Roman empire the legal protection in regard to serfs could not be kept up in the same way as before. The weak governments which took the place of imperial authority were not able to maintain the strict discipline and the stress of judicial power which would have been necessary to guarantee the tenure and status of the serfs. And yet serfdom became the prevailing condition for the lower orders during the middle ages. Custom and economic requirements produced checks on the sway of the masters which proved effectual even when legal protection was insufficient. The direction of events towards the formation of serfdom is already clearly noticeable in Celtic communities. In Wales and Ireland the greater part of the rural working classes was reduced not to a state of slavery, but to serfdom. The male slave (W. *cæth*) does not play an

important part in Celtic economic arrangements: there is not much room for his activity as a completely dependent tool of the master. The female slave (*cumal*) was evidently much more prominent in the household. Prices are reckoned out in numbers of such slaves and there must have been a constant call for them both as concubines and as household servants. As for male workmen they are chiefly *tæogs* in Wales, that is half-free bondmen with a certain though base standing in law. Even these, however, could not be said to form the social basis for the existence of an upper free class. The latter was numerous, not wealthy as a rule, and had to undertake directly a great part of the common work; as may be seen from the extent of the free and servile tenures on the estates carved out for English conquerors in Wales and Ireland. Anyhow, the tæog class of half-free peasants stands by the side of the smaller tribesmen as subjected to heavier burdens in the way of taxation and services in kind. In Wales they are distributed into *gavells* and *gwelys*, like the free tribesmen themselves and thus connected with the land, but there is nothing to show that this connexion was deemed a servitude of the glebe. The tie with the lord is after all a personal one.

The Germanic tribes moved on similar lines. Slavery was not a natural institution with them, although it did occur. In the eyes of a Roman observer, however, even downright slavery was turned into serfdom by the force of circumstances. As Tacitus tells us, the ancient Germans made use of their slaves in a different way from the Romans. These slaves had their separate households, while the masters exacted tribute from them in the shape of corn, cattle or clothes, and the serfs had to obey to the extent of rendering such tribute (Tacitus, *Germania*, 21). This means, of course, that it was in the interest of the master to levy tribute and not to organize slave labour. After the conquest of the provinces by the Germanic invaders the Roman stock of coloni naturally combined with German tributary peasants to form medieval serfdom. A half-free group is marked off in the early laws under the designation of *liti*, *lazzi*, *aldiones*. But in process of time this group was merged with freedmen, settled slaves (*servi casati*) and small freedmen into the numerous class of serfs (*servi*, *rustici*, *villani*) which appears under different names in all western European countries. The customary regulations of the duties of an important group of this class in regard to their lords are clearly expressed in the Bavarian law (7th century): serfs settled on the estates of the church have to work, as a rule, three days in the week for their masters and are subject to divers rents and payments in kind. The regulations in question, although entered in a legal text, are not a legislative enactment, but the result of a slow process of adjustment of claims between the ecclesiastical landowners and masters on one side and their rural dependents on the other. There can be no doubt that they were largely representative of the conditions prevailing on Bavarian estates belonging not only to the church but also to the duke and to lay lords. The old English *Rectitudines singularum personarum* (11th century) present other variations of the same customary arrangements. The rustic class appears in them to be differentiated into several subdivisions—the *geneats* performing riding duties and occasional services, the *gebúrs* burdened with week work and the *cotsets* holding cottages and performing light work in the shape of one day in the week and services to match (see VILLENAGE). Of these various groups that of the gebúrs corresponds more closely to the continental serfs (*coloni*, *Hörige*, *unfreie Hintersassen*).

The dualism characteristic of medieval serfdom, its formation out of debased freedom and rising servitude, may be traced all through the history of the middle ages. French jurists of the 13th century, *e.g.*, lay stress on a fundamental difference in law between the complete serf whose very body belongs to his lord (cf. the German *Leibeigenschaft*) and the villein or *roturier*, who is only bound to perform certain duties and ought not to be further oppressed by the landowners on whose soil he is settled (Beaumanoir, *Coutume de Beauvaisis*). But the same texts which draw the line between the two classes make it clear that there were no other guarantees to the maintenance of the rights of the superior rustics than the moral sense and the self-interest of their masters. Should the lords infringe the well-established rights of their subjects, the latter had no court to appeal to and only God could inflict punishment on the oppressors. It must be added, however, that even in the darkest times of feudal sway, economic forces provided some protection for the peasants who had lost the means of appealing to legal remedies. A certain balance had to be struck in most cases between the greed and selfishness of the class of landowners and the necessary requirements and human aspirations of the subjects. Feudal masters could not afford to act with the ruthless cruelty of slaveholders relying on government and civilization to back their claims to a complete sway over their human chattels. Lords who did not wish to see their estates deserted had to submit to the rule of custom in respect of exactions. And the screen of rural custom proved sufficient to allow of the growth of some property in the hands of the toiling class, a result which in itself rendered possible further emancipation.

A very instructive example of the formation of serfdom is presented by the history of Russia. Personal slavery in the sense in which it existed in the West was practised in ancient Russia (*kholopi*) and arose chiefly from conquest, but also from voluntary subjection in cases of great hardship and from the redemption of fines and debts (cf. the O. Eng. *wite-theow*). But the number of personal serfs was not large and they were principally to be met in the households of great people. The great mass of the peasantry was originally free. Even when in the course of time landownership was appropriated by the crown, the ecclesiastical corporations and the nobles, the tillers of the land retained their personal freedom and were considered to be farmers holding their plots under contracts. They were free to leave their farms provided they were able to effect a settlement in regard to all outstanding rent arrears and debts. Members of the household who were not directly responsible for the farms could look out for their livelihood as they pleased. The custom of the country gradually took the shape of a simultaneous resettlement of all conditions of rural occupation about St George's day (November 24), that is after the gathering of the harvest and the practical winding up of rural work. Such was the legal state of affairs up to the end of the 16th century. A great change supervened, however, through the slow working of economic and political causes. The peasants settled under the way of nobles and churches could very seldom produce a clean bill in regard to their money relations with the landlords. They generally had to account for arrears and got into debt from the very start by taking over stock with the farm. The longer they remained on the same plot, the more entangled became the ties of their economic dependence. Thus, as in the case of many Roman coloni, thoroughly free settlers gradually lapsed into a state of perpetual subjection from which they could not emancipate themselves by legal means. On the other hand, the growth of the Muscovite state with its fiscal and governmental requirements involved a watchful repartition of burdens among the population and led ultimately to a system of collective liability in which the farms were considered chiefly as the sources of taxable income. The government was directly interested in maintaining their efficiency and in preventing migrations and desertions which led to a weakening of the taxpaying communities. A third aspect of the question must also not be disregarded, namely, the keen competition between landowners trying to attract settlers to their estates at the expense of their needy or less powerful neighbours. The first legislative measures of the Moscow rulers directed towards the establishment of a servile class similar to the Roman coloni fall into the first years of the 17th century (A.D. 1601, 1606) and consist in enactments against landowners depriving their neighbours of the tillers of their estates. But matters were clearly ripe for a wider application of the view that the peasant ought to stick to the soil, and the restoration of the Muscovite empire under the Romanovs brought with it the consolidation of all rural arrangements around this principle. Peter the Great regularized and completed this evolution by effecting a comprehensive cadastre and

census of the rural population. The ultimate result was, however, not only the fixity of peasant tenures, but the subjection of the entire peasant population as a separate class (*Krepostrie*) to the personal sway of the landowners. The state insisted to a certain extent on the public character of this subjection and drew distinctions between personal slavery and serfdom. In the midst of the peasants themselves there lived a consciousness of their special claims as to tenant right, claims which sometimes assumed the shape of the quaint saying, "The land is ours, though we are yours." But, in fact, serfdom naturally took the form of an ugly ownership of live chattels on the part of a privileged class, and all sorts of excesses, of cruelty, ruthless exploitation and wanton caprice, followed as a matter of course. Emancipation was brought about in the 19th century by economic causes as well as by humanitarian considerations. The fabric of a state built up on the basis of serfdom proved inadequate to meet the tasks of modern times. Private enterprise and the free application of capital and labour were hindered in every way by the bondage of the peasant class. Even such a necessary measure as that of moving cultivators to the rich soil of the south was thwarted by the adherence of the northern peasantry to the glebe. On the humanitarian and liberal ideas making for emancipation we need not dwell, as they are self-evident. After several half-hearted attempts directed in the course of Nicholas I.'s reign to face the question while safeguarding at the same time the rights and privileges of the old aristocracy, the moral collapse of the *ancien régime* during the Crimean war brought about the Emancipation Act of the 19th of February 1861, by which some 15 millions of serfs were freed from bondage. The most characteristic feature of this act was that the peasants, as distinct from household servants, received not only personal freedom but allotments in land in certain proportions to their former holdings. The state indemnified the former landowners, and the peasants had to redeem the loan by yearly payments extending over a number of years.

If we turn back from this course of development to the history of serfdom and emancipation in the West striking contrasts appear. As we have already noticed, medieval serfdom in the West was the result of a process of customary feudal growth hardly interfered with by central governments. The loosening of bondage is also, to a great extent, prepared by the working of local economic agencies. Villeins and serfs in France rise gradually in the social scale, redeem many of the onerous services of feudalism and practically acquire tenant-right on most of the plots occupied by them. Tocqueville has pointed out that already before the revolution of 1789 the greater part of the territory of France was in the hands of small peasant owners, and modern researches have confirmed Tocqueville's estimate. Thus feudal overlordship in France had resolved itself into a superficial dominion undermined in all directions by economic realities. The fact that there still existed all kinds of survivals of harsh forms of dependence, *e.g.* the bondage of the serfs in the Jura Mountains, only rendered the contrast between legal conditions and social realities more pointed. The night of the 4th of August 1789 put an end to this contrast at one stroke and the further history of rural population came to depend entirely on the play of free competition and free contract.

The evolution of serfdom in Germany was effected by the working of somewhat more complicated causes. The regulating influence of government made itself felt to a greater extent, especially in the east. The colonization of the eastern provinces and the struggle against the Slavs necessitated a stronger concentration of aristocratic power, and the reception of Roman law during the 15th and 16th centuries hardened the forms of subjection originated by customary conditions. It may be said in a general way that Germany occupied in this respect, as in many others, an intermediate position between the west of Europe and Russia. Emancipation followed also a middle course. It was brought about chiefly by governmental measures, although the ground was to a great extent prepared by social evolution. The reforms of Stein and Hardenberg in Prussia, of the French and of their clients in South Germany, opened the way for a gradual redemption of the peasantry. Personal serfdom (*Leibeigenschaft*) was abolished first, hereditary subjection (*Erbunterthänigkeit*) followed next. Emancipation in this case was not connected with a recognition of the full tenant-right of the peasants; they had to part with a good deal of their land. To the last the landowners were not disturbed in their economic predominance, and succeeded very well in working their estates by the help of agricultural labourers and farmers. In the west the small peasant proprietorship had a better chance, but it arose in the course of economic competition rather than through any general recognition of tenant-right. On the whole serfdom appears as a characteristic corollary of feudalism. It grew up as a consequence of customary subjection and natural husbandry; it melted away with the coming in of an industrial and commercial age.

AUTHORITIES.—Wallon, *Histoire de l'esclavage dans l'antiquité*; Pauly-Wissowa, *Realencyklopädie des klassischen Altertums*, *s.v.* "Coloni"; Fustel de Coulanges, *Recherches sur quelques problèmes d'histoire*; *Institutions politiques de la France* (*L'alleu et le domaine rural*); F. Seebohm, *English Village Community* (1883); P. Vinogradoff, *The Growth of the Manor* (1905); G. Waitz, *Deutsche Verfassungsgeschichte* (1844, ff.); P. Viollet, *Histoire du droit français* (3rd ed., 1905); Engelmann, *Geschichte der Leibeigenschaft in Russland*; Kluchevsky, *Lectures on the History of Russia* (in Russian), ii. (1906); G. Hansen, *Die Aufhebung der Leibeigenschaft in Schleswig und Holstein* (1861); G. F. Knapp, *Die Bauernbefreiung in Preussen* (1887); *Handwörterbuch der Staatswissenschaften*, ed. by Conrad and Lexis, *s.vv.* "Bauernbefreiung," "Unfreiheit," "Gründherrschaft." (P.Vi.)

SERGEL, JOHAN TOBIAS (1740–1814), Swedish sculptor, was born on the 8th of September 1740 in Stockholm. After studying for some time in Paris he went to Rome, where he remained for twelve years and sculptured a number of groups in marble, including, besides subjects from classical mythology, a colossal representation of "History," in which are depicted the achievements of Gustavus Adolphus before the Chancellor Oxenstierna. It was in Rome also that he modelled the statue of Gustavus III., subsequently cast in bronze and purchased by the city of Stockholm in 1796. Sergel returned to Stockholm in 1779 and continued to produce his works there. Among them are a tomb for Gustavus Vasa, a monument to Descartes, and a large relief in the church of St Clarens in Stockholm, representing the Resurrection. He died in his native city on the 26th of February 1814.

SERGINSK, UPPER and **LOWER,** two towns of East Russia, in the government of Perm, 53 and 44 m. W.S.W. of Ekaterinburg respectively. They are noted for their iron-works. Upper Serginsk, which had a population of 8000 in 1897, yields annually over 8000 tons of pig-iron and 12,000 tons of steel. Lower Serginsk, with 14,000 inhabitants, yields about 7250 tons of pig-iron and 14,500 tons of steel. The latter town is well built and has a monument to Alexander II. Mineral waters (sulphurous) are found close by.

SERGIPE (originally SERGIPE D'EL-REY), a small Atlantic state of Brazil, bounded N. by Alagôas, E. by the Atlantic, and S. and W. by Bahia. Area, 15,093 sq. m. Pop. (1900) 356,264, three-fourths half-castes and negroes. The São Francisco forms its northern boundary, and the drainage of the northern part of the state is northward and eastward to that river. The southern half of the state, however, slopes eastward and is drained directly into the Atlantic through a number of small rivers, the largest of which are the Irapiranga (whose source is in the state of Bahia and which is called Vasa Barris at its mouth), the Real, and the Cotinguiba. These streams are navigable for short distances, but are obstructed by sand-bars at their mouths, that of Cotinguiba being especially dangerous. The surface of the state resembles in part that of Bahia, with a zone of forested lands near the coast, and back of this a higher zone of rough open country, called *agrestes*. There is a sandy belt along the coast, and the western frontier is slightly mountainous. The intermediate lands are highly fertile, especially in the forested region, where the rainfall is abundant. Further inland the year is divided into wet and dry seasons with occasional prolonged droughts. These districts are pastoral, and the lower fertile lands are cultivated for sugar, cotton, maize, tobacco, rice, beans, and *mandioca*—sugar being the principal product.

Rubber and some other natural products are exported. There is only one railway in the state, which runs from Aracajú northward to Capella, with a branch running westward to Simão Dias. The only manufacturing industries of importance are cotton mills, sugar factories and distilleries, one of the largest sugar usines in Brazil being located at Riachuelo near Larangeiras. There are no good ports on the coast because of the bars at the mouths of the rivers.

The capital of the state is Aracajú (pop. 1890, 16,336; 1906 estimate, 25,000), on the lower course, or estuary, of the Cotinguiba river, near the coast. The bar at the entrance to this river is exceptionally dangerous, and the port is frequented only by coasting vessels of light draught. The town stands on a sandy plain, and there are sand dunes within the city limits. The public buildings are a large plain church with unfinished twin towers, the government palace, the legislative halls, a normal school and public hospital. The other principal towns are Estancia (pop. 1890, 14,555) on the Rio Real in the southern part of the state, with manufactures of cotton textiles, cigars and cigarettes, and soap, and an active trade; Laranjeiras (11,350), in a highly productive sugar district N. of the capital; Capella (11,034); Simão Dias (10,984); Lagarto (10,473); São Christovão, formerly Sergipe d'el-Rey (8793), the old capital, near the mouth of the Irapiranga, and Maroim (7851).

SERGIUS, ST, generally associated with St Bacchus, one of the most celebrated martyrs of Christian antiquity. His festival is on the 7th of October, and the centre of his cult was Resafa, or Rosafa, in Syria, in the province of Augusta Euphratesia. This town, which since the middle of the 6th century was also called Sergiopolis, acquired importance as a place of pilgrimage, and became a bishop's see (Le Quien, *Oriens Christ.* ii. 951). The cult of the saint spread rapidly. In 353 we find a church of St Sergius at Eitha, in Batanaea (Waddington, *Inscriptions de Syrie,* n. 2124)—the most ancient example of a dedication of this kind. In the 6th century St Sergius was honoured in the West (Gregory of Tours, *De gloria martyrum,* 96). According to their *Acta* (which, however, have little authority), SS. Sergius and Bacchus were soldiers. In art they are most generally represented in military costume.

See *Acta sanctorum* (October), iii. 833-883; *Analecta Bollandiana,* xiv. 373-395. (H. De.)

SERGIUS, the name of four popes.

Sergius I., pope from 687 to 701, came of an Antiochene family which had settled at Palermo. He was elected after a fierce struggle between two other candidates, Paschal and Theodore. In the second year of his pontificate he baptized King Ceadwalla of Wessex at Rome. For rejecting certain canons of the Trullan (Quinisext) council of 692, Justinian II. commanded his arrest and transportation to Constantinople, but the militia of Ravenna and the Pentapolis forced the imperial protospatharius to abandon the attempt to carry out his orders. Sergius was followed by John VI. as pope.

Sergius II., pope from 844 to 847, a Roman of noble birth, elected by the clergy and people to succeed Gregory IV., was forthwith consecrated without waiting for the sanction of the emperor Lothair, who accordingly sent his son Louis with an army to punish the breach of faith. A pacific arrangement was ultimately made, and Louis was crowned king of Lombardy by Sergius. He was a man of weak health, suffering much from gout, and abandoned the direction of affairs to unworthy persons, whose administration provoked many complaints. In this pontificate Rome was ravaged, and the churches of St Peter and St Paul robbed, by Saracens (August 846). Sergius was succeeded by Leo IV.

Sergius III., elected pope by one of the factions in Rome in 898, simultaneously with John IX., was expelled from the city by his adversaries. Circumstances becoming more favourable, he reappeared in 904, seized the two claimants, Leo V. and Christopher, who were disputing the succession of Benedict IV., and had them strangled. His adherents rallied round the *vestiarius* Theophylact, a powerful Roman functionary, and his wife Theodora. Sergius is reputed to have been the lover of Theodora's daughter Marozia, by whom he is said to have had a son, who became pope as John XI. This is the beginning of the so-called "pornocracy." Unlike John IX. and his successors, Sergius was very hostile to the memory of Pope Formosus, and refused to recognize any of the ordinations celebrated by him, thus causing grave disorders. He also affected to consider as anti-popes, not only John IX., but also his successors down to and including Christopher. He restored the Lateran basilica, which had fallen down in 897. He died on the 14th of April 911, and was succeeded by Anastasius III.

Sergius IV., pope from 1009 to 1012, originally bore the name of Bucca porca (*Os porci*). He was a mere tool in the hands of the feudal nobility of the city; he was succeeded by Benedict VIII.

SERGIYEVO, a town of Russia, in the government of Moscow, 44 m. by rail N.N.E. of Moscow. It has grown up round the monastery or *lavra* of Troitsko-Sergiyevskaya. It is situated in a beautiful country, the buildings extending partly over the hill occupied by the monastery and partly over the valley below. Including the suburbs it had, in 1884, 31,400 inhabitants, and 31,413 in 1900. Sergiyevo has long been renowned for its manufacture of holy pictures (painted and carved), spoons, and other articles carved in wood, especially toys, which are sold to pilgrims who resort to the place to the number of 100,000 annually.

The Troitsk or Trinity monastery is the most sacred spot in middle Russia, the Great Russians regarding it with more veneration than even the cathedrals and relics of the Kremlin at Moscow. It occupies a picturesque site on the top of a hill, protected on two sides by deep ravines and steep slopes. The walls, 25 to 50 ft. in height, are fortified by nine towers, one of which is a prison for both civil and ecclesiastical offenders. Thirteen churches, including the Troitskiy (Trinity) and Uspenskiy cathedrals, a bell-tower, a theological academy, various buildings for monks and pilgrims, and a hospital stand within the precincts, which are two-thirds of a mile in circuit. A small wooden church, erected by the monk Sergius, and afterwards burned (1391) by the Tatars, stood on the site now occupied by the cathedral of the Trinity, which was built in 1422, and contains the relics of Sergius, as well as ecclesiastic treasures of priceless value and a holy picture which has frequently been brought into requisition in Russian campaigns. The Uspensky cathedral was erected in 1585; close beside it are the graves of Tsar Boris Godunov (died in 1605) and his family. In the southern part of the monastery is the church of Sergius, beneath which are spacious rooms where 200,000 dinners are distributed gratis every year to the pilgrims. The bell-tower, 320 ft. high, has a bell weighing 64 tons. Several monasteries of less importance exist in the neighbourhood. In 1340 two brothers erected a church on the spot. The elder took monastic orders under the name of Sergius, and became famous among the peasants around. His monastery acquired great fame and became the wealthiest in middle Russia. Ivan the Terrible in 1561 made it the centre of the ecclesiastical province of Moscow. During the Polish invasion at the beginning of the 17th century it organized the national resistance. In 1608–1609 it withstood a sixteen months' siege by the Poles: at a later date the monks took a lively part in the organization of the army which crushed the outbreak of the peasants. In 1685 Peter the Great took refuge here from the revolted *streltzi,* or Muscovite military guards. The theological seminary, founded in 1744 and transformed in 1814 into an academy, reckoned Platon and Philarete among its pupils.

SERIEMA, or Cariama, a South-American bird, sufficiently well described and figured in G. de L. Marcgrav's work (*Hist. rer. nat. Brasiliae,* p. 203), posthumously published by De Laet in 1648, to be recognized by succeeding ornithologists, among whom M. J. Brisson in 1760 acknowledged it as forming a distinct genus *Cariama,* while Linnaeus regarded it as a second species of *Palamedea* (see Screamer), under the name of *P. cristata,* Englished by J. Latham in 1785 (*Synopsis,* v. 20) the "Crested Screamer,"—an appellation since transferred to a wholly different bird. Nothing more seems to have been known of it in Europe till 1803, when Azara published at Madrid his

observations on the birds of Paraguay (*Apuntamientos*, No. 340), wherein he gave an account of it under the name of "Saria," which it bore among the Guaranis,—that of "Cariama" being applied to it by the Portuguese settlers, and both expressive of its ordinary cry.[1] It was not, however, until 1809 that this very remarkable form came to be autoptically described scientifically. This was done by the elder Geoffroy St-Hilaire (*Ann. du muséum*, xiii. pp. 362-370, pl. 26), who had seen a specimen in the Lisbon museum; and, though knowing it had already been received into scientific nomenclature, he called it anew *Microdactylus marcgravii*. In 1811 J. K. W. Illiger, without having seen an example, renamed the genus *Dicholophus*—a term which has since been frequently applied to it—placing it in the curious congeries of forms having little affinity which he called *Alectorides*. In the course of his travels in Brazil (1815–1817), Prince Max of Wied met with this bird, and in 1823 there appeared from his pen *N. Act. Acad. L.-C. nat. curiosorum*, xi. pt. 2, pp. 341-350, tab. xlv.) a very good contribution to its history, embellished by a faithful life-sized figure of its head. The same year Temminck figured it in the *Planches coloriées* (No. 237). It is not easy to say when any example of the bird first came under the eyes of British ornithologists: but in the Zoological *Proceedings* for



Seriema.

1836 (pp. 29-32) W. Martin described the visceral and osteological anatomy of one which had been received alive the preceding year.

The Seriema, owing to its long legs and neck, stands some two feet or more in height, and in menageries bears itself with a stately deportment. Its bright red beak, the bare bluish skin surrounding its large grey eyes, and the tufts of elongated feathers springing vertically from its lores, give it a pleasing and animated expression; but its plumage generally is of an inconspicuous ochreous grey above and dull white beneath, the feathers of the upper parts, which on the neck and throat are long and loose, being barred by fine zigzag markings of dark brown, while those of the lower parts are more or less striped. The wing-quills are brownish black, banded with mottled white, and those of the tail, except the middle pair, which are wholly greyish brown, are banded with mottled white at the base and the tip, but dark brown for the rest of their length. The legs are red. The Seriema inhabits the *campos* or elevated open parts of Brazil, from the neighbourhood of Pernambuco to the Rio de la Plata, extending inland as far as Matto Grosso (long. 60°), and occurring also, though sparsely, in Paraguay. It lives in the high grass, running away in a stooping posture to avoid discovery on being approached, and taking flight only at the utmost need. Yet it builds its nest in thick bushes or trees at about a man's height from the ground, therein laying two eggs, which Professor Burmeister likens to those of the Land-Rail in colour.[2] The young are hatched fully covered with grey down, relieved by brown, and remain for some time in the nest. The food of the adult is almost exclusively animal,—insects, especially large ants, snails, lizards and snakes, but it also eats certain large red berries.

Until 1860 the Seriema was believed to be without any near relative in the living world of birds;[3] but in the Zoological *Proceedings* for that year (pp. 334–336) G. Hartlaub described an allied species discovered by H. C. C. Burmeister in the territory of the Argentine Republic.[4] This bird, which has since been regarded as entitled to generic division under the name of *Chunga burmeisteri* (*P.Z.S.*, 1870, p. 466, pl. xxxvi.), and seems to be known in its native country as the "Chunnia," differs from the Seriema by frequenting forest or at least bushy districts. It is also darker in colour, has less of the frontal crest, shorter legs, a longer tail, and the markings beneath take the form of bars rather than stripes, while the bill, eyes and legs are all black. In other respects the difference between the two birds seems to be immaterial.

There are few birds which have more exercised the taxonomer than this, and the reason seems to be plain. The Seriema must be regarded as the not greatly modified heir of some very old type, such as one may fairly imagine to have lived before many of the existing groups of birds had become differentiated, and it is probable that the extinct birds known as *Stereornithes*, and in particular the fossil *Phororhachos* from the Miocene of Patagonia, were closely allied to its ancestors. It is now placed in the family *Cariamidae* of Gruiform birds (see BIRD). (A. N.)

SERIES (a Latin word from *serere*, to join), a succession or sequence. In mathematics, the term is applied to a succession of arithmetical or algebraic quantities (see below); in geology it is synonymous with *formation*, and denotes a stage in the classification of strata, being superior to *group* (and consequently to *bed*, and *zone* or *horizon*) and inferior to *system*; in chemistry, the term is used particularly in the form *homologous series*, given to hydrocarbons of similar constitution and their derivatives which differ in empirical composition by a multiple of CH_2, and in the form *isologous series*, applied to hydrocarbons and their derivatives which differ in empirical composition by a multiple of H_2; it is also used in the form *isomorphous series* to denote elements related isomorphously. The word is also employed in zoological and botanical classification.

In mathematics a set of quantities, real or complex, arranged in order so that each quantity is definitely and uniquely determined by its position, is said to form a series. Usually a series proceeds in one direction and the successive terms are denoted by $u_1, u_2, \ldots u_n, \ldots$; we may, however, have a series proceeding in both directions, a back-and-forwards series, in which case the terms are denoted by

$$\ldots u_{-m}, \ldots u_{-2}, u_{-1}, u_0, u_1, u_2, \ldots u_n \ldots;$$

or its general term may depend on two integers positive or negative, and its general term may be denoted by $u_{m,n}$; such a series is called a double series, and so on. The number of terms may be limited or unlimited, and we have two theories, (1) of finite series and (2) of infinite series. The first concerns itself mainly with the summation of a finite number of terms of the series; the notions of convergence and divergence present themselves in the theory of infinite series.

Finite Series.

1. When we are given a series, it is supposed that we are given the law by which the general term is formed. The first few terms of a series afford no clue to the general term; the series of which the first four terms are 1, 2, 4, 8, may be the series of which the general term is 2^n; it may equally well be the series of which the general term is $\frac{1}{6}(n^3 + 5n + 6)$; in fact we can construct an infinite number of series of which the leading terms shall be any assigned quantities. The only case in which the series may be completely determined from its leading terms is that of a "recurring series." A recurring series is a series in which the consecutive terms, after the earlier ones, are connected by a linear relation; thus if we have a relation of the form

$$a_p u_r + a_{p-1} u_{r+1} + a_{p-2} u_{r+2} + \ldots + a_1 u_{r+p-1} + a_0 u_{r+p} = 0,$$

the series is said to be a recurring series with a scale of relation

[1] Yet Forbes states (*Ibis*, 1881, p. 358) that *Seriema* comes from *Siri*, "a diminutive of Indian extraction," and *Ema*, the Portuguese name for the Rhea (see EMEU), the whole thus meaning "Little Rhea."

[2] This distinguished author twice cites the figure given by Thienemann (*Fortpflanzungsgesch. gesammt. Vögel*, pl. lxxii. fig. 14) as though taken from a genuine specimen; but little that can be called Ralline in character is observable therein. The same is to be said of an egg laid in captivity at Paris; but a specimen in Mr Walter's possession undeniably shows it (cf. *Proc. Zool. Society*, 1881, p. 2).

[3] A supposed fossil *Cariama* from the caves of Brazil, mentioned by Bonaparte (*C.R.* xliii. p. 779) and others, has since been shown by Reinhardt (*Ibis*, 1882, pp. 321-332) to rest upon the misinterpretation of certain bones, which the latter considers to have been those of a Rhea.

[4] Near Tucuman and Catamarca (Burmeister, *Reise durch die La Plata Staaten*, ii. p. 508).

$a_0+a_1x+a_2x^2+\ldots+a_px^p$. It is clear that we can regard the series $u_0+u_1x+u_2x^2+\ldots$ as the expansion in powers of x of an expression of the form

$$(b_0+b_1x+\ldots+b_{p-1}x^{p-1})/(a_0+a_1x+\ldots+a_px^p),$$

and by splitting this expression into partial fractions we can obtain the general term of the series. If we know that a series is a recurring series and know the number of terms in its scale of relation, we can determine this scale if we are given a sufficient number of terms of the series and obtain its general term. It follows that the general term of a recurring series is of the form $\Sigma\phi(n)a^n$, where $\phi(n)$ is a rational integral algebraic function of n, and a is independent of n. The series whose general term is of the form $Ka^n+\phi(n)$, where $\phi(n)$ is a rational integral algebraic function of degree r, is a recurring series whose scale of relation is $(1-ax)(1-x)^{r+1}$, but the general term of this series may be obtained by another method. Suppose we have a series $u_0, u_1, u_2, \ldots$ From this we can form a series $v_0, v_1, v_2, \ldots$ where $v_n=u_{n+1}-u_n$; from $v_0, v_1, v_2, \ldots$ we similarly form another series and so on; we write $v_n\equiv\Delta u_n$, and we suppose E to be an operation such that $Eu_n\equiv u_{n+1}$ (the notation is that of the calculus of finite differences); the operations E and $1+\Delta$ are equivalent and hence the operations E^n and $(1+\Delta)^n$ are equivalent, so that we obtain $u_n=u_0+n\Delta u_0+\frac{n.n-1}{1.2}\Delta^2u_0+\ldots$ This is true whatever the form of u_n. When u_n is of the form $Ka^n+\phi(n)$, where $\phi(n)$ is of degree r, $\Delta^{r+1}u_0, \Delta^{r+2}u_0, \ldots$ form a geometrical progression, of which the common difference is $a-1$, or vanish if the term Ka^n is absent. In either case we readily obtain the expression for u_n.

2. The general problem of finite series is to find the sum of n terms of a series of which the law of formation is given. By finding the sum to n terms is meant finding some simple function of n, or a sum of a finite number of simple functions, the number being independent of n, which shall be equal to this sum. Such an expression cannot always be found even in the case of the simplest series. The sum of n terms of the arithmetic progression $a, a+b, a+2b, \ldots$ is $na+\frac{1}{2}n(n-1)b$; the sum of n terms of the geometric progression $a, ab, ab^2, \ldots$ is $a(1-b^n)/(1-b)$; yet we can find no simple expression to represent the sum of n terms of the harmonic progression

$$1+\tfrac{1}{2}+\tfrac{1}{3}+\ldots+\frac{1}{n}.$$

3. The only type of series that can be summed to n terms with complete generality is a recurring series. If we let $S_n=u_0+u_1x+\ldots+u_{n-1}x^{n-1}$, where $u_0, \ldots$ is a recurring series with a given scale of relation, for simplicity take it to be $1+px+qx^2$, we shall have

$$S_n(1+px+qx^2)=u_0+(u_1+pu_0)x+(pu_{n-1}+qu_{n-2})x^n+qu_{n-1}x^{n+1}.$$

If x had a value that made $1+px+qx^2$ vanish, this method would fail, but we could find the sum in this case by finding the general term of the series. For particular cases of recurring series we may proceed somewhat differently. If the nth term is u_nx^n we have from the equivalence of the operations E and $1+\Delta$,

$$u_1x+u_2x^2+\ldots+u_nx^n=\frac{xu_1-x^{n+1}u_{n+1}}{1-x}+\frac{x^2\Delta u_1-x^{n+2}\Delta u_{n+1}}{(1-x)^2}+\frac{x^3\Delta^2u_1-x^{n+3}\Delta^2u_{n+1}}{(1-x)^3}+\ldots$$

in general, and for the case of $x=$ unity we have

$$u_1+u_2+\ldots+u_n=nu_1+\frac{n.n-1}{1.2}\Delta u_1+\frac{n.n-1.n-2}{1.2.3}\Delta^2u_1+\ldots,$$

which will give the sum of the series very readily when u_n is a polynomial in n or a polynomial + a term of the form Ka^n.

4. Other types of series, when they can be summed to n terms at all, are summed by some special artifice. Summing the series to 3 or 4 terms may suggest the form of the sum to n terms which can then be established by induction. Or it may be possible to express u_n in the form $w_{n+1}-w_n$, in which case the sum to n terms is $w_{n+1}-w_1$. Thus, if $u_n=a(a+b)(a+2b)\ldots(a+n-1b)/c(c+b)(c+2b)\ldots(c+n-1b)$, the relation $(c+nb)u_{n+1}=(a+nb)u_n$ can be thrown into the form $(c+nb)u_{n+1}-(c+n-1b)u_n=(a-c+b)u_n$, whence the sum can be found. Again, if $u_n=\tan nx\tan(n+1)x$, the summation can be effected by writing u_n in the form $\cot x(\tan n+1x-\tan nx)-1$. Or a series may be recognized as a coefficient in a product. Thus, if $f(x)\equiv u_0+u_1x+u_2x^2+\ldots, u_0+u_1+\ldots+u_n$ is the coefficient of x^n in $f(x)/(1-x)$; in this way the sum of the first n coefficients in the expansion of $(1-x)^{-k}$ may be found. The sum of one series may be deduced from that of another by differentiation or integration. For further information the reader may consult G. Chrystal's *Algebra* (vol. ii.).

5. The sum of an infinite series may be deduced from the sum to n terms, when this is known, by increasing n indefinitely and finding the limit, if any, to which it tends, but a series may often be summed to infinity when it cannot be summed to n terms; the sum of the infinite series $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\ldots$ is $\frac{\pi^2}{6}$, the sum to n terms cannot be found.

For methods and transformations by means of which the sum to n terms of a series may be found approximately when it cannot be found exactly, the reader may consult G. Boole's *Treatise on the Calculus of Finite Differences*.

Infinite Series.

6. Let $u_1, u_2, u_3, \ldots u_n$, be a series of numbers real or complex, and let S_n denote $u_1+u_2+\ldots+u_n$. We thus form a sequence of numbers $S_1, S_2, \ldots S_n$. This sequence may tend to a definite finite limit S as n increases indefinitely. In this case the series $u_1+u_2+\ldots+u_n$ is said to be *convergent*, and to converge to a sum S. If by taking n sufficiently large $|S_n|$ can be made to exceed any assignable quantity, however large, the series is said to be *divergent*. If the sequence $S_1, S_2, \ldots$ tends to finite but different limits according to the form of n the series is said to oscillate, and is also classed under the head of divergent series. The sum of n terms of the geometric series $1+x+x^2+\ldots$ is $(1-x^n)/(1-x)$. If x is less than unity S_n clearly tends to the limit $1/(1-x)$, and the series is convergent and its sum is $1/(1-x)$. If x is greater than unity S_n clearly can be made greater than any assignable quantity by taking n large enough, and the series is divergent. The series $1-1+1-1+\ldots$, where S_n is unity or zero, according as n is odd or even, is an example of an oscillating series. The condition of convergency may also be presented under the following form. Let ${}_pR_n$ denote $S_{n+p}-S_n$: let ϵ be any arbitrarily assigned positive quantity as small as we please; if we can find a number m such that for $m=$ or $>n$, $|{}_pR_n|<\epsilon$ for all values $1, 2, \ldots$ of p, then the series converges. The least value of the number m corresponding to a given value of ϵ, if it can be found, may be regarded as a measure of rapidity of the convergency of the series; it may happen that when u_n involves a variable x, m increases indefinitely as x approaches some value; in this case the convergence of the series is said to be infinitely slow for this value of x.

7. An infinite series may contain both positive and negative terms. The terms may be positive and negative alternately or they may occur in groups which without altering the order of the terms of the series may each be collected into a single term; thus all series may be regarded as belonging to one of two types, $u_1+u_2+u_3+\ldots$ in which the terms are all positive, or $u_1-u_2+u_3-\ldots$ in which the terms are alternately positive and negative.

8. It is clear that if a series is convergent u_n must tend to the limit zero as n is increased indefinitely. This condition though necessary is by no means sufficient. If all the terms of a convergent series are positive a series obtained by writing its terms in any other order is convergent and converges to the same sum. For if S_n denotes the sum of n terms of the first series and Σ_n denotes the sum of n terms of the new series, then, when n is any large number, we can choose numbers p and q such that $S_q>\Sigma_n>S_p$; so that Σ_n tends to the common limit of S_p and S_q, which is the sum of the original series. If $u_1, u_2, u_3, \ldots$ are all positive, and if after some fixed term, say the pth, u_n continually decreases and tends to the limit zero, the series $u_1-u_2+u_3-u_4+\ldots$ is convergent. For $|S_{p+2n}-S_p|$ lies between $|u_{p+1}-u_{p+2}|$ and $|u_{p+1}-u_{p+2n}|$ so that, when n is increased indefinitely, $|S_{p+2n}|$ remains finite; also $|S_{p+2n+1}-S_{p+2n}|$ tends to zero, so that the series converges. If u_n tends to a limit a, distinct from zero, then the series $v_1-v_2+v_3-\ldots$, where $v_n=u_n-a$, converges and the series $u_1-u_2+u_3\ldots$ oscillates. As examples we may take the series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\ldots$ and $2-\frac{3}{2}+\frac{4}{3}-\frac{5}{4}+\ldots$; the first of these converges, the second oscillates.

9. The series $u_1+u_3+u_5+\ldots, u_2+u_4+u_6+\ldots$ may each of them diverge, though the series $u_1-u_2+u_3-\ldots$ converges. A series such that the series formed by taking all its terms positively is convergent is said to be *absolutely convergent*; when this is not the case the series is said to be *semi-convergent* or *conditionally convergent*. A series of complex numbers in which $u_n=p_n+iq_n$, where p_n and q_n are real (i being $\sqrt{-1}$), is said to be convergent when the series $p_1+p_2+p_3+\ldots, q_1+q_2+q_3+\ldots$ are separately convergent, and if they converge to P and Q respectively the sum of the series is $P+iQ$. Such a series is said to be absolutely convergent when the series of moduli of u_n, *i.e.*, $\Sigma(p_n^2+q_n^2)^{\frac{1}{2}}$, is convergent; this is sufficient but not necessary for the separate convergence of the p and q series.

There is an important distinction between absolutely convergent and conditionally convergent series. In an absolutely convergent series the sum is the same whatever the order of the terms; this is not the case with a conditionally convergent series. The two series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\ldots$, and $1+\frac{1}{3}-\frac{1}{2}+\frac{1}{5}+\frac{1}{7}-\frac{1}{4}+\ldots$, in which the terms are the same but in different orders, are convergent but not absolutely convergent. If we denote the sum of the first by S and the sum of the second by Σ it can be shown that $\Sigma=\frac{3}{2}S$. G. F. B. Riemann and P. G. L. Dirichlet have shown that the terms of a semi-convergent series may be so arranged as to make the series converge to any assigned value or even to diverge.

10. Tests for convergency of series of positive terms are obtained by comparing the series with some series whose convergency or divergency is readily established. If the series of positive terms $u_1+u_2+u_3+\ldots, v_1+v_2+v_3+\ldots$ are such that u_n/v_n is always finite, then they are convergent or divergent together; if $u_{n+1}/u_n<v_{n+1}/v_n$ and Σv_n is convergent, then Σu_n is convergent; if $u_{n+1}/u_n>v_{n+1}/v_n$ and Σv_n is divergent, then Σu_n is divergent. By comparison with the ordinary geometric progression we obtain the

following tests. If $\sqrt[n]{u_n}$ approaches a limit l as n is indefinitely increased, Σu_n will converge if l is less than unity and will diverge if l is greater than unity (Cauchy's test); if u_{n+1}/u_n approaches a limit l as n is indefinitely increased, Σu_n will converge if l is less than unity and diverge if l is greater than unity (D'Alembert's test). Nothing is settled when the limit l is unity, except in the case when l remains greater than unity as it approaches unity. The series then diverges. It may be remarked that if u_{n+1}/u_n approaches a limit and $\sqrt[n]{u_n}$ approaches a limit, the two limits are the same. The choice of the more useful test to apply to a particular series depends on its form.

In the case in which u_{n+1}/u_n approaches unity remaining constantly less than unity, J. L. Raabe and J. M. C. Duhamel have given the following further criterion. Write $u_n/u_{n+1} = 1 + a_n$, where a_n is positive and approaches zero as n is indefinitely increased. If na_n approaches a limit l, the series converges for $l > 1$ and diverges for $l < 1$. For $l = 1$ nothing is settled except for the case where l remains constantly less than unity as it approaches it; in this case the series diverges.

If $f(n)$ is positive and decreases as n increases, the series $\Sigma f(n)$ is convergent or divergent with the series $\Sigma a^n f(a^n)$ where a is any number > 2 (Cauchy's condensation test). By means of this theorem we can show that the series whose general terms are

$$\frac{1}{n^a}, \frac{1}{n(\ln)^a}, \frac{1}{n\ln(\ln^2 n)^a}, \frac{1}{n\ln\ln^2 n(\ln^3 n)^a}, \ldots,$$

where $\ln n$ denotes $\log n$, $\ln^2 n$ denotes $\log\log n$, $\ln^3 n$ denotes $\log\log\log n$, and so on, are convergent if $a > 1$ and divergent if $a = $ or < 1.

By comparison with these series, a sequence of criteria, known as the logarithm criteria, has been established by De Morgan and J. L. Bertrand. A. De Morgan's form is as follows: writing $u_n = 1/\phi(n)$, put $p_0 = x\phi'(x)/\phi(x)$, $p_1 = (p_0 - 1)\ln x$, $p_2 = (p_1 - 1)\ln^2 x$, $p_3 = (p_2 - 1)\ln_3 x, \ldots$ where $\ln^r x$ denotes $\log\log\log \ldots x$. If the limit, when x is infinite, of the first of the functions $p_0, p_1, p_2, \ldots$, whose limit is not unity, is greater than unity the series is convergent, if less than unity it is divergent.

In Bertrand's form we take the series of functions

$$1 - \frac{1}{u_n}/\ln n,\ 1 - \frac{1}{nu_n}/\ln^2 n,\ 1 - \frac{1}{nu_n \ln n}/\ln^3 n, \ldots$$

If the limit, when n is infinite, of the first of these functions, whose limit is not unity, is greater than unity the series is convergent, if less than unity it is divergent. Other forms of these criteria may be found in Chrystal's *Algebra*, vol. ii.

Though sufficient to test such series as occur in ordinary mathematics, it is possible to construct series for which they entirely fail. It follows that in a convergent series not only must we have Lt $u_n = 0$ but also Lt $nu_n = 0$, Lt $n\ln u_n = 0$, &c. Abel has, however, shown that no function $\phi(n)$ can exist such that the series Σu_n is convergent or divergent as Lt $\phi(n)u_n$ is or is not zero.

11. Two or more absolutely convergent series may be added together, thus $(u_1 + u_2 + \ldots) + (v_1 + v_2 + \ldots) = (u_1 + v_1) + (u_2 + v_2) + \ldots$, that is, the resulting series is absolutely convergent and has for its sum the sum of the sums of the two series. Similarly two or more absolutely convergent series may be multiplied together thus $(u_1 + u_2 + u_3 + \ldots)(v_1 + v_2 + v_3 + \ldots) = u_1v_1 + (u_1v_2 + u_2v_1) + (u_1v_3 + u_2v_2 + u_3v_1) + \ldots$, and the resulting series is absolutely convergent and its sum is the product of the sums of the two series. This was shown by Cauchy, who also showed that the series Σw_n, where $w_n = u_1v_n + u_2v_{n-1} + \ldots + u_nv_1$, is not necessarily convergent when both series are semi-convergent. A striking instance is furnished by the series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + \ldots$ which is convergent, while its square $1 - \frac{2}{\sqrt{2}} + \left(\frac{2}{\sqrt{3}} + \frac{1}{2}\right) - \ldots$ may be shown to be divergent. F. K. L. Mertens has shown that a sufficient condition is that one of the two series should be absolutely convergent, and Abel has shown that if Σw_n converges at all, it converges to the product of Σu_n and Σv_n. But more properly the multiplication of two series gives rise to a double series of which the general term is $u_m v_n$.

12. Before considering a double series we may consider the case of a series extending backwards and forwards to infinity

$$\ldots u_{-m} + \ldots + u_{-2} + u_{-1} + u_0 + u_1 + u_2 + \ldots + u_n + \ldots$$

Such a series may be absolutely convergent and the sum is then independent of the order of the terms and is equal to the sums of the two series $u_0 + u_1 + u_2 + \ldots$ and $u_{-1} + u_{-2} + \ldots$, but, if not absolutely convergent, the expression has no definite meaning until it is explained in what manner the terms are intended to be grouped together; for instance, the expression may be used to denote the foregoing sum of two series, or to denote the series $u_0 + (u_1 + u_{-1}) + (u_2 + u_{-2}) + \ldots$, and the sum may have different values, or there may be no sum, accordingly. Thus, if the series be $\ldots - \frac{1}{2} - \frac{1}{2} + 0 + \frac{1}{2} + \frac{1}{2} + \ldots$, with the former meaning the two series $0 + \frac{1}{2} + \frac{1}{2} + \ldots$ and $-\frac{1}{2} - \frac{1}{2} - \ldots$ are each divergent, and there is no sum; but with the latter meaning the series is $0 + 0 + 0 + \ldots$ which has a sum 0. So, if the series be taken to denote the limit of $(u_0 + u_1 + \ldots + u_n) + (u_{-1} + u_{-2} + \ldots + u_{-m})$, where n and m are each of them ultimately infinite, there may be a sum depending on the ratio $n : m$, which sum acquires a determinate value only when this ratio is given. In the case of the series given above, if this ratio is k, the sum of the series is $\log k$.

13. In a singly infinite series we have a general term u_n, where n is an integer positive in the case of an ordinary series, and positive or negative in the case of a back-and-forwards series. Similarly for a doubly infinite series we have a general term $u_{m,n}$ where m, n are integers which may be each of them positive, and the form of the series is then

$$\begin{array}{l} u_{0,0}\ u_{0,1}\ u_{0,2} \ldots \\ u_{1,0}\ u_{1,1}\ u_{1,2} \ldots \\ \cdot\ \ \cdot\ \ \cdot \\ \cdot\ \ \cdot\ \ \cdot \end{array}$$

or they may be each of them positive or negative. The latter is the more general supposition, and includes the former, since $u_{m,n}$ may $= 0$, for m or n each or either of them negative. To attach a definite meaning to the notion of a sum, we may regard m, n as the rectangular coordinates of a point in a plane; if m and n are each positive we attend only to the positive quadrant of the plane, but otherwise to the whole plane. We may imagine a boundary depending on a parameter T, which for T infinite is at every point thereof at an infinite distance from the boundary; for instance, the boundary may be the circle $x^2 + y^2 = T$, or the four sides of a rectangle, $x = \pm\alpha T$, $y = \pm\beta T$. Suppose the form is given and the value of T, and let the sum $S_{m,n}$ be understood to denote the sum of the terms $u_{m,n}$ within the boundary, then, if as T increases without limit, $S_{m,n}$ continually approaches a determinate limit (dependent, it may be, on the form of the boundary) *for such form of boundary* the series is said to be convergent, and the sum of the doubly infinite series is the limit of $S_{m,n}$. The condition of convergency may be otherwise stated; it must be possible to take T so large that the sum $R_{m,n}$ for all terms $u_{m,n}$ which correspond to points outside the boundary shall be as small as we please.

14. It is easy to see that, if each of the terms $u_{m,n}$ is positive and the series is convergent for any particular form of boundary, it will be convergent for any other form of boundary, and the sum will be the same in each case. Suppose that in the first case the boundary is the curve $f_1(x, y) = T$. Draw any other boundary $f_2(x, y) = T'$. Wholly within this we can draw a curve $f_1(x, y) = T_1$ of the first family, and wholly outside it we can draw a second curve of the first family, $f_1(x, y) = T_2$. The sum of all the points within $f_2(x, y) = T'$ lies between the sum of all the points within $f_1(x, y) = T_1$ and the sum of all the points within $f_1(x, y) = T_2$. It therefore tends to the common limit to which these two last sums tend. The sum is therefore independent of the form of the boundary. Such a series is said to be absolutely convergent, and similarly a doubly infinite series of positive and negative terms is absolutely convergent when the series formed by taking all its terms positively is convergent.

15. It is readily seen that when the series is not absolutely convergent the sum will depend on the form of the boundary. Consider the case in which m and n are always positive, and the boundary is the rectangle formed by $x = m$, $y = n$, and the axes. Let the sum within this rectangle be $S_{m,n}$. This may have a limit when we first make n infinite and then m; it may have a limit when we first make m infinite and then n, but the limits are not necessarily the same; or there may be no limit in either of these cases but a limit depending on the ratio of m to n, that is to say, on the shape of the rectangle.

When the product of two series is arranged as a doubly infinite series, summing for the rectangular boundary $x = \alpha T$, $y = \beta T$ we obtain the product of the sums of the series. When we arrange the double series in the form $u_1v_1 + (u_1v_2 + u_2v_1) + \ldots$ we are summing over the triangle bounded by the axes and the straight line $x + y = T$, and the results are not necessarily the same if the terms are not all positive. For full particulars concerning multiple series the reader may consult E. Goursat, *Cours d'analyse*, vol. i.; G. Chrystal, *Algebra*, vol. ii.; or T. J. I'A. Bromwich, *The Theory of Infinite Series*.

16. In the series so far considered the terms are actual numbers, or, at least, if the terms are functions of a variable, we have considered the convergency only when that variable has an assigned value. In the case, however, of a series $u_1(z) + u_2(z) + \ldots$, where $u_1(z), u_2(z), \ldots$ are single-valued continuous functions of the general complex variable z, if the series converges for any value of z, in general it converges for all values of z, whose representative points lie within a certain area called the "domain of convergence" and within this area defines a function which we may call $S(z)$. It might be supposed that $S(z)$ was necessarily a continuous function of z, but this is not the case. G. G. Stokes (1847) and P. L. Seidel (1848) independently discovered that in the neighbourhood of a point of discontinuity the convergence is infinitely slow and thence arises the notion of *uniform* and *non-uniform* convergence.

17. If for any value of z the series $u_1(z) + u_2(z) + \ldots$ converges it is possible to find an integer n such that $|S(z) - S_n(z)| < \epsilon$, $|S(z) - S_{n+1}(z)| < \epsilon, \ldots$, where ϵ is any arbitrarily assigned positive quantity, however small. For a given ϵ the least value of n will vary throughout any region from point to point of that region. It may, however, be possible to find an integer ν which is a superior limit to all the values of n in that region, and we thus have, throughout this region, $|S(z) - S_\nu(z)| < \epsilon$, $|S(z) - S_{\nu+1}(z)| < \epsilon \ldots$ where z is any point in the region and ν is a finite integer depending only on ϵ and not on z

The series is then said to converge uniformly throughout this region.

If, as z approaches the value z_1, n increases as $|z-z_1|$ diminishes and becomes indefinitely great as $|z-z_1|$ becomes indefinitely small the series is said to be non-uniformly convergent at the point z_1.

A function represented by a series is continuous throughout any region in which the series is uniformly convergent; there cannot be discontinuity with uniform convergence; on the other hand there may be continuity and non-uniform convergence. If $u_1(z)+u_2(z)+\dots$ is uniformly convergent we shall have $\int S(z)dz=\int u_1(z)dz+\int u_2(z)dz+\dots$ along any path in the region of uniform convergence; and we shall also have $\frac{d}{dz}S(z)=\frac{d}{dz}u_1(z)+\frac{d}{dz}u_2(z)+\dots$ if the series $\frac{d}{dz}u_1(z)+\frac{d}{dz}u_2(z)+\dots$ is uniformly convergent.

Uniform convergence is essentially different from absolute convergence; neither implies the other (see FUNCTION).

18. A series of the form $a_0+a_1z+a_2z^2+\dots$, in which $a_0, a_1, a_2, \dots$ are independent of z, is called a power series.

In the case of a power series there is a quantity R such that the series converges if $|z|<R$, and diverges if $|z|>R$. A circle described with the origin as centre and radius R is called the circle of convergence. A power series may or may not converge on the circle of convergence. The circle of convergence may be of infinite radius as in the case of the series for sin z, viz. $z-\frac{z^3}{3!}+\frac{z^5}{5!}-\dots$ In this case the series converges over the whole of the z plane. Or its radius may be zero as in the case of the series $1+1!\,z+2!\,z^2+\dots$, which converges nowhere except at the origin. The radius R may be found usually, but not always, from the consideration that a series converges absolutely if $|u_{n+1}/u_n|<1$, and diverges if $|u_{n+1}/u_n|>1$.

A power series converges absolutely and uniformly at every point within its circle of convergence; it may be differentiated or integrated term by term; the function represented by a power series is continuous within its circle of convergence and, if the series is convergent on the circle of convergence, the continuity extends on to the circle of convergence. Two power series cannot be equal throughout any region in which both are convergent without being identical.

19. Series of the type $a_0+a_1\cos z+a_2\cos 2z+\dots$
$+b_1\sin z+b_2\sin 2z+\dots,$
where the coefficients $a_0, a_1, a_2, \dots b_1, b_2, \dots$ are independent of z, are called Fourier's series. They are of the greatest interest and importance both from the point of view of analysis and also because of their applications to physical problems. For the consideration of these series and the expansion of arbitrary functions in series of this type see FUNCTION and FOURIER'S SERIES. For the general problem of the development of functions in infinite series of various types see FUNCTION.

20. The modern theory of convergence dates from the publication in 1821 of Cauchy's *Analyse algébrique*. The great mathematicians of the 18th century used infinite series freely with very little regard to their convergence or divergence and with, occasionally, very extraordinary results. Series which are ultimately divergent may be used to calculate values of functions in special cases and to represent what are called "asymptotic expansions" of functions (see FUNCTION).

Infinite Products.

21. The product of an infinite number of factors formed in succession according to any given law is called an infinite product. The infinite product $\Pi_n\equiv(1+u_1)(1+u_2)\dots(1+u_n)$ is said to be convergent when $\mathrm{Lt}_{n\to\infty}\Pi_n$ tends to a definite finite limit other than zero. If Lt Π_n is zero or infinite or tending to different finite values according to the form of n the product is said to be divergent.

The condition for convergency may also be stated in the following form. (1) The value of Π_n remains finite and different from zero however great n may become, and (2) Lt Π_n and Lt Π_{n+r} must be equal, when n is increased indefinitely, and r is any positive integer. Since in particular Lt $\Pi_n=$Lt Π_{n+1}, we must have Lt $u_{n+1}=0$. Hence after some fixed term $u_1, u_2, \dots$ or their moduli in the case of complex quantities, must diminish continually down to zero. Since we may remove any finite number of terms in which $|u_n|>1$ without affecting the convergence of the whole product, we may regard as the general type of a convergent product $(1+u_1)(1+u_2)\dots(1+u_n)\dots$ where $|u_1|, |u_2|, \dots |u_n|, \dots$ are all less than unity and decrease continually to zero.

A convergent infinite product is said to be absolutely convergent where the order of its factors is immaterial. Where this is not the case it is said to be semi-convergent.

22. The necessary and sufficient condition that the product $(1+u_1)(1+u_2)\dots$ should converge absolutely is that the series $|u_1|+|u_2|+\dots$ should be convergent. If $u_1, u_2, \dots$ are all of the same sign, then, if the series $u_1+u_2+\dots$ is divergent, the product is infinite if $u_1, u_2, \dots$ are all positive and zero if they are all negative.

If $u_1+u_2+\dots$ is a semi-convergent series the product converges, but not absolutely, or diverges to the value zero, according as the series $u_1^2+u_2^2+\dots$ is convergent or divergent. These results may be deduced by considering, instead of Π_n, log Π_n which is the series $\log(1+u_1)+\log(1+u_2)+\dots$ (see G. Chrystal's *Algebra*, vol ii., or E. T. Whittaker's *Modern Analysis*, chap. ii.); they may also be proved by means of elementary theorems on inequalities (see E. W. Hobson's *Plane Trigonometry*, chap. xvii.).

23. If $u_1, u_2, \dots$ are functions of a variable z, a convergent infinite product $(1+u_1)(1+u_2)\dots$ defines a function of z. For such products there is a theory of uniform convergence analogous to that of infinite series. It is not in general possible to represent a function as an infinite product; the question has been dealt with by Weierstrass (see his *Abhandlungen aus der Functionlehre* or A. R. Forsyth's *Theory of Functions*). One of the simplest cases of a function expressed as an infinite product is that of sin z/z, which is the value of the absolutely convergent infinite product.

$$\left(1-\frac{z^2}{\pi^2}\right)\left(1-\frac{z^2}{2^2\pi^2}\right)\dots\left(1-\frac{z^2}{n^2\pi^2}\right)\dots$$

24. K. T. W. Weierstrass has shown that a semi-convergent or divergent infinite product may be made absolutely convergent by the association with each factor of a suitable exponential factor called sometimes a "convergency factor." The product $\left(1+\frac{z}{\pi}\right)\left(1+\frac{z}{2\pi}\right)\left(1+\frac{z}{3\pi}\right)\dots$ is divergent; the product $\left(1+\frac{z}{\pi}\right)e^{-\frac{z}{\pi}}\left(1+\frac{z}{2\pi}\right)e^{-\frac{z}{2\pi}}\dots$ is absolutely convergent. The product for sin z/z is semi-convergent when written in the form

$$\left(1-\frac{z}{\pi}\right)\left(1+\frac{z}{\pi}\right)\left(1-\frac{z}{2\pi}\right)\left(1+\frac{z}{2\pi}\right)\dots,$$

but absolutely convergent when written in the form

$$\left(1-\frac{z}{\pi}\right)e^{\frac{z}{\pi}}\left(1+\frac{z}{\pi}\right)e^{-\frac{z}{\pi}}\left(1-\frac{z}{2\pi}\right)e^{\frac{z}{2\pi}}\left(1+\frac{z}{2\pi}\right)e^{-\frac{z}{2\pi}}\dots$$

From this last form it can be shown that if

$$\phi(z)=\left(1-\frac{z}{\pi}\right)\left(1-\frac{z}{2\pi}\right)\dots\left(1-\frac{z}{n\pi}\right)\left(1+\frac{z}{\pi}\right)\left(1+\frac{z}{2\pi}\right)\dots\left(1+\frac{z}{m\pi}\right),$$

then the limit of $\phi(z)$ as m and n are both made infinite in any given ratio is

$$\left(\frac{m}{n}\right)^{\frac{z}{\pi}}\frac{\sin z}{z}.$$

Another example of an absolutely convergent infinite product, whose convergency depends on the presence of an exponential factor, is the product $z\Pi\left(1-\frac{z}{\Omega}\right)e^{\Omega+\frac{1}{2}\frac{z^2}{\Omega^2}}$, where Ω denotes $2m\omega_1+2n\omega_2$, ω_1 and ω_2 being any two quantities having a complex ratio, and the product is taken over all positive and negative integer and zero values of m and n, except simultaneous zeros. This product is the expression in factors of Weierstrass's elliptic function $\sigma(z)$.

AUTHORITIES.—G. Chrystal, *Algebra*, vol. ii. (1900); E. Goursat, *Cours d'analyse* (translated by E. R. Hedrick), vol. i. (1902); J. Harkness and F. Morley, *A Treatise on the Theory of Functions* (1893) and *Introduction to the Theory of Analytic Functions* (1899); E. W. Hobson, *Plane Trigonometry* (1891), and *Theory of Functions of a Real Variable*; H. S. Carslaw, *Fourier's Series*; E. T. Whittaker, *Modern Analysis* (1902); J. Tannery, *Introduction à la théorie des functions d'une variable*; C. Jordan, *Cours d'analyse de l'École Polytechnique* (2nd ed., 1896); E. Césaro, *Corso di analisi algebraica* (1894); O. Stolz, *Allgemeine Arithmetik* (1886); O. Biermann, *Elemente der höheren Mathematik* (1895); W. F. Osgood, *Introduction to Infinite Series*; T. J. I'A. Bromwich, *Theory of Infinite Series* (1908). Also the article by A. Pringsheim, "Irrationalzahlen und Konvergenz unendlichen Prozesse" in the *Encyclopädie der mathematischen Wissenschaften* 1, a. 3 (Leipzig). For the history of the subject see R. Reiff, *Geschichte der unendlichen Reihen*; G. H. Hardy, *A Course of Pure Mathematics*. (A. E. J.)

SERINGAPATAM, or SRIRANGAPATANA, a town of India, formerly capital of the state of Mysore, situated on an island of the same name in the Cauvery river. Pop. (1901) 8584. The town is chiefly noted for its fortress, which figured prominently in Indian history at the close of the 18th century. This formidable stronghold of Tippoo Sultan twice sustained a siege from the British, and was finally stormed in 1799. After its capture the island was ceded to the British, but restored to Mysore in 1881. The island of Seringapatam is about 3 m. in length from east to west and 1 in breadth, and yields valuable crops of rice and sugar-cane. The fort occupies the western side, immediately overhanging the river. Seringapatam is said to have been founded in 1454 by a descendant of one of the local officers appointed by Ramanuja, the Vishnuite apostle, who named it the city of Sri Ranga or Vishnu. At the eastern or lower end of the island is the Lal Bagh or "red garden," containing the mausoleum built by Tippoo Sultan for his father Hyder Ali, in which Tippoo himself also lies.

SERJEANT, or SERGEANT (from Lat. *serviens, servire,* to serve, through O. Fr. *sergant, serjant,* mod. Fr. *sergent*), the title (1) of a non-commissioned officer in the army and of a subordinate officer of police; (2) of certain officials of the royal household (see *Serjeants-at-arms,* below). (3) The name was also given formerly to the highest rank of barristers in England and Ireland (see SERJEANT-AT-LAW). In the middle ages *serviens* had a variety of applications all connoting the sense of service, from the *serviens de pane et mensa,* the domestic servant of a monastery, to the *servientes de armis,* the serjeants-at-arms (Fr. *sergeans d'armes*) of monarchs, the *servientes* (*sergeans*) who were the apparitors of the French king, and vassals who held by a special service (serjeanty, *q.v.*). The *serjeants* (*fratres servientes*) formed also an important division of the great military orders (see SAINT JOHN OF JERUSALEM, KNIGHTS OF THE ORDER OF, and TEMPLARS). Du Cange (*Glossarium, s.v.* "Serviens") gives many other instances.

1. *Military Title.*—In its early military uses the word implied a subordinate, and it is not clear how it came to be used for a minor commander. The "serjeants" of ordinary medieval armies were the heavy-armed (generally mercenary) cavalry or men-at-arms. In the 15th century it became usual to subdivide troops of all sorts into groups of dissimilar combatants, graded amongst themselves according to military or social importance. Thus a "lance," or group, might consist of a heavy-armed lancer (man-at-arms), a mounted and a foot archer and an armed valet, and the "serjeant" would be its most important member. But the general evolution of armies led to their being classed by arms and grouped in more homogeneous regiments. Under such an organization the title of the group-leader lost its cavalry significance and became specifically the designation of an infantry rank. From the cavalry it disappeared altogether, the titles "corporal of horse," "maréchal des logis," &c., taking its place. In 16th and 17th century armies the title serjeant is found amongst the highest ranks of an army. With a partial return to the old meaning it signifies, in all its forms, an expert professional soldier, the serjeant of a company, the serjeant-major of a regiment and the serjeant-major-general of the army (these last the originals of the modern ranks, major and major-general) being charged with all duties pertaining to the arraying, camping and drill of their units.

In modern armies the word serjeant is used of a non-commissioned officer ranking between corporal and serjeant-major. A "lance-serjeant" is a corporal holding the appointment and performing the duties, but not having the rank of serjeant. The serjeant-major in the British service is a "warrant-officer," although in the cavalry and artillery the ranks of "troop," "squadron" or "battery serjeant-major" are non-commissioned and correspond to the "colour-serjeant" of infantry. This last officer is the senior non-commissioned officer of a company, and has, besides his duties in the colour-party, the pay and accounting work of his unit. The former "corporal of horse" and "corporal-major" still survive in the British Household Cavalry. In Germany, Austria and Russia the regimental serjeant-majors of infantry and cavalry are styled *Feldwebel* and *Wachtmeister* respectively, while in France the titles are *adjudant* and *maréchal des logis* or *maréchal des logis chef.*

2. *Serjeants-at-Arms.*—In the British royal household there are eight serjeants-at-arms, whose duties are ceremonial; they have to be in attendance only at drawing-rooms, levees, state balls and state concerts. There are also two other serjeants-at-arms to whom special duties are assigned, the one attending the Speaker of the House of Commons and the other the lord chancellor in the House of Lords, carrying their maces and executing their orders. The Speaker's serjeant-at-arms is the disciplinary officer of the House of Commons, whose duty it is to expel members at the order of the Speaker and to arrest and keep in custody those persons condemned to this punishment by the authority of the House. The serjeants-at-arms have no special uniform. At court they wear any naval, military or civil uniform to which they may be entitled, or the court dress of those holding legal appointments, but not entitled to wear robes, *i.e.* a suit of black cloth, with knee-breeches, lace bands and ruffles, a black silk cocked hat with rosette and steel loop and a sword. A silver collar of office is worn on special occasions. This costume, with the chain, is that worn by the serjeants-at-arms in the House of Lords and the House of Commons always.

SERJEANT-AT-LAW, the name (see above) given to what was formerly an order of the highest rank of barristers at the English or Irish bar. The word is a corruption of *serviens ad legem,* as distinguished from *apprenticius ad legem,* or utter barrister, who probably originally obtained his knowledge of law by serving a kind of apprenticeship to a serjeant. When the order of serjeants was instituted is unknown, but it certainly dates from a very remote period. The authority of serjeant counters or countors (*i.e.* pleaders, those who frame counts in pleading) is treated in the *Mirror of Justices,* and they are named in 3 Edw. I. c. 29. They may possibly have been the representatives of the *conteurs* mentioned in the great customary of Normandy. The position of the serjeant had become assured when Chaucer wrote. One of the characters in the *Canterbury Tales* is

> "A serjeant of the law, wary and wise,
> That often had y-been at the parvis."[1]

Serjeants (except king's serjeants) were created by writ of summons under the great seal, and wore a special and distinctive dress, the chief feature of which was the coif, a white lawn or silk skull-cap, afterwards represented by a round piece of black silk at the top of the wig. They enjoyed a social precedence after knights bachelors and before companions of the Bath and other orders. In this they differed from king's counsel, who had simply professional as distinguished from social rank. Socially the serjeant had precedence, professionally the king's counsel, unless indeed, as was often the case, a patent of precedence was granted to the former. The serjeants at the Irish bar had precedence next after the law officers of the crown. Till past the middle of the 19th century a limited number of the serjeants were called "king's (queen's) serjeants." They were appointed by patent and summoned to parliament. Until 1814 the two senior king's serjeants had precedence of even the attorney-general and solicitor-general. It was the custom for serjeants on their appointment to give gold rings with mottoes to their colleagues. Down to 1845 the order enjoyed a very valuable monopoly of practice. The serjeants had the right of exclusive audience as leading counsel in the Court of Common Pleas. In 1834 a royal mandate of William IV. attempted to abolish this privilege, but in 1840 the judicial committee of the privy council declared the mandate informal and invalid. The monopoly was finally abolished in 1845 by Act of Parliament. For at least 600 years the judges of the superior courts of common law were always serjeants, but by the Judicature Act 1873 no person appointed a judge of the High Court of Justice or the Court of Appeal was required to take or have taken the degree of serjeant-at-law. The serjeants had their own inn of court known as Serjeants' Inn, which was formerly in two divisions, one in Fleet Street and one in Chancery Lane. In 1758 the members of the former joined the latter. In 1877 the society was dissolved, the inn sold to one of the members and the proceeds divided among the existing serjeants. The order is now extinct.

See *Serviens ad Legem,* by Mr Serjeant Manning; and *The Order of the Coif,* by Mr Serjeant Pulling.

SERJEANTY. Tenure by serjeanty was a form of land-holding under the feudal system, intermediate between tenure by knight-service (*q.v.*) and tenure in socage. It originated in the assignation of an estate in land on condition of the performance of a certain duty, which can hardly be described more exactly than as not being that of knight-service. Its essence, according to Pollock and Maitland, might be described as "servantship," the discharge of duties in the household of king or noble; but it ranged from service in the king's host, distinguished only by equipment from that of the knight, to petty

[1] The parvis was the porch of old St Paul's, where each serjeant had his particular pillar at which he held interviews with his clients

renders scarcely distinguishable from those of the rent-paying tenant or socager. Serjeanties, as Miss Bateson has expressed it, "were neither always military nor always agricultural, but might approach very closely the service of knights or the service of farmers. . . . The serjeanty of holding the king's head when he made a rough passage across the Channel, of pulling a rope when his vessel landed, of counting his chessmen on Christmas day, of bringing fuel to his castle, of doing his carpentry, of finding his potherbs, of forging his irons for his ploughs, of tending his garden, of nursing the hounds gored and injured in the hunt, of serving as veterinary to his sick falcons, such and many others might be the ceremonial or menial services due from a given serjeanty." The many varieties of serjeanty were afterwards increased by lawyers classing for convenience under this head such duties as those of escort service to the abbess of Barking, or of military service on the Welsh border by the men of Archenfield.

Serjeants (*servientes*) are already entered as a distinct class in Domesday Book (1086), though not in all cases differentiated from the barons, who held by knight-service. Sometimes, as in the case of three Hampshire serjeanties—those of acting as king's marshal, of finding an archer for his service, and of keeping the gaol in Winchester Castle—the tenure can be definitely traced as far back as Domesday. It is probable, however, that many supposed tenures by serjeanty were not really such, although so described in returns, in inquests after death, and other records. The simplest legal test of the tenure was that serjeants, though liable to the feudal exactions of wardship, &c., were not liable to scutage: they made in place of this exaction special composition with the crown.

The germ of the later distinction between "grand" and "petty" serjeanty is found in the Great Charter (1215), the king there renouncing the right of prerogative wardship in the case of those who held of him by the render of small articles. The legal doctrine that serjeanties were (*a*) inalienable, (*b*) impartible, led to the "arrentation," under Henry III., of serjeanties the lands of which had been partly alienated, and which were converted into socage tenures, or, in some cases, tenures by knight-service. Gradually the gulf widened, and "petty" serjeanties, consisting of renders,[1] together with serjeanties held of mesne lords, sank into socage, while "grand" serjeanties, the holders of which performed their service in person, became alone liable to the burden of wardship and marriage. In Littleton's *Tenures* this distinction appears as well defined, but the development was one of legal theory.

When the military tenure of knight-service was abolished at the Restoration (by 12 Charles II., cap. 24), that of grand serjeanty was retained, doubtless on account of its honorary character, it being then limited in practice to the performance of certain duties at coronations, the discharge of which as a right has always been coveted, and the earliest record of which is that of Queen Eleanor's coronation in 1236. The most conspicuous are those of champion, appurtenant to the Dymokes' manor of Scrivelsby, and of supporting the king's right arm, appurtenant to that of Worksop. The latter duty was performed at the coronation of King Edward VII. (1902).

The meaning of serjeant as a household officer is still preserved in the king's serjeants-at-arms, serjeant-surgeons and serjeant-trumpeter. The horse and foot serjeants (*servientes*) of the king's host in the 12th century, who ranked after the knights and were more lightly armed, were unconnected with tenure.

The best summary of tenure by serjeanty is in Pollock and Maitland's *History of English Law*; McKechnie's *Magna Carta* (1905) should also be consulted; and for Domesday the *Victoria History of Hampshire*, vol. i. The best list of serjeanties is in the *Red Book of the Exchequer* ("Rolls" series), but the *Testa de Nevill* (Record Commission) contains the most valuable records concerning them. Blount's *Tenures* is useful, but its modern editions very uncritical. Wollaston's *Coronation Claims* is the best authority on its subject.

(J. H. R.)

SERMON (Lat. *sermo*, a discourse), an oration delivered from a pulpit with fullness and rhetorical effect. Pascal, than whom no greater authority can be desired, defines a sermon as a religious address, in which the word of God is stated and explained, and in which an audience is excited to the practice of virtue. This may be so extended as to include a discourse in favour of pure morality, though, even in that case, the morals are founded on Christian doctrine, and even the sermon which the fox preaches in La Fontaine's *Fables* is a parody of a Christian discourse. The Latin sermons of St Augustine, of which 384 are extant, have been taken as their models by all sensible subsequent divines, for it was he who rejected the formal arrangement of the divisions of his theme, and insisted that simplicity and familiarity of style were not incompatible with dignity and religion. His object was not to dazzle by a conformity with the artificial rules of oratory, but to move the soul of the listener by a direct appeal to his conscience. His adage was *Qui sophistice loquitur odibilis est*, and his influence has been exercised ever since in warning the Christian orator against artificiality and in urging upon him the necessity of awakening the heart. Nevertheless, on many occasions, fashion has led the preachers of a particular epoch to develop rules for the composition of sermons, the value of which is more than doubtful. Cardinal Siffrein, who is known as the Abbé Maury (1746–1817), resumed all the known artifices of sermon-style in a volume which has a permanent historical value, the well-known *Essai sur l'éloquence de la chaire* (1810); he was himself rather a fiery politician than a persuasive divine. Maury describes all the divisions of which a good sermon should consist—an exordium, a proposition, a section, a confirmation in two or more points, a peroration; and he holds that a sermon on morals should have but two points, while one on the Passion must have three. These are effects of pedantry, and seem rather to be founded on a cold-blooded analysis of celebrated sermons than on any instinctive sense of the duty of the preacher. We may wish to see in a good sermon, what Bossuet recommended, not the result of slow and tedious study, but the flush of a celestial fervour. Voltaire makes an interesting observation on the technical difference between an English and a French sermon in the 18th century; the former, he says, is a solid and somewhat dry dissertation which the preacher reads to the congregation without a gesture and without any inflection of his voice; the latter is a long declamation, scrupulously divided into three points, and recited by heart with enthusiasm.

Among the earliest examples of pulpit oratory which have been preserved in English literature, the discourses of Wycliffe and his disciples may be passed by, to arrive at the English sermons of John Fisher (1469?–1535), which have a distinct literary value. But Hugh Latimer (1485?–1555) is the first great English preacher, and the wit and power of his sermons (1549) give them prominence in our literature. One of the expository discourses of John Knox (1505–1572), we are told, was of more power to awaken his hearers than a blast from "five hundred trumpets." When we come to Elizabethan times, we possess a few examples of the sermons of the "judicious" Hooker (1554–1600); Henry Smith (1550–1591) was styled "the prime preacher of the nation"; and Lancelot Andrewes (1555–1626), whose sermons were posthumously printed at the command of James I. in 1628, dazzled his contemporaries by the brilliancy of his euphemism; Andrewes was called "the star of preachers." At a slightly later date John Donne (1573–1621) and Joseph Hall (1574–1656) divided the suffrages of the pious. In the middle of the 17th century the sermon became one of the most highly-cultivated forms of intellectual entertainment in Great Britain, and when the theatres were closed at the Commonwealth it grew to be the only public form of eloquence. It is impossible to name all the eminent preachers of this time, but a few must be mentioned. John Hales (1584–1656); Edmund Calamy (1600–1666); the Cambridge Platonist, Benjamin Whichcote (1609–1685); Richard Baxter (1615–1691); the puritan John Owen (1616–1683); the philosophical Ralph Cudworth (1617–1688); Archbishop Leighton (1611–1684)—each of these holds an eminent position in the records of pulpit eloquence, but all were outshone by the gorgeous oratory and art of Jeremy Taylor (1613–1667), who is the most illustrious

[1] Usually a bow, sword, dagger or other small thing belonging to war.

writer of sermons whom the British race has produced. His matchless collection of discourses delivered at Golden Grove, *The Enantos*, was published in 1653–1655. The fault of the 17th-century sermon was a tendency, less prominent in Jeremy Taylor than in any other writer, to dazzle the audience by a display of false learning and by a violence in imagery; the great merit of its literary form was the fullness of its vocabulary and the richness and melody of style which adorned it at its best. Some of the most remarkable divines of this great period, however, are scarcely to be mentioned as successful writers of sermons. At the Restoration, pulpit oratory in England became drier, less picturesque and more sententious. The great names at this period were those of Isaac Barrow (1630–677); Robert South (1634–1716), celebrated for his wit in the pulpit; John Tillotson (1630–1694), the copyright of whose sermons fetched the enormous sum of 2500 guineas after his death, and of whom it was said that he was "not only the best preacher of the age, but seemed to have brought preaching to perfection"; and Edward Stillingfleet (1635–1699), styled, for his appearance in the pulpit, "the beauty of holiness." These preachers of the Restoration were controversialists, keen, moderate and unenthusiastic. These qualities were accentuated in the 18th century, when for a while religious oratory ceased to have any literary value. The sermons of Benjamin Hoadly (1676–1761) have a place in history, and those of Joseph Butler (1692–1752), the *Rolls Sermons* of 1726, have great philosophical importance. Thomas Boston's (1676–1732) memory has been revived by the praise of Stevenson, but his zeal was far exceeded by that of John Wesley (1703–1791), who preached 40,000 sermons, and by that of George Whitefield (1714–1770).

Of all countries, however, France is the one which has shown most brightly in the cultivation of the sermon. In the 14th century Gerson (1363–1429) seems to have been the earliest divine who composed and preached in French, but his example was not followed by any man of equal genius. It was the popular movement of the Reformation, which made the sermon a piece of literature, on the lips of Jean Calvin (1509–1564), Pierre Viret (1511–1571) and Théodore de Bèze (1519–1605). With these stern Protestant discourses may be contrasted the beautiful, but somewhat euphuistical sermons of St François de Sales (1605–1622), full of mystical imagery. Father Claude de Lingendes (1591–1660) has been looked upon as the father of the classic French sermon, although his own *conciones* were invariably written in Latin, but his methods were adopted in French, by the school of Bourdaloue and Bossuet. In the great body of noble religious eloquence delivered from French pulpits during the 17th century, the first place is certainly held by the sermons of J. B. Bossuet (1627–1704), who remains perhaps the greatest preacher whom the world has ever seen. His six *Oraisons Funèbres*, the latest of which was delivered in 1687, form the most majestic existing type of this species of literature. Around that of Bossuet were collected other noble names: Louis Bourdaloue (1632–1704), whom his contemporaries preferred to Bossuet himself; Esprit Fléchier (1632–1710), the politest preacher who ever occupied a Parisian pulpit; and Jules Mascaron (1634–1703), in whom all forms of eloquence were united. A generation later appeared Baptiste Massillon (1663–1742), who was to Bossuet as Racine to Corneille; and Jacques Saurin (1677–1730), whose evangelical sermons were delivered at the Hague. These are the great classic preachers whose discourses continue to be read, and to form an inherent part of the body of French literature. There was some revival of the art of the sermon at Versailles a century later, where the Abbé Maury, whose critical work has been mentioned above, preached with vivid eloquence between 1770 and 1785; the Père Elisée (1726–1783), whom Diderot and Mme Roland greatly admired, held a similar place, at the same time, in Paris. Since the end of the 18th century, although a great number of volumes of sermons have been and continue to be published, and although the pulpit holds its own in Protestant and Catholic countries alike, for purposes of exhortation and encouragement, it cannot be said that the sermon has in any way extended its influence as a form of pure literature. It has, in general, been greatly shortened, and the ordinary sermon of to-day is no longer an elaborate piece of carefully balanced and ornamental literary architecture, but a very simple and brief homily, not occupying the listener for more than some ten minutes in the course of an elaborate service.

In Germany, the great preachers of the middle ages were Franciscans, such as Brother Bertold of Regensburg (1220–1272), or Dominicans, such as Johann Tauler (1290–1361), who preached in Latin. The great period of vernacular preaching lasted from the beginning of the 16th to the end of the 17th century. Martin Luther was the most ancient type of early Reformation preacher, and he was succeeded by the mystic Johann Arndt (1555–1621); the Catholic church produced in Vienna the eccentric and almost burlesque oratory of Abraham a Santa Clara (1642–1709). The last of the great German preachers of this school was P. J. Spener, the founder of the Pietists (1635–1705).

Among the best authorities on the history of the sermon are Abbé Maury: *Essai sur l'éloquence de la chaire* (2 vols., Paris, 1810), Rothe, *Geschichte der Predigt* (Bremen, 1881). (E. G.)

SEROUX D'AGINCOURT, JEAN BAPTISTE LOUIS GEORGE (1730–1814), French archaeologist and historian, was born at Beauvais on the 5th of April 1730. He belonged to a good family, and in his youth served as an officer in a regiment of cavalry. Finding it necessary to quit the army in order to take charge of his younger brothers who had been left orphans, he was appointed a farmer-general by Louis XV. In 1777 he visited England, Germany and Holland; and in the following year he travelled through Italy, with the view of exploring thoroughly the remains of ancient art. He afterwards settled at Rome, and devoted himself to preparing the results of his researches for publication. He died on the 24th of September 1814, leaving the work, which was being issued in parts, unfinished; but it was carried on by M. Gence, and published complete under the title *L'Histoire de l'art par les monuments, depuis sa décadence au quatrième siècle jusqu'à son renouvellement au seizième* (6 vols. fol. with 325 plates, Paris, 1823). An English translation by Owen Jones was published in 1847. In the year of his death Seroux d'Agincourt published in Paris a *Recueil de fragments de sculpture antique, en terre cuite* (1 vol. 4to).

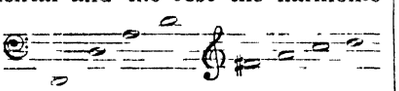
SEROW, or SARAU, the Himalayan name of a goat-like antelope of the size of a donkey, nearly allied to the goral (*q.v.*) of the same region, but considerably larger, and with small face-glands. The Himalayan animal is a local race of the Sumatran *Nemorhaedus sumatrensis*; and the name serow is now extended to embrace all the species belonging to the same genus, the range of which extends from the Himalaya to Burma, the Malay Peninsula and Sumatra in one direction, and to Tibet, China, Japan and Formosa in another. Serows inhabit scrub-clad mountains, at no great elevation. (R. L.*)

SERPA PINTO, ALEXANDRE ALBERTO DE LA ROCHA (1846–1900), Portuguese explorer in Africa, was born at the castle of Polchras, on the Douro, on the 10th of April 1846. Entering the army in 1864, he served in Mozambique, and in 1869 took part in an expedition against tribes in revolt on the lower Zambezi. In 1877 he and Captains Capello and Ivens of the Portuguese navy were sent on an expedition to south central Africa. The explorers left Benguella in November 1877 for the interior, but Serpa Pinto soon parted from his colleagues, who went north, while Serpa Pinto continued east. He crossed the Kwando in June 1878, and in August reached Lialui, the Barotse capital on the Zambezi, where he received help from the Rev. F. Coillard which enabled him to continue his journey down the river to the Victoria Falls, whence he turned south, arriving at Pretoria on the 12th of February 1879. He was the fourth explorer to traverse Africa from west to east, and was the first to lay down with approximate accuracy the route between Bihe and Lialui. Among other rewards the Royal Geographical Society of London awarded him (1881) the Founder's medal. The account of his travels appeared in English under the title *How I crossed Africa* (2 vols., London, 1881). In 1884 he attempted, with less success, the exploration of the regions between Mozambique and Lake Nyasa. Appointed governor of

Mozambique in 1889, he organized an expedition with the object of securing for Portugal the Shiré highlands and neighbouring regions, but the vigorous action of the British agents (John Buchanan and H. H. Johnston) frustrated this design (see AFRICA, § 5). Shortly afterwards Serpa Pinto returned to Lisbon and was promoted to the rank of colonel. He died on the 28th of December 1900.

SERPENT (Lat. *serpens*, creeping, from *serpere*; cf. "reptile" from *repere*, Gr. ἕρπειν), a synonym for reptile or snake (see REPTILE, and SNAKES), now generally used only of dangerous varieties, or metaphorically. See also SERPENT-WORSHIP below.

In music the serpent (Fr. *serpent*, Ger. *Serpent*, *Schlangenrohr*, Ital. *serpentone*) is an obsolete bass wind instrument derived from the old wooden cornets (*Zinken*), and the progenitor of the bass-horn, Russian bassoon and ophicleide. The serpent is composed of two pieces of wood, hollowed out and cut to the desired shape. They are so joined together by gluing as to form a conical tube of wide calibre with a diameter varying from a little over half an inch at the crook to nearly 4 in. at the wider end. The tube is covered with leather to ensure solidity. The upper extremity ends with a bent brass tube or crook, to which the cup-shaped mouthpiece is attached; the lower end does not expand to form a bell, a peculiarity the serpent shared with the cornets. The tube is pierced laterally with six holes, the first three of which are covered with the fingers of the right hand and the others with those of the left. When all the holes are thus closed the instrument will produce the following sounds, of which the first is the fundamental and the rest the harmonic series founded thereon:



Each of the holes on being successively opened gives the same series of harmonics on a new fundamental, thus producing a chromatic compass of three octaves by means of six holes only.



The holes are curiously disposed along the tube for convenience in reaching them with the fingers; in consequence they are of very small diameter, and this affects the intonation and timbre of the instrument adversely. With the application of keys to the serpent, which made it possible to place the holes approximately in the correct theoretical position, whereby the diameter of the holes was also made proportional to that of the tube, this defect was remedied and the timbre improved.

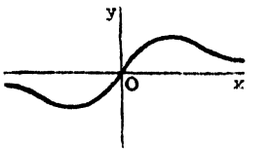
The serpent was, according to Abbé Lebœuf,[1] the outcome of experiments made on the *cornon*, the bass cornet or *Zinke*, by Edmé Guillaume, canon of Auxerre, in 1590. The invention at once proved a success, and the new bass became a valuable addition to church concerted music, more especially in France, in spite of the serpent's harsh, unpleasant tone. Mersenne (1636) describes and figures the serpent of his day in detail, but it was evidently unknown to Praetorius (1618). During the 18th century the construction of the instrument underwent many improvements, the tendency being to make the unwieldy windings more compact. At the beginning of the 19th century the open holes had been discarded, and as many as fourteen or seventeen keys disposed conveniently along the tube. Gerber, in his *Lexikon* (1790), states that in 1780 a musician of Lille, named Régibo, making further experiments on the serpent, produced a bass horn, giving it the shape of the bassoon for greater portability; and Frichot, a French refugee in London, introduced a variant of brass which rapidly won favour under the name of "bass horn" or "basson russe" in English military bands. On being introduced on the continent of Europe, this instrument was received into general use and gave a fresh impetus to experiments with basses for military bands, which resulted first in the ophicleide (*q.v.*) and ultimately in the valuable invention of the piston or valve.

Further information as to the technique and construction of the serpent may be gained from Joseph Fröhlich's excellent treatise on all the instruments of the orchestra in his day (Bonn, 1811), where clear and accurate practical drawings of the instruments are given. (K. S.)

[1] See *Mémoire concernant l'histoire ecclésiastique et civile d'Auxerre* (Paris, 1848), ii. 189.

SERPENTARIUS, or OPHIUCHUS, in astronomy, a constellation of the northern hemisphere, anciently named Aesculapius, and mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.). According to the Greek fables it variously represents: Carnabon (or Charnabon), king of the Getae, killing one of the dragons of Triptolemus, or Heracles killing the serpent at the river Sangarius (or Sagaris), or the physician Asclepius (Aesculapius), to denote his skill in curing snake bites. Ptolemy catalogued 29 stars, Tycho Brahe 15, and Hevelius 40. "New" stars were observed in 1604 and 1848.

SERPENTINE, in geometry, a cubic curve described by Sir Isaac Newton, and given by the cartesian equation $y(a^2+x^2)=abx$. The origin is a point of inflection, the axis of x is an asymptote, and the curve lies between the parallel lines $2y=\pm b$.



SERPENTINE, a mineral which, in a massive and impure form, occurs on a large scale as a rock, and being commonly of variegated colour, is often cut and polished, like marble, for use as a decorative stone. It is generally held that the name was suggested by the fancied resemblance of the dark mottled green stone to the skin of a serpent, but it may possibly refer to some reputed virtue of the stone as a cure for snake-bite. Serpentine was probably, at least in part, the λίθος ὀφίτης of Dioscorides and the *ophites* of Pliny; and this name appears in a latinized form as the *serpentaria* of G. Agricola, writing in the 16th century, and as the *lapis serpentinus* and *marmor serpentinum* of other early writers. Italian sculptors have sometimes termed it *ranochia* in allusion to its resemblance to the skin of a frog.

Although popularly called a "marble," serpentine is essentially different from any kind of limestone, in that it is a magnesium silicate, associated, however, with more or less ferrous silicate. Analyses show that the mineral contains $H_4Mg_3Si_2O_9$, and if the water be regarded as constitutional the formula may be written $Mg_2(SiO_4)_2H_2(MgOH)$. Serpentine occurs massive, fibrous, lamellar or granular, but never crystallized. Fine pseudomorphs having the form of olivine, but the composition of serpentine, are known from Snarum in Buskerud, Norway, the crystals revealing their character by containing an occasional kernel of the original mineral. The alteration of rocks rich in olivine has given rise to much of the serpentine occurring as rock-masses (see PERIDOTITE). Studied microscopically, the change is seen to proceed from the surface and from the irregular cracks of the olivine, producing fibres of serpentine. The iron of the olivine passes more or less completely into the ferric state, giving rise to grains of magnetite, which form a black dust, and may ultimately yield scales of haematite or limonite. Considerable increase of volume generally accompanies serpentinization, and thus are produced fissures which afford passage for the agents of alteration, resulting in the formation of an irregular mesh-like structure, formed of strings of serpentine enclosing kernels of olivine in the meshes, and this olivine may itself ultimately become serpentinized. Serpentine may also be formed by the alteration of other non-aluminous ferro-magnesian silicates such as enstatite, augite or hornblende, and in such cases it may show microscopically a characteristic structure related to the cleavage of the original mineral, notably lozenge-shaped in the case of hornblende. Many interesting pseudomorphs of serpentine were described by Professor J. D. Dana from the Tilly Foster iron-mine, near Brewster, New York, U.S.A., including some remarkable specimens with cubic cleavage.

The purest kind of serpentine, known as "noble serpentine," is generally of pale greenish or yellow colour, slightly translucent, and breaking with a rather bright conchoidal fracture. It occurs chiefly in granular limestone, and is often accompanied by forsterite, olivine or chondrodite. The hardness of serpentine is between 3 and 4, while the specific gravity varies from 2·5 to 2·65. A green serpentine of the exceptional hardness of 6,

formerly regarded as jade, is known as bowenite, having been named by J. D. Dana after G. T. Bowen. The original bowenite came from Smithfield, Rhode Island, U.S.A., and a similar mineral was described by General C. A. McMahon as occurring in Afghanistan, where it is carved for ornamental purposes in the belief that it is jade (*q.v.*). Many common carvings regarded as jade are really serpentine, and therefore soft. Serpentine of columnar or coarsely fibrous form is termed picrolite, a name proposed by J. F. L. Hausmann from the Greek πικρός (bitter) in allusion to the presence of magnesia. The finely fibrous serpentine is called chrysotile from the lustrous yellowish colour which it usually presents (χρυσός, gold; τίλος, fibre) and this variety is extensively worked, especially in Canada, for use as asbestos (*q.v.*). In order to avoid confusion between the words chrysotile and chrysolite, it has been proposed by Dr J. W. Evans that the fibrous serpentine should be distinguished as karystiolite—a modification of the ancient name, taken from its occurrence near Karystos in Euboea. Foliated serpentine is usually termed marmolite—a name given by G. T. Nuttall, from μαρμαίρω (to glisten) in reference to its lustre. A thin lamellar or flaky serpentine supposed to occur in the Antigorio valley north of Domodossola in Piedmont is called antigorite, having been named in 1840 by M. E. Schweizer, after whom a somewhat similar mineral is termed schweizerite. Antigorite has been studied by Professor T. G. Bonney and Miss C. Raisin (*Quart. Journ. Geol. Soc.*, lxi., 1905, p. 690; lxiv., 1908, p. 152). An apple-green translucent serpentine passes under the name of williamsite, having been so called by C. U. Shepard in honour of its discoverer L. White Williams, of West Chester, Pennsylvania, where this variety occurs.

"Common serpentine" is the impure massive kind which occurs in rock-masses and is extensively worked as "serpentine-marble." It is sometimes veined with steatite, or magnesite, and may contain scattered crystals of diallage, bronzite or bastite (an altered rhombic pyroxene), which by schillerization may present a metallic lustre. In England the chief localities of serpentine are in Cornwall, especially in the Lizard district, where it is quarried and carved into mantelpieces, columns, vases and other ornaments. Much of it presents a rich red or brown colour, often mottled and sometimes veined. Professor Bonney has shown that it has been largely derived from olivine. Green serpentine occurs near Holyhead in Anglesey. A beautiful serpentine, generally mottled red and green, with veins of steatite, is found at Portsoy in Banffshire, Scotland, and was used for pillars in the great hall at Versailles. Serpentine containing chromite is found in the Shetland Islands.

The rock called "ophicalcite" consists of an intimate association of serpentine with limestone, often forming an ornamental stone which is beautifully clouded and zoned with various shades of green. It generally results from the metamorphism of an impure dolomitic limestone, the impurities having crystallized as new minerals which become altered to serpentine. Pseudomorphs of serpentine occur after forsterite. The best known serpentinous marble of the British Isles occurs in Connemara in Galway, Ireland, and passes in trade under the name of "Irish green." Ophicalcites are developed also in various parts of Scotland, and the green pebbles found in Iona belong to this type of rock. The famous eozoonal marble of Canada is also of similar character.

In Saxony common serpentine is largely worked at Zöblitz near Marienberg and Waldheim. The rock of Zöblitz, mentioned by G. Agricola in the 16th century, is usually of dull green or brown colour, and frequently contains dark red Bohemian garnet or pyrope (*q.v.*). It was used in the mausoleum of Prince Albert at Frogmore, Windsor, and in Abraham Lincoln's monument at Springfield, Illinois, U.S.A. Italy is rich in serpentine, the best-known being the *verde di Prato*, which has been quarried for centuries at Monteferrato near Prato in Tuscany, and has been largely used in ecclesiastical architecture in Florence, Prato and Pistoja. Much serpentine is found near Genoa and Levanto. The *verde di Pegli* comes from Pegli not far from Genoa, while the *verde di Genova* is a brecciated serpentinous limestone from Pietra Lavezzara. Serpentine occurs also at many localities in the Apennines, in Elba and in Corsica. The term ophiolite has been vaguely used to include not only serpentines but many other rocks associated with the Italian serpentines. *Verde antico* is a brecciated serpentine with fragments of limestone, originally brought by the Romans from Atrax in Thessaly, and called *lapis atracius*. It is sometimes known as *vert antique*, or, following the old French, *verd antique*. The term serpentine is often improperly applied to the ancient green porphyry of Laconia in the Peloponnesus (*porfido serpentino verde*). True serpentine occurs at numerous localities in the Alps and in France, an elegant variety being quarried at Épinal in the Vosges, whilst a fine ophicalcite is worked at St Véran and Maurins, dep. Hautes-Alpes. The Ronda Mountains in Spain also yield serpentine.

In North America serpentine is so widely distributed that only a few localities can be specified. It is found in St Lawrence county, Essex county and Warren county, New York, and also on Staten Island; at Montville and Hoboken in New Jersey; at Newport, Rhode Island; at Newbury and Newburyport, Massachusetts; Texas, Lancaster county, and West Chester, Chester county, Pennsylvania; at many localities in Vermont and in California, Connecticut, Georgia, Maine, Maryland, Michigan, New Mexico, North Carolina and Washington.

For American Serpentine see *Stones for Building and Decoration*, by George P. Merrill (New York, 1903); and for serpentine asbestos see the same author's *Non-metallic Minerals* (New York, 1904).

(F. W. R.*)

SERPENT-WORSHIP. From all parts of the world there is a very considerable body of evidence for the prominence of the serpent in religion, mythology and folk-lore. Snake-worship still prevails largely in India, and a writer in 1896 remarks that the previous census showed in the North-West Provinces over 25,000 Nāga (serpent) worshippers, 123,000 votaries of the snake-god Gūga, and, in the Punjab, some 35,000 special votaries of the snake godlings.[1] The evidence from modern India can be supplemented by the medieval and ancient Indian sources, and, in particular, by the representations of the adoration of snake-deities on the Buddhist topes of Sanchi and Amravati.[2] There we find, not indeed living serpents, but deities with serpent-symbolism, indicating a composition of various strata of religious belief, analogous to the evidence for serpent-symbolism from Babylonia, Crete, Greece or Peru; for the higher religions have almost invariably retained in their ritual and belief, sometimes with only slight modification, cruder conceptions which can still be studied in less elevated form among the lower races of India, Africa or America. The result is instructive when we turn to the numerous serpent myths and legends from the Old World and the New, to the stray notices in old writers, or to the fragmentary scraps of popular superstition everywhere. Modern scientific research has vividly illustrated the stereotyped nature of the human mind; there is a general similarity in the effect of similar phenomena upon people at a similar stage of mental growth: there is an almost inherent or unconscious belief which has been transmitted through the countless ages of man's history. At the same time, apart from the gradual evolution of religious and other conceptions there are the more incidental and artificial influences which have shaped them. Hence, our evidence for serpent-cults everywhere represents varying stages in the historical development of a few related fundamental ideas which are psychologically explicable; and it is impossible to deal with the subject geographically or historically. It is most useful, perhaps, to survey some of the general features of belief as an introduction to the more complex inquiries which involve a consideration of other subjects over a larger field.

1. Prevalence in varying forms.

[1] See W. Crooke, *The Popular Religion and Folk-lore of Northern India* (London, 1896), ii. 122.

[2] See the elaborately illustrated work of James Fergusson, *Tree and Serpent Worship, or Illustrations of Mythology and Art in India* (2nd ed., London, 1873); also M. Winternitz, "der Sarpabali, ein altindischer Schlangen-cult," in *Mitteil. d. anthrop. Gesell.* of Vienna, xviii. (1888), pp. 25-52, 250-264. Both give abundant information on the various features of serpent-cults.

Haunting buildings and famous ruins, gliding around pools, walls and trees, mysteriously disappearing below ground, the serpent and all its kind invariably arrested attention through its uncanny distinctiveness from bird or beast. Its gliding motion suggested the winding river. Biting its tail it symbolized the earth surrounded by the world-river. Its patient watchfulness, the fascination it exerted over its victims, the easy domestication of some species, and the deadliness of others have always impressed primitive minds. Its swift and deadly dart was likened to the lightning; equally marvellous seemed its fatal power. It is little wonder that men who could tame and handle the reptiles gained esteem and influence. Sometimes the long life of the serpent and its habit of changing the skin suggested ideas of immortality and resurrection, and it is noteworthy that one Indian snake-festival occurs after or at the sloughing, when the sacred being is thus supposed to become purified.[1]

A very common belief associates serpents or dragons and other monsters with the guardianship of treasure or wealth; comp., *e.g.*, the golden apples of the Hesperides, and the Egyptian gods Kneph and Osiris, and the Indian Krishna and Indra. Serpents adorned with necklaces of jewels or with crowns were familiar in old superstition, and the serpent with a ruby in its mouth was a favourite love-token. Many stories tell of the grateful reptile which brought valuable gifts to a benefactor. According to a common Indian belief a wealthy man who dies without an heir returns to guard his wealth in the form of a serpent, and Italian superstition supposed that to find a serpent's skin brought good luck (Leland).[2] No singular preference for jewels on the part of serpents will explain the belief, and creatures like the jackdaw which have this weakness do not enjoy this prominence in folk-lore. A rationalistic explanation might be found in the connexion between the chthonic serpent and subterranean sources of wealth.[3] Moreover, the serpent is often associated with metallurgy, and to serpent deities have been ascribed the working of metals, gem-cutting and indeed culture in general. The Aztec Quetzalcoatl taught metallurgy and agriculture, gave abundance of maize, also wisdom and freedom from disease. The Babylonian Ea, who sometimes has serpent attributes, introduced—like the American serpent Votan knowledge and culture. The half-serpent Cadmus brought knowledge of mines, agriculture, and the "Cadmean" letters, while Cecrops inculcated laws and ways of life and was the first to establish monogamy. Although the reptile is not particularly intelligent, it has become famed for shrewdness and wisdom, whether in the Garden of Eden (Gen. iii. 1; 2 Cor. xi. 3) or generally (cf. Matt. x. 16). The Ophites (*q.v.*) actually identified the serpent with Sophia ("Wisdom"); the old sage Garga, one of the fathers of Indian astronomy, owed his learning to the serpent-god Sesha Nāga; and the Phoenician γέρων Ὀφίων wrote the seven tablets of fate which were guarded by Harmonia.[4] Not only is the serpent connected with oracles, the beneficent *agathodaemon* of Phoenicia also symbolized immortality. In Babylonian myth a serpent, apparently in a well or pool, deprived Gilgamesh of the plant which rejuvenated old age, and if it was the rightful guardian of the wonderful gift, one is reminded of the Hebrew story, now reshaped in Gen. iii., where the supernatural serpent is clearly acquainted with the properties of the tree of life.[5]

2. Serpents' wealth and wisdom.

[1] Fergusson, p. 259. Perhaps the sloughing more than any other feature stimulated primitive speculation; cf. Winternitz, p. 28.

[2] See Crooke, ii. 1 and 33 sqq.; C. G. Leland, *Etruscan Roman Remains*, p. 283; Winternitz 37 seq.; A. W. Buckland, *Anthropological Studies* (1891), pp. 104-139 (on serpents in connexion with metallurgy and precious stones).

[3] Excavators know how the popular mind associates their labours with search for hidden treasure, and no doubt the wealth of dead civilizations often stimulated the imagination of subsequent generations. A gruesome Indian story (Crooke, ii. 130) shows how old treasure-chambers could actually harbour enormous and deadly snakes.

[4] Nonnus (Dion xli. 340 sqq.), cited by W. W. G. Baudissin, *Stud. z. Relig.-Gesch.* (Leipzig, 1876), i. 274 seq. (pp. 255-292, Semitic serpent-cult). See, for Garga, C. F. Oldham, *The Sun and the Serpent* (London, 1905), p. 54; and, for the serpent's wisdom, F. L. Schwartz, *Ursprung der Mythologie* (1800), pp. 55 seq.; J. Maehly, *Die Schlange im Mythus u. Cultus d. class. Völker* (1867), pp. 9 seq., 11, 23 seq.

[5] See H. Gressmann, *Archiv f. Religionswissenschaft*, x. 357 sqq. A Babylonian cylinder represents two figures (divine?) on either side of a fruit-tree, and behind one of them a serpent coils upwards.

Serpents were supposed to know of a root which brought back their dead to life, and an old Greek story told how certain mortals took the hint.[6] In one form or another the healing powers of the serpent are very familiar in legend and custom. Siegfried bathed in the blood of the dragon he slew and thus became invulnerable; the blind emperor Theodosius recovered his sight when a grateful serpent laid a precious stone upon his eyes; Cadmus and his wife were turned into serpents to cure human ills. "In 1899 a court in Larnaca, Cyprus, awarded £80 (Turkish) as damages for the loss of a snake's horn which had been lent to cure a certain disease" (Murison, p. 117, n. 9). Not to multiply examples, it must suffice to refer to the old popular idea that medical skill could be gained by eating some part of a serpent: the idea that its valuable qualities would thus be assimilated belongs to one of the fundamental dogmas of primitive mankind (cf. Porphyry, *De abst.* ii. 48). Now, serpents were tended in the sanctuaries of the Greek Aesculapius (Asklēpios), the famous god of healing. Among his symbols was a serpent coiled round a staff, and physicians were for long wont to place this at the head of their prescriptions. He is also represented leaning on a staff while a huge serpent rears itself up behind him, or (on a coin from Gythium) a serpent seems to come to him from a well. At Athens, Asklepios Amynos had a sanctuary with altar and well, and among the votive offerings have been discovered models of snakes.[7] The god-hero came from Epidaurus to the shrine at Sicyon in the form of a serpent, and the serpent sent from Epidaurus to stay a plague at Rome remained there, and a temple was erected to Aesculapius. The sanctuary of the deified healer at Cos marked the site where another serpent brought from Epidaurus dived into the earth (Pausanias, ii. 10, 3, iii. 23, 4). Hygieia, goddess of health, passed for his daughter, and is commonly identified with the woman in Greek art who feeds a serpent out of a saucer. Moreover, the temple of the earth-goddess Bona Dea on the slopes of the Aventine was a kind of herbarium, and snakes were kept there as a symbol of the medical art. Even in Upper Egypt a few decades ago, there was a tomb of the Mahommedan sheikh Herīdī, who—it is alleged—was transformed into a serpent; in cases of sickness a spotless virgin entered the cave and the serpent-occupant might permit itself to be taken in procession to the patient. The place was the scene of animal sacrifices and a yearly visit of women, and apparently preserved the traces of an old serpent-cult.[8]

3. Serpents in healing.

Several practices conform to the idea that "a hair of the dog that bit you" is a sure remedy, and that the serpent was best fitted to overcome other serpents.[9] At Emesa in Syria, watered by the Orontes, an image, the lower part of which was a scorpion, cured the sting of scorpions and freed the city from snakes.[10] Constantinople was similarly protected by the serpent-trophy of Delphi which Constantine removed thither; an emperor was said to have performed an enchantment over the monument well known in Greek history.[11] In modern India a walking-stick from a species of cane in the neighbourhood of a certain serpent-shrine protects against snake-bite.[12] At Fernando Po, when there

4. As remedy against snake-bite.

The interpretation is uncertain, but the motive has parallels (see Goblet d'Alviella, *Migration of Symbols*, London, 1894, pp. 129, 133, 167 seq.). R. G. Murison, "The Serpent in the O.T." (*Amer. Journ. of Sem. Lang.* xxi. 128), cites an American-Indian belief in a tree of healing, or rather of knowledge, inhabited by a serpent.

[6] J. G. Frazer, *Adonis, Attis and Osiris* (2nd ed., London, 1907), p. 153; also his notes on Pausanias, vol. iii. p. 65 seq.

[7] Similar votive offerings are known in India (Oldham, 87), and, though their true significance is uncertain, in ancient Arabia, Palestine and Elam (see H. Vincent, *Canaan d'après l'exploration récente*, Paris, 1907, pp. 174 sqq.).

[8] A. H. Sayce, "Serpent Worship in Ancient and Modern Egypt," *Contemporary Review* (Oct. 1893), p. 523; cf. also Fergusson, 34.

[9] See, for analogies, Frazer, *Golden Bough* (2nd ed.), ii. 426 seq.

[10] Even clothes washed in the waters of Emesa similarly protected the wearers. See Guy Le Strange, *Palestine under the Moslems*, 353 sqq., and for other miscellaneous evidence, 396, 405, 495.

[11] Ruy Gonzalez de Clarijo, *Hakluyt Society* (1859), p. 35.

[12] *Journal of the Bombay Branch of the Royal Asiatic Society*, ix. p. 180.

was an epidemic among children, they were brought to touch a serpent's skin which hung on a pole. The same ideas underlie the story of the Brazen Serpent which cured the Israelites of the bites of the serpents in the Wilderness (Num. xxi. 6-9; 1 Cor. x. 9). The object, however, was no temporary device; centuries later, 250 years after the founding of the temple of Jerusalem, the Brazen Serpent was regarded as unorthodox by the reforming king Hezekiah, and the historian who relates its overthrow ascribes its origin to the founder of Israelite national religion (2 Kings xviii. 4). The story in fact may have arisen to explain the object of cult; in any case it illustrates a general belief.

According to primitive thought, rivers, lakes, springs and wells are commonly inhabited by spirits which readily assume human or animal form. Here the serpent and its kind are frequently encountered.[1] In India the serpent-godlings are very often associated with water, and, even at the digging of a well, worship is paid to the "world serpent," and the Sālagrāma (spiral ammonite), sacred to Vishnu, is solemnly wedded to the Tulasī or basil plant, representative of the garden which the pool will fertilize.[2] It is often supposed that the Nāga (serpent) chiefs rule countries in or under the water, and in Kashmir a submarine serpent-king became a convert and built churches. Especially common are the popular stories connecting serpents with submarine palaces and treasures (Crooke i. 45, cf. § 2 above); and one submarine realm in the Ganges was reputed to possess "the water of strength." In Palestine and Syria, where demoniacal beings are frequently associated with water, local opinion is sometimes uncertain whether the water is under the care of a *jinn* or of a patron-saint. Several springs are named after the serpent, and the sacred fountain of Ephca at Palmyra, whose guardian in the early Christian era was appointed by the god Yarḥibol, is still tenanted by a female serpent-demon which can impede its flow.[3] Jerusalem had the stone Zōḥeleth (possibly "serpent") by the well En-Rogel (1 Kings i. 9) and also its Dragon Well (Neh. ii. 13): in modern times the curative Virgin's Spring or St Mary's Well has its dragon which, when awake, swallows the intermittent flow of the water.[4] Serpents of the water are often healers (cf. § 3). A serpent in a lagoon near Gimbo-Amburi in Africa could cure madness; another, which haunted an Algerian well, embodied the soul of a Mahommedan saint and could cure sore eyes. This feature is especially intelligible when the waters have medicinal qualities. Among the southern Arabs the hot well of Msa'ide was virtually a sanctuary, and the serpent-demon was honoured by annual festivals in the sacred month Rajab. As recently as 1882, when the grand Llama of Tashilumpo was not relieved by the hot springs of Barchutsan, religious services were held to propitiate the serpent-deities (Oldham, 203). Finally, although in the sanctuary of Aesculapius healing came directly or indirectly as the patients dreamed, it appears from the burlesque of Aristophanes (*Plutus*, 653 sqq.) that they first bathed in the sacred spring.

5. In wells and lakes.

The serpent of the water is also the serpent of the great sea upon which the earth rested.[5] Sometimes the reptile lives in submarine infernal regions (with his wife, Crooke i. 43), and as the demon of the underworld it is sometimes the earth-shaker.[6] The Greek demon or snake Poseidon, god of sea and springs, was an earthquake god. To the great half-serpent monster Typhon were ascribed numerous springs; he was also the cause of earthquakes, and when he buried himself in the earth he formed the bed of the Syrian Orontes. This river, which was otherwise called Drakōn, Typhōn or Ophites, is known at the present day as the "river of the rebel" (*Nahr El-'Aṣi*; Baudissin ii. 163). The waterspout, sometimes taken for a long-tailed dragon, is a huge sea-serpent, according to the Wanika of East Africa (Tylor i. 292 seq.). In ancient Persia the rainbow was the celestial serpent, and among some African tribes it is the subterranean wealth-conferring serpent, stretching its head to the clouds, and spilling the rain in its greedy thirst.[7] An early Indian name of the Milky Way is "the path of the serpent" (Crooke i. 25), and a great dragon or serpent is often the cause of eclipses, so that in India, on the occasion of an eclipse, its attention can be attracted by bathing in a sacred stream, or by a ritual which includes the worship of the image of the snake-god (i. 22 seq.).[8] Again the serpent is often associated with the lightning (Winternitz, 33).[9] Hence, as the reptile's range seems to be boundless, one is prepared for the serpentine deity of the Samoan and Tonga natives which connects heaven and earth (Tylor ii. 309 seq.), and for the part the serpent plays in the traditions of a universal deluge.[10]

6. Serpent and Cosmological connexions.

The folk-lore of the Old and New World contains many examples of supernatural conception, an idea which is to be supplemented by the actual living belief (*e.g.* in Palestine) that supernatural beings can be fathers.[11] In Annam where water spirits may take the form of serpents or of human beings, two deified heroes were said to have been serpents born of a childless woman, who drank from a bowl of water into which a star had fallen.[12] Leland (132) cites the medieval belief that the household snake (see § 9), if not propitiated, can prevent conception, and in Bombay barrenness is sometimes attributed to a serpent which has been killed by the man or his wife in a former state of their existence. Hence the demon is laid to rest by burning the serpent-image with due funereal rites.[13] In the sanctuary of Aesculapius at Epidaurus women were visited in their dreams by a serpent—the reputed father of the child that was born, and elsewhere Sicyon who had such a progenitor was regarded as the son of the divine healer.[14] Similar also was the origin of Augustus in a temple of Apollo, the god who had his tame serpents in the grove on Epirus. Further, as the serpent-"father" of Alexander the Great came with a healing-root to cure his general Pompey (Cicero, *De div.* ii. 66), so in an Indian story the son of a king of serpents and of a virgin (or, in a variant form, a widow) was succoured in warfare by his sire (Fergusson, 266). In India the serpent origin of kings and rulers is famous. The same idea meets us in China, Greece (*e.g.* Aegeus, and Drakōn or Cecrops the first king of Athens), the Arabian dynasty of Edessa, the dynasty of Abyssinia, &c.; it is proper, therefore, to notice the serpent-symbol of royalty on the signets of the Rajahs of Chota Nagpur, the fire-spitting serpent which adorned the head of Egyptian Pharaohs, and the dragons which entwine King Arthur as he stands at the tomb of

7. Serpent and parentage.

[1] See Frazer's notes on Pausanias (1898), vol. v. pp. 44 seq.

[2] Crooke i. 42 seq., 49; see also Oldham, 51, 114; Winternitz, 259. The ammonite, here an instrument in a nature "marriage," has elsewhere given rise to legends of the destruction of serpents, viz. by St Hilda at Whitby in Yorkshire, and perhaps also by St Patrick in Ireland (see E. B. Tylor, *Primitive Culture*, 1903, i. 372).

[3] W. R. Smith, *Religion of the Semites*, 2nd ed., pp. 168 seq., with references. Cf. G. F. Abbot, *Macedonian Folk-lore*, 261: "the drakos held back the water"; see further § 11 below.

[4] C. R. Conder, *Tent-work in Palestine* (1878), i. 313 seq., who notes the "moving" of the water in John v. 3, 4 (see R.V. marg.).

[5] Cf. Amos ix. 3 and the Babylonian Tiamat, a serpent of the sea; see Baudissin in Hauck's *Realency. f. Theol.* v. p. 5 (1898); T. K. Cheyne, *Ency. Bib.*, art. "Serpent."

[6] See Fergusson, 57; J. G. Frazer, *Adonis*, 165; and R. Lasch, *Arch. f. Relig.* v. 236 sqq., 369 sqq.

[7] Crooke ii. 144; Tylor i. 294; A. B. Ellis, *The Ewe-Speaking Peoples of the Slave Coast of West Africa* (1890), pp. 47 seq.

[8] See also R. Lasch, *op. cit.* iii. 97 sqq.

[9] D. G. Brinton, *Myths of the New World* (1896), 135; A. S. Palmer, *Nineteenth Century* (Oct. 1909), pp. 694 sqq.

[10] For the latter, see J. T. Medina, *Les Aborigènes de Chile* (1882), 28 sqq.; D. G. Brinton, *op. cit.*, 176 sqq.; Frazer, *Pausanias*, v. 44 seq.; J. F. Maclennan, *Studies in Anc. Hist.*, 2nd series, 203 seq. The Babylonian story of Ea (see § 2) and the deluge finds an Indian parallel in the fish (or, otherwise a manifestation of Vishnu the many-headed serpent) which warned Manu. Among the Austrian gipsies the serpent is supposed to be able to swallow up prolonged rains, and it may be conjectured that the stories associating the commencement or conclusion of great floods with chasms (*e.g.* Lucian, *De dea Syria*, § 12 seq.) are connected with the beliefs associating wells or springs with serpents and other occupants.

[11] See E. S. Hartland, *Primitive Paternity* (1909); Frazer, *Adonis* (Index, *s.v.* Conception), and *Totemism and Exogamy* (1910; Index, *s.vv.* "Conception," "Snake").

[12] E. S. Hartland, *The Legend of Perseus* (1894–1896), i. 121. In many places streams or springs are credited with the power of removing barrenness which, in primitive thought, is often ascribed to supernatural malevolence. See Hartland, *op. cit.*, i. 71 sqq., 133, 167 sqq.

[13] *Journal of the Bombay Royal As. Soc.* ix. 188; for sacrifices and snake-deities to obtain offspring, see Crooke i. 226; Winternitz, 258. In the *Arabian Nights* Solomon prescribes the flesh of two serpents for the childless wives of the king of Egypt and his vizier.

[14] Frazer, *Adonis*, 72 (with other examples). The Inca hero Yupanqui had as father a divine being with serpent and lion attributes who revealed himself in a well (Hartland ii. 14 seq.).

the emperor Maximilian at Innsbruck.[1] Sometimes the serpent stands at the head of the human race as the mother of all.[2] This, following an old and still well supported interpretation of the name Eve (*ḥawwah*), was apparently also the belief of one branch of the Hebrews.[3]

8. Relations with clans.

There are many instances of tribes or clans named after the serpent. These are not necessarily examples of nicknames, since a relationship between the two often shows itself in custom or belief. This feature sometimes applies, also, to cases where the clan does not bear the serpent name. In accordance with universal ideas of the reality of the "name," there are tribes who will refrain from mentioning the serpent.[4] Also there are clans like the American Apaches and Navahos who will neither kill nor eat rattlesnakes for purely "superstitious" reasons. Where the reptile is venerated or feared it is usually inviolable, and among the Brassmen of the Niger the dangerous and destructive cobra was especially protected by an article in the diplomatic treaty of 1856 for the Bight of Biafra (Maclennan, 524). The North American Indians fear lest their venerated rattlesnake should incite its kinsfolk to avenge any injury done to it, and when the Seminole Indians begged an English traveller to rid them of one of these troublesome intruders, they scratched him—as a matter of form—in order to appease the spirit of the dead snake.[5] The snake-tribes of the Punjab clothe and bury a dead serpent, and elsewhere in India when one is killed in the village a copper coin is placed in its mouth and the body ceremonially burned to avert evil.[6] These snake-tribes claim to be free from snake-bite, as also the ancient Psylli of Africa and the Ophiogenes ("serpent born") of Cyprus who were supposed to be able to cure others. This power (cf. above § 3 seq.) was claimed likewise by the Marsians of ancient Italy, and is still possessed by the snake-clan of Senegambia.[7] In Kashmir the serpent-tribes became famous for medical skill in general, and they attributed this to the health-giving serpent (Fergusson, 260). Moreover, the Psylli would test the legitimacy of their new-born by exposing them to serpents which would not harm those of pure birth, and a similar ordeal among the Ophiogenes of Asia Minor showed whether a man was really of their kin.[8] This peculiar "kinship" between serpent-clans and serpents may be further illustrated from Senegambia, where a python is supposed to visit every child of the python-clan within eight days of birth, apparently as a sign of recognition. Also at Fernando Po there was an annual ceremony where children born within the year were made to touch the skin of a serpent suspended from a tree in the public square.[9]

We have next to notice the very general belief that the household snake was an agreeable guest, if not a guardian spirit. In Sweden, even in the 16th century, such snakes were virtually household gods and to hurt them was a deadly sin. Among the old Prussians they were invited to share an annual sacrificial meal, and their refusal was a bad sign.[10] Mahomet, it is said, declared that the house-dwelling snakes were a kind of *jinn*, and the heathen Arabs invariably regarded them as alike malevolent or benevolent demoniacal beings.[11]

9. Relations with families.

Among the Romans every place had its *genius* equally in the form of a serpent—cf. the doubt of Aeneas (Verg. *Aen.* v. 84 sqq.)—and household snakes were lodged and fed in vast numbers. They were the guardian-spirits of men and families, and stories are told of the way in which human life depended upon the safety of the reptile.[12] As a chthonic animal the serpent has often been regarded as an embodiment of the soul of the dead. Grimm's story of king Gunthram tells how, while he slept, his soul in serpent-form visited a mountain full of gold (Paulus Diac. iii. 34), and Porphyry relates that a snake crawled from beneath the bed of Plotinus at the moment of the philosopher's death (cf. the Indian story, Oldham, 79). In Bali near Java, where the Nāga-cult flourishes, a serpent is carried at the funeral ceremonies of the Kshatriya caste and burned with the corpse. Among many African tribes the house-haunting serpents are the dead, who are therefore treated with respect and often fed with milk.[13] But it does not appear that every venerated serpent was an incarnation or that every incarnation was reverenced or even tolerated. Among the Nāyars of Malabar, the family-serpent is capable of almost unlimited powers for good or evil; it is part of the household property, but does not seem to be connected with ancestral cults.[14]

10. As heroes and local guardians.

In Greece, however, "the dead man became a chthonic *daemon*, potent for good or evil; his natural symbol as such, often figured on tombs, was the snake."[15] "The men of old time," as Plutarch observed, "associated the snake most of all beasts with heroes," and in Photius the term "speckled hero" thus finds an explanation. At the battle of Salamis the serpent which appeared among the ships was taken to be the hero Cychreus.[16] These heroes might become objects of cult and local divinities of healing; people would pass their tombs in awe, or resort thither for divination or for taking oaths.[17] In Egypt not only are there serpents of the houses, but each quarter in Cairo had a serpent-guardian (Lane). This is said also of the villages and districts of Armenia, and Buddhist legends affirm it for India.[18] The Satī (Suttee) wife immolated to accompany her deceased husband often became the guardian of the village, and on the Satī shrine a snake may be represented in the act of rising out of the masonry.[19] Athene ("the Athenian one") was primarily the guardian spirit of Athens, and at the Erechtheum her sacred serpent (apparently known to the 3rd century A.D.), was fed monthly with honey-cakes; when, during the Persian War, it left the food untouched it was taken as a sign that the protectors had forsaken the city.[20] At Lebadeia in the shrine of Trophonios (to whom serpents were sacred) offerings of honey cakes were made to an oracular serpent. At Delphi a virgin superintended a similar oracle; and in the sacred grove of Apollo at Epirus a nude virgin-attendant brought

[1] Fergusson, 65; Crooke ii. 124; Oldham, 37, 85 sqq., 200 sqq.; Maclennan, p. 526 seq.

[2] Murison, p. 130 n. 43; Maclennan, 527.

[3] Possibly the Kenite and allied families; cf. the conjecture associating Moses and the Levites with a serpent-clan (E. Meyer and B. Luther, *Die Israeliten*, 116, 426 sqq.). It is curious that Thermuthis, the traditional name of the princess who adopted Moses (Josephus, *Ant.* ii. 9. 5), is also the name of a serpent-deity (Aelian, *De anim.* x. 31; see Wiedemann on Herod. ii. 74 seq.).

[4] Examples in Frazer, *Golden Bough*, i. 456 sqq.; N. W. Thomas, *Encyc. of Rel. and Ethics*, i. 526, col. 1.

[5] Frazer, citing W. Bartram, *Travels through N. and S. Carolina* (London, 1792), 258 sqq.

[6] See Fergusson, 259; Winternitz, 257; Crooke ii. 151 seq.

[7] The 'Omar ibn 'Isa of the Hadhramaut had the same gift (so Makrīzī); cf. also Lane's account of the "Saadeeyeh" sect who charm away serpents from houses (*Modern Egyptians*).

[8] Strabo xiii. 1. 14. Serpents which would only attack those who were not natives were to be found on the banks of the Euphrates and also at Tiryns (*Mir. Ausc.* 149 seq.; Pliny viii. 59. 84). In Sicily also, where Pliny (xxxvii. 10. 54) records some mystery about harmless scorpions, old John Maundeville in his travels (chap. v.) found a belief in snakes which were harmful only to illegitimate children.

[9] Frazer, *Golden Bough*, ii. 370 seq.; *Totemism and Exog.* i. 20. See also Crooke ii. 124, 142, 151 seq. (descent from a serpent involves immunity from its bite, and a serpent is supposed to identify the rightful heirs of a kingdom).

[10] See also B. Deane, *Serpent Worship*, 245 seq., Fergusson, 23; J. Grimm, *Teutonic Mythology* (1888), iv. 1490 sqq.; Tylor ii. 240.

[11] T. Nöldeke (on serpent-beliefs in Arabia), *Zeit. f. Völkerpsychol.* i. 412 sqq. (1860).

[12] So, in the stories of Tiberius and D. Laelius; Frazer, *Adonis*, 74 n. 2 (with references); cf. Fergusson, 19.

[13] Frazer, *Adonis*, 73 seq.; for India, see Winternitz, 258.

[14] F. Fawcett, *Madras Bulletin*, iii. 279 (1901).

[15] *Companion to Greek Studies*, ed. L. Whibley (1905), p. 502 and fig. 97. The libations of milk which the Greeks poured upon graves were possibly for these embodiments of the dead.

[16] Pausanias. i. 36, 1; see Rohde, *Psyche*, 2nd ed., i. 196.

[17] See especially, on the Greek hero as a snake, Miss Jane E. Harrison, *Journ. of Hell. Studies*, xix. (1889), 204 sqq.; *Proleg. to Study of Greek Religion* (1903), 326 sqq.

[18] Abeghian, *Armen. Volksglaube*, 74 sqq.; Crooke ii. 127.

[19] Crooke i. 187 seq. To these local examples may be added the lord (or lady) of life, a serpent-deity of the Assyrian city Dēr (Winckler and Zimmern, *Keilinschrift. u. d. alte Test.* 505; for other evidence, see Index, *s.v.* "Schlange").

[20] Herod. viii. 41. The serpent was probably regarded as the embodiment of the king Erechtheus; see Frazer, *Adonis*, 75; A. Frickenhaus, *Athen. Mitt.* xxxiii. (1908), 171-176.

offerings, and it was a sign of a plentiful year if they were accepted. So also at Lanuvium, south of Rome, in a grove near the temple of the Argive Hera, sacred maidens descended blindfolded once a year with a barley-cake, and if the serpent took it, it indicated that they were pure and that the husbandmen would be fortunate. On a Greek vase-painting the snake is the vehicle of the wrath of Athene, even as Chryse, another local "maiden," had a snake-guardian of a shrine which she sent against Philoctetes.[1] Similarly Orestes in serpent-form would slay Clytaemnestra (Aeschylus, *Choëphori*): the serpent is thus the avenging spirit of the deceased, the embodiment of Vengeance (cf. Acts xxviii. 4).[2]

To these characteristics of serpents and serpent-godlings we must add the control of the weather. This was ascribed to the nāga demi-gods and rajahs of India and to the "king of snakes" among North American Indians.[3] It is significant that in India the widely-distributed Nāgapañchami-festival occurs in the rainy season. We have seen how closely the serpent is associated with water generally (§ 5 seq.), and since we meet with the belief that sources will dry up when the serpent-occupant is killed (Bechuanas, Zulus), or that they will resent impurities thrown into their springs by causing storms (tribes of the Hindu-Kush), it is not surprising to find elaborate precautions for the propitiation of such powerful beings. Now, there are popular stories of springs and wate s which could only be used in return for regular human sacrifices.[4] In a story from the isle of Lesbos the dragon must receive a human victim twice a day. Curiously enough, an old authority tells us that the people of Lesbos were directed to throw a virgin into the sea to Poseidon, and the hero who vainly tried to save her reappeared years later with a wonderful cup of gold (Hartland, iii. 43 seq., 79, see Athenaeus xi. 15). In the Chinese annals of Khotan in Cashgar, when a certain stream dried up, a female dragon declared that her husband had died; one of the royal grandees sacrificed himself to meet the want, the water flowed once more, and the "husband" of the being became the guardian of the kingdom's prosperity.[5] A careful study of all the related traditions suggests that they preserve an unmistakable recollection of human sacrifice to serpents and other spirits of the water, and that the familiar story of the hero who vanquishes the demon and rescues the victim (usually a female, and especially a virgin) testifies to the suppression of the rite.

11. Human sacrifice.

An extremely rich dynasty in the Upper Niger was supposed to owe its wealth to a serpent in a well which received yearly a maiden attired as a bride; the cessation of the practice brought drought and sickness (Hartland iii. 57 seq.). In Mexico the half-serpent Ahuizotl dragged into its pool hapless passers-by; however, their souls were supposed to go to the terrestrial paradise—see on this idea, Rohde, ii. 374, n. 2—and the relatives became rich through the unhappy accident (Hartland, 86 seq.). But in India human sacrifice was actually made in the expectation of gaining hidden treasure, and doubtless we have a survival of this when snake-charmers, for a drop of blood from the finger of a first-born, will track the snakes which are guardians of treasure (Crooke ii. 135, 170 seq.). Indian traditions tell how reformers have persuaded the people in the past to stop their human sacrifices to serpent-spirits (Fergusson, 64, Oldham, 101), and a survival may be recognized in parts of the N.W. Provinces when, at the Gurū serpent-festival, women make vicarious offerings by throwing to Nāg Deotā, the river demon, dolls which the village lads beat with long switches (Crooke ii. 139). It is unnecessary to refer more fully to the evidence for former human sacrifice or to the popular stories and grim superstitions which indicate its persistence; the grisly custom of our ancestors has been attested by comparatively recent observation in Mexico, Peru, Fiji and W. Africa.[6]

A conspicuous feature in serpent-cults is the prominence of females. In India, in Behār, during August there is a colourless festival in which women, "wives of the snake," go round begging on behalf of the Brahmans and the villages (Crooke ii. 138). Among the Nāyars of Malabar at the ceremonies of the Pambantullel, the household serpent-deities show their benevolence by inspiring with oracles certain women who must be of perfect purity.[7] In Travancore a serpent-god is the property of a family, the priests of a temple; the eldest female carries the image at the festal processions and must lead a celibate life (Oldham, 153 seq.). Far more noteworthy is the cult of the Python Dañh-gbi of Whydah, which after taking root in Dahomey, became the most remarkable example of a thoroughly organic serpent-cult.[8] The python-deity is god of wisdom and earthly bliss and the benefactor of man (cf. § 2): he opened the eyes of the first human pair who were born blind. He is specially invoked on behalf of the king (the nominal head of the priesthood) and the crops, and a very close connexion was supposed to exist between the god's agency and all agricultural life. Initiated priests, after remaining silent in his temple for seven days, receive a new name and thus become ordained. They possess a knowledge of poisons and antidotes and thereby acquire considerable income (cf. §§ 3, 8). Children who touch or are touched by one of the many temple-snakes are sequestered for a year and learn the songs and dances of the cult. Women who are touched become "possessed" by the god. In addition to his ministrant priestesses, the god has numerous "wives," who form a complete organization. Neither of these classes may marry, and the latter are specially sought at the season when the crops begin to sprout.[9] These "wives" take part in licentious rites with the priests and male worshippers, and the python is the reputed father of the offspring (cf. § 7). Every snake of its kind receives the profound veneration of the native of Whydah, who salutes it as master, father, mother and benefactor. Such snakes must be treated with every respect, and if they are even accidentally killed, the offending native might be burned alive (cf. § 8). In 1890 a semblance of the penalty was still maintained: the offender being allowed to escape from a burning hut through a crowd of snake-worshippers armed with clubs; if discreet in his bribes, and lucky, he might reach running water and could purify himself there. On the day of public procession—the last took place in 1857 or 1858—naked priests and "wives" escorted the company with songs and dances; death was the penalty of those caught peering from their houses, and, apart from this, the natives feared loathsome diseases should they gaze upon the sacred scene. It is said that Europeans who violated the prohibition have been poisoned. Occasional human sacrifice in honour of the god is attested (cf. § 11).

12. The famous Dahomey cult.

While Dahomey furnishes this elaborate example of the modern worship of a god in the embodiment of a serpent, elsewhere we find either less organic types, or the persistence and survival of cults whose original form can only be reconstructed by inference. In the gloomy rites of the Diasia, the Olympian Zeus, as Zeus Meilichios god of wealth, has been imposed upon a chthonic snake-deity who is propitiated by holocausts of pigs and by a ritual of purgation (Harrison, *Prol.* 12-28). In the Thesmophoria, a sowing festival of immemorial antiquity performed by women, cakes and pigs were thrown to serpents kept in caves and sacred to the corn-goddess Demeter, who, like the Bona Dea, was representative

13. Various developments of cults.

[1] Sophoc. *Phil.* 1327; Harrison, *Prol.* 301 seq., 306 seq.

[2] Compare the snake attributes of the Erinyes; see Harrison, 217 sqq., 233 sqq.

[3] Fergusson, 48 seq., 82, 257 seq.; Crooke, ii. 129; Oldham, 49-51, 121, 123, 129, 200; cf. Winternitz, 44 seq., 259 seq.

[4] Hartland iii. 2, 4, 10 seq., 14, 28, 30, 74, 87-94; Frazer, *Paus.* v. 45; *Lectures on the Early History of the Kingship* (1905), 183 seq., 192.

[5] Hartland iii. 73 seq.; cf. also J. G. R. Forlong, *Faiths of Man* (1906), iii. 268.

[6] See Deane, *Serpent Worship*, 245 seq. (Livonia); and for more modern evidence, Maclennan, 216, 219; Oldham, 40, 50, 100 seq.; and A. B. Ellis (§ 12 below). Folk-lore adds to the survivals some of the customs for producing rain, *e.g.* bathing and drenching willing or unwilling victims, dipping holy images in water, and otherwise disturbing springs and fountains (Frazer, *Golden Bough*, i. 95 sqq., 108, 111 seq., 209 sqq.). Here also are the superstitions which associate rivers or pools with the safety of human life (*e.g.* Frazer iii. 318 seq.; Hartland ii. 20, 22 sqq.; G. L. Gomme, *Ethnology in Folklore* [1892], 71 sqq., 77 seq.).

[7] F. Fawcett, Madras Gov. Museum, *Bull.* iii. 277. (For the stress laid upon the personal purity of the females, cf. p. 282).. For other evidence for the prominence of females, see Fergusson, 82, 257 seq.

[8] A. B. Ellis (above, § 6, n. 7), 47 sqq., 140 sqq., cf. Frazer, *Adonis*, 57 sqq. The cult taken by slaves to America is the Vôdu (Vaudoo or Vaudoux) worship of Haiti (Ellis, 29 seq.).

[9] On their marriage to the god these devotees are marked with his image (said to be imprinted by the god himself); cf. the story that Atia, the mother of Augustus, when touched by the serpent in the temple of Apollo, was marked with a stain like a painted serpent.

of the fertility of nature. Myth explained it as a celebration of the capture of Kore by Plouton.[1] The Maenads ("mad ones") or Bacchae, the women attendants of Dionysus, with their snake-accompaniments, are only one of the various snake-features associated with the cult of a deity who was also a god of healing. The symbol of the Bacchic orgies was a consecrated serpent, and the snakes kept in the sacred cistae of the cult of Dionysus find a parallel among the sect of the Ophites where, at the sacramental rites, bread was offered to the living serpent and afterwards distributed among the worshippers.[2] Other developments may be illustrated from the cult of Aesculapius, who seems to have been merely a deified ancestor, like the Egyptian Imhotep (below) or the interesting Indian healer Sokha Bāba (Crooke i. 147, ii. 122). Introduced into Athens about 421 B.C., Aesculapius inherited the older local cult of the serpent "protector" Amynos (Harrison, 346 seq.). In Laodicea he apparently replaced an older deity with serpent attributes.[3] In Egypt, he superseded the sage Imhotep at Memphis, and at the temple sacred to Aesculapius and Hygieia at Ptolemais the money-box has been found with the upper part in the form of a great snake.[4] Finally among the Phoenicians he was identified with Eshmun, an earlier god of healing, who in turn was already closely associated with Dionysus and with Caelestis-Astarte.[5]

For the retention of older cults under a new name, Mahommedanism supplies several examples, as when a forest-serpent of India receives a Mahommedan name (Oldham 128).

14. Contests with serpents. But sometimes there is a contest between the new cult and the old. Thus Apollo has to fight the oracle serpent of Gaia, and it has been observed that where Apollo prevailed in Greek religion the serpent became a monster to be slain.[6] At Thebes—the Thebans were Serpentigenae—Apollo took the place of Cadmus, who, after killing the dragon which guarded a well and freeing the district, had ended by being turned into a serpent. This looks like the assumption of indigenous traits by a foreigner—cf. Aesculapius (§ 13)—much in the same way as Hercules has contests with serpents and dragons, becomes the patron of medicinal springs, and by marrying the serpent Echidna was the ancestor of the snake-worshipping Scythians.[7] But an ethnological tradition appears when Phorbas killed the serpent Ophiusa, freed Rhodes of snakes and obtained supremacy, or when Cychreus slew the dragon of Salamis and took the kingdom.[8] A story told by Herodotus (i. 78) admirably shows how the serpent as a child of earth was a type of indigenous peoples, and there was a tendency to represent the earlier conquered races as monsters and demons, though not necessarily unskilled (*e.g.* the Cretan Kourētes), or to depict the conquest of barbarians as the overthrow of serpents or serpent-like beings.[9] This obviously complicates the investigation of serpent-*cults*. Moreover, the serpent or dragon may have an opponent like the eagle (see Goblet d'Alviella, 17), or a cosmical antagonist—the lightning, thunder or rain-god. Indra, the rain-god, slew with a thunderbolt Ahi or Vitra, who kept back the waters (Oldham, 32 sqq.); the thunder god of the Iroquois killed the subterranean serpent which fed on human flesh (Hartland iii. 151).[10] Or the victor is the sun: the Egyptian sun-god Re had his fire-spitting serpent to oppose his enemies, of which one was the cloud and storm serpent Apophis, while in Greek myth the sanctuary of Helios (the sun) sheltered the young Orpheus from the snake.

It is impossible to trace a safe path through the complicated aetiological myths, the fragments of reshaped legend and tradition, or the adjustment of rival theologies. It remains to observe the overthrow or supersession of the serpent in Christian lands. At Axum in Abyssinia, where worship was divided between the serpent and the Mosaic Law, it is said that the great dragon was burst asunder by the prayers of Christian saints (*c.* A.D. 340; Fergusson, 35). At the Phrygian Hierapolis the serpent Echidna was expelled by the Apostles Philip and John.[11] France had its traditions of the destruction of serpents by the early missionaries (Deane, 283 seq.), and the memory possibly survived at Luchon in the Pyrenees, where the clergy and people celebrated the eve of St John by burning live serpents.[12] Christian saints have also stepped into the shoes of earlier serpent-slayers, while, in the stories of "St George and the Dragon" type, the victory of the pious over the enemy of mankind has often been treated as a literal conflict with dragons, thus introducing a new and confusing element into the subject. This purely secondary aspect of the serpent as the devil cannot be noticed here.[13] At Rouen the celebration of St Romain seems to preserve a recollection of human sacrifice to a serpent-demon which was primarily suppressed by a pagan hero, and at Metz, where St Clement is celebrated as the conqueror of a dragon, its image (formerly kept in the cathedral) was taken round the streets at the annual festival and received offerings of food.[14] Most remarkable of all, at Cocullo in the Abruzzi mountains on the border of the old territory of the Marsi snake-men (see § 8), the serpent-deity has a lineal descendant in the shape of St Domenico of Foligno (A.D. 950–1031). The shrine is famous for its cures, and when the saint has his serpent-festival on the first Thursday in May, Serpari or serpent-men carry coils of live reptiles in procession before his image, which in turn is hung with serpents of all sizes. The rites, we may suppose, have become modified and more orthodox, but none the less they are a valuable testimony to the persistence of the cult among people who still claim power over serpents and immunity from their bite, and who live hard by the home of the ancient tribe which ascribed its origin to the son of Circe.[15] One may recall the old cult of Sabazios where

15. In Christianity.

[1] Harrison, 109 seq., 120 sqq., and art. THESMOPHORIA. The rites included the "pursuit," possibly derived from the intentional opportunity of escape allowed the victim. Plouton, also associated with Proserpine, the great mother-goddess, was patron of the chasms with mephitic vapours in the valley of the Maeander (see Frazer, *Adonis*, 170 sqq.).

[2] A Greek vase shows snake-bodied nymphs at the grape-harvest (Harrison 259 seq.), and in Egypt the harvest goddess Rannut had snake-form (F. Petrie, *Relig. of Ancient Egypt*, 1906, p. 26). The serpent-god revered by Taxilus (king of Taxila), which was seen by Alexander the Great on his way to India, was identified by Greek writers with Dionysus or Bacchus. For the serpent in the cult of Sabazius, see Harrison, *Prol.* 418, 535. A kind of sacramental communion with a snake is found among a Punjab snake-tribe (Frazer, *Golden Bough*, ii. 441 seq.; *Punjab Notes and Queries*, ii. 91).

[3] For this and other Phrygian evidence, see W. M. Ramsay, *Cities and Bishoprics of Phrygia*, i. 52, 94, 104.

[4] *Ag. Zeit.* xl. 140 seq. Aelian (*De anim.* xvi. 36) mentions a huge serpent at the temple dedicated to Aesculapius. Serapis (Osiris-Apis) who came to acquire the attributes of Aesculapius and of Pluto, god of the dead, sometimes had serpent-form, and even in the reign of Constantine popular belief connected the rise of the Nile with his agency (Frazer, *Adonis*, 398).

[5] See on this branch of the subject, W. W. G. Baudissin, *Zeit. d. morgenl. Gesell.* lix. (1905), 459-522, and *Orient. Stud. Theodor Nöldeke* (ed. Bezold, 1906), ii. 729 sqq.

[6] Harrison, *Journ. Hell. Stud.* xix. 223, cf. *Proleg.* 392; and E. Rohde, *Psyche*, i. 133 seq.

[7] Herod. iv. 9; for Hercules and healing waters, see Frazer, *Adonis*, 174 seq.; cf. above, § 5. Here arises the question of the tendency to attribute to outside aid the introduction of culture (cf. § 2), and even of law (F. Pollock, ed. of Maine's *Ancient Law*, 1907, p. 19).

[8] Cf. the similar view of serpent-conflicts in Persian tradition (Fergusson, 44 seq.), and the story of the colonization of Cambodia, where the new-comer marries the dragon-king's daughter (*ib.* 53).

[9] Cf. the serpent-pillars found in the old Roman provinces of Europe (Frazer, *Pausanias*, ii. 49, v. 478 seq.). For the Kourētes, the fish and serpent-like peoples struck down by Zeus or Apollo, see Harrison, *Annual of Brit. School at Athens*, xv. 308 sqq.

[10] In popular Macedonian lore the lightning or thunder is the enemy of the serpent-dragon (G. F. Abbott, *Macedonian Folklore*, 261; cf. also Schwartz, 150 sqq., W. R. Smith, 175, n. 1; Winternitz, 45).

[11] W. M. Ramsay, *op. cit.* i. 86 seq.; cf. Gutschmid, *Rhein. Mus.* (1864), pp. 398 sqq.

[12] Fergusson, p. 20, n. 2 (see, however, Frazer, *Golden Bough*, iii. 323 seq.). For analogous traditions, see Fergusson, 32.

[13] See ANTICHRIST; DEVIL; DRAGON.

[14] See further Frazer, *Kingship*, 184-192; Schwartz, 73 seq.; Hocker, *Deutscher Volksglaube* (Göttingen, 1853), p. 231. Similarly, food is offered to the snake of dough in the Punjab festival already mentioned (note [2] above).

[15] The festival is described (as seen in 1906) by Marian C. Harrison, *Folklore*, xviii. (1907), 187 sqq. A combination of a cult of the house-snake with that of the (Christian) saint of the master of the house is said to prevail in modern Greece (J. C. Lawson, *Modern Greek Religion*, 1910, p. 260).

men waved great red snakes over their heads as they marched in procession. One may even recall the cult of Dahomey. Moreover, we find at Madagascar the procession of the god of fertility and healing, the patron of serpents who are the ministers of his vengeance (Frazer, *Paus.* v. 66 seq.). In a Bengal festival the men march entwined with serpents, while the chief man has a rock-boa or python round his neck and is carried or rides on a buffalo (Fergusson, 259). Again, among the Moquis of America, where the snake-clan claim descent from a woman who gave birth to snakes, the reptiles are freely handled at the "snake dances" which are performed partly to secure the fertility of the soil.[1]

16. Complexity of motives.

These last examples are important because they illustrate the immense difficulty of determining the true significance of any isolated piece of evidence. It cannot be assumed that isolated features which find a parallel in more completely known cults presuppose such cults; yet it may be inferred that they point to earlier, more perfect structures, to rites which perhaps linger only as a memory, and to conceptions and beliefs which have been elevated or modified by other religions. Hence also the impossibility of treating the present subject schematically. Apart from the more obvious characteristics of the serpent likely to impress all observant minds (§ 1), its essentially *chthonic* character shows itself markedly when it is associated with the treasures and healing herbs of the earth, the produce of the soil, the source of springs—and thence of all water—and the dust unto which all men return.[2] Although much evidence connects the serpent with *the dead*, especially as a guardian-spirit over the living, any discussion of this aspect of the subject is bound up with the varying beliefs regarding ancestors and death. Among the Arunta of Central Australia, the ghosts of the dead haunt certain localities, and, entering the bodies of passing women, are constantly reincarnated; the Black-snake clan of the Warramunga tribe embodies the spirits which the original ancestor had deposited by a certain creek.[3] On the other hand, the "rattlesnake" men of the Moqui are merely transformations and expect to return at death to their original reptile form (Maclennan, 357). It is another stage when only the more conspicuous mortals assume serpent guise, and the deification of heroes involves yet another course of ideas. Here it is evident that some of the attributes of prominent serpent-gods will be purely secondary. Moreover, it is a human weakness to manipulate one's ancestry, and the common claim to be descended from the local godling is not to be confused with the Arunta type of reincarnation.[4]

Again, in the part taken by *women* in serpent-lore other problems of primitive society and religion intermingle. For example, when one considers how often milk is used in the tending and propitiation of venerated snakes, it is noteworthy that in Roman cult the truly rustic deities are offered milk (Fowler), and it is no less singular that many of the old goddesses of Greece have serpent attributes (Harrison).[5] Now anthropological research has vividly shown that woman, naturally fitted (as it seemed) to understand the mysteries of increase, was assigned a prominent part in rites for the furtherance of *growth and fertility*. And the same thread of ideas seems to recur in the "wives" of the python Dañh-gbi (§ 12), the Shakti ceremonies in India for the increase of the divine energy of nature (Fergusson, 258 seq.), and, to a certain extent, in the providing of deities or demons of serpent-type with consorts.[6] There is everywhere a danger of misunderstanding isolated evidence, of wrongly classifying different motives, and of overlooking necessary links in the chain of argument. There is an obvious development from the serpent *qua* reptile to the deity or the devil, and that the original theriomorphic form is not at once forgotten can be seen in Zeus Meilichios, Aesculapius Amynos, in the Cretan snake-goddesses, or in the Buddhist topes illustrated by Fergusson. But naturally there are other developments to be noticed when originally distinct attributes are combined, when, for example, Greek goddesses take the forms of birds as well as of snakes (Harrison, 322), or when the Aztec snake-deity Huitzilopochtli, like the Votan of the Mayas, has feathers (Maclennan, 384).[7]

Thus it will be perceived that the subject of this article involves at every turn problems of the history of thought (cf. the similar difficulties in the discussion of TREE-WORSHIP). There is ample material for purely comparative purposes and for an estimate both of the general fundamental ideas and of the artificially-developed secondary speculations; but for any scientific research it is necessary to observe the social, religious and historical conditions of the provenance and period of the evidence, and for this the material is often insufficient. The references in this article furnish fuller information and are usually made to works suitable for pursuing the subject more thoroughly. One may also consult the English and foreign journals devoted to folklore, comparative religion or anthropology (especially the volumes of *Folklore*, Index, *s.v.* "Snakes"), and the articles in this *Encyclopaedia* on the various departments of primitive religion. In general, works which endeavour to reduce the evidence for this fascinating subject to clear-cut systems are more useful for the data they provide than for their conclusions, and it is not unnecessary to warn readers against the unscientific studies of "ophiolatry" and especially against "that portentous nonsense called the 'arkite symbolism'" (see E. B. Tylor's remarks, *Primitive Culture*, 4th ed., ii. 239).

(S. A. C.)

SERPUKHOV, a town of Russia, in the government of Moscow, 62 m. by rail S. of the city of Moscow. The population in 1884 was 22,420, and 24,456 in 1897. Built on high cliffs on both banks of the river Nara, 3 m. above its confluence with the Oka, Serpukhov is an important manufacturing and commercial town. Its manufactories produce cotton and woollen stuffs, paper, leather, chemicals and candles. Petty trades are much developed in the neighbourhood—textile fabrics, furniture, and earthenware and porcelain. The manufactured goods of Serpukhov are sent—mostly by rail—to the fairs of Nizhniy-Novgorod and the Ukraine, while large amounts of grain, hemp and timber, brought from the east down the Oka, are discharged at Serpukhov and sent on to Moscow and St Petersburg. The cathedral (1380) was rebuilt in the 18th century; the old fortress has almost entirely disappeared.

Serpukhov is one of the oldest towns of the principality of Moscow; in 1328 it was a nearly independent principality under the protectorate of Moscow. Its fortress protected Moscow on the south and was often attacked by the Tatars; the Mongol prince Toktamish plundered it in 1382, and the Lithuanians in 1410. In 1556 the town was strongly fortified, so that fifteen years later it was able to resist the Mongols. Its commercial importance dates from the 18th century.

SERRANO Y DOMINGUEZ, FRANCISCO, DUKE DE LA TORRE AND COUNT OF SAN ANTONIO (1810–1885), Spanish marshal and statesman, was born in the island of Leon at Cadiz on the 17th of December 1810. His father was a general officer and a Liberal. Serrano began his studies at Vergara in the Basque provinces, became a cadet in 1822, cornet in 1833 in the lancers of Sagunto, passed into the carabineers in 1829, and when the Carlist agitation began in 1833 he exchanged into the cuirassiers. He formed part of the escort which accompanied Don Carlos, the first pretender and brother of Ferdinand VII., to the frontier of Portugal. As

[1] J. G. Bourke, *Snake-Dance of the Moquis* (1884), p. 180 seq.; see Frazer, *Totem. and Exog.* iii. 229 sqq.

[2] Here one will note the prevalence of the ideas of "mother earth," and also the association in higher religions of chthonic powers with the serpent, so, *e.g.* the winds (viz. Boreas in Greece, cf. Harrison, *Prol.* 68, 181), subterranean gods (for Assyria, cf. *Zeit. f. Assyr.* [1894] p. 116, and for the Finns, Fergusson, p. 250 seq.). For the serpent (sometimes with anthropomorphic hints) in the *Tabellae devotionis*, see R. Wünsch, *Sethianische Verfluchungstafeln* (Leipzig, 1898), 100 sqq., and for a Carthaginian triad of the under world (cf. the threefold Hecate) including *ḥ-w-t* (cf. *ḥawwah*, Eve, "serpent"), see G. A. Cooke, *N. Semit. Inscr.* (1903), p. 135.

[3] Spencer and Gillen, *N. Tribes of Central Australia*, 162, 330 seq. (Frazer, *Adonis*, p. 80); A. Lang, *Origins of Religion* (1890), p. 124.

[4] There appears to be a fundamental inclination towards ideas of rebirth and reincarnation (see F. B. Jevons, *Introd. to Study of Comp. Religion*, 1908, pp. 50 sqq., 59 sqq.); it would seem to be wrapped up in the feeling of the essential "one-ness" of the group (including its deity), and involves the belief that such corporate bodies never die (cf. even the Roman conception of the family, Maine, *op. cit.* 197 sqq.).

[5] W. W. Fowler, *Roman Festivals*, 103-105; Harrison, *Journ. Hell. Stud.* xix. 221. For the use of milk, cf. Frazer, *Adonis*, 74 (with the suggestion that it is because milk is the food of babes), Crooke ii. 130, and F. Fawcett, *Madras Gov. Bull.* (1900), iii. 1, 58 (a South-Indian festival on the fifth of Srāvana, when the serpent-deity is *bathed* in milk).

[6] Here the transition from mother-right to paternity should probably be taken into consideration. For the view that the serpent as a *genius* or *daemon* may be replaced by the human (and female) victim, who thus becomes in time the guardian (cf. § 10), see J. C. Lawson, *op. cit.* pp. 271 sqq.

[7] One may note the Indian local saint Gūga, who punishes by snake-bite and can cure his worshippers (similarly the Egyptian Mert-seger, the serpent-patroness of the Theban necropolis and the serpent, the saviour-god of the Phrygian Hierapolis); he is represented on horseback descending to the infernal regions; over him two snakes meet, one being coiled round the long staff which he holds in his hands (Crooke i. 212 seq.). But how many different factors may not have influenced the representation!

aide-de-camp of Espoz y Mina, then under the orders of Generals Cordoba and Espartero, in the armies of Queen Isabella, Serrano took such an active part in the Carlist War from 1834 to 1839 that he rose from the rank of captain to that of brigadier-general. His services obtained for him the Cross of San Fernando and many medals. In 1839 he was elected a member of Cortes for the first time by Malaga, and in 1840 he was made a general of division and commander of the district of Valencia, which he relinquished to take his seat in congress. From that day Serrano became one of the chief military politicians of Spain. In 1841 he helped Espartero to overthrow the regency of Queen Christina; in 1843 at Barcelona he made a *pronunciamiento* against Espartero; he became minister of war in the Lopez cabinet, which convoked the Cortes that declared Queen Isabella of age at fifteen, served in the same capacity in an Olozaga cabinet, sulked as long as the Moderados were in office, was made a senator in 1845, captain-general of Granada in 1848, and from 1848 to 1853 lived quite apart from politics on his Andalusian estates or travelling abroad. He assisted Marshal O'Donnell in the military movements of 1854 and 1856, and was his staunch follower for twelve years. O'Donnell made him marshal in 1856 and captain-general of Cuba from 1859 to 1862; and Serrano not only governed that island with success, and did good service in the war in Santo Domingo, but he was the first viceroy who advocated political and financial reforms in the colony. On his return to Spain he was made duke de la Torre, grandee of the first class, and minister of foreign affairs by O'Donnell. Serrano gallantly exposed his life to help O'Donnell quell the formidable insurrection of the 22nd of June 1866 at Madrid, and was rewarded with the Golden Fleece. At the death of O'Donnell, he became the chief of the Union Liberal, and as president of the senate he assisted Rios Rosas to draw up a petition to Queen Isabella against her Moderado ministers, for which both were exiled. Nothing daunted, Serrano began to conspire with the duke of Montpensier, Prim and Sagasta; and on the 7th of July 1868 Gonzalez Bravo had Serrano and other generals arrested and taken to the Canary Isles. There Serrano remained until Admiral Topete sent a steamer to bring him to Cadiz on the 18th of September of the same year. On landing he signed the manifesto of the revolution with Prim, Topete, Sagasta, Martos and others, and accepted the command of the revolutionary army, with which he routed the troops of Queen Isabella under the orders of the marquis of Novaliches at the bridge of Alcolea. The queen fled to France, and Serrano, having entered Madrid, formed a Provisional Government, convoked the Cortes Constituyentes in February 1869, and was appointed successively president of the executive and regent. He acted very impartially as a ruler, respecting the liberty of action of the Cortes and cabinets, and bowing to their selection of Amadeus of Savoy, though he would have preferred Montpensier. As soon as Amadeus reached Madrid, after the death of Prim, Serrano consented to form a coalition cabinet, but it kept together only a few months. Serrano resigned, and took the command of the Italian king's army against the Carlists in North Spain. He tried to form one more cabinet under King Amadeus, but again resigned when that monarch declined to give his ministers dictatorial powers and sent for Ruiz Zorilla, whose mistakes led to the abdication of Amadeus on the 11th of February 1873. Serrano would have nothing to do with the federal republic, and even conspired with other generals and politicians to overthrow it on the 23rd of April 1873; but having failed, he had to go to France until General Pavia, on the eve of his *coup d'état* of the 3rd of January 1874, sent for him to take the head of affairs. Serrano assumed once more the title of president of the executive; tried first a coalition cabinet, in which Martos and Sagasta soon quarrelled, then formed a cabinet presided over by Sagasta, which, however, proved unable to cope with the military and political agitation that brought about the restoration of the Bourbons by another *pronunciamiento* at the end of December 1874. During the eleven months he remained in office Serrano devoted his attention chiefly to the reorganization of finance, the renewal of relations with American and European powers, and the suppression of revolt. After the Restoration, Serrano spent some time in France, returned to Madrid in 1876, attended palace receptions, took his seat as a marshal in the senate, coquetted a little with Sagasta in 1881, and finally gave his open support to the formation of a dynastic Left with a democratic programme defended by his own nephew, General Lopez Dominguez. He died in Madrid on the 26th of November 1885, twenty-four hours after Alphonso XII. (A. E. H.)

SERRES, OLIVIA (1772–1834), an English impostor, who claimed the title of Princess Olive of Cumberland, was born at Warwick on the 3rd of April 1772. She was the daughter of Robert Wilmot, a house-painter in that town, who subsequently moved to London. In 1791 she married her drawing-master, John Thomas Serres (1759–1825), marine painter to George III., but in 1804 separated from him. She then devoted herself to painting and literature, producing a novel, some poems and a memoir of her uncle, the Rev. Dr Wilmot, in which she endeavoured to prove that he was the author of the *Letters of Junius*. In 1817, in a petition to George III., she put forward a claim to be the natural daughter of Henry Frederick, duke of Cumberland, the king's brother, and in 1820, after the death of George III., claimed to be the duke's legitimate daughter. In a memorial to George IV. she assumed the title of Princess Olive of Cumberland, placed the royal arms on her carriage and dressed her servants in the royal liveries. Her story represented that her mother was the issue of a secret marriage between Dr Wilmot and the princess Poniatowski, sister of Stanislaus, king of Poland, and that she had married the duke of Cumberland in 1767 at the London house of a nobleman. She herself, ten days after her birth, was, she alleged, taken from her mother, and substituted for the still-born child of Robert Wilmot. Mrs Serres's claim was supported by documents, and she bore sufficient resemblance to her alleged father to be able to impose on the numerous class of persons to whom any item of so-called secret history is attractive. In 1823 Sir Robert Peel, then Home Secretary, speaking in parliament, declared her claims unfounded, and her husband, who had never given her pretensions any support, expressly denied his belief in them in his will. Mrs Serres died on the 21st of November 1834, leaving two daughters. The eldest, who married Antony Ryves, a portrait painter, upheld her mother's claims and styled herself Princess Lavinia of Cumberland. In 1866 she took her case into court, producing all the documents on which her mother had relied, but the jury, without waiting to hear the conclusion of the reply for the crown, unanimously declared the signatures to be forgeries. Mrs Serres's pretensions were probably the result of an absurd vanity. Between 1807 and 1815 she had managed to make the acquaintance of some members of the Royal family, and from this time onwards seems to have been obsessed with the idea of raising herself, at all costs, to their social level. The tale once invented, she brooded so continuously over it that she probably ended by believing it herself.

See W. J. Thoms, *Hannah Lightfoot, and Dr Wilmot's Polish Princess* (London, 1867); *Princess of Cumberland's Statement to the English Nation*; *Annual Register* (1866), Case of *Ryves* v. *the Attorney-General*.

SERTORIUS, QUINTUS, Roman statesman and general, was a native of Nursia in Sabine territory. After acquiring some reputation in Rome as a jurist and orator, he entered upon a military career. He served under Marius in 102 B.C. at the great battle of Aquae Sextiae (mod. Aix) in which the Teutones were decisively defeated. In 97 he was serving in Spain. In 91 he was quaestor in Cisalpine Gaul, and on his return to Rome he would have been elected to the tribuneship but for the decided opposition of Sulla. He now declared for Marius and the democratic party, though of Marius himself as a man he had the worst opinion. He must have been a consenting party to the hideous massacres of Marius and Cinna in 87, though he seems to have done what he could to mitigate their horrors. On Sulla's return from the East in 83, Sertorius went to Spain, where he represented the Marian or democratic party, but without receiving any definite commission or appointment. Having been

obliged to withdraw to Africa in consequence of the advance of the forces of Sulla over the Pyrenees, he carried on a campaign in Mauretania, in which he defeated one of Sulla's generals and captured Tingis (Tangier). This success recommended him to the people of Spain, more particularly to the Lusitanian tribes in the west, whom Roman generals and governors of Sulla's party had plundered and oppressed. Brave and kindly, and gifted with a rough telling eloquence, Sertorius was just the man to impress them favourably, and the native militia, which he organized, spoke of him as the "new Hannibal." Many Roman refugees and deserters joined him, and with these and his Spanish volunteers he completely defeated one of Sulla's generals and drove Q. Caecilius Metellus Pius, who had been specially sent against him from Rome, out of Lusitania, or Further Spain as the Romans called it. Sertorius owed much of his success to his statesmanlike ability. His object was to build up a stable government in the country with the consent and co-operation of the people, whom he wished to civilize after the Roman model. He established a senate of 300 members, drawn from Roman emigrants, with probably a sprinkling of the best Spaniards, and surrounded himself with a Spanish bodyguard. For the children of the chief native families he provided a school at Osca (Huesca), where they received a Roman education and even adopted the dress of Roman youths. Strict and severe as he was with his soldiers, he was particularly considerate to the people generally, and made their burdens as light as possible. It seems clear that he had a peculiar gift for evoking the enthusiasm of rude tribes, and we can well understand how the famous white fawn, a present from one of the natives, which was his constant companion and was supposed to communicate to him the advice of the goddess Diana, promoted his popularity. For six years he may be said to have really ruled Spain. In 77 he was joined by M. Perperna (or Perpenna) Vento from Rome, with a following of Roman nobles, and in the same year the great Pompey (*q.v.*) was sent to conquer him. Sertorius proved himself more than a match for his adversaries, utterly defeating their united forces on one occasion near Saguntum. Pompey wrote to Rome for reinforcements, without which, he said, he and Metellus would be driven out of Spain. Sertorius was in league with the pirates in the Mediterranean, was negotiating with the formidable Mithradates, and was in communication with the insurgent slaves in Italy. But owing to jealousies among the Roman officers who served under him and the Spaniards of higher rank he could not maintain his position, and his influence over the native tribes slipped away from him, though he won victories to the last. In 72 he was assassinated at a banquet, Perperna, it seems, being the chief instigator of the deed.

See Plutarch's lives of *Sertorius* and *Pompey*; Appian, *Bell. civ.* and *Hispanica*; the fragments of Sallust; Dio Cassius xxxvi. 25, 27, 28, xliv. 47; Vell. Pat. ii. 25, 29, 30, 90.

SERURIER, JEAUME MATHIEU PHILIBERT, Comte (1742–1819), French soldier, was born at Laon of middle-class parentage. After being lieutenant of the Laon militia, he entered the royal army, and served in the campaigns in Hanover (1759), Portugal (1762) and Corsica (1771). At the beginning of the Revolution he had attained the rank of major, and in its course he became colonel, brigadier-general and finally general of division. He fought under Kellermann and B. L. J. Schérer in the army of the Alps in 1795, and under Bonaparte in Italy at Vico, Mondovi, Castiglione and Mantua. Besides his military qualities, he showed great administrative talent in governing Venice (1797) and Lucca (1798). He helped Bonaparte in the *coup d'état* of 18 Brumaire, and had a brilliant career under the empire, when he was made senator, count, marshal, and governor of the palace of the Invalides. In 1814, however, he voted for the downfall of Napoleon, and under the Restoration was made a peer of France. He was dismissed from all his posts for having joined Napoleon during the Hundred Days, and died in retirement. A statue has been raised to his memory at Laon.

See L. Tuetey, *Un Général de l'armée d'Italie, Serurier* (Paris, 1899).

SERVAL (*Felis serval*), an African wildcat, ranging from Algeria to the Cape. It is of medium size, with long limbs, short tail, and tawny fur spotted with black; the head and body may measure 40 in. and the tail 16 in. Messrs Nicolls and Eglington, joint authors of *The Sportsman in South Africa*, state that the serval is fairly common in South Central Africa, frequenting the thick bush near rivers, and preying on the smaller antelopes, guinea-fowls and francolins. The mantles made from its skin are reserved for chiefs and dignitaries of native tribes. Serval kittens can be tamed with little trouble, but are difficult to rear.

SERVAN, JOSEPH MICHEL ANTOINE (1737–1807), French publicist, was born at Romans (Dauphiné) on the 3rd of November 1737. After studying law he was appointed *avocat-général* at the parlement of Grenoble at the age of twenty-seven. In his *Discours sur la justice criminelle* (1766) he made an eloquent protest against legal abuses and the severity of the criminal code. In 1767 he gained great repute by his defence of a Protestant woman who, as a result of the revocation of the Edict of Nantes, had been abandoned by her Catholic husband. In 1772, however, on the parlement refusing to accede to his request that a present made by a grand seigneur to a singer should be annulled on the ground of immorality, he resigned, and went into retirement. He excused himself on the score of ill-health from sitting in the States General of 1789, to which he had been elected deputy, and refused to take his seat in the *Corps Législatif* under the Empire. Among his writings may be mentioned *Réflexions sur les Confessions de J.-J. Rousseau* (1783) and *Essai sur la formation des assemblées nationales, provinciales, et municipales* (1789). His *Œuvres choisies* and *Œuvres inédites* have been published by De Portets. His brother Joseph Servan de Gerbey (1741–1808) was war minister in the Girondist ministry of 1792.

See "Lettres inédites de Servan," in *Souvenirs et mémoires* (vol. iv., Paris, 1900).

SERVAN (or Servando known as Servandoni), **JEAN NICOLAS** (1695–1766), French decorator, architect and scene-painter, was born on the 2nd of May 1695. He was the son of a carriage builder at Lyons. From 1724 to 1742 he was director of decorations at the Paris Opera, at that time situated in a wing of the Palais-Royal. His activity was considerable, whether as a painter or as an inventor of scenic contrivances for fêtes at the marriage of royal personages. He also designed the decorations for altars, and the façade for the church of Saint Sulpice in Paris. He died in Paris on the 19th of January 1766. His writings include *Description abrégée de l'église Saint Pierre de Rome* (Paris, 1738), and *La Relation de la représentation de la forêt enchantée sur le théâtre des Tuileries, le 31 mars 1754.*

SERVETUS, MICHAEL [Miguel Serveto] (1511–1553), physician and polemic, was born in 1511[1] at Tudela in Navarre, his father being Hernando Villanueva, a notary of good family in Aragon. His surname is given by himself as "Serveto" in his early works, "per Michaelem Serueto, alias Reues." Later he Latinized it "Servetus"; when writing French (1553) he signs "Michel Seruetus."[2] It is probable that he was of the same family as the Spanish ecclesiastic Marco Antonio Serveto de Reves (d. 1598), born at Villanueva de Sigena in the diocese of Huesca (Latassa, *Bibl. nueva*, 1798, i. 609). At this place is the traditional mansion of the family, and in the parish church the family altar with the family arms (*Christian Life*, 29th Sept. 1888). Servetus at Geneva makes Villanueva his birthplace, assigning it to the adjoining diocese of Lerida. His later adopted surname, Villanovanus or de Villeneufve, was no mere pseudonym since he followed his father's example. Of his education we only know that his father sent him to study law at Toulouse, where he first became acquainted with the Bible (1528). From 1525 he had found a patron in Juan de Quintana (d. 1534), a Franciscan

[1] This date rests on his own testimony (both at Vienna and Geneva) and that of Calvin. An isolated passage of the Geneva testimony may be cited in favour of 1509.

[2] The form Servet first appears in a letter of Oecolampadius to the senate of Basel (1531) and is never used by himself. Mosheims' "Servede" is an imaginary form.

promoted in 1530 to be confessor to Charles V. In the train of Quintana he witnessed at Bologna the double coronation of Charles in February 1530, visited Augsburg, and perhaps saw Luther at Coburg. The spectacle of the adoration of the pope at Bologna impressed him strongly in an anti-papal direction. He left Quintana, visited Lyons and Geneva, repaired to Oecolampadius at Basel, and pushed on to Bucer and Capito at Strassburg. Considerable attention was attracted by his first publication, *De Trinitatis erroribus* (1531, printed by John Setzer at Hagenau). It is crude, but original and earnest, and shows a wide range of reading very remarkable in so young a man. Melanchthon writes "Servetum mul um lego." Quintana, who describes him as *di grandissimo ingegno*, and *gran sophista*, thought the matter was Serveto's, but the execution too good to be his (H. Lämmer, *M numenta Vaticana*, 1861, 109). The essay was followed in 1532 by a revised presentation of his views in dialogue form. We next find him at Lyons (1535) editing scientific works for the Trechsel firm, adopting the "Villanovanus" surname, which he constantly used till the year of his death. At Lyons he found a new patron in Dr Symphorien Champier (Campegius) (1472–1539), whose profession he resolved to follow. Resorting (1536) to Paris, he studied medicine under Johann Günther, Jacques Dubois and Jean Fernel. It was in 1536, when Calvin was on a hurried and final visit to France, that in Paris he first met Servetus, and as he himself says, proposed to set him right on theological points.[1] Servetus succeeded Vesalius as assistant to Günther, who extols his general culture, and notes his skill in dissection, and ranks him *vix ulli secundus* in knowledge of Galen. He graduated in arts, and claims to have graduated in medicine (of this there is no record at Paris), published six lectures on "syrups" (the most popular of his works), lectured on geometry and "astrology" (from a medical point of view) and defended by counsel a suit brought against him (March 1538) by the medical faculty on the ground of his astrological lectures. In June 1538 he writes from Louvain (enrolled there as a university student on the 14th of December 1537 as Michael Villanova) to his father (then resident at San Gil), explains his removal from Paris, early in September, in consequence of the death (8th August) of his master (*el señor mi maestro*), says he is studying theology and Hebrew, and proposes to return to Paris when peace is proclaimed. After this he practised medicine for a short time at Avignon, and for a longer period at Charlieu (where he contemplated marriage, but was deterred by a physical impediment). In September 1540 he entered himself for further study in the medical school at Montpellier, possibly gaining there a medical degree.

Among attendants on his Paris lectures was Pierre Paulmier, since 1528 archbishop of Vienne. Paulmier now invited Servetus to Vienne as his confidential physician. He thus acted for twelve years (1541–1553), making money by his practice, and also by renewed editorial work for the Lyons publishers—work in which he constantly displayed his passion for original discovery in all departments. Outwardly he was a conforming Catholic; privately he pursued his theological speculations. It is probable that in 1541 he had been rebaptized (he maintained the duty of adult baptism at the age of thirty). Late in 1545, or very early in 1546, he opened a fatal correspondence with Calvin, forwarding the manuscript of a much-enlarged revision of his theological tracts and expressing a wish to visit Geneva. Calvin replied (13th February 1546) in a letter now lost; in which, he says, he expressed himself "plus durement que ma coustume ne porte." On the same day he wrote to Guillaume Farel, "si venerit, modo valeat mea autoritas, vivum exire nunquam patiar," and to Pierre Viret in the same terms. Evidently Servetus had warning that if he went to Geneva it was at his peril. Writing to Abel Pouppin (in or about 1547) he complains that Calvin would not return his manuscript, and adds, "mihi ob eam rem moriendum esse certo scio." The volume of theological tracts, again recast, was declined by two Basel publishers, Jean Frellon (at Calvin's instance) and Marrinus, but an edition of 1000 copies was secretly printed at Vienna by Balthasar Arnollet. Ready by the 3rd of January 1553, the bulk of the impression was privately consigned to Lyons and Frankfort for the Easter market. On 26th February, a letter, enclosing a sheet of the printed book, and revealing the secret of its authorship, was written from Geneva by Guillaume H. C. de Trye, formerly *échevin* of Lyons, to his cousin Antoine Arneys in that city. The letter bears no sign of dictation by Calvin (who must, however, have furnished the enclosed sheet), and de Trye's part may be explained by an old grudge of his against the Lyons booksellers. For a subsequent letter Calvin furnished (reluctantly, according to de Trye) samples of Servetus's handwriting, expressly to secure his conviction. The inquisitor-general at Lyons, Matthieu Ory (the "Doribus" of Rabelais) took up the case on 12th March; Servetus was interrogated on 16th March, arrested on 4th April, and examined on the two following days. His defence was that, in correspondence with Calvin, he had assumed the character of Servetus for purposes of discussion. At 4 A.M. on 7th April he escaped from his prison, evidently by connivance. He took the road for Spain, but turned back in fear of arrest. How he spent the next four months is not known. His own account is that he never left France; Calvin believed he was wandering in the North of Italy; the absurd suggestion that he lay hid as a conspirator in Geneva was first started by J. Spon (*Hist. de Genève*, 1680). On Saturday the 12th of August he rode into Louyset, a village on the French side of Geneva. Next morning, having sold his horse, he walked into Geneva, put up at "the Rose," and asked for a boat to take him towards Zürich on his way to Naples. Finding he could not get the boat till next day (Monday) he attended afternoon service (he would probably have got into trouble if he had not done so), was recognized at church *par quelques frères*, and immediately arrested. The process against him (Nicholas de la Fontaine being in the first instance the nominal prosecutor) lasted from 14th August to 26th October, when sentence "estre brusle tout vyfz" was passed, and carried out next day at Champel (Oct. 27th, 1553). Calvin would have had him beheaded. Meanwhile the civil tribunal at Vienne had ordered (17th June) that he be fined and burned alive; the sentence of the ecclesiastical tribunal at Vienne was delayed till 23rd December. Jacques Charmier, a priest in Servetus's confidence, was condemned to three years' imprisonment in Vienne. The only likeness of Servetus is a small copperplate by C. Sichem, 1607 (often reproduced); the original is not known and the authenticity is uncertain. In 1876 a statue of Servetus was erected by Don Pedro Gonsalez de Velasco in front of his Instituto Antropológico at Madrid; in 1903 an expiatory block was erected at Champel; in 1907 a statue was erected in Paris (Place de la Mairie du XIVe Arrondissement); another is at Aramnese; another was prepared (1910) for erection at Vienne.

The religious views of Servetus, marked by strong individuality, are not easily described in terms of current systems. His denial of the tripersonality of the Godhead and the eternity of the Son, along with his anabaptism, made his system abhorrent to Catholics and Protestants alike, in spite of his intense Biblicism, his passionate devotion to the person of Christ, and his Christocentric scheme of the universe. His earliest theological writings, in which he approximates to the views of F. Socinus, are better known than his riper work. He has been classed with Arians, but he endorses in his own way the homoousian formula, and denounces Arius as "Christi gloriae incapacissimus." He has had many critics, some apologists (*e.g.* Postel and Lincurius), few followers. The fifteen condemnatory clauses, prefacing the sentence at Geneva, set forth in detail that he was guilty of heresies, blasphemously expressed, against the foundation of the Christian religion. An instance of his injurious language was found in his use of the term "trinitaires" to denote "ceux qui croyent en la Trinité." No law, current in Geneva, has ever been adduced as enacting the capital sentence. Claude Rigot, the procureur-général, put it to Servetus that his legal education must have warned him of the provisions of the code of Justinian to this effect; but in 1535 all the old laws on the subject of religion had been set aside at Geneva; the only civil penalty recognized by the edicts of 1543 being banishment. The Swiss churches, while agreeing to condemn Servetus, say nothing of capital punishment in their letters of advice. The extinct law seems to have been revived for the occasion. A valuable controversy followed on the question of executing heretics, in which Beza (for), Mino Celsi (against),

[1] Beza incorrectly makes Servetus the challenger, and the date 1534.

and several caustic anonymous writers (especially Castellio) took part.

The following is a list of his writings :—

1. *De Trinitatis erroribus libri septem* (Hagenau, 1531).

2. *Dialogorum de Trinitate libri duo* (Hagenau, 1532); two reprints of 1 and 2, to pass for originals; No. 1 in Dutch version (1620), by Regnier Telle.

3. *Claudii Ptolomaei Alexandrini geographicae enarrationis libri octo; ex Bilibaldi Pirckheymeri translatione, sed ad Graeca et prisca exemplaria a Michaele Villanovano jam primum recogniti. Adjecta insuper ab eodem scholia, &c.* Lyons, Melchior and Gaspar Trechsel (1535; 2nd ed., Lyons, Hugo à Porta (1541), *i.e.* 1542 fol.; printed by Caspar Trechsel at Vienne); on this work Tollin founds his high estimate of Servetus as a comparative geographer; the passage incriminated on his trial as attacking the verity of Moses is from Lorenz Friese; the accounts of the language and character of modern nations show original observation.

4. *In Leonardum Fuchsium apologia. Autore Michaele Villanovano* (1536, reproduced by photography, 1909).

5. *Syruporum universa ratio, &c.* (Paris, 1537); four subsequent editions; latest, Venice, 1548 (six lectures on digestion; syrups treated in fifth lecture).

6. *Michaelis Villanovani in quendam medicum apologetica disceptatio pro astrologia* (Paris, 1538; reprinted, Berlin, 1880); the medicus is Jean Tagault, who interrupted Servetus's lectures on astronomy, including meteorology.

7. *Biblia Sacra ex Santis Pagnini tralatione . . . recognita et scholiis illustrata, &c.* (Lyons, Hugo à Porta, 1542, fol.), remarkable for its theory of prophecy, explained in the preface and illustrated in the notes.

8. D'Artigny says Servetus *fit les argumens* to a Spanish version of the *Summa* of Aquinas; this, and *divers traités de grammaire* from Latin into Spanish have not been identified.

9. *Christianismi restitutio* (1553; perfect copies in Vienna and Paris); a copy in Edinburgh University Library is complete except that the missing first sixteen pages are replaced by a transcript from the original draft, containing matter not in the print (this supplementary manuscript was reproduced by photography, 1909): a transcript of other portions of the draft is in the Bibl. Nat., Paris; partly reprinted (London, 1723), (copies in London and Paris); reprinted (page for page) from the Vienna copy (Nuremberg, Rau, 1790); German version, by B. Spiess (Wiesbaden, 1892–1895); the last section, *Apologia* to Melanchthon, is given in the original Latin. The book is not strictly anonymous; the initials M.S.V. are given at the end; the name Seructus on p. 199. The often-cited description of the pulmonary circulation (which occurs in the 1546 draft) begins p. 169; it has escaped even Sigmond that Servetus had an idea of the composition of water and of air; the hint for his researches was the dual form of the Hebrew words for blood, water, &c. Two treatises, *Desiderius* (*ante* 1542) and *De tribus impostoribus* (1598) have been wrongly ascribed to Servetus. Most of his few remaining letters are printed by Mosheim; his letter from Louvain was despatched in duplicate (to evade capture), but both were seized; one is in the Record Office (U. 140), the other in the British Museum (Cotton MSS., Galba B. x.).

AUTHORITIES.—The literature relating to Servetus is very large; a bibliography is in A. v. d. Linde, *Michael Servet* (1891); the following are among the important pieces. Calvin's *Defensio orthodoxae fidei* (1554) (in French, *Déclaration pour maintenir*, &c., 1554), is the source of prevalent misconceptions as to Servetus's opinions, and attitude on his trial. De la Roche's *Historical Account* in *Mem. of Lit.* (1711–1712) (in French, *Biblioth. Ang.* Amsterdam, 1717) was followed by *An Impartial History*, &c., 1724 (said to be by Sir Benjamin or Nathaniel Hodges). Allwoerden's *Historia*, &c. (1728) (materials furnished by Mosheim) is superseded by Mosheim's *Anderweitiger Versuch* (1748, with appendix, *Neue Nachrichten*, &c., 1750), reproducing the records of the Vienne examination (since lost) first printed by D'Artigny, *Nouveaux Mémoires d'hist.*, &c., vol. ii. (1749). Chaufepié's valuable article, *Nouv. Dict. historique*, iv. (1756), fol. (in English, by Rev. James Yair, 1771) makes no use of Mosheim's later researches. Trechsel's *Die Prot. Antitrinitaires vor F. Socin*, bk. i. (1839), uses all available material up to date. The investigations of H. Tollin, M.D. (forty separate articles in various journals, 1874 to 1885) have thrown much light, mixed with some conjecture. The records of the Geneva trial, first published by De la Roche, reproduced in Rilliet's *Relation* &c., (1844), and elsewhere, are best given in vol. viii. (1870) of the *Corpus reformatorum* edition of Calvin's works; Roget's *Hist. du peuple de Genève*, vol. iv. (1877), has a good account of both trials. The passage on the pulmonary circulation, first noticed by W. Wotton, *Reflections upon Anc. and Mod. Learning* (1694), has given rise to a literature of its own; see, especially, Tollin's *Die Entdeckung des Blutkreislaufs*, &c. (1876); Huxley, in *Fortnightly Rev.* (February 1878); Tollin's *Kritische Bemerkungen über Harvey und seine Vorgänger* (1882). Other physiological speculations of Servetus are noted by G. Sigmond, *Unnoticed Theories of Servetus* (1826). The best study of Servetus as a theologian is Tollin's *Lehrsystem M. Servets* (3 vols., 1876–1878); Pünyer's *De M. Serveti doctrina* (1876), is useful. From a Unitarian point of view, Servetus is treated by R. Wright, *Apology* (1807); W. H. Drummond, D.D. (1848); R. Wallace, *Antitrin. Biog.* (1850); J. S. Porter, *Servetus and Calvin* (1854). E. Saisset, *Rev. des deux mondes* (1848), treats Servetus as a pantheist; he is followed by Menendez Pelayo, *Los Heterodoxos españoles* (1880, vol ii.), and by R. Willis, M.D., *Servetus and Calvin* (1877, an unsatisfactory book; cf. A. Gordon, *Theol. Rev.*, April and July 1878). Of Servetus's personal character the best vindication is Tollin's *Characterbild M. Servets* (1876, in French, with additions by Dardier, *Portrait Caractère*, 1879). His story has been dramatized by Max Ring, *Die Genfer* (1850), by José Echegaray, *La Muerte en los Labios* (1880), by Albert Hamann, *Servet* (1881), and by Prof. Shields, *The Reformer of Geneva* (1897). Recent pamphlets by Spanish and French writers are numerous; some of the illustrations in Dr W. Osler's *Michael Servetus* (1909), are useful. (A. Go.*)

SERVIA[1] [*Srbiya*], an inland kingdom of south-eastern Europe, situated in the north of the Balkan Peninsula. The frontier, as defined by the Berlin Treaty of 1878, is, roughly speaking, indicated by rivers in the north, and by mountains in the south. In the north, between Verciorova and Belgrade, the Danube divides Servia from Hungary for 157 m.; and between Belgrade and the border village of Racha the Save divides it from Croatia-Slavonia for 80 m. In the north-west the Drina flows for 102 m. between Bosnia and Servia;



[1] The English-speaking races alone write this word with a *v* instead of a *b*, *Servia* for *Serbia*; a practice resented by the Serbs, as suggesting the derivation of their name from the Latin *Servus*, "a slave."

in the north-east the Danube, for 50 m., and the Timok for 23 m., constitute respectively the Rumanian and Bulgarian boundaries. Various mountain ranges mark the frontiers of Bosnia, on the west, Turkey on the south-west and south, and Bulgaria on the south and south-east. According to the survey carried out by the Servian general staff in 1884 the area of the country is 18,782 sq. m.

Mountains.—The mountain groups which rise confusedly over almost the whole surface of the land, fall into two main blocks, one on either side of the river Morava. On the east of this river, three vast ranges, the Transylvanian Alps, the Balkans and Rhodope, encroach upon Servian soil; while on the west there is a chaos of mountain masses, outliers of the Bosnian and Albanian highlands.

Rivers.—The chief navigable river of Servia is the Danube, which enters the country at Belgrade and pierces the Transylvanian Alps by way of the Kazan (*i.e.* "Cauldron") Pass, near the famous Iron Gates (see RUMANIA). The Timok, which formed the Bulgarian frontier as long ago as the 9th century, springs in the western Balkans, or Stara Planina, and issues into the Danube, near Negotin, after a course of 70 m. Sooner or later, indeed, all the Servian rivers reach the Danube. The Save, which is also navigable, meets it at Belgrade, after being joined, at Racha, by the Drina, a Bosnian river, which rises on the Montenegrin border, 155 m. S. by W. Near Obrenovats the Kolubara also enters the Save, after traversing 45 m. from its source in the Sokolska Gora. Apart from frontier rivers, the most important stream is the Morava, which, rising on the western slopes of the Kara Dagh, a little beyond the Servian frontier, enters the country with a north-easterly course near the extreme S.E., and then turns N.N.W. and flows almost in a straight line through the heart of the kingdom to the Danube. Its total length is about 150 m. In the upper part of its course it is known as the Bulgarian Morava, and only after receiving the Servian Morava on the left is it known as the Morava simply or as the Great Morava. The Servian Morava is joined on the south by the Ibar, which comes from the Albanian Alps; the combined length of these rivers being about 130 m. The only other important tributary of the Great Morava is the Nishava, which it receives on the right, at Nish. This stream flows 68 m. W. by N. from its source among the foothills of the Stara Planina. The valleys of all these rivers, especially those of the Bulgarian and the Great Morava, and of the Nishava, contain considerable areas of level or low-lying country well suited for the growth of corn, and the low grounds along the Save and the Danube from the Drina to the Morava are also well adapted for agriculture, except the tract of fenland called the Machva, in the extreme north-west.

Geology.—The geological structure of Servia is varied. In the south and west the sedimentary rocks most largely developed are of ancient, pre-Carboniferous date, interrupted by considerable patches of granite, serpentine and other crystalline rocks. Beyond this belt there appear in the north-west Mesozoic limestones, such as occupy so extensive an area in the north-west of the Balkan Peninsula generally, and the valleys opening in that quarter to the Drina have the same desolate aspect as belongs to these rocks in the rest of that region. In the extreme north-east the crystalline schists of the Carpathians extend to the south side of the Danube, and stretch parallel to the Morava in a band along its right bank. Elsewhere east of the Morava the prevailing rocks belong to the Cretaceous series, which enters Servia from Bulgaria. The Shumadia is mainly occupied by rocks of Tertiary age, with intervening patches of older strata; and the Rudnik Mountains are traversed by metalliferous veins of syenite.

Minerals.—Gold, silver, iron and lead were worked by the Romans, whose operations can still be traced in the Kostolats mine, near Pozharevats, and elsewhere. Even more ancient is the Avala mercury mine, near Belgrade. The heaps of débris which cover so many acres near Belgrade, on the Kopaonik foothills and in the Toplitsa valley bear witness to the importance of this industry in the past. During the later middle ages the Servian mines brought in a large revenue to the merchant princes of Ragusa. They prospered greatly during the 14th century, but Turkish rule put a stop to this industry after 1459; and the revival only began in 1835, under the patronage of Prince Milosh. The richest coal and lignite seams occur among the north-eastern mountains, generally near the Danube or Timok, and along the Morava. They are worked by the state, by Belgian companies and by private enterprise, the output in 1907 being valued at £121,000. Lead is principally raised in the Podrinye, especially at Krupan; and at Kuchayna, in the Pozharevats department, where zinc and small quantities of gold and silver are obtained. Antimony is mined at Zayechar. Copper and iron are worked by Belgians at Maydanpek, the chief mining centre east of the Morava. Nickel, mercury, manganese, graphite, marble, sulphur and oil shales are found in various regions, but the mineral resources of the country, as a whole, remain almost undeveloped.

The numerous mineral springs are even more neglected than the mines. Waters rich in iodine and sulphur occur in the Machva. About 1878 an unsuccessful attempt was made to convert Arandyelovats into a popular health-resort. The baths near Nish and Vranya are comparatively prosperous, while the beautiful surroundings attract visitors even from abroad.

Climate.—The climate of Servia is on the whole mild, though subject to the extremes characteristic of inland Eastern countries. In summer the temperature may rise as high as 106° F., while in winter it often sinks to 13° or even 20° below zero. The high-lying valleys in the south are colder than the rest of the country, not only on account of their greater elevation but also because of their being exposed to cold winds from the north and north-east.

Fauna.—The wild life of the Servian highlands is unusually varied. A few bears and wild boars and lynxes find shelter in the remoter forests, with many badgers, wolves, foxes, wildcats, martens and weasels. Otters are common along the rivers; chamois may very rarely be seen on the least accessible peaks; roe-deer, red-deer, squirrels and rabbits people the lower woodlands; and hares abound in the open. The beaver is extinct. Among land birds may be enumerated several varieties of eagle, vulture, falcon, owl, crow, jay, magpie, stork, quail, thrush, dove, &c. Pheasants are easily acclimatized; grouse and woodcock are indigenous on the uplands of the north; partridges, in all districts. Game laws were instituted in 1898. Innumerable aquatic birds haunt the banks of the Save, Danube and Drina, and the lower reaches of the Timok and Morava; among them being pelicans, cranes, grey and white herons, and many other kinds of waders, besides wild geese, ducks, rail and snipe. Edible frogs, tree-frogs, lizards, snakes, tortoises and scorpions are found in all parts. The principal fisheries are in the Danube and Save.

Forests.—About one-tenth of the land is covered by forests, which give place, at an altitude of 5000 ft., to lichens and mosses. Little care was bestowed on forestry in the 19th century, apart from government supervision of the national and communal domains, a task usually delegated to the local mayor. Much of the finest timber was felled in the wars of 1876–1878 and of 1885, and the rights of grazing and wood-cutting also caused widespread destruction. The total forest area (official estimate, 1909) is about 3,800,000 acres, of which 1,625,000 belong to the communes and 1,375,000 to the state. Oaks and beeches predominate in the north; pines, often of gigantic size, among the fantastic white or grey rocks of the wild south-western ridges.

Agriculture.—Servian methods of farming remain in many respects primitive. Real progress was, however, achieved in the period 1890–1910, chiefly owing to improvements in agricultural education. Indian corn is the principal crop, for corn-cake forms the staple diet of the peasantry, while the grain is also used for feeding pigs, the heads for feeding cattle and the stubble for manure. The normal yield exceeds 5,000,000 bushels yearly, wheat coming next with a little less than 4,000,000. Flax, hemp and tobacco are also grown; hemp especially near Leskovats. The cultivation of sugar-beet, introduced in 1900, became an important industry, but the attempt to introduce cotton failed. The native tobacco plantations meet all the local demand, except for a small quantity of Turkish tobacco imported for the manufacture of special blends. The best Servian wines are those of Negotin and Semendria. Before the appearance of *Phylloxera* in 1882 wine was exported to France and Switzerland, but in 1882–1895 thousands of acres of vines were destroyed. *Phylloxera* was checked by the importation of American vines and the establishment of schools of viticulture. The creation of state vine-nurseries, stocked with American plants, was authorized by a law of 1908. Orchards are very extensive, and all the fruits of central Europe will thrive in Servia. The chief care is bestowed on plums, from which is distilled a mild spirit known as *raki* or *rakiya*. The favourite kind of *raki* is *shlivovitsa* (the *sliwowitz* of Austria), extracted solely from plums. There is a considerable trade in dried plums and plum marmalade. Bees are very generally kept, the honey being consumed in the country, the wax exported. Mulberries are grown on many farms for silkworms; sericulture is encouraged and taught by the state, and over 100,000 lb of cocoons are annually exported. Relatively to its population, Servia possesses a greater number of sheep (3,160,000 in 1905) and pigs (908,000 in 1905) than any country in Europe. Large herds of swine fatten, in summer and autumn, on the beech-mast and acorns of the forests, returning in winter to the lowlands. The Servian pig is pure white or black, but other breeds, notably the Berkshire and Yorkshire, are kept. Despite American competition and Austro-Hungarian tariffs the export of swine remains the principal branch of Servian commerce. Cheeses are made from the milk of both sheep and goats; but

cattle are mostly bred for export or draught purposes. The cumbrous wooden carts which afford the sole means of transport in many districts are generally drawn by oxen, although buffaloes may be seen in the south. The native horses, though strong, are, like the cattle, of small size.

Land Tenure.—More than four-fifths of the Servians are peasant farmers; and the great majority of these cultivate the land belonging to their own families. Holdings are generally small, not exceeding an average of 20 acres for each household. They cannot be sold or mortgaged entire; the law forbids the alienation for debt of a peasant's cottage, his garden or courtyard, his plough, his last six *yutara*[1] of land and the cattle necessary for working his farm. Besides the small farms there is the *zadruga*, a form of community which appears to date from prehistoric times, and mainly survives along the Bosnian frontier, though tending to disappear everywhere and to be replaced by rural co-operation. Under the zadruga system, each homestead or cluster of cottages is occupied by a group of families connected by blood and dwelling together on strictly communistic principles. The association is ruled by a house-father (*domanyin* or *staryeshina*) and a house-mother (*domanyitsa*), who assign to the members their respective tasks. The *staryeshina* may be the patriarch of the community, but is often chosen by the rest of the members on account of his prudence and ability; nor is his wife necessarily the *domanyitsa*. In addition to the farm work, the members often practise various trades, the proceeds of which are paid into the common treasury. The community sometimes includes a priest, whose fees for baptism, &c., augment the common fund. The buildings belonging to the homesteads are enclosed within an immense palisade, inside which a large expanse of fields is mostly planted with plum, damson, and other fruit-trees, surrounding the houses of the occupiers. In the midst of these is the house of the *staryeshina*, which contains the common kitchen, eating hall, and family hall of the entire homestead. Here all the members assemble in the evening for conversation and amusement, the women spinning, while the children play. The houses are mostly very small wooden structures, serving for little else but sleeping places. But that of the *staryeshina* is often of brick, and is invariably of better construction than the rest. The houses are often raised on piles, above the level of the floods which occur so frequently near the Save and Drina. Zadrugas were very prosperous, as they had always a sufficient number of hands at command, and their members combined to obtain implements and cattle. But with the establishment of order and security, the zadrugas began rapidly to disappear, a further cause of their dissolution being the fact that members could legally acquire private property (*osobina*). A new stimulus was given to agriculture by the encouragement which King Alexander personally extended to the establishment of rural co-operative associations on the Raiffeisen principles. The object of these associations is principally to facilitate the acquisition of improved implements and better breeds of cattle. No fewer than 100 of such credit societies were founded between 1894 and 1899. The total number of agricultural co-operative societies exceeded 500 in 1910; each has its tribunal (*Conseil des Prud'hommes*), which arbitrates in disputes; and all together, with the state-aided Co-operative Caisse, which lends money to the smaller societies, form a single great organization known as the General Union.

Small holdings were in themselves a hindrance to Servian agricultural progress, inasmuch as small farmers cannot afford the cost of scientific farming; hence the great success of co-operation. As a rule, also, the lots of ground belonging to one household or family do not lie together, but are dispersed in different, very often distant, parts of the village land. To meet this difficulty, a farmer with more crops than he can reap unaided will summon his neighbours to his assistance, supplying them with food, but no money, and binding himself to repay the service in kind. This form of voluntary co-operation is called *moba*. Another serious drawback to the economic position is that Servia has no seaboard, and that it is far from the nearest export harbours (*e.g.* Galatz, Salonica, Fiume). In such a situation the country is at the mercy of hostile tariffs.

Manufactures and Commerce.—The scarcity of labour prevents the growth of any great manufacturing industries. There is no native artisan class; for except in very rare cases, the people value their independence too highly to work in factories, or even to enter domestic service. A large proportion of the artisans throughout Servia are Austro-Hungarians or gipsies. The chief manufacturing industries are those for which the country supplies raw material, notably meat-packing, flour-milling, brewing, tanning, and the weaving or spinning of hemp, flax and wool. There are also iron-foundries, potteries, and sugar, tobacco and celluloid factories. A law of 1898 authorizes the government to grant concessions on very favourable terms to foreign capitalists willing to promote mining and manufactures in Servia; but in 1910 the number of large industrial establishments in the kingdom did not exceed 60, nor the number of hands employed 5000. There are a few domestic industries, such as the manufacture of sandals (*opanke*), and of the hand-woven carpets and rugs made at Pirot, which are popular throughout the Balkan Peninsula.

[1] One *yutro* is the area which two oxen can plough in a day.

Commerce.—The following table shows the value of Servian imports and exports for five years:

Year.	Imports.	Exports.
1904	£2,437,000	£2,486,000
1905	2,224,000	2,879,000
1906	1,773,000	2,864,000
1907	2,823,000	3,259,000
1908	3,025,000	3,019,000

Cotton and woollen fabrics, leather, salt, sugar, iron and machinery are the principal imports, and come chiefly from Austria-Hungary, Germany and Great Britain. Large quantities of prunes, grain, meat, raw hides, eggs and copper are exported, chiefly to Austria-Hungary, Germany and Turkey.

Finance.—Up to 1878 the principal revenues were derived from the customs, excise and a sort of poll-tax. The government required the town and village communities to pay into the state treasury £1, 4s. per head of the able-bodied citizens living in the community, and the municipal board made repartition of the total amount due to the government from its citizens according to their estimated wealth or earnings. That system yielded without the slightest difficulty about £750,000 annually. But the Berlin Treaty (1878) stipulated that Servia should construct part of the international railway to Constantinople and to Salonica, and should pay the Turkish landowners an indemnity for the estates which had been taken from them and divided among their Servian tenants. This and the necessity of indemnifying the people from whom, during the wars with Turkey (1876–1878), requisitions had been taken and money borrowed, forced the government to enter the European financial markets. Up to that time (1881) Servia had practically no public foreign debt, although it owed Russia about £240,000 lent privately for war preparations, and to its own people about £320,000 taken by a forced loan for war purposes. The first public loans were made in 1881 by French banks at 71¾ for 5 % bonds, and the expenditure had to be immediately increased to £1,240,000. The introduction of new taxes and the reorganization of the financial administration of the country could not keep pace with the increase of public expenditure, chiefly because the skupshtina was for some time reluctant to replace the old system of direct taxation by a more modern system. When in 1884 the new law of taxation was adopted, the situation became so serious that in 1895 a new scheme was adopted by which the government gave to the bondholders additional securities, the bondholders at the same time accepting the new 4 % unified bonds in exchange for their old 5 % bonds. The following table gives an analysis of the national debt on the 1st of January 1909:—

Russian debt of 1876 (5 %)	£150,000
Lottery loan of 1881 (2 %)	989,000
Loan of the Uprava Fondova (5 %)	291,000
Primary loan of 1888	367,000
Unified loan of 1895 (4 %)	13,516,000
Railway loan of 1899 (5 %)	192,000
Monopoly loan of 1902 (5 %)	2,300,000
Loan of 1906 (4½ %)	3,767,000
Total	£21,572,000

The chief sources of revenue are customs duties, the state monopolies of salt, sugar, tobacco, matches and petroleum; national property, *e.g.* forests, railways, postal service; direct taxes, of which the most important are the poll-tax and the land taxes (graduated according to the quality of the land). The heaviest charges are for the service of the national debt and for the army; each of these items exceeded £1,000,000 in 1909. The estimated revenue and expenditure for five years are shown below:—

Year.	Revenue.	Expenditure.
1905	£3,522,000	£3,505,000
1906	3,595,000	3,566,000
1907	3,618,000	3,615,000
1908	3,832,000	3,830,000
1909	4,145,000	4,132,000

Banks and Money.—The National Bank of Servia, founded in Belgrade in 1883, has a nominal capital of £800,000 (£260,000 paid). The Mortgage Bank (*Uprava Fondova*), founded in 1862, is a state institution which lends money for agricultural operations, &c. The Export Bank, founded in 1901, is a private bank under state supervision, with branches in Budapest, Vienna, Berlin, &c. Its chief object is the furtherance of Servian foreign commerce.

In 1875 Servia adopted the decimal system for money, weights and measures, which came into actual use in 1883. The monetary unit is the *dinar* (franc) of 100 *paras* (centimes). In circulation there are gold pieces of 10 and 20 *dinars*; silver of 50 *paras*, and 1, 2 and 5 *dinars*; nickel of 5, 10 and 20 *paras*; and bronze of 2 paras. Twenty-five dinars equal £1 sterling.

Chief Towns.—The chief towns of Servia are Belgrade, the capital, with 69,097 inhabitants in 1900; Nish (24,451); Kraguyevats (14,100); Pozharevats (12,957); Leskovats (13,000); Shabats (12,072); Vranya (11,921); Pirot (10,421); Krushevats (10,000); Uzhitse (7000); Valyevo (6800); Semendria (6912); Chupriya (6000); and Kralyevo (3600).

Communications.—Until the middle of the 19th century, travellers through the Balkan Peninsula had a choice between two main routes, which started as a single highway from Belgrade, and up the Morava valley to Nish. Here two roads diverge; one branching off south-eastwards to Pirot, Sofia and Constantinople; the other proceeding southwards to Vranya, Uskub and Salonica. The railway which connects western and central Europe with Constantinople and Salonica takes the same course. That section of it which traverses Servia was begun in 1881 and finished in 1888. Branch lines give access to Kraguyevats, Zayechar, Semendria and other important towns, and there are several smaller railways in the valleys of the Save, the Danube, the Servian Morava and their tributaries. Apart from country lanes and footpaths, there are three classes of highways, controlled, respectively, by the nation, department and commune. Construction and repairs are, in theory, carried out by compulsory labour; but this right is seldom enforced. Even in the Shumadia, where materials are plentiful, the roads rapidly give way under heavy traffic, or after bad weather; in the Machva, Podrinye and remoter districts, they are often impassable. The Constantinople and Salonica roads remain the best in Servia. Besides the frontier streams on the north and west, the only river of any importance for navigation is the Morava, which is navigable by steamers of light draught as high as Chupriya, about 60 m. from its mouth.

The postal system dates from 1820, when an organized system of couriers was established, for state correspondence only. From 1843 to 1868 the Servian government undertook the carriage of letters in Servia itself, while the Austro-Hungarian consulate in Belgrade forwarded correspondence to and from central and western Europe. In 1868 the whole business of posting was taken over by the state; post offices are also maintained by many communes, and a few are itinerant. Servia joined the International Telegraphic Union in 1866, the Postal Union in 1874. The first telegraph line was constructed as early as 1855; telegrams between Constantinople, Sofia, Budapest and Vienna pass over lines constructed by the Servian government (under conventions with Austria-Hungary and Turkey) in 1899 and 1900. The telephone service, inaugurated in 1900, is a state monopoly (both for construction and operation).

Population.—With a continuous excess of births over deaths, and of male over female children, the population of Servia rose from 2,161,961 in 1890 to 2,493,770 in 1900, and to about 2,750,000 in 1910. More than four-fifths of this number belong to the Serbo-Croatian branch of the Slavonic race; while the remainder is composed of about 160,000 Rumans, 47,000 gipsies, 8000 Austro-Hungarians and Germans, and 5000 Jews. Many Servian emigrants returned, after 1878, to the territories which the Treaty of Berlin restored to their country. These territories had been occupied, under Turkish rule, by Albanians, west of the Morava, and by Bulgarians, along the Nishava; but, after 1878, the Albanians withdrew, and the Bulgarians were absorbed. The Rumans reside principally in the north-east, near the borders of their native land, and are peasant farmers, like the Serbs. The gipsies occasionally settle down, forming separate camps or villages, but in most cases they prefer a wandering life. They are often admirable artisans and musicians, almost every town possessing a gipsy band. The Germans and Austro-Hungarians control a large share of the commerce of the country; the Jews, as elsewhere in the Balkans, are retail traders. Anti-Semitism is not prevalent in Servia, owing to the smallness of the Jewish communities. The stature and features of the Serbs vary in different regions; but the northern peasantry are generally fairer and shorter than the mountaineers of the south. Those of the Shumadia are blue-eyed or grey-eyed. In many parts the prevailing types have been modified by intermarriage with Bulgars, Albanians and Vlachs; so that, along the Timok, for instance, it is impossible to make physiognomy a test of nationality. Even language does not afford a sure criterion, so nearly akin are many spoken dialects of Servian and Bulgarian.

National Characteristics.—Servia is a land without aristocracy or middle class. Instead, it possesses an army of placemen and officials; but these being mainly recruited from the peasantry, do not disturb the prevailing social equality. In 1900 there was neither pauper nor workhouse in the country. The people, less thrifty and industrious than the Bulgars, less martial than the Montenegrins, less versatile and intellectual than the Rumans, value comfort far more highly than progress. A moderate amount of work enables them to live well enough, and to pass their evenings at the village wine-shop; although, being a sober race, they meet there rather to discuss politics than to drink. Of politics they never tire; and still greater is their devotion to music, poetry and dancing. Perhaps their most characteristic dance is the *kolo*, sometimes performed by as many as 100 men and women, in a single serpentine line. Their national instrument, the *gusle* (gusla), is a single-stringed fiddle, often roughly fashioned of wood and ox-hide, the bow being strung with horse-hair. All classes delight in hearing or intoning the endless romances which celebrate the feats of their national heroes; for every true Serb lives as much in the past as in the present, and medieval wars still constantly furnish themes of new legends and ballads. It is largely this enthusiasm for the past which keeps alive the desire for a reunion of the whole race, in another Servian Empire, like that overthrown by the Turks in 1389. The fasts of the Orthodox Church are strictly kept; while the festivals, which are hardly less numerous, are celebrated even by the Servian Moslems. As in Bulgaria and Rumania, the *slava*, or patron saint's day, is set aside for rejoicing. A Servian crowd at a festival presents a medley of brilliant and picturesque costumes, scarlet being the favourite colour. Men wear a long smock of homespun linen, beneath red or blue waistcoats with trousers of white frieze. The women's dress consists of a similar smock, a "zouave" jacket of embroidered velvet and two brightly coloured aprons tied over a white skirt, one in front and one behind. The head-dress is a small red cap, tambourine-shaped, and strings of coins are coiled in the hair, or worn as necklaces and bracelets. In this manner a farmer's wife will often decorate herself with her entire dowry. During the cold months, both sexes wrap themselves in thick woollen coats or sheepskins, with the fleece inwards; both are also shod with corded sandals, called *opanke*. The Rumanian women retain their native costume, and are further distinguished by the wooden cradles, slung over the shoulders, in which they carry their infants; the Servian mothers prefer a canvas bag. Women weave most of the garments and linen for their families, besides sharing in every kind of manual labour. Turkish ideas prevail about their social position; but so highly valued are their services, that parents are often unwilling to see their daughters marry; and wives are in many cases older than their husbands. The relationship called *pobratimstvo* is only less common than in Montenegro (*q.v.*); equally binding is *kumstvo*, or sponsorship, *e.g.* the relation subsisting between the "best man" and the bridegroom at a wedding, or between godparents and god-children. Persons connected by *kumstvo*, *pobratimstvo*, or cousinship, however distant, may not marry. At a funeral, the coffin is left open until the last moment—a custom found everywhere in the Balkans, and said to have been introduced by the Turks, who found that coffins were a convenient hiding-place for arms. The same practice is, however, common in Spain and Portugal. Few countries are richer than Servia in myth and folklore. The peasants believe in charms and omens, in vampires, were-wolves, ghosts, the evil eye and *vile* or white-robéd spirits of the earth, air, stream and mountain, with hoofs like a goat and henna-dyed nails and hair. Even at the beginning of the 20th century, education had done little to dispel such superstitions.

Constitution and Government.—In 1903, after the murder of King Alexander Obrenovich, and the accession of Peter Karageorgevich, the constitution of 1889 was revived. By this instrument the government of Servia is an independent constitutional monarchy, hereditary in the male line, and in the order of primogeniture. The executive power is vested in the king, advised by a cabinet of eight members, who are collectively and individually responsible to the nation, and represent the

ministers of foreign affairs, war, the interior, finance, public works, commerce, religion and education, and justice. The king and the national assembly, or *Narodna Skupshtina*, of 130[1] members, together form the legislature. A general election must be held every fourth year. Each member receives 15 dinars for every day of actual attendance, and travels free on the railways. There is also a state council which deals with various legal and financial matters. Of its 16 members, half are chosen by the king, and half by the Skupshtina. Apart from soldiers of the active army, all male citizens of full age may vote, if they pay 15 dinars in direct taxes; while, apart from priests, communal mayors and state servants, all citizens of 30 years, paying 60 dinars, are eligible to the Skupshtina. The *Velika Skupshtina* or Grand Skupshtina is only convoked to discuss the most serious national questions, such as changes in the succession, the constitution or the territories of the kingdom. Its vote is regarded as a referendum, and its members are twice as numerous as those of the Narodna Skupshtina. For purposes of local government Servia is divided into 17 departments (*okrug*, pl. *okruzhi*), each under a prefect (*nachalnik*), who is assisted by a staff of civil servants, dealing with finance, public works, sanitation, religion, education, police, commerce and agriculture. He also commands the departmental constabulary or *pandurs*. Every department is divided into districts (*srez*), administered by the sub-prefect (*sreski nachalnik*); and the districts are sub-divided into communes or municipalities, each having its salaried mayor (*kmet* or *knez*), who presides over a council elected on a basis of population. Within the smaller spheres of their jurisdiction, the sub-prefect and mayor have the same duties to fulfil as their superior, the prefect. The mayor is, further, responsible for the maintenance of the communal granary, forests and other property. He presents to the councillors (*odbornik*, pl. *odbornitsi*) a yearly statement of accounts and estimates, which they may reject or amend. All taxes levied by the state are paid by the communal council, which assesses the property owned by each family under its authority, collects the amount due and has the right to retain one-fourth, or more, for local requirements. The central government cannot veto the election of a communal mayor or councillor.

Justice.—The highest judicial authority in Servia is the Court of Cassation, created in 1855 and re-organized in 1865. The court of appeal (1840) has two sections, one competent for Belgrade and the seven northern departments, the other for the rest of the kingdom. There are also departmental tribunals of first instance in every department, and a commercial court of first instance in Belgrade. Communal courts exist in every commune or municipality, and certain judicial powers are delegated to the police, under laws dated 1850–1904. Trial by jury, which existed among the Serbs at least as early as the 13th century and fell into desuetude under Turkish rule, was revived in 1871.

Defence.—The medieval citadels of Belgrade, Nish, Pirot and Semendria have no military value, but some strategic points on the Bulgarian frontier were entrenched between 1889 and 1899, while the modern forts of Nish, Pirot and Zayechar were strengthened and re-armed at the beginning of the 20th century. The defensive force of the country, as reorganized in 1901, consists of the national army (*narodna voyska*) and the landsturm. In the national army, which is organized in 5 divisions, with headquarters at Nish, Belgrade, Valyevo, Kraguyevats and Zayechar, every able-bodied citizen must serve (for two years in the artillery and cavalry or eighteen months in other branches) between his 21st and his 45th year. He must also belong to the landsturm at the ages of 17-21 and 45-50. Exemption from service is granted in a few exceptional cases. The national army consists of three *bans* or classes; the first is the field army, the units of the second exist in peace as cadres only, the third is unorganized. On a peace footing the strength of the army is 35,000 men; in war it might reach 225,000, including landsturm. The infantry were armed in 1910 with the Mauser rifle (model 99); the field artillery with quick-firing guns on the Schneider-Canet system.

Religion.—The Servian Church is an autocephalous branch of the Orthodox Eastern communion. It is subject, as a whole, to the ministry of education; for internal administration its governing body is a synod of five prelates, presided over by the archbishop of Belgrade, who is also the metropolitan of Servia. Belgrade is the only archiepiscopal see; the four dioceses are Nish, Shabats, Chachak and the Timok (espiscopal see at Zayechar). The synod is the highest ecclesiastical tribunal; there are also two ecclesiastical courts of appeal and diocesan courts of first instance in every bishopric; the canon law is an important part of the law of the land. In 1910 there were 54 monasteries, but only 110 monks, all belonging to the order of St Basil. Studenitsa, near Kralyevo, and Manasia and Ravanitsa, near Chupriya, are the most interesting monasteries. Much political influence is wielded by the priests, who played a prominent part in the struggles for national independence. They marry and work, and sometimes even bear arms like their parishioners, from whom a large part of their income is derived, in the shape of offerings and fees. The remainder comes principally from church lands; only the highest dignitaries being paid by the state. No able-bodied man may become a priest or monk unless he has served in the army. Liberty of conscience is unrestricted. Liberty of worship is accorded to Roman Catholics, Jews, Mahommedans and certain Protestant communities. The Mahommedans (about 3000 Turks and 11,000 gipsies) are the largest religious body apart from the national Church.

Education.—In 1910, 17 % of the population could read and write. Primary education in the state schools is free and compulsory; the reading of Church Slavonic, nature-study and agriculture (for boys) domestic science (for girls), certain handicrafts, singing and gymnastics are among the subjects taught. There are higher schools (mostly *Real-Gymnasien*) in many of the larger towns, besides (1910) one theological seminary, 4 training schools for teachers, 4 technical schools, a military academy, and 5 secondary schools for girls. The communes and municipalities pay the entire cost of primary education, except the salaries of teachers, which, with the cost of higher education, are paid by the state. In February 1905 the Great School (*Velika Shkola*) in Belgrade was reorganized as the University of Servia, with faculties of theology, philosophy, law, medicine and engineering. Other important institutions of a semi-educational character are the Royal Servian Academy (1836), which controls the national museum and national library in Belgrade, and publishes periodicals, &c.; the ethnographical museum (1891), the natural history museum (1904), the national theatre (1890), the State Archives (1866, reorganized 1901), and the state printing office (1831), all in Belgrade.

See *Servia by the Servians*, ed. A. Stead (London, 1909); J. Mallat, *La Serbie contemporaine* (Paris, 1902); E. Lazard and J. Hogge, *La Serbie de nos jours* (Paris, 1901). For topography:—the Servian and Austrian General Staff Maps; P. Coquelle, *La Royaume de Serbie* (Paris, 1894); and A. de Gubernatis, *La Serbie et les Serbes* (Florence, 1897). For geology and minerals:—J. Cvijić (Tsviyich), *Grundlinien der Geographie und Geologie*, &c. (Belgrade, 1908); J. M. Zhuyovich (Žujović), *Geologiya Srbiye* (with map, Belgrade, 1893); D. J. Antula, *Revue générale des gisements métallifères en Serbie* (with map, Paris, 1900); Th. Mirkovich (Mirković), *Les Eaux minérales en Serbie* (Paris, 1892). For commerce:—Annual British Consular Reports; Statistical Reports of the Servian Ministry of Commerce. For agriculture:—L. R. Yovanovich (Jovanović), *L'Agriculture en Serbie* (Paris, 1900). For religion:—Bishop N. Ruzhichich (Ružičić), *Istoriya Srpske Tsrkve* (Belgrade, 1893–1895); and, by the same author, *Das kirchlich-religiöse Leben bei den Serben* (Göttingen, 1896). (X.)

[1] One member is chosen to represent every 4500 electors.

History

The Serbs (*Srbi*, as they call themselves) are a Slavonic nation, ethnically and by language the same as the Croats (*Hrvati*, *Horvati*, *Croati*). The Croats, however, are Roman Catholics and use the Latin alphabet, while the Serbs belong to the Orthodox Church and use the Cyrillic alphabet, augmented by special signs for the special sounds of the Serb language. (See Slavs.)

The earliest mention of the Serbs is to be found in Ptolemy (Σίρβοι) and in Pliny (*Sirbi*). Nothing is known of their earlier history except that they lived as an agricultural people in Galicia, near the sources of the rivers Wissla and Dniester. In the beginning of the 6th century they descended to the shores of the Black Sea. Thence they began to move on in a westerly direction along the left shore of the Danube, crossed that river and occupied the north-western corner of the Balkan Peninsula. According to the emperor Constantine Porphyrogenitus, the emperor Heraclius (610–640) invited the Serbs to come over to settle down in the devastated north-western provinces of the Byzantine empire and to defend them against the incursions of the Avars. According to newer investigations, Heraclius only made peace with them, confirming them in the possession of the provinces which they already had occupied, and obtaining from them at the same time the recognition of his suzerainty. Their known history as a Balkan nation begins towards the middle of the 7th century.

The Zhupaniyas.—In their new settlements the Serbs did not form at once a united political organization. The clans (*plemena*, sing. *pleme*), more or less related to each other, occupied a certain

territory, which as a geographical and political unit was called *Zhupa* or *Zhupaniya* (county), the political and military chief of which was called *Zhupan*. The country was divided into many such Zhupaniyas, which were originally independent of each other. The history of the Serbs during the first five centuries after their arrival in their present country was a struggle between the attempts at union and centralization of the Zhupaniyas into one state under one government, and the resistance to such union and centralization, a struggle between the centripetal and the centrifugal political forces. The more powerful Zhupan was tempted to subjugate and absorb the neighbouring less powerful Zhupaniyas. If successful, he would take the title of *Veliki Zhupan* (Grand Zhupan). But such unions were followed again and again by decentralization and disruption. It is not to be wondered at that this struggle gave occasion for wars between the Zhupaniyas, for civil wars within the Zhupaniyas, for popular risings, court revolutions, dethronements, political assassinations and such like. The earlier history of the Serbs on the Balkan territory is especially turbulent and bloody. One of the minor causes of that turbulence is to be found in the struggle between the ancient Slavonic order of inheritance, according to which a Zhupan ought to be succeeded by the oldest member of the family and not necessarily by his own son, and the natural desire of every ruler that his own son should inherit the throne.

This internal political process was complicated by the struggle between the Greek Church and Greek emperors on the one side, and the Roman Catholic Church and the Roman Catholic Powers (Venice and Hungary) on the other side, for the possession of exclusive ecclesiastical and political influence in the provinces occupied by the Serbs. The danger increased when the Bulgarians came, towards the end of the 7th century, and formed a powerful kingdom on the eastern and south-eastern frontiers of the Serbs. Practically from the 8th to the 12th century the bulk of the Serbs was under either Bulgarian or Greek suzerainty, while the Serbo-Croat provinces of Dalmatia acknowledged either Venetian or Hungarian supremacy.

The Visheslav Dynasty.—The first Serb princes who worked with more or less success at the union of several Zhupaniyas into one state, belonged to what might be called "the Visheslav dynasty." Zhupan Visheslav lived in the beginning of the 9th century, and seems to have been the descendant of that leader of the Serbs who signed the settlement treaty with the emperor Heraclius towards the middle of the 7th century. His ancestral Zhupaniya comprised Tara, Piva, Lim (the neck of land between the Montenegro and Servia of our days). Visheslav's son Radoslav, his grandson Prissegoy, and his great-grandson Vlastimir, continued his work. Vlastimir successfully defended the western provinces of Servia against the Bulgarian attacks, although the eastern provinces (Branichevo, Morava, Timok, Vardar, Podrimlye) were occupied by the Bulgars. The Bulgarian danger, and probably the energetic and successful operations of the Greek emperor Basil the Macedonian (867-886), determined the Servian Zhupans to acknowledge again the suzerainty of the Greek emperors. One of the important consequences of this new vassalship to the Byzantine empire was that the entire Servian people embraced Christianity, between 871 and 875. In all important transactions the Servians were led by the Grand Zhupan Mutimir Visheslavich (d. 891). During the reign of his heirs almost all the Servian provinces were conquered by the Bulgarian Tsar Simeon (924). In 931 Chaslav, one of the princes of the Visheslav dynasty, liberated the largest part of the Servian territory from Bulgarian domination, but to maintain that liberty he had to acknowledge the Byzantine emperors as his suzerains.

The Princes of Zetta and the First Serb Kingdom.—Towards the end of the 9th century the political centre of the Serbs was transferred to Zetta (Zeta or Zenta: see MONTENEGRO) and the Primorye (Sea-Coast). The prince (sometimes called king) of Zetta, Yovan Vladimir, tried to stop the triumphal march of the Bulgarian Tsar Samuel through the Serb provinces, but in 989 was defeated, made prisoner and sent to Samuel's capital, Prespa. The historical fact that Vladimir married Kossara, the daughter of Samuel, and was sent back to Zetta as reigning prince under the Bulgarian suzerainty, forms the subject of the first Serb novel, *Vladimir and Kossara*, as early as the 13th century. Vladimir, who seems to have been a noble-minded and generous man, was murdered by Samuel's heir, Tsar Vladislav (1015). By the Christians of both churches in Albania he is to this day venerated as a saint. But after the death of Samuel the Bulgarian power rapidly lost the Serb provinces, which, to get rid of the Bulgarians, again acknowledged the Greek overlordship. About 1042, however, Prince Voislav of Travuniya (Trebinje), cousin of the assassinated Vladimir of Zetta, started a successful insurrection against the Greeks, and united under his own rule Travuniya, Zahumlye and Zetta. His son Michael Voislavich annexed the important Zhupaniya of Rashka (Rascia or Rassia), and in 1077 proclaimed himself a king (*rex*), receiving the crown from Pope Gregory VII. His son Bodin continued the work of his father, and enlarged the first Serb kingdom by annexing territories which up to that time were under direct Greek rule. A body of Crusaders under Count Raymond of Toulouse passed through Bodin's kingdom about 1101. After Bodin's death the civil wars between his sons and relatives materially weakened the first Serb kingdom. Bosnia reclaimed her own independence; so did Rashka, whose Grand Zhupans came forward as leaders of the Serb national policy, which aimed at freedom from Greek suzerainty and the union of all the Serb Zhupaniyas into one kingdom under one king. The task was difficult enough, as the Byzantine empire, then under the reign of the energetic Manuel Comnenus, regained much of its lost power and influence. About the middle of the 12th century all the Serb Zhupaniyas were acknowledging the suzerainty of the Byzantine emperors.

The Nemanyich Dynasty and the Serb Empire.—A change for the better began when Stephen Nemanya became the Grand Zhupan of Rashka (1169). He succeeded in uniting all the Serb countries under his rule, and although he never took the title of king, he was the real founder of the Serb kingdom and of the royal dynasty of Nemanyich, which reigned over the Serb people for nearly 200 years. The youngest son of Stephen Nemanya, Prince Rastko, secretly left his father's royal court, went to a convent in Mount Athos, made himself a monk, and afterwards, under the name of Sava, became the first archbishop of Servia. As such he established eight bishoprics and encouraged schools and learning. He is regarded as the great patron and protector of education among the Serbs, as a saint, and as one of the greatest statesmen in the national history. After Stephen Nemanya and Sava the most distinguished members of the Nemanyich dynasty were Urosh I. (1242–1276), his son Milutin (1282–1321) and Stephen Dushan[1] (1331–1355). Urosh married Helen, a French princess of the house de Courtenay, and through her he kept friendly relations with the French court of Charles of Anjou in Naples. He endeavoured to negotiate an alliance between Serbs and French for the overthrow and partition of the Byzantine empire. His son Milutin continued that policy for some time, and increased his territory by taking several fortified places from the Greeks; but later he joined the Greeks under the emperor Andronicus against the Turks. Milutin's grandson, Stephen Dushan, was a great soldier and statesman. Seeing the danger which menaced the disorganized Byzantine empire from the Turks, he thought the best plan to prevent the Turkish invasion of the Balkan Peninsula would be to replace that empire by a Serbo-Greek empire. He took from the Greeks Albania and Macedonia excepting Salonica, Kastoria and Iannina. Towards the end of 1345 he proclaimed himself "emperor of the Serbs and the Greeks," and was as such solemnly crowned at Usküb on Easter Day 1346. At the same time he raised the archbishop of Ipek, the primate of Servia, to the dignity of patriarch. Three years later he convoked the *Sabor* (parliament) at Usküb to begin a codification of the laws and legal usages. The result was the publication, in 1349, of the *Zakonik Tsara Dushana* (Tsar Dushan's Book of Laws), a code of great historical interest which proves that Servia was not much behind the foremost European states in

[1] *Dushan* is a term of endearment, derived from *dusha*, "the soul," and not, as formerly believed by Western philologists, from *dushiti* "to strangle."

civilization. In 1355 Dushan began a new campaign against the Greeks, the object of which was to unite Greeks, Serbs and Bulgars into one empire, and by their united forces prevent the Turkish power taking root on European ground. To attain that object he was making preparations for a siege of Constantinople, but in the midst of these preparations, or, as some historians assert, on the march towards Constantinople, he died suddenly at the village of Deabolis on the 20th of December 1355. His only son Urosh, a young man of nineteen, seemed physically and mentally incapable of holding together an empire composed of such different races and upheaving with such divergent interests. Some of the powerful viceroys of Dushan's provinces speedily made themselves independent. The most prominent amongst them was Vukashin, who proclaimed himself king of Macedonia. He wished to continue Dushan's policy and to expel the Turks from Europe, but in the battle of Taenarus, on the 26th of September 1371, his army was destroyed by the Turks, and he was slain. This was the first great blow which shook the fragile structure of the Serb empire to its foundation. Two months later (December 1371) Tsar Urosh died, and with his death ended the rule of the Nemanyich dynasty.

The Turkish Invasion: Kossovo.—After a few years of indecision and anarchy the Sabor met at Ipek in 1374 and elected Knez (count) Lazar Hrebelyanovich, a kinsman of Urosh, as ruler of the Serbs. Lazar accepted the position and its responsibilities, but never would assume the title of tsar, although the people commonly called him "Tsar Lazar." He tried to stop the further disruption of the Serb empire and worked to organize a Christian league against the Turks. When this was reported to the Turks, they at once decided to prevent the formation of such a league by attacking its prospective members one by one. This was the real cause of the Turkish attacks on Bulgaria and Servia in 1389, which resulted in the complete subjugation of Bulgaria and in the defeat of the Serb army in the battle of Kossovo (15th of June 1389). No historic event has made such a deep impression on the mind of the Serbs as the battle of Kossovo – probably because the flower of the Serb aristocracy fell in that battle, and because both the tsar of the Serbs, Lazar, and the sultan of the Turks, Murad I., lost their lives. The sultan was killed by the Serb knight or voyvode Milosh Obilich (otherwise Kobilovich). There exists a cycle of national songs—sung to this day by the Serb bards (*guslari*)—concerning the battle of Kossovo, the treachery of Vuk Brankovich and the glorious heroism of Milosh Obilich.

The Despotate.—After the battle of Kossovo Servia existed for some seventy years (1389–1459) as a country tributary to the sultans but governing itself under its own rulers, who assumed the Greek title of "despot." The first despot after Kossovo was Tsar Lazar's eldest son "Stephen the Tall," who was an intimate friend of Sigismund IV., king of Hungary and emperor of the Germans. Being childless, Stephen on his deathbed in 1427 appointed his nephew, George Brankovich, to be his successor. As despot, George worked to establish an alliance between Servia, Bosnia and Hungary. But before such an alliance could practically be arranged, Murad II. attacked Servia in 1437 and forced George to seek refuge in Hungary, where he continued to work for a Serbo-Hungarian alliance against the Turks. Having at his disposal a large fortune he succeeded in organizing a Serbo-Hungarian expedition against the Turks in 1444. This expedition, under the joint command of the Despot George and of Hunyádi János, defeated the Turks in a great battle at Kunovitsa. The sultan was forced to conclude peace, restoring to George all the countries previously taken from him. For the remainder of his life George was rather estranged from his former allies the Hungarians. At the age of ninety he was wounded in a duel by a Hungarian nobleman, Michael Szilagyi, and died of his wound on the 24th of December 1457. His youngest son Lazar succeeded him, but only for a few months. Lazar's widow Helena Palaeologina gave Servia to the pope, hoping thereby to secure the assistance of Roman Catholic Europe against the Turks. But no one in Europe moved a finger to help Servia, and Sultan Mahommed II. occupied the country in 1459, making it a pashalik under the direct government of the Porte.

For fully 345 years Servia remained a Turkish pashalik, enduring all the miseries which that lawless régime implied (see TURKEY, *History*). But the more or less successful invasions of the Turkish empire in Europe by the Austrian armies in the course of the 18th century—invasions in which thousands of Serbs always participated as volunteers—prepared the way for a new state of things.

The Struggle for Servian Independence.—The disorganization and anarchy in the Turkish empire at the beginning of the 19th century gave the Serbs their opportunity, and the people rose *en masse* against its oppressors (January 1804). A national assembly met in February 1804 in the village of Orashats, and elected George Petrovich—more generally known under the name of "Tsrni Gyorgye" or "Karageorge" (*q.v.*)—both meaning "Black George"—as commander-in-chief of all the nation's armed forces and the leader of the nation (*Vozhd naroda*). Under his command the Serbs quickly succeeded in breaking the power of the Dahias, as the four chieftains of the Janissaries of Belgrade were called, who, having rebelled against the sultan, took possession of Servia, became its political and military masters, and exploited the country as their own private property. The Serbs cleared their country altogether of the Turks, and began to organize it as a modern European state. In 1807 the sultan offered to grant the Serbs self-government, and to acknowledge Karageorge as the chief of the nation with the title of prince. On the advice of the Russians, who were just going to war with Turkey, the Serbs refused that offer, preferring to fight against the Turks as Russian allies. The principal scene of the Russo-Turkish war being transferred to the Lower Danube, only a few unimportant actions took place on Servian territory. From 1804 till the autumn of 1813 the Serbs governed themselves as an independent nation. But when in 1812 Russia, attacked by Napoleon, had in great haste to conclude at Bucharest a treaty of peace with Turkey, and omitted to make sufficient provision for the security of her allies the Serbs, the Turkish army invaded and reconquered Servia, occupying all its fortresses. Karageorge, with most of the leading men, left the country (September 1813) and found a refuge first in Austria and then in Russia. Of those who remained in Servia the natural leader, by his own position, talents and influence, was Milosh Obrenovich, voyvode of Rudnik. He surrendered to the Turks and was appointed by them the ruler of central Servia. Not quite two years later Milosh began the second insurrection of the Serbs against the Turks (on Palm Sunday 1815, near the little wooden church of Takovo). He was successful not only in the field but in his diplomacy, and by 1817 Servia had regained autonomy under the suzerainty of the sultan. That autonomy was placed on an international basis by the treaty of Adrianople, concluded between Turkey and Russia in 1829. In compliance with that treaty the sultan by the Hatti-Sherif of 1830 formally granted full autonomy to the Serbs, retaining at the same time Turkish garrisons in the Servian fortresses.

Servia an Autonomous State: 1830–1879.—Milosh, declared hereditary prince of Servia, worked hard for the internal organization and for the economic and educational progress of his country. But his attempts to make Servia independent of Russian protection brought him into conflict with Russia, and his autocratic methods of government united against him all who wished for a constitution. The result was that Prince Milosh was forced to abdicate and leave the country in 1839. Three days before his abdication he was induced to sign a constitution (that of 1838) imposed on Servia by the Porte, at the instance of Russia, with the object of undermining his position. This constitution delegated part of the prince's authority to a council of 70 members appointed for life. Prince Milosh's elder son, Prince Milan (Obrenovich II.), died in a few months, and the younger son Michael (Obrenovich III.) ascended the throne. But the politicians who forced Milosh to abdicate did not feel safe with Milosh's second son as the reigning prince of Servia. They started a military revolt, drove Michael also into exile (1842), and elected Alexander

Karageorgevich, the younger son of Karageorge, as prince of Servia. His reign (1842–1858) was quiet and prosperous, and the country made remarkable progress in culture and wealth. But he feared to summon the national assembly, was personally weak and vacillating, and in foreign politics was Turcophil and Austrophil rather than Russophil. Not only Russia but Servia also was dissatisfied with such a policy, and when Alexander Karageorgevich, forced by public opinion, at last dared convoke a national assembly, that assembly's first resolution was that Prince Alexander should be dethroned and replaced by the old Prince Milosh Obrenovich I. This change of the reigning dynasty was effected without the slightest disorder or loss of life. Milosh returned to power at the beginning of 1859, but died in 1860. His son Michael then ascended the throne for the second time. He was a man of refinement who had learned much during his long exile (1842-1859). His political programme was that the law should be respected as the supreme will in the country, that Servia's political autonomy should be jealously guarded, and every encroachment on the part of the suzerain power should be resented and rebuffed. He introduced many important reforms in administration, and replaced the old constitution, granted to Servia by the Porte in 1830, by a new constitution which he himself gave to the country. When in 1862 the Turkish garrison in the citadel of Belgrade bombarded the town, he demanded the evacuation of all the Servian fortresses and forts by the Turks. Only a few of the less important forts were delivered to the Serbs at that time; but in 1863 Prince Michael sent his wife, the beautiful and accomplished Princess Julia (*née* Countess Hunyadi), to plead the cause of Servia in London, and she succeeded in interesting prominent English politicians (Cobden, Bright, Gladstone) in the fate of the Balkan countries. Prince Michael organized the national army, armed it and drilled it, and entered into understandings with Greece, Montenegro, Bosnia and Herzegovina, Bulgaria and Albania, for an eventual general rising against the Turks. In the beginning of 1867 he addressed to the Porte a formal demand that the Turkish garrisons should be withdrawn from Belgrade and other Serb fortresses. To prevent a general conflagration in the Balkan Peninsula, the powers advised the sultan to comply with the demand, and when the British government strongly supported that advice the sultan yielded and delivered all the fortresses on Servian territory to the keeping of the prince of Servia (March 1867). Prince Michael's great popularity in consequence of his diplomatic successes alarmed the friends of the exiled Karageorgevich dynasty, more especially when rumours began to circulate that the prince contemplated divorcing his childless wife Julia and remarrying. A conspiracy was formed, and Prince Michael was assassinated on the 10th of June 1868. The conspirators failed to overthrow the government, and the army proclaimed Milan, the son of Prince Michael's first cousin Milosh Obrenovich (son of Yephrem, brother to Milosh the founder of the dynasty), as prince of Servia. The choice was unanimously approved by the Velika Skupshtina, which had been immediately convoked. As Milan Obrenovich IV. was a boy of only thirteen, a regency, presided over by Jovan Ristich or Ristitch (*q.v.*), was appointed to manage the government until the boy prince attained his full age, which took place in 1872. In 1869 the regency had substituted a new constitution for that of 1838. Prince Milan followed the policy of his dynasty, and, encouraged by the Russian Panslavists, declared war on Turkey (June 1876). His army, commanded by the Russian General Chernyayev, was defeated by Abdul-Kerim Pasha, whose advance was stopped by the intervention of Tsar Alexander II. But the situation created by Prince Milan's action in the Balkans forced the hand of the tsar, and Russia declared war on Turkey (1877).

The Treaty of Berlin.—Prince Milan was educated in the political school favourable to Russia, and unhesitatingly followed the Russian lead up to the conclusion of the preliminary treaty of peace between Russia and Turkey at San Stefano. By that treaty Russia, desiring to create a great Bulgaria, took within its limits districts inhabited by Servians, and considered by the Servian politicians and patriots as the natural and legitimate inheritance of their nation. This act of Russia created great dissatisfaction in Servia, and became the starting-point for a new departure in Servian politics. At the Berlin Congress the Servian plenipotentiary, Jovan Ristich, in vain appealed to the Russian representatives to assist Servia to obtain better terms. The Russians themselves advised him to appeal to Austria and to try to obtain her support. The utter neglect of the Servian interests by Russia at San Stefano, and her evident inability at the Berlin Congress to do anything for Servia, determined Prince Milan to change the traditional policy of his country, and instead of continuing to seek support from Russia, he tried to come to an understanding with Austria-Hungary concerning the conditions under which that power would give its support to Servian interests. This new departure was considered by the Russians especially by those of the Panslavist party—almost as an apostasy, and it was decided to oppose Prince Milan and his supporters, the Servian Progressives. The treaty of Berlin (13th of July 1878) disappointed Servian patriots, although the complete independence of the country was established by it (art. 34). This was proclaimed at Belgrade by Prince (afterwards King) Milan on the 22nd of August.

The Progressive Régime.—The political history of Servia from 1879 to the abdication of King Milan on 3rd March 1889 was an uninterrupted struggle between King Milan and the Progressives on one side, and Russia with her adherents, the Servian Radicals, on the other. King Milan and his government were badly handicapped by several unfortunate circumstances. To fulfil the engagements accepted in Berlin and the conditions under which independence had been granted to Servia, railways had to be constructed within a certain time, and the government had also to pay to the Turkish landlords in the newly acquired districts an equitable indemnity for their estates, which were divided among the peasants. These objects could not be attained without borrowing a considerable amount of money in the European markets. To pay regularly the interest on the loans the government of King Milan had to undertake the unpopular task of reforming the entire financial system of the country and of increasing the taxation. The expenditure increased more rapidly than the revenue. Deficits appeared, which had to be covered temporarily by new loans, and which forced the government to establish monopolies on salt, tobacco, matches, mineral oils, &c. Every such step increased the unpopularity of the government and strengthened the opposition. An attempt on the life of King Milan was made in 1882, and an insurrection in the south-eastern districts was started in 1883. But the majority of the people, and especially the regular army, remained loyal, and the revolt was quickly suppressed.

War with Bulgaria.—The union of Bulgaria and Eastern Rumelia inspired King Milan and his government with the notion that either that union must be prevented, or that Servia should obtain some territorial compensation, so that the balance of power in the Balkan Peninsula might be maintained. This view, which did not find support anywhere outside Servia, led to war between Servia and Bulgaria (see *Servo-Bulgarian War*); the Servians were defeated at Slivnitza and had to abandon Pirot, whilst the farther advance of the Bulgarian army on Nish was stopped by the intervention of Austria-Hungary. An honourable peace was concluded between the two contending powers in March 1886. Then came the unhappy events connected with Milan's divorce from Queen Natalie. That domestic misfortune was cleverly exploited by King Milan's enemies in the country and abroad, and did him more harm than all his political mistakes. He tried to retrieve his position in the country, and succeeded in a great measure, by granting a very liberal constitution (January 1889, or Dec. 1888 O.S.) at a time when all agitation for a new constitution had been given up. Then, to the great astonishment of the Servians and of his Russian enemies, King Milan voluntarily abdicated, placing the government of the country in the hands of a regency during the minority of his only son Alexander, whom he proclaimed king of Servia on the 6th of March 1889.

King Alexander: The Regency.—The leading man of the

regency was Jovan Ristich, who had already been regent during the minority of King Milan (1868-1871). Although he had been since 1868 the leader of the Liberal party, he showed himself, as regent, extremely Conservative. The new constitution was the embodiment of Radical principles, and the numerically strongest party in the country was Radical. The national assembly was composed, therefore, almost exclusively of Radicals, and the government was Radical likewise. From the very beginning the Conservative regency and the Radical government distrusted each other. The government was not strong enough to resist the clamour of their numerous partisans for participation in the spoils of party warfare. Political passions, which had been stirred up by the long struggle against King Milan's Progressive régime, could not be allayed so quickly; and as the anarchical element of the Radical party obtained the ascendancy over the more cultured and more moderate members, all sorts of political excesses were committed. The old system of borrowing money to cover the yearly deficits was continued, and the expenditure went on increasing from year to year. The administration lost all authority, the police were paralysed and brigandage became rife. The Radical government thought to strengthen their position by letting the national assembly vote a law prohibiting the return of the king's father to Servia, and forcibly expelling the king's mother, Queen Natalie. But such laws and such acts only embittered political passions and greatly encouraged the adherents of Prince Peter Karageorgevich, who, having married the eldest daughter of Prince Nicholas of Montenegro and living at Cettigne, was supposed to enjoy the support of Russia. The political situation became still more confused when on the death of the third regent, General Kosta Protich, the government tried to force the regency to accept in his stead M. Pashich, the leader of the Radical party. The regents thereupon dismissed the Radical cabinet and called the Liberals to the government (August 1892). The Liberal cabinet dissolved the Radical national assembly, and at the general elections used very great pressure to secure a Liberal majority. In this they did not succeed, and the situation became hopelessly entangled by the fact that the national assembly was Radical, the government Liberal, and the regency practically in all its tendencies Conservative. The legislative machinery as well as the administration of the country was thus completely paralysed. Then the young king Alexander suddenly proclaimed himself of age (although at that time only in his seventeenth year), dismissed the regents and the Liberal cabinet, and formed his first cabinet from among the moderate Radicals (13th April 1893).

The King's Administration.—The moderate Radicals quickly showed themselves unable to do any serious work. They were fettered by the dissatisfaction of the Left wing of their own party. To satisfy the extreme Radicals they had to impeach the members of the last cabinet. This increased the bitterness of the Liberals, who, though not so numerous as the Radicals, included in their ranks more men of wealth and culture. Political passions were again in full blaze. The anti-dynastic party raised its head again, and in many Radical publications the expulsion of the reigning dynasty and its replacement by the Karageorgevich were advocated. At the same time reports were reaching King Alexander that Russia was discussing with the leaders of the extreme Radicals the conditions under which a Russian grand-duke was to be proclaimed king of Servia.

The ex-King Milan's Return.—In such circumstances King Alexander thought best to invite his father the ex-King Milan (who was living in Paris) to his side, and to use his great knowledge of men and his political experience. In the beginning of January 1894 King Milan arrived in Belgrade. The Radical cabinet resigned and was replaced by a cabinet composed of politicians standing outside the political parties. In June the Radical constitution of 1889 was suspended, and in its place the constitution of 1869 was re-established.

The nation was evidently tired of the violent agitations of recent years. This feeling gave rise to Conservative, even somewhat reactionary, legislation. The duration of the legislature was extended from three to five years; the liberty of the press was curtailed by the enactment that proprietors of political papers must pay to the government a deposit of 5000 dinars (£200), and that the editors must have completed their studies at a university; the laws on *lèse-majesté* were made more severe. After the advent to power of Dr Vladan Georgevich (October 1897) persistent and successful efforts were made to improve the country's financial and economic condition. The violent party strife which from 1880 to 1895 had absorbed the best energies of the country and paralysed every serious and productive work, ceased almost completely, and the nation as a whole turned to improve its agriculture and commerce. The sustained improvement in the political and commercial situation was not influenced materially by the temporary excitement in consequence of the attempt on the life of King Milan (6th July 1899), and of the state trial of several prominent Radicals accused of having conspired for the overthrow of the dynasty. One remarkable feature in the foreign policy of Servia in the last years of the 19th century was that after King Milan was appointed commander-in-chief of the Servian regular army (1898), Russia and Montenegro practically, although not formally, broke off their diplomatic relations with Servia, while at the same time the relations of that country with Austria-Hungary became more friendly than under the Radical régime.

King Alexander's Marriage.—All this was suddenly changed when in July 1900 King Alexander married Mme Draga Mashin, once lady-in-waiting to his mother Queen Natalie. He threw himself into the arms of Russia, forbade his father Milan to reside in Servia, and followed Russian guidance in all questions of foreign policy. To strengthen his position in the country he promulgated a new constitution in April 1901, establishing for the first time in the history of Servia a parliament with two houses (skupshtina and senate). But the unpopularity of the king's marriage was not lessened. Constitutional liberties and especially the free press were mercilessly used to attack both the king and the queen, who neither wished nor were able to conceal their dissatisfaction. A general feeling that King Alexander contemplated changing the situation by one of his bold and clever *coups d'état* increased the political unrest. Matters went from bad to worse when persistent rumours were set in motion that Queen Draga had succeeded in persuading King Alexander to proclaim one of her two brothers heir-apparent to the throne. In 1902 a widespread military conspiracy was rumoured to exist, while Austria and Russia repeatedly gave proofs that they were indifferent to the fate of Alexander, and so encouraged the malcontents. King Alexander felt that he could eventually fortify his position either by a great foreign policy or by his divorce from the childless Queen Draga. He seems to have been working for joint action with Bulgaria for the liberation of Macedonia from Turkish rule. Some of his intimate friends asserted that he contemplated divorcing the queen, and that he was only waiting for her departure for an Austrian watering-place, which departure was fixed for the 15th of June 1903. In the first hours of the 11th of June the conspirators surrounded the palace with troops, forced an entrance and assassinated both King Alexander and Queen Draga in a most cruel and savage manner. (C. Mi.)

King Peter Karageorgevich.—The regicides proclaimed Prince Peter Karageorgevich king of Servia; and a provisional cabinet was formed, with Colonel Mashin, brother-in-law of the murdered Queen Draga and organizer of the conspiracy, as minister of public works. The skupshtina and senate assembled, restored the constitution of 1889 instead of the reactionary constitution promulgated by King Alexander on the 19th of April 1901, and ratified the election of Prince Peter, who entered Belgrade as king on the 24th of June 1903. Born in 1844, he was the son of Alexander Karageorgevich and grandson of Karageorge; in 1883 he had married Princess Zorka, daughter of Prince (afterwards King) Nicholas of Montenegro. His authority was at first merely nominal; the highest administrative offices were occupied by the regicides, who received the unanimous thanks of the skupshtina for the assassination of King Alexander and Queen Draga. Russia, Austria-Hungary and Montenegro were

the only Powers which congratulated King Peter on his accession, and in December 1903 all the Powers temporarily withdrew their representatives from Belgrade, as a protest against the attitude of the Servian government towards the regicides. But at the coronation of King Peter, in September 1904, all the European powers except Great Britain were officially represented, some concessions, more apparent than real, having being made in the matter of the regicides, who were very unpopular among the peasants and in the army. Further protests were made by many of the powers when the illusory nature of these concessions became known, and it was not until May 1906 that diplomatic relations with Servia were resumed by Great Britain. In the same year a convention was concluded by Servia and Bulgaria as a preliminary to a customs union between the two states. This convention, which tended to neutralize the dependence of Servia upon Austria-Hungary by facilitating the export of Servian goods through the Bulgarian ports on the Black Sea, brought about a war of tariffs between Servia and the Dual Monarchy.

The Bosnian Crisis.—In 1908 the annexation of Bosnia and Herzegovina by Austria-Hungary and the revolution in Turkey brought about an acute crisis. Many Serbs still hoped for the realization of the so-called "Great Servian Idea," *i.e.* the union in a single empire of Servia, Bosnia and Herzegovina, Montenegro and Old Servia (*Stara Srbiya*) or the sanjak of Novibazar with north-western Macedonia—all countries in which the population consists largely, and in some cases almost exclusively, of Orthodox Serbs. The whole nation clamoured for war with Austria-Hungary, and was supported in this attitude by Montenegro, despite a temporary rupture of diplomatic relations between Belgrade and Cettigne, due to the alleged complicity of the Servian crown prince in a plot for the assassination of Prince Nicholas. As, however, the armaments and finances of Servia were unequal to a conflict with Austria-Hungary, while Great Britain, Russia, France and Italy counselled peace, the skupshtina, meeting in secret session on the 11th of October 1908, determined to avoid open hostilities, and sent M. Milanovich, the minister for foreign affairs, to press the claims of Servia upon the powers. The tariff war with Austria-Hungary was at the same time renewed. Servia demanded compensation in various forms for the annexation of Bosnia and Herzegovina; what the government hoped to obtain was the cession to Servia of a strip of territory between Herzegovina and Novibazar, which would check the advance of Austria-Hungary towards Salonica, make Servia and Montenegro conterminous, pave the way for a union between them, and give Servian commerce an outlet to the Adriatic. Neither the Dual Monarchy nor the Young Turks would consider the cession of any territory, and in January 1909 the outcry for war was renewed in Servia. But the threatening attitude of Austria-Hungary, with the moderating influence of M. Pashich, who became the real, though not the nominal, head of a new ministry in February 1909, induced Servia to accept the advice of the Russian government by abandoning all claim to territorial "compensation," and leaving the Balkan question for solution by the Powers. The Servian government defined its attitude in a circular note to the Powers (9th of March), and finally accepted the terms of a conciliatory declaration suggested by the British government (31st of March). By this declaration Servia abandoned all its demands as against Austria-Hungary, while the Austro-Hungarian foreign minister made simultaneously a public declaration that the Dual Monarchy harboured no unfriendly designs against Servia.

On the 27th of March 1909 the crown prince George (b. 1887), who had been the most outspoken leader of the anti-Austrian party in 1908, was induced to resign his right of succession to the throne. It was alleged that his violence had caused the death of one of his own male servants, and that he was partially insane. On the 27th of March 1909 his brother Alexander (b. Dec. 17, 1888) took the oath as heir-apparent.

The books by Stead, Mallat and Hogge, mentioned above, contain important historical matter. See also the bibliography to the article BALKAN PENINSULA, with L. von Ranke, *Geschichte Serbiens bis 1842* (Leipzig, 1844; Eng. trans. by A. Kerr, *The History of Servia* (London, 1847); id., *Serbien und die Türkei im 19. Jahrhundert* (Leipzig, 1879); A. Hilferding, *Geschichte (ältere) der Serben und Bulgaren* (2 vols. from the Russian, Bantzen, 1856–1864); S. Novaković, *Srbi i Turtsi xiv. i xv. veka*, &c (Belgrade, 1893); B. S. Cunibert, *Essai historique sur les révolutions et l'indépendance de la Serbie: 1804–1850* (2 vols., Paris, 1850–1855); E. L. Mijatovich, *History of Modern Servia* (London, 1872); Rachić, *Le Royaume de Serbie, étude d'histoire diplomatique* (Paris, 1901); V. Georgevic, *Das Ende der Obrenović* (Leipzig, 1905); C. Mijatovich, *A Royal Tragedy* (London, 1906). (X.)

LANGUAGE

The Servian language belongs to the family of Slavonic languages (see SLAVS). According to the Servian philologist Danichich (*Dioba Slov. yezika*, Belgrade, 1874), the Servians were the first Slavonic branch which separated from the original Slavonic stem, while the Russians and the Bulgarians only separated from it at a considerably later date. The Russian and Bulgarian languages undoubtedly stand nearer to Old Slavonic than the Servian. According to another theory (T. Schmidt, *Vocalismus* ii. 179) two separate branches developed from the Old Slavonic stem, one identical with the western Slavs, and the other with the south-eastern group; and from the Slavonic of the south-east the first languages to separate were the Russian and the South Slavonic. From the latter developed Bulgarian, on one side, and Servian-Slovene on the other, while from the last-named branch Servian or Serbo-Croatian and Slovene developed on two separate twigs. There can be no doubt that in the south-eastern group of the Slavonic languages Serbo-Croatian and Slovene form a special closely-connected group, in which the Servian and the Croat languages are almost identical.

Both the Servians and the Croats arrived in the first half of the 7th century (or more precisely about A.D. 635) in the north-western corner of the Balkan Peninsula. There they met the partly Romanized Illyrians, and in course of time absorbed them. There can be little doubt that this absorption softened and enriched the Serbo-Croatian dialects, a process to which climatic conditions and intercourse with Italy also contributed, until Serbo-Croatian became one of the richest and most melodious of Slavonic languages.

Servian is spoken in the following countries, forming geographically (although not politically) a connected whole: southern Hungary, the kingdom of Servia, Old Servia (the Turkish vilayet of Kossovo), western Macedonia, the sanjak of Novi-Bazar, Bosnia, Herzegovina, Croatia-Slavonia, Dalmatia and Montenegro. It ranks with Bulgarian as one of the two principal Slav languages of the Balkan Peninsula; the Macedonian dialects are intermediate between these two. Between eight and nine millions of people speak Serbo-Croatian in the countries just enumerated.

Considering the extent of territory in which the language is spoken, it is not surprising that it should have several dialects. Practically, however, there are only three principal dialects, which are differentiated by the manner in which the Old Slavonic double vocal *ѣ* (the so-called *yach*) is pronounced. The Old Slavonic words *lyepo*, *byelo*, are pronounced by the Servians of Herzegovina, Bosnia, Montenegro, Dalmatia, Croatia and south-western Servia as *leeyepo*, *beeyelo*; by the Servians of Syrmia the same vowel is pronounced sometimes as *e* (*lepo*, *belo*), sometimes as *ee* (*videeti*, *leteeti*); by the Servians of the Morava valley and its accessory Ressava valley, always only as *e* (*lepo*, *belo*, *videti*, *leteti*). Vuk Stefanovich Karajich called the first dialect the "South-Western or Herzegovinian dialect," the second the "Syrmian," the third the "Ressava" dialect. Professor Belich of Belgrade University has tried to give in the *Servian Dialectological Compendium* (Belgrade, 1905) a new division of the Servian dialects into five groups, viz. Prizren-Timok, Kossovo-Ressava, Shumadiya-Srem (Syrmia), Zetta-Bosnia, Adriatic coast. Of all the Servian dialects the most correct, richest and softest is the Herzegovinian or Zetta-Bosnian dialect. Karajich and his followers tried to make it the literary language of the Servians. All the national songs which he transcribed from the recitations of the bards were written and published by him in that dialect, into which the Bible has also been translated. But, as in the second half of the 19th century the kingdom of Servia, speaking the Ressava or Shumadiya-Syrmian dialect, became the centre of Servian literary activity, the last-mentioned dialect tended to become the literary language.

Servian and Croatian are only two dialects of the same Slavonic language. Servian is sometimes called *shtokavski* because the Servian word for "what" is *shto*, whereas the Croats say *cha* for *shto*, and

therefore their language is called *chakavski*. The more important differences between the two languages were pointed out by Danichich (*Glasnik*, IX., 1857). They are as follows: (*a*) while the Servians pronounce the Old Slavonic *yach* as *ye* or *e* or *ee*, the Croats pronounce it always as *ee* (Servian *beeyelo* or *belo*, Croatian *beelo*); (*b*) the Servians have the sound *gye* (softened *d* or *g*), the Croats are without it, but have instead *ya* or *ye* (Servian *gospogva*, Croatian *gospoya*); (*c*) the Servians let the vowel *i* transform the preceding consonant into a soft consonant, whereas the Croats pronounce the consonant unaffected by the softening influence of *i* (Servian *bratya*, Croatian *bratia*); (*d*) the Servians change the letter *l* at the end of a word into *o* whereas the Croats always pronounce it as *l*. These differences are so insignificant that it was very natural that the Croats after having tried to convert the *chakavski* dialect into a separate literary language were compelled to abandon that attempt and to adopt the *shtokavski*. To facilitate this reform, to overcome the ecclesiastical prejudices of the Roman Catholic Croats against the Eastern Orthodox Servians, and vice versa, certain Croatian patriots, led by Ljudevit Gaj, proposed that all the Slavonic peoples in the north-western part of the Balkan Peninsula should call themselves *Illyri* and their language *Illyrian* (see CROATIA-SLAVONIA: *Language and Literature* and *History*). The appellation "Serbo-Croatian" for the literary language of both nations now finds more favour. The great dictionary compiled and published by the South Slavonic Academy of Agram is called *The Lexicon of the Servian or Croatian Language*. Although the Croats write and print in Latin characters, while the Servians write and print in Cyrillic, and although many a Servian cannot read Croatian books, and vice versa, the literary language of both nations is one and the same. (C. MI.)

LITERATURE

1. *Formation of a Servian-Slavonic Language.*—Servian literature begins with the biblical and liturgical books, written in "Old Slavonic," or "Church Slavonic," into which "the Slavonic apostles" Cyril and Methodius (see SLAVS) had translated the Bible and other church books about the middle of the 9th century. Cyril and Methodius used the Greek alphabet somewhat modified and adapted to the necessities of the Slavonic language. That alphabet is called "Cyrillic" (in Servian *Kyrilitsa*), and is—simplified and modernized—practically the alphabet used by the Servians, Bulgarians and Russians of our times. The Cyrillic alphabet replaced an older Servian, or probably Old Slavonic, alphabet called "Glagolitic" (see SLAVS: *Alphabets*). A few Servian books are still printed in Glagolitic, and some in Latin letters; but by far the greatest number are written and printed in Cyrillic.

The Old Slavonic church books had naturally to be copied from time to time, and the Servian, Bulgarian and Russian copyists were unable to resist the influences of their respective living languages. Thus comparatively soon there appeared church books no longer written in pure Old Slavonic (of which the so-called "Asseman's Gospel" in the Vatican is the best type), but in Old Slavonic modified by Servian, Bulgarian, Russian influences, or in the languages which could be called Servian-Slavonic, Bulgarian-Slavonic, Russian-Slavonic. The best extant specimen of the Servian-Slavonic is "Miroslav's Gospel," written in the second half of the 12th century for the Servian prince Miroslav; a facsimile edition was published in 1897 in Belgrade. Servian-Slavonic was the literary language of the Servians from the 12th century to the end of the 15th, *i.e.* during the first period of their literary history.

2. *Servian-Slavonic Literature.*—The only noteworthy literary productions of this first period of Servian literature were *zhivoti* (biographies) and *letopisi* (chronicles). The best writers of the time were Archbishop Sava (St Sava), his brother King Stephen (*Stefan*) Prvovenchani (*i.e.* the "first-crowned"), the monks Domentiyan and Theodosius, Archbishop Danilo, Gregorius Tsamblak, Stephen Lazarevich, prince of Servia, and Constantine the Philosopher. The most important literary work of St Sava (d. 1237) was *The Life of St Simeon*, in which he described the life of his father, Stephen Nemanya, the first sovereign of the united Servian provinces, who towards the end of his life became a monk and took the name of Simeon. Domentiyan wrote a life of St Sava in the involved and bombastic Byzantine style of the middle of the 13th century. The best literary creations of the period are undoubtedly *The Lives of the Servian Kings and Archbishops* by Archbishop Danilo (d. 1338), and Constantine the Philosopher's *Life of Despot Stephen Lazarevich*, written in 1432.

The chronicles (*letopisi*) are without any literary value, although as historical material they are useful. They number about thirty. The oldest of them was written between 1371 and 1390. The best are *Letopis of Ypek*, which ends with the year 1391; *Letopis of Koporin*, written by Deacon Damyan in 1453; *Letopis of Carlovitz*, 1503; and the chronicle of the monastery of Tronosha, 1526.

To this period of Servian literature belongs the first attempt by an unknown author to write a romance. The story of the love and sufferings of the Servian prince Vladimir, who lived in the 11th century, and his wife, the Bulgarian princess Kossara, written probably in the 13th century, was very popular among the Servians of the 14th and 15th centuries. Other comparatively widely-read books of the period were the *Life of Alexander the Great*, *The Story of the Siege of Troy*, *Stefanite and Ikhnylat* (an Indian story) and *The Journey of a Soul from this World to that Other* all of which were translations from the Greek.

A characteristic example of the literary and also, as it appears, of the official language of the Servians in the middle ages is the Codex of Tsar Dushan (*Zakonik Tsara Dushana*), which was promulgated at the Servian parliament (*Sabor*) in Skoplye (Uskül) in 1349 and 1354. Very interesting material for the study of the Servian literary language during the 12th, 13th and 14th centuries is to be found in several collections of old charters and letters of that period (F. Miklosich's *Monumenta Serbica*, Putsich's *Srpski Spomenitsi u Dubrovachkoy Arkhivi*, and the publications of the Royal Servian Academy in Belgrade and the South Slavonic Academy of Science in Agram). The oldest document written in the vernacular Servian is considered to be a charter by which Kulin, the ban of Bosnia, grants certain commercial privileges to the Ragusan merchants in 1189.

The oldest printed book in Servian-Slavonic issued in 1483 from the printing-press of Andreas de Theresanis de Asula in Venice. A few years later the Servian nobleman Bozhidar Vukovich bought a printing-press in Venice and established it at Obod in Montenegro, from which issued in 1493 the first church book (the *Octoich*) printed on Servian territory. There is a copy of this book in the British Museum. Vicentius, the son of Bozhidar Vukovich, carried on the enterprise of his father, and their printing-press continued to work up to 1566, issuing several church books in the Servian-Slavonic language. During the first half of the 16th century the Servians had printing-presses in Belgrade, Skadar (Scutari) on the river Boyana, Gorazhde, Mileshevo and elsewhere. But in the second half of that century all printing absolutely ceased in the Servian countries under the direct rule of the Turks, and was not resumed until the middle of the 18th century. Books for the use of the churches had to be imported from Russia, printed in the Russian-Slavonic language.

3. *Dalmatian Literature.*—While among the Servians belonging to the Eastern Church all literary work had practically stopped from the middle of the 16th century to the middle of the 18th, the Roman Catholic Servians of Dalmatia, and more especially those of the semi-independent republic of Ragusa, became more active. Being for centuries politically, ecclesiastically and commercially connected with Venice, Rome and Italy in general, they came under the influence of Italian civilization, and during the 15th, 16th and 17th centuries were the most cultured branch of the Servian nation. The awakening of literary ambition among these Servians of the Adriatic coast was originally due to the influence of immigrant Greek scholars who came to Ragusa after the fall of Constantinople in 1453.

Between 1450 and 1530 there had already been founded in Spalato a small literary society, in which the Servian poets Marulich, Papalich, Martinich and others read their poetical compositions, mostly lyrical and religious songs. About the same time (1457–1501) there appeared in Ragusa the poet Menchetich, who wrote nearly four hundred love-songs and elegies, taking Ovid as his model, and George Drzhich (1460–1510), author of many erotic poems and of a drama. Two of the finest works of this early period of the Servian literature of Ragusa are the poem *Dervishiyada*, written by the Ragusan nobleman Stepan Guchetich (1495–1525), rich in humour and satire, and the poem *Yegyupka* ("The Gipsy Woman"), written by Andreas Chubranovich (1500–1550), a goldsmith by profession and a very original and clever lyrical poet. Another remarkable Ragusan poet was Hectorovich (1486–1572), who wrote the poem *Ribanye* ("The Fishing and Talking with Fishermen"), and anticipated a new movement in Servian literature by publishing three national songs as he heard them from the popular bards (*guslars*). But the true glory of Ragusan literature was established by its three poets, Ivan Gundulich (1558–1638), Gyon Palmotich (1606–1657) and Ignacius Gyorgyich (1675–1737). Of these the greatest was Gundulich (*q.v.*). Palmotich is remarkable as a dramatic poet. The subjects of most of his dramas were taken from Latin and Italian poets (*Atalanta* after Ovid, *Lavinia* after Virgil, *Armida* after Tasso); but at least in two dramas, *Pavlimir* and *Tsaptislava*, he displayed some originality, taking his themes from Servian national history. All the works of Palmotich have been published by the South Slavonic Academy (*Stari Pisti*, vols. xii., xiii., xiv., xix.). Gyorgyich's best work is

considered to be his translation of the Psalms into Servian verse (*Saltiyer Slovinski*). He also wrote *The Sighs of the Repenting Magdalen* and the unfinished tragedy *Judith*.

After Gyorgyich the Servian literature of Ragusa and Dalmatia during the 18th century has no great name to show, except that of the mathematician, Ruggiero Boshkovich (see Boscovich). His two brothers and his sister Anitsa Boshkovich were known in their time as poets. But on the whole Servian literature on the Adriatic coast showed little originality in the 18th century; its writers were content to produce good translations of Latin, Italian and French works.

Mention must be made, however, of an author whose work connects the literature of the Adriatic Servians of the 18th century with the regenerative efforts of the Danubian Servians in the second decade of the 19th century. The literature of the Adriatic Servians was, with very few exceptions, Servian only in language, but Italian in form and spirit. About the middle of the 18th century a learned Dalmatian monk, Andrea Kachich Mioshich by name, emancipated himself from the yoke of pseudo-classicism and slavery to Western models. As a papal delegate he had to visit all the Roman Catholic communities in Dalmatia, Herzegovina and Bosnia, and had numerous opportunities of hearing the bards recite songs on old national heroes. In 1756 he published a book entitled *Razgovor Ugodni Naroda Slovinskoga* ("The Popular Talk of the Slavonic People"), in which in 201 songs he described – in the manner and in the spirit of the national bards – the more important historic or legendary events and heroes of the "Slavonic people." Under this denomination he comprised Servians, Croats, Slovenes and Bulgarians, anticipating the modern appellations of the *Yugo-Sloveni* (Southern Slavs). His book immediately became the most popular that ever appeared among the Servians, and was again and again reprinted, under the less ponderous title *Pesmaritsa*, "The Book of Songs." Some sixty years after its appearance it inspired Vuk Stefanovich Karajich with the vision of his true mission. But Kachich Mioshich found no immediate followers among the Servian *literati* of the second half of the 18th century.

4. *The Revival of Servian Literature: Obradovich and Karajich.* – As long as the countries inhabited by the Orthodox Servians were under the deadening immediate rule of the Turks, they produced no serious literature. But when the Austrian wars of the 17th century began to roll back the Turkish power, and Hungary recovered its freedom, the Servians living in that country rapidly acquired some culture, and their literature began to revive. During the 18th century, however, they did not write in the living language of the Servian people. After the disappearance of the Servian printing-presses in the 16th century, all liturgical books were brought from Russia and printed in the Russian-Slavonic language; while the teachers in the Servian schools were Russians. Russian-Slavonic thus became the literary language of the Orthodox Servians.

The more important works of the time were the *History of Montenegro*, by the Montenegrin bishop Basil Petrovitch (Moscow, 1754); the *Short Introduction into the History of the Origin of the Slaveno-Servian Nation*, by Paul Yulinats (Venice, 1765); and above all the *History of the Slavonic Nations, more especially of the Bulgarians, Croats and Servians*, by Archimandrite Yovan Raich (Vienna, 1794). During extensive travels in Russia and the Balkan countries Raich had collected a rich historical material and was able to write, for the first time in the annals of Servian literature, a work which has every claim to be considered as a real history. The Servians call him "the father of Servian history."

But Russian-Slavonic was not readily understood by the Servian reading public. It was not much better when through the influence of the living language it began to approach nearer to Servian than to Russian, and was called "Slavonic-Servian" (*Slaveno-Serbski*). The Servians had some authors in the 18th century, but it could hardly have been said that they had readers. All this suddenly changed when Dositey (Dositheus) Obradovich (1739–1811) appeared on the scene. In boyhood he had entered the monastery of Hopovo in south Hungary and had become a monk. But as very soon he found that the monastery could not satisfy his aspirations, he left it and started to travel, acquiring a knowledge of classical and modern languages and literatures. An ardent Servian patriot, he proclaimed the principle that books ought to be written for the people and therefore in the language which the people understood and spoke. His first book, *The Life and the Adventures of Demeter Obradovich—a monk named Dositey* (Leipzig, 1783), was written in the language spoken in Servian towns. It immediately made a great impression, which was enhanced by the continuation of his autobiography (*Home Letters*) and especially by his *Fables of Aesop and of other Writers* (Leipzig, 1789). These books created a reading public among the Servians and mark the beginning of a really modern period of Servian literature. Obradovich, or rather "Dositey" as Servians call him, was so highly appreciated as an author, savant and patriot that in 1807 Karageorge invited him to Servia and appointed him a senator and minister of public education, in which capacity he established in Belgrade the first Servian college (*Velika Shkola*). Dositey was an admirer of England and English literature. While staying in London in 1783 he was much encouraged by the patronage and friendship of Dr William Fordyce, while his pupil, Paul Solarich, another distinguished author, was befriended by the Hon. Frederick North, afterwards 5th earl of Guildford, state secretary for public instruction in the Ionian Islands.

Only a few of his contemporaries followed the example which Dositey set in writing in the vernacular (although even he introduced from time to time purely Slavonic words and forms). It was believed that the vernacular could not be raised to the dignity of a literary language, and that literature and science needed words and expressions which were entirely lacking in the common language. But Vuk Stefanovich Karajich, a self-taught writer, proved the fallacy of that assumption. By his publication of the national songs and poems, which he carefully collected, he opened the eyes of Servian authors to the wealth and beauty of their own language, as spoken by the mass of the people and used by the national bards. Besides collecting national songs and poems, folk-lore, proverbs, &c., he wrote a grammar of the Servian language (Vienna, 1814) and the first Servian lexicon, with explanations in German and Latin, (Vienna, 1818). His thorough knowledge of the Servian language led him to reform the Cyrillic alphabet, in which several letters were redundant and certain sounds of the spoken language were unrepresented. His efforts to make Servian writers adopt his reformed alphabet, and accept the language of the common people as a literary language, met with fierce opposition, especially on the part of the clergy and friends of the artificial Slaveno-Servian literary language. It was only after 1860 that his principles won a complete victory in all directions. (See Karajich.)

5. *Modern Servian Literature.*—The activity of Karajich brought new life to the Servian literature of the 19th century. The poets abandoned classical models and ceased to write in hexameters; they preferred to derive their inspiration from popular poetry, of which Karajich collected for them hundreds of examples. Writers in different departments of literature vied with each other to write in pure and correct Servian. And, although it could not be justly said that the Servians of the 19th century produced a really great work from the literary point of view, they certainly made progress and produced some remarkable poetry.

Their three greatest poets are Sima Milutinovich Sarayhya (1791–1847), Peter Petrovich Nyegosh (1813–1851), prince-bishop of Montenegro, and "Zmay" Yovan Yovanovich (1833–1904). Sarayhya's most important work is *Serbivanka* (Leipzig, 1826), in which he describes the rising of the Servians against the Turks in 1804 and 1815. His imagination is lively, his descriptions graphic, but the impetuosity of his genius cannot find adequate words to express itself, and then he creates new words of which the meaning is not always clear. For this reason he never was really popular among the Servians. Nyegosh composed his first important poem, *Lucka Microcosma* or "The Light of the Microcosm" (Belgrade, 1847), under the influence of *Paradise Lost*. In the *Lucka* he describes how the spirit of man wished to solve the problem of human destiny. He was led by a protecting angel to the beginning of time when Satan, supported by an angel called Adam, was in full rebellion against God. But the co-rebel Adam repented and God then created the Earth and sent Adam to expiate his sin by living amidst difficulties and sufferings on that planet. In *Gorski Viyenats*, "The Mountain Wreath" (Vienna, 1847), Nyegosh describes the liberation of Montenegro from the Turks towards the end of the 17th century in the form of a drama. There is, however, hardly anything dramatic in the poem, but the characters deliver magnificent descriptions of Montenegro and Montenegrins, and the play is full of noble sentiments and great thoughts. The Servians consider *Gorski Viyenats* the finest poetical work in their literature. It has been translated into all the principal European languages except English. Dr Yovan Yovanovich, called by his admiring countrymen *Zmay* (the Dragon) on account of the high flight of his poetry and his ardent patriotism, began his poetical career by producing melodious translations of some of the best poems of other nations (the Hungarian Arany's *Toldi János*, Petöfi's *János Vitéz*, Lermontov's *Demon*, Tennyson's "Enoch Arden," Bodenstedt's *Mirza-Shaffy*, Goethe's *Iphigenie*, &c.). His own lyrical and satirical poems are without a rival in Servian literature. In his later years he gave much of his time and talent to the interests of children, editing papers for boys and dedicating hundreds of his finest songs to children. There are several editions of his collected poems; one of the best is that of the Servian Literary Association (Belgrade, 1896).

Among the other prominent Servian poets of the 19th century may be mentioned Dr Milosh Svetich (1799–1809), Branko Radichevich (1824–1853), Gyura Yakshich (1832–1878), Yovan Subotich (1817–1886), Dr Laza Kostich (b. 1841), Aberdar (1842–1893), Voislav Ilich (1862–1894), Prince Nicholas of Montenegro (b. 1841).

The Servians have as yet no great novelist, but they have several very successful writers of short stories. Among these the first place

belongs to Dr Laza Lazarevich. After him the most popular authors of short stories are: Stefan Sremats, whose mild satire and sparkling humour earned for him the name of the "Servian Dickens"; Yanko Veselinovich, author of some delightful sketches from the life of Servian peasants; Sima Matavuly, whose stories give a true picture of the Servians of Dalmatia and of Montenegro. Delightful stories of old times and of the Adriatic coast were written by Stefan Mitrov Lyubisha (1824–1878).

In dramatic literature the Servians are comparatively rich. The poet Dr Laza Kostich made excellent translations from Shakespeare (*King Lear, Romeo and Juliet, King Richard III.*), and gave the Servian stage two of its best tragedies: *Maxim Tsrnoyevich* and *Petar Segedinats*; also the comedy *Gordana*. Matiya Ban's *Meyrimah* is considered the best tragedy in the Serbo-Croatian language. The patriotic drama *Balkanska Tsaritsa*, by Prince Nicholas of Montenegro, has been often played and enthusiastically received by the public, but the critics deny to it much dramatic value. Milosh Tsvetich has given fine and lasting contributions to the Servian stage in his drama *Stefan Nemanya* and tragedy *Todor of Stalach*. Among the writers of comedy the first place must be assigned to Kosta Trifkovich (d. 1875); Milovan Glishich (d. 1908) was also very popular; and Branislav Nushich was the most successful of Servian dramatists early in the 20th century.

In modern scientific literature the principal Servian names are those of the electrician Nicholas Tesla, the botanist Dr Josif Panchich, and the geologists Dr Yovan Zhuyevich and Dr Yovan Tsviyich (Cvijić). In philology a very high place is occupied by Gyuro Danichich, once professor of philology at the high school in Belgrade and secretary to the South Slavonic Academy at Agram, where he was for years the principal editor of the great lexicon of the Servian or Croatian language. He had a very distinguished pupil in Stoyan Novakovich, who wrote numerous studies on philological subjects, and whose Servian grammar is still the standard book in all Servian schools. In historical literature we find besides Yovan Raich, mentioned earlier, Panta Sretykovich, with his *History of the Servian Nation*; Stoyan Boshkovich (d. 1908), with his *Servia under Tsar Dushan*; Stoyan Novakovich, with his numerous essays on subjects from the medieval history of Servia, his *History of Servian Literature*, his *Resurrection of the Servian National State* and *Rising against the Dahis* (the two last-named books appeared in Belgrade in 1904); Lyubomir Kovachevich and Lyuba Yovanovich, who together wrote a standard work on the history of the Servian nation; Chedo Mijatovich, with his monographs on Gyuragy Brankovich and the conquest of Constantinople by the Turks.

BIBLIOGRAPHY.—The best works on the Servian language and literature are those already mentioned as written by Servian authors: Karajich, Danichich, Stoyan Novakovich, &c. See also on the language Dr F. Miklosich's *Vergleichende Lautlehre der slav. Sprachen*; Section II.: *Serbisch und Chorvatisch* (Vienna, 1879), and his *Wortbildungslehre der slav. Sprachen* (Vienna, 1876); W. Vondrak *Vergleichende slavische Grammatik* (Göttingen, 1906 and 1908); J. Florinsky, *Lektsi po slavyankomu yazykoznaniye* (Kiev, 1895). Good text-books are P. Budmani, *Grammatica della lingua serbo-croata* (Vienna, 1867); Parchich, *Grammaire de la langue serbo-croate* (Paris, 1877); Fr. Vymezal, *Serbische Grammatik* (Brunn, 1882). For the literature see A. N. Pypin and V. D. Spassovich, *History of Slavonic Literatures* (in Russ., St. Petersburg, 1879, in French, Paris, 1881), and Dr Mathias Murko, *Die Kultur osteuropäischer Literaturen und die slavischen Sprachen* (Berlin and Leipzig, 1908). (C. MI.)

SERVICE TREE, *Pyrus domestica*, a native of the Mediterranean region, not infrequently planted in southern Europe for its fruit. It has been regarded as a native of England on the evidence of a single specimen, which has probably been planted, now existing in the forest of Wyre. Though not much cultivated, its fruit is esteemed by some persons, and therefore two or three trees may very well be provided with a place in the orchard, or in a sheltered corner of the lawn. The tree is seldom productive till it has arrived at a goodly size and age. The fruit has a peculiar acid flavour, and, like the medlar, is fit for use only when thoroughly mellowed by being kept till it has become bletted. There is a pear-shaped variety, *pyriformis*, and also an apple-shaped variety, *maliformis*, both of which may be propagated by layers, and still better by grafting on seedling plants of their own kind. The fruit is sometimes brought to market in winter. The service is nearly allied to the mountain ash, *Pyrus Aucuparia*, which it resembles in having regularly primate leaves. *P. torminalis* is the wild service, a small tree occurring locally in woods and hedges from Lancashire southwards; the fruit is sold in country markets. These, with other species, including *P. Aria*, white beam, so called from the leaves which are white and flocculent beneath, form the subgenus *Sorbus*, which was regarded by Linnaeus as a distinct genus.

SERVIEN, ABEL, MARQUIS DE SABLÉ and DE BOISDAUPHIN, COMTE DE LA ROCHE-SERVIEN (1593–1659), French diplomat, was born at Grenoble, the son of Antoine Servien, procurator-general of the estates of Dauphiné. He succeeded his father in that office in 1616, and in the following year attended the assembly of notables at Rouen. In 1618 he was named councillor of state and in 1624 was called to Paris, where he found favour with Richelieu. He displayed administrative ability and great loyalty to the central government as intendant in Guienne in 1627, and in 1628 negotiated the boundary delimitation with Spain. Appointed president of the parlement of Bordeaux in 1630, he soon resigned to accept an embassy to Italy, where he was one of the signatories of the treaty of Cherasco and of the treaties with the duke of Savoy (1631–1632). In 1634 he was admitted to the French Academy. Two years later he retired from public life as the result of court intrigue. Servien lived at Angers or on his estates at Sablé until the death of Louis XIII., when Mazarin entrusted him with the conduct, conjointly with the comte d'Avaux, of French diplomatic affairs in Germany. After five years' negotiations, and a bitter quarrel with the comte d'Avaux, which ended in the latter's recall, Servien signed the two treaties of the 24th of October 1648 which were part of the general peace of Westphalia. He received the title of minister of state on his return to France in April 1649, remained loyal to Mazarin during the Fronde, and was made superintendent of finances in 1653. He was an adviser to Mazarin in the negotiations which terminated in the treaty of the Pyrenees (1659). He amassed a considerable fortune, and was unpopular, even in court circles. He died at the château of Meudon on the 17th of February 1659.

Servien left an important and voluminous correspondence. See R. Kerviler, *A. Servien, étude sur sa vie politique et littéraire* (Mamers, 1879).

SERVITES, or "SERVANTS OF MARY," an order under the Rule of St Augustine, founded in 1233. In this year seven merchants of Florence, recently canonized as "the seven holy Founders," gave up their wealth and position, and with the bishop's sanction established themselves as a religious community on Monte Senario near Florence. They lived an austere life of penance and prayer, and being joined by others, they were in 1240 formed into an order following the Augustinian rule supplemented by constitutions borrowed from the Dominicans. Soon they were able to establish houses in various parts of Italy, where within twenty-five years four provinces were formed; they also at an early date founded many houses in France, Germany and Spain, but they never came to England before the Reformation. The most illustrious member of the order and its chief propagator and organizer was St Filippo Benizi, the fifth general, who died in 1285. The order received papal approbation in 1255; in 1424 it was recognized as a Mendicant order, and in 1567 it was ranked with the four great orders of Mendicant friars. The Servites undertook missions in Tartary, India and Japan. As in the other orders there were various mitigations and relaxations of the rule, producing a variety of reforms, the chief being that of the eremitical Servites. There are at the present day 64 Servites houses, mostly in Italy; there are two or three in England and in America.

There are Servite nuns and also tertiaries, founded by St Juliana Falconieri, 1305, who are widespread and devote themselves chiefly to primary education. They have several convents in England. The habit of the Servites is black.

The chief work on the Servites is the *Monumenta* by Morini and Soulier, 1897, &c. See Helyot, *Histoire des ordres religieux* (1715), iii. cc. 39-41; Max Heimbucher *Orden u. Kongregationen* (1907), ii. § 73; Wetzer u. Welte, *Kirchenlexicon* (2nd ed.); Herzog-Hauck *Realencyklopädie* (3rd ed.). The most interesting part of Servite history is told by P. Soulier, *Vie de S. Philippe Benizi* (1886). (E. C. B.)

SERVITUDE (Lat. *servitus*, from *servire*, to serve), a right over the property of another. In Roman law, servitudes were classified into (1) personal, *i.e.* those given to a particular person, and (2) praedial, *i.e.* those enjoyed over something else (*praedium serviens*) by being owner or tenant of a piece of land or a house (*praedium dominans*). Personal servitudes were subdivided into (*a*) *usus*, the right of using property; (*b*) *usufructus* the

right of using and enjoying the fruits of property; and (*c*) and (*d*) *operae servorum sive animalium*. Praedial servitudes were either (*a*) *rustic*, such as *jus eundi*, the right of walking or riding along the footpath of another; *aquae ductus*, the right of passage for water; *pascendi*, the right of pasture, &c.; or (*b*) *urban*. Urban servitudes were of various kinds, as *oneris ferendi*, the right of using the wall of another to support a man's own wall; *projiciendi*, the right of building a structure, such as a balcony or verandah, so as to project over another's land; *stillicidii*, *fumi immittendi* and several others. Servitudes were created by a disposition *inter vivos*, or by contract; by testamentary disposition; by the conveyance of land or by prescription. They might be extinguished by destruction of either the res serviens or the res dominans; by release of the right, or by the vesting of the ownership of the res serviens and res dominans in the same person.

In English law there may be certain limited rights over the land of another, corresponding somewhat to servitudes, and termed easements (*q.v.*). In Scots law the term is still in use (see EASEMENT).

SERVIUS HONORATUS, MAURUS (or MARIUS), Roman grammarian and commentator on Virgil, flourished at the end of the 4th century A.D. He is one of the interlocutors in the *Saturnalia* of Macrobius, and allusions in that work and a letter from Symmachus to Servius show that he was a pagan. He was one of the most favourable examples of the Roman "grammatici" and the most learned man of his time. He is chiefly known for his commentary on Virgil, which has come down to us in two distinct forms. The first is a comparatively short commentary, definitely attributed to Servius in the superscription in the MSS. and by other evidence. A second class of MSS. (all going back to the 10th or 11th century) presents a much expanded commentary, in which the first is embedded; but these MSS. differ very much in the amount and character of the additions they make to the original, and none of them bears the name of Servius. The added matter is undoubtedly ancient, dating from a time but little removed from that of Servius, and is founded to a large extent on historical and antiquarian literature which is now lost. The writer is anonymous and probably a Christian. A third class of MSS., written for the most part in Italy and of late date, repeats the text of the first class, with numerous interpolated scholia of quite recent origin and little or no value. The real Servian commentary practically gives the only complete extant edition of a classic author written before the destruction of the empire. It is constructed very much on the principle of a modern edition, and is partly founded on the extensive Virgilian literature of preceding times, much of which is known only from the fragments and facts preserved in the commentary. The notices of Virgil's text, though seldom or never authoritative in face of the existing MSS., which go back to, or even beyond, the times of Servius, yet supply valuable information concerning the ancient recensions and textual criticism of Virgil. In the grammatical interpretation of his author's language, Servius does not rise above the stiff and overwrought subtleties of his time; while his etymologies, as is natural, violate every law of sound and sense. As a literary critic the shortcomings of Servius, judged by a modern standard, are great, but he shines in comparison with his contemporaries. In particular, he deserves credit for setting his face against the prevalent allegorical methods of exposition. But the abiding value of his work lies in his preservation of facts in Roman history, religion, antiquities and language, which but for him might have perished. Not a little of the laborious erudition of Varro and other ancient scholars has survived in his pages. Besides the Virgilian commentary, other works of Servius are extant: a collection of notes on the grammar (*Ars*) of Aelius Donatus; a treatise on metrical endings (*De finalibus*); and a tract on the different metres (*De centum metris*).

Editions of the Virgilian commentary by G. Fabricius (1551); P. Daniel, who first published the enlarged commentary (1600); and G. Thilo and H. Hagen (1878–1902). The *Essai sur Servius* by E. Thomas (1880) is an elaborate and valuable examination of all matters connected with Servius; many points are treated also by O. Ribbeck in his *Prolegomena* to Virgil; see also a review of Thilo's edition by H. Nettleship in *Journal of Philology*, x. (1882). The smaller works of Servius are printed in H. Keil's *Grammatici Latini*, iv.

SERVIUS TULLIUS, sixth legendary king of Rome (578–534 B.C.). According to one account he was the son of the household genius (Lar) and a slave named Ocrisia, of the household of Tarquinius Priscus. He married a daughter of Tarquinius and succeeded to the throne by the contrivance of his mother-in-law, Tanaquil, who was skilled in divination and foresaw his greatness. Another legend, alluded to in a speech by the emperor Claudius (fragments of which were discovered on a bronze tablet dug up at Lyons in 1524), represented him as an Etruscan soldier of fortune named Mastarna, who attached himself to Caeles Vibenna (Caelius Vivenna), the founder of an Etruscan city on the Caelian Hill (see also Tacitus, *Annals*, iv. 65). An important event of his reign was the conclusion of an alliance with the Latins, whereby Rome and the cities of Latium became members of one great league, whose common sanctuary was the temple of Diana on the Aventine. His reign of forty-four years was brought to a close by a conspiracy headed by his son-in-law, Tarquinius Superbus.

The legend of Servius presents certain similarities to that of the founder of Rome. His miraculous birth, commemorated by Servius himself in the festival established by him in honour of the Lares, recalls that of Romulus. Again, as Romulus was the author of the patrician groundwork of the constitution, so Servius was regarded as the originator of a new classification of the people, which laid the foundation of the gradual political enfranchisement of the plebeians (for the constitutional alterations with which his name is associated, see ROME: *Ancient History*; for the Servian Wall see ROME: *Archaeology*). His supposed Latin descent is contradicted by the Etruscan tradition alluded to above (on which see V. Gardthausen, *Mastarna oder Servius Tullius*, 1882), and his insertion among the kings of Rome is due to the need of providing an initiator of subsequent republican institutions. The treaty with the Latins is mentioned by Dionysius of Halicarnassus alone, who had not seen it himself; indeed, it is doubtful whether it was then in existence, and in any case, considering the changes which the language had undergone, it would have been unintelligible. It is also suspicious that no list of the members of the league is given, contrary to the usual custom.

For a critical examination of the story see Schwegler, *Romische Geschichte*, bks. xvi., xvii.; Sir G. Cornewall Lewis, *Credibility of early Roman History*, ch. xi.; W. Ihne, *History of Rome*, i.; E. Pais, *Storia di Roma*, i. (1898); and *Ancient Legends of Roman History* (Eng. trans., 1906), where he comes to the conclusion that "instead of being the sixth *rex* of Rome, he was originally the *rex servus*, the priest of the cult of Diana Aricina transferred to the Aventine, the priest of the protecting goddess of fugitive slaves"; C. Pascal, *Fatti e legende di Roma antica* (Florence, 1903); also O. Gilbert, *Geschichte und Topographie der Stadt Rom im Altertum* (1883–1885), and J. B. Carter, *The Religion of Numa* (1906), on the reorganization of Servius.

SERVO-BULGARIAN WAR (1885). The Berlin Congress of 1878, by its revision of the treaty of San Stefano, created two states in the Balkan Peninsula—the principality of Bulgaria owning a nominal suzerainty to Turkey, and the autonomous province of eastern Rumelia, presided over by a Turkish governor-general, and apparently intended to remain in close relations with the porte. This settlement came to an end when the movement in favour of a united Bulgaria culminated (September 1885) in a revolution in the Rumelian capital. Prince Alexander of Bulgaria, recognizing that the movement was irresistible and that, unless directed by authority, it might degenerate into anarchy and civil war, placed himself at its head, and, proceeding to Philippopolis, formally accepted the government of the united Bulgarian states. As it was assumed that the sultan would reassert his claim by force of arms, the Bulgaro-Rumelian forces were concentrated as rapidly as possible near the Turkish frontier. Prince Alexander, however, had taken the step of acknowledging the sultan's suzerainty; and Turkey was not inclined to begin a war which would probably cause a revolt in Macedonia and might end by rendering Russian influence paramount in Bulgaria. But, while a conference of ambassadors was vainly discussing the situation at Constantinople, the Gordian knot was cut by the announcement that

Servia, seeking compensation for the aggrandizement of Bulgaria, had constituted herself the champion of the treaty of Berlin.

King Milan had issued orders for the Servian army mobilization on the very day of Prince Alexander's proclamation at Philippopolis, and large forces were concentrated (October 1st–12th) on the Bulgarian frontier. On the 19th the prince ordered troops to the quarter thus threatened, but it seems certain that, whilst in eastern Rumelia every preparation had been made for war, Prince Alexander had so little expectation of, and wish for, a war with Servia, that few measures were taken to supply the needs of a field army on that side, though fortifications were begun at several places, notably at Sofia and Slivnitza, towards the end of October.

Unlike the Servian army, which contained few permanent units and consisted mainly of militiamen, the standing army of Bulgaria, trained and commanded by Russian officers since 1877 1878, was organized on the German system of filling up relatively strong *cadres* to war strength and forming additional units. When fully mobilized the field army numbered about 55,000 men. The Rumelian forces (militia) consisted in all of about 35,000 men. Besides these forces was the "Bandit brigade" of Captain Panitza, an irregular force some 3000 strong, composed of Macedonians, Turks, Jews and other miscellaneous volunteers. This force did good service as a flying right wing of the main army. In the Bulgarian army the whole of the staff and superior officers, as well as about half the regimental captains, were Russians. When the mobilization of the Bulgarian and Rumelian forces was decreed by the prince, the whole of the Russian officers were at once withdrawn, and the heavy task of creating a staff and selecting young officers for all the superior commands had to be undertaken in front of the enemy. Moreover, when on the 14th of November Milan finally declared war, the Bulgarian forces were mostly far away beyond the Balkans on the Turkish frontier. The Servian main army (under King Milan), and the army of the Timok promptly crossed the frontier and soon came in contact with small forces of the enemy. On the Timok little or nothing of importance took place throughout the war, as the forces opposing the army of the Timok near Vidin effectually neutralized that force. In front of Dragoman and Trn the Bulgarians fell back, engaging in stubborn rearguard combats at every favourable place. The Servian "Army of the Nishava" advanced but slowly and with hesitation, while the most strenuous exertions were made by Prince Alexander and his newly-formed staff to collect their far-distant troops in the Slivnitza position. Every commander was given the simple order to march on Slivnitza. The civilian population was warned to be ready with supplies to meet the troops by the roadside, and under these peculiar conditions, and extraordinary difficulties of country and weather, the Bulgarians marched on the decisive point at the highest possible speed of man and horse. Some remarkable marches are recorded: the 8th infantry, 4500 strong, covered 59 m. in thirty-two hours, leaving only sixty-two men behind; the 3rd and part of another Rumelian battalion reached Sofia so exhausted that they were sent to the front on horseback, two men to each horse; the troops that were sent up by rail were packed in open trucks, sixty men to a truck. The furious energy displayed had its reward on the field of battle. Before the last shot of the battle of Slivnitza was fired, nearly half of the entire forces of Bulgaria and Rumelia were in the lines, and 14,000 men more faced the army of the Timok at Widdin. With the main army—a striking display of what could be accomplished by patriotism and vigour—were fifty-six pieces of artillery, most of which had been dragged over the Balkan passes in mid-winter.

The position of Slivnitza, barring the high road between Nish and Sofia, had been extensively fortified, but when the Servians opened their attack on the 17th of November, there were but few troops available to occupy the works. On the right of the Bulgarian line was the Meka Krud height, occupied by some battalions under Captain Benderev; here fighting went on through the short winter day, which ended with a gallant, and for the time successful, counter-attack by six Bulgarian battalions led by Benderev. The prince, not yet ready for the offensive, withdrew these troops to their original position. In the centre, near the high road, a hot and, at one moment of the day, almost successful attack of the Servians ended with their complete repulse. The latter had had 17,000 men against the Bulgarians' 11,000; yet they had, owing mainly to faults in the superior leading, been unsuccessful. Next day their chances of victory would be even less, for the defenders were hourly reinforced from Sofia, and on the 18th were actually somewhat superior in numbers. On this day the Servians made a very heavy attack on the Bulgarian left wing, which was eventually repulsed, though not without great difficulty, by the newly arrived troops from Sofia. Later a half-hearted attack was made on the centre, and from his position on Meka Krud Benderev again attacked the Servian "Danube" division. On this day a Servian division pushed the Bulgarians out of Breznik, but made no farther advance either on Sofia or on the left flank of the Bulgarians at Slivnitza, in spite of orders to do so. On the 19th alarm and consternation at Sofia, caused by the presence of hostile forces at Breznik, were so great that Alexander left the command in the hands of his chief of staff, Major Guchev, and hurried back to the capital in order to organize the defence. The Servian leader was, however, as inactive on the 19th as on the 18th, and when he at last moved forward towards Slivnitza it was only with a portion of his force; this was driven back, by a detachment from the left wing of the Bulgarian position, to Rakita. Meanwhile, the active Benderev had reopened his attack on the Danube division. Twice he was repulsed, but finally at about 3 P.M. his battalions carried the heights held by the Servians. A little before this the Bulgarian centre likewise moved forward, and, though a final attack of the Servians on the gap caused by the absence of the Bulgarian troops detached towards Bresnik came near to success, the prince returned to the battlefield to find his troops everywhere victorious and driving the enemy before them. Two days later, reorganized and reinforced, the Bulgarians took the offensive and carried the Dragoman pass.

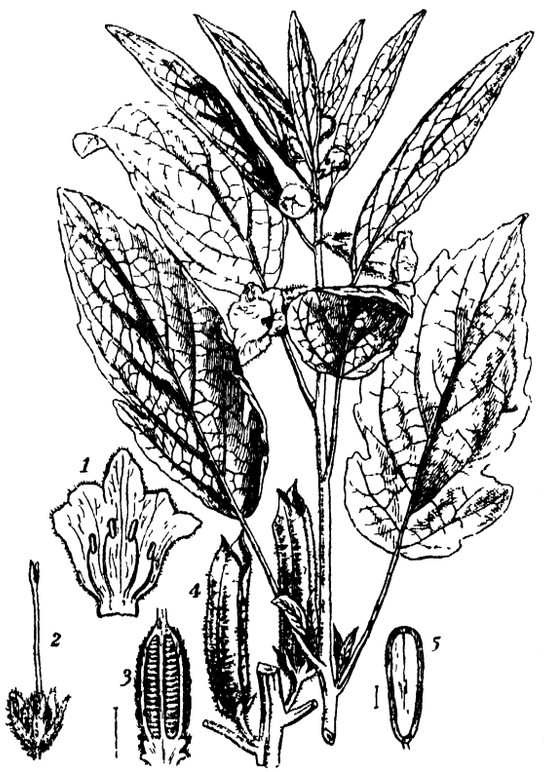
On the 25th Prince Alexander received at Tzaribrod proposals for an armistice from King Milan; these were not accepted, and the Bulgarian army, crossing the frontier, advanced in several columns upon Pirot, where the army of the Nishava took up a defensive position in the town and on the surrounding heights. A two-days' engagement followed (26th and 27th of November). On the 26th the Bulgarians were successful, but a heavy counter attack on the following day almost snatched the victory out of their hands, and it was only after a severe contest lasting eleven hours that the Servians finally gave way. The Bulgarians were not permitted to reap the fruits of their success. As they were preparing to pursue the defeated and now greatly demoralized enemy on the 28th, the Austrian minister at Belgrade arrived at headquarters and hostilities ceased. The intervention of Austria saved the Servian army, which was greatly demoralized, and was now threatened by the united Bulgarian force of nearly 55,000 men. On the same day the army of the Timok was repulsed with heavy loss in an attack on Vidin.

Servia escaped almost unpunished from her war of aggression. The young Bulgarian army, with its improvised staff and newly-appointed field officers, displayed admirable marching power and fighting qualities, and the Rumelian militiamen proved themselves to be good soldiers. The Servians had, however, fought with great bravery also, and the victory must be ascribed in the main to the personal influence, the strenuous exertions and the sound military judgment of Prince Alexander; and the brief but decisive campaign set the seal to Bulgarian unity.

BIBLIOGRAPHY.—Dragoni Edler von Rabenhorst, *Strategische Betrachtungen über den serbisch-bulgarischen Krieg* (Vienna, 1886); Hungerbühler, *Die schweizerische Militärmission nach dem S.-B. Kriegsschauplatze* (Frauenfeld, 1886); von Bilimek-Waissolm, *Der serbisch-bulgarische Krieg* (Vienna, 1886); A. E. von Huhn, *Der Kampf der Bulgaren um ihre Nationaleinheit* (Leipzig, 1886; Eng. trans. *The Struggle of the Bulgarians for their National Independence*,

London, 1886); Möller, *Der serbisch-bulgarische Krieg, 1885* (Hanover, 1888); Regenspursky, *Die Kämpfe bei Slivnitza* (Vienna, 1895); *Der serbisch-bulgarische Krieg bis zum Waffenstillstande* (Berlin, 1886); *Der serbisch-bulgarische Krieg, eine militarische Studie* (Berlin, 1887); Kunz, *Taktische Beispiele aus den Kriegen der neuesten Zeit: I. Der serbisch-bulgarische Krieg* (Berlin, 1901); Bujac, *Précis de quelques campagnes contemporaines: I. Dans les Balkans* (Limoges and Paris).

SESAME, the most important plant of the genus *Sesamum* (nat. ord. Pedalineae), is that which is used throughout India and other tropical countries for the sake of the oil expressed from its seeds. *S. indicum* is a herb 2 to 4 ft. high, with the lower leaves on long stalks, broad, coarsely toothed or lobed. The upper leaves are lanceolate, and bear in their axils curved, tubular, two-lipped flowers, each about ¾ in. long, and pinkish or yellowish in colour. The four stamens are of unequal length, with a trace of a fifth stamen, and the two-celled ovary ripens into a two-valved pod with numerous seeds. The plant has been cultivated in the tropics from time immemorial, and is supposed on philological grounds to have been disseminated from the islands of the Indian Archipelago, but at present it is not known with certainty in a wild state. The plant varies in the colour of the flower, and especially in that of the seeds, which range from light yellow or whitish to black. Sesame oil, otherwise known as gingelly or til (not to be confounded with that derived from *Guizotia oleifera*, known under the same vernacular name), is very largely used for the same purposes as olive oil, and, although less widely known by name, is commercially a much more important oil. The oil is included in the Indian and Colonial Addendum (1900) to the British Pharmacopeia. The seeds and leaves also are used by the natives as demulcents and for other medicinal purposes. The soot obtained in burning the oil is said to constitute one of the ingredients in India or Chinese ink. The plant might be cultivated with advantage in almost all the tropical and semi-tropical colonies of Britain, but will not succeed in any part of Europe.



From Bentley and Trimen, *Medicinal Plants*, by permission of J. & A. Churchill.

Sesame (*Sesamum indicum*). ½ nat. size.
1, Corolla cut open with stamens. ½ nat. size
2, Flower after removal of corolla. ¾ nat. size.
3, Ovary cut lengthwise.
4, Fruit. ½ nat. size.
5, Seed cut lengthwise. 3 and 5 enlarged

A detailed account of its history and the cultivation of the plant in India is given by Sir G. Watt, *Dictionary of Economic Products of India* (1893).

SESOSTRIS, the name of a legendary king of Egypt. According to Herodotus, Diodorus Siculus (who calls him Sesoosis) and Strabo, he conquered the whole world, even Scythia and Ethiopia, divided Egypt into administrative districts or nomes, was a great law-giver, and introduced a system of caste and the worship of Serapis. He has been considered a compound of Seti I. and Rameses II., belonging to the XIXth Dynasty. In Manetho, however, he occupied the place of the second Senwosri (formerly read Usertesen) of the XIIth Dynasty, and his name is now usually viewed as a corruption of Senwosri. So far as is known no Egyptian king penetrated a day's journey beyond the Euphrates or into Asia Minor, or touched the continent of Europe. The kings of the XVIIIth and XIXth dynasties were the greatest conquerors that Egypt ever produced, and their records are clear on this point. Senwosri III. raided south Palestine and Ethiopia, and at Semna beyond the second cataract set up a stela of conquest that in its expressions recalls the stelae of Sesostris in Herodotus: Sesostris may, therefore, be the highly magnified portrait of this Pharaoh. Khian, the powerful but obscure Hyksos king of Egypt, whose prenomen might be pronounced Sweserenrē, is perhaps a possible prototype, for objects inscribed with his name have been found from Bagdad to Cnossus. Sesostris is evidently a mythical figure calculated to satisfy the pride of the Egyptians in their ancient achievements, after they had come into contact with the great conquerors of Assyria and Persia. When we recollect that the Ethiopian Tearchus (Tirhaka) of the 7th century B.C., who was hopelessly worsted by the Assyrians and scarcely ventured outside the Nile valley, was credited by Megasthenes (4th century) and Strabo with having extended his conquests as far as India and the pillars of Hercules, it is not surprising if the dim figures of antiquity were magnified to a less degree. In the case of Tearchus, the miscellaneous levies which he employed himself and those which composed the Egyptian and Assyrian armies opposed to him, and the lands that Egypt and Ethiopia traded with, must all have been counted, partly through misunderstanding, partly through wilful perversion, to his empire.

Herodotus ii 102-111; Diod. Sic. i. 53-59; Strabo xv. p. 687; see also article EGYPT; and Kurt Sethe, "Sesostris," 1900, in his *Unters. z. Gesch. u. Altertumskunde Ägyptens*, tome II. (F. Ll. G.)

SESSA AURUNCA, a town and episcopal see of Campania, Italy, in the province of Caserta, on the S.W. slope of the extinct volcano of Rocca Monfina, 27 m. by rail W.N.W. of Caserta and 20½ m. E. of Formia by the branch railway to Sparanise, 666 ft. above sea-level. Pop. 5945 (town), 22,077 (commune). It is situated on the site of the ancient Suessa Aurunca, on a small affluent of the Liri. The hill on which Sessa lies is a mass of volcanic tufa. The town contains many ancient remains, notably the ruins of an ancient bridge in brickwork of twenty-one arches, of substructures in *opus reticulatum* under the church of S. Benedetto, of a building in *opus quadratum*, supposed to have been a public portico, under the monastery of S. Giovanni, and of an amphitheatre. The Romanesque cathedral is a basilica with a vaulted portico and a nave and two aisles begun in 1103, a mosaic pavement in the Cosmatesque style, a good ambo resting on columns and decorated with mosaics showing traces of Moorish influence, a Paschal candelabrum, and an organ gallery of similar style. The portal has curious sculptures with scenes from the life of SS. Peter and Paul. In the principal streets are memorial stones with inscriptions in honour of Charles V., surmounted by an old crucifix with a mosaic cross. The hills of Sessa are celebrated for their wine.

The ancient chief town of the Aurunci, Aurunca or Ausona, is believed to have lain over 2000 ft. above the level of the sea, on the narrow south-western edge of the extinct crater of Rocca Monfina. Here some remains of Cyclopean masonry exist; but the area enclosed, about 100 yds. by 50, is too small for anything but a detached fort. It dates, doubtless, from a time prior to Roman supremacy. In 337 B.C. the town was abandoned, under the pressure of the Sidicini, in favour of the site of the modern Sessa. The new town kept the old name until 313, when a Latin colony under the name Suessa Aurunca was founded here. It was among the towns that had the right of coinage, and it manufactured carts, baskets, &c. Cicero speaks of it as a place of some importance. The triumviri settled some of their veterans here, whence it appears as Colonia Julia Felix Classica Suessa. From inscriptions it appears that Matidia the younger, sister-in-law of Hadrian, had property in the district. It was not on a highroad, but on a branch between the Via Appia at Minturnae and the Via Latina

at Teanum; the pavement of the road between the latter place and Suessa is in places well preserved, especially near Teano, and so is that of a road ascending from Suessa northward towards the crater mentioned.

See A. Avena, *Monumenti dell' Italia Meridionale* (Naples, 1902), i. 181 sqq. (T. As.)

SESSION (through Fr. from Lat. *sessio, sedere,* to sit), the act of sitting or the state of being seated, more generally the sitting together or assembly of a body, judicial, legislative, &c., for the transaction of its business, and also the time during which the body sits until its adjournment or dispersion. A session of parliament is reckoned from its assembling till prorogation; usually there is one session in each year. In particular the term is applied to the sittings of various judicial courts, especially criminal, such as the sessions of the Central Criminal Court in London. The sittings of the justices of the peace or magistrates in the United Kingdom are "sessions of the peace" for the transaction of the judicial business committed to them by statute or by their commission. These are either "petty sessions," courts of summary jurisdiction held by two or more justices of the peace or by a stipendiary or metropolitan police magistrate under statute for the trial of such cases as are not of sufficient importance to be tried before quarter-sessions, or for a preliminary inquiry into indictable offences (see JUSTICE OF THE PEACE and SUMMARY JURISDICTION). The "special sessions" of the justices are held for licensing purposes, styled "Brewster sessions," or for carrying out the provisions of the Highway Acts, &c. The only sessions which are "general sessions" of the peace are now "quarter-sessions" (*q.v.*). The supreme court of Scotland is termed the "Court of Session" (see SCOTLAND), and the name is given in the Presbyterian church to the lowest ecclesiastical court, composed of the elders of the church presided over by the minister. In the Established Church of Scotland this is usually styled the "Kirk-session."

SESTETT, the name given to the second division of a sonnet, which must consist of an octave, of eight lines, succeeded by a sestett, of six lines. In the usual course the rhymes are arranged *abc | abc*, but this is not necessary. Early Italian sonnets, and in particular those of Dante, often close with the rhyme-arrangement *abc | cba*; but in languages where the sonority of syllables is not so great as it is in Italian, it is dangerous to leave a period of five lines between one rhyme and another. In the quatorzain, there is properly speaking no sestett, but a quatrain followed by a couplet, as in the case of Shakespeare's so-called "Sonnets." Another form of sestett has only two rhymes, *ab | ab | ab*; as is the case in Gray's famous sonnet "On the Death of Richard West." The sestett should mark the turn of emotion in the sonnet; as a rule it may be said that the octave having been more or less objective, in the sestett reflection should make its appearance, with a tendency to the subjective manner. For example, in Matthew Arnold's ingenious "The Better Part," the rough inquirer, who has had his own way in the octave, is replied to as soon as the sestett commences:—

> "So answerest thou? But why not rather say:
> 'Hath Man no second life? *Pitch this one high.*
> *More strictly, then, the inward judge obey!*
> *Was Christ a man like us? Ah! let us try*
> *If we, then, too, can be such men as he!*'"

Wordsworth and Milton are both remarkable for the dignity with which they conduct the downward wave of the sestett in their sonnet. The French sonneteers of the 16th century, with Ronsard at their head, preferred the softer sound of the arrangement *aab | ccb |*. The German poets have usually wavered between the English and the Italian forms.

SESTINA, one of the most elaborate forms of verse employed by the medieval poets of Provence and Italy, and retained in occasional use by the modern poets of Western Europe. The scheme on which the sestina is built was the invention of the great troubadour, Arnaut Daniel (d. 1199), who wrote many sestinas in the *lingua di sì*. Dante, a little later, wrote sestinas in Italian, and of these the most famous is that beginning "Al poco giorno ed al gran cerchio d' ombra." In the *De vulgari Eloquio,* Dante admits that he copied the structure of his sestinas from Arnaut Daniel; "et nos eum secuti sumus," he says, after praising the work of the Provençal poet. The sestina, in its pure medieval form, is independent of rhyme; it consists of six stanzas of six lines each of blank verse. This recurrence of the number six gives its name to the poem. The final words of the first stanza appear in inverted order in all the others, the order as laid down by the Provençals being as follows:—*abcdef, faebdc, cfdabe, ecbfad, deacfb, bdfeca.* To these six stanzas followed a *tornada,* or *envoi,* of three lines, in which all the six key-words were repeated in the following order:—*b-e, d-c, f-a.* It has been supposed that there was some symbolic mystery involved in the rigid elaboration of this form, from which no slightest divergence was permitted, but if so this cryptic meaning has been lost. Petrarch cultivated a slightly modified sestina, but after the middle ages the form fell into disuse, until it was revived and adapted to the French language by the poets of the Pléiade, in particular by Pontus de Thyard. In the 19th century, the sestina or sextine was assiduously cultivated by the Comte de Gramont, who, between 1830 and 1848, wrote a large number of examples, included in his *Chant du passé* (1854). He followed the example of Petrarch rather than of the Provençal troubadours, by introducing two rhymes instead of the rigorous blank verse. A sestina by Gramont, beginning:—

> "L'étang qui s'éclaircit au milieu des feuillages,
> La mare avec ses joncs rubanant au soleil,
> Ses flotilles de fleurs, ses insectes volages
> Me charment. Longuement au creux de leurs rivages
> J'erre, et les yeux remplis d'un mirage vermeil,
> J'écoute l'eau qui rêve en son tiède sommeil,"

has been recommended to all who wish to "triumph over the innumerable and terrible difficulties" of the sestina, as a perfect model of the form in its "precise and classic purity." The earliest sestina in English was published in 1877 by Mr Gosse; this was composed according to the archaic form of Arnaut Daniel. Since that time it has been frequently employed by English and American writers, particularly by Swinburne, who has composed some beautiful sestinas on the rhymed French pattern; of these, that beginning "I saw my soul at rest upon a day" is perhaps the finest example of this poem existing in English. Mr Swinburne is, moreover, like Petrarch, the author of an astonishing *tour de force,* "The Complaint of Lisa," which is a double sestina of twelve verses of twelve lines each. The sestina was cultivated in Germany in the 17th century, particularly by Opitz and by Weckherlin. In the 19th century an attempt was made, not without success, to compose German sestinas in dialogue, while the double sestina itself is not unknown in German literature.

SESTRI LEVANTE (anc. *Segesta Tiguliorum*), a seaport of Liguria, Italy, in the province of Genoa, from which it is 28½ m. distant by rail, 33 ft. above sea-level. Pop. (1901) 3034 (town); 12,038 (commune). It is both a summer and a winter resort, with fine views. Part of the town is situated on a promontory (230 ft.) between two bays. The ancient town was the port of exportation of the slate of the district, for we hear of a place called Tigulia or Tegulata on the coast-road; but we know practically nothing of the political condition of the district in Roman times.

SESTRI PONENTE, a town of Liguria, Italy, in the province of Genoa, 4 m. W. of that town on the coast. Pop. (1901) 17,225. It has important shipbuilding yards and iron-works, with factories for macaroni, matches and tobacco, tanneries and saw-mills, and, in the vicinity, alabaster quarries. A mile and a half west is Pegli, also a favourite seaside resort, with beautiful walks and fine villas, among which the Villa Pallavicina, with rare trees and fantastic buildings, fountains and grottoes, is noticeable.

SETH (שֵׁת according to Dillmann, "setting" or "slip"; Septuagint, Philo and New Testament, Σήθ, but 1 Chron. i. 1 Σήθ in A; Josephus, Σήθος, Vulg. *Seth*), in Gen. iv. 25, 26 (J) and v. 3-8 (P), the son of Adam. At the age of 105 he begat Enos; he lived in all 912 years. Seth was born after the murder of Abel, and in iv. 25 a popular etymology is given of his name—Adam's wife called his name Seth, "For God," saith she, "hath

appointed, *shāth*, me another seed instead of Abel." It is further said that after Enos was born, men began to worship Yahweh. Apparently Gen. iv. 25, 26 had no original connexion with J.'s story of the creation, which speaks of Yahweh freely from the outset. As Enos is a Hebrew word for man, it is probably derived from a tradition in which Enos was the first man. An examination of the Sethite genealogy, vv. 12-27, *Kenan, Mahalalel, Jared, Enoch, Methuselah, Lamech*, shows that it is a slightly different version of the Cainite genealogy, iv. 17-18, *Cain* (Heb. *Kayin*), *Enoch, Irad, Mehujael, Methusael, Lamech*. Seth is named in the opening genealogy of Chronicles, 1 Chron. i. 1, and in Luke's genealogy of Christ, Luke iii. 38. The Hebrew text of Ecclesiasticus xlix. 16 has "And Shem and Seth and Enosh were visited,"—probably with divine favour; the Greek version runs, "Shem and Seth were glorified among men."

In Num. xxiv. 17, the Authorized Version has "the children of Sheth" in a list of nations; the Hebrew is the same as *Seth* in Genesis. The passage may perhaps indicate that Seth was originally the name of a tribe. The "Seth" of Numbers is sometimes identified with the Bedouin, who appear as *Sutu* in Assyrian and Babylonian inscriptions. But the Revised Version takes the word *shēth* as a common noun, "tumult," and others interpret it as "pride"; cf. Gray's *Numbers*, p. 371.

If the ten patriarchs of Gen. v. (see NOAH) correspond to the ten primitive kings of Babylon, Seth, as second, will correspond with the Adapa of the Babylonian inscriptions, the Alaparos or Adaparos of Berosus. The two have been compared in that Adapa was demiurge and Logos; and Seth figures as the Messiah in later Jewish tradition.[1] We may also note the resemblance between the names Sheth, *Set*, the Egyptian god of war, and the Hittite deity *Suteh*. The latter has been supposed to be a Hyksos or Semitic deity and to have some connexion with Sheth; but Cheyne and Müller reject this view.[2] Seth is also identified with Moab or the land of Moab.[3]

A mass of Christian and Jewish tradition has gathered round the name of Seth. Philo, *De posteriori Caini*, § 3, explains the name as meaning ποτισμός, "watering" or "irrigation," connecting it with the Hebrew root *Sh Th H*. Josephus, *Ant.* I. ii. 3, tells us that Seth was a virtuous man, and that his descendants lived in perfect harmony and happiness. They discovered astronomy, and inscribed their discoveries on two pillars, one of which, says Josephus, survived in his time. In the *Book of Jubilees* (1st century A.D.) the name of Seth's wife is given as Azura. In the Ascension of Isaiah (1st century A.D.) Seth is seen in heaven. In the Book of Adam and Eve (A.D. 500–900) Seth is described as perfectly beautiful, like Adam, only more beautiful. Seth was the last child born to Adam; he grew in stature and strength, and began to fast and pray strenuously. A Gnostic sect took the name Sethians. (W. H. BE.)

SETIA (mod. *Sezze*, 52 m. by rail S.E. of Rome), an ancient town of Latium (adjectum), Italy, on the south-west edge of the Volscian mountains, overlooking the Pomptine Marshes, 1047 ft. above sea-level, and over 900 ft. above the plain. It was an ancient Volscian town, a member of the Latin league of 499 B.C., which became a Latin colony in 382 B.C., and, owing to the strength of its position as a frontier fortress, is frequently mentioned in the military history of Rome up to the time of Sulla, by whom it was captured in 82 B.C. Under the empire it was well known for its wine, which Augustus preferred even to Falernian. Considerable remains of the city walls exist, built of large blocks of limestone in the polygonal style. This style may also be seen in several terrace walls belonging to a later date, as is indicated by the careful jointing and bossing of the blocks of which they are composed. Such intentional archaism is by no means uncommon in the neighbourhood of Rome. The modern town, occupying the ancient site, is an episcopal see, with a much-restored 13th-century Gothic cathedral. Pop. (1901) 6944 (town), 10,827 (commune). At the foot of the hill on which the town stands are considerable remains of Roman villas. (T. As.)

[1] A. Jeremias, *Das A. T. im Lichte des alten Orients*, p. 118.
[2] *Encycl. Biblica*, "Seth," "Egypt."
[3] E. Meyer, *Die Israeliten und ihre Nachbarstämme*, p. 219.

SET-OFF, in law, a statutory defence to the whole or to a portion of a plaintiff's claim. It had no existence under the English common law, being created by 2 Geo. II. c. 22 for the relief of insolvent debtors. Such a defence could be pleaded only in respect of mutual debts of a definite character, and did not apply to cases in which damages were claimed, nor to equitable claims or demands. By the rules of the Supreme Court (O. XIX. r. 3) a defendant in an action may set off or set up any right or claim by way of counterclaim against the claims of a plaintiff, and such set-off or counterclaim has the same effect as a statement of claim in a cross-action. (See PLEADING.)

In architecture, the term set-off is given to the horizontal line shown where a wall is reduced in thickness, and consequently the part of the thicker portion appears projecting before the thinner. In plinths this is generally simply chamfered. In other parts of work the set-off is generally concealed by a projecting string. Where, as in parapets, the upper part projects before the lower, the break is generally hid by a corbel table. The portions of buttress caps which recede one behind another are also called sets-off.

SETON (*Family*). The Scottish family of Seton, Seyton or Seatoun, claims descent from a Dougall Seton who lived in the reign of Alexander I. Sir Richard Maitland of Lethington counted seven generations between this personage and Sir Christopher Seton (d. 1306), the first of the house who emerges in history with any distinctness, but these links are not all supported by documentary evidence. The name was derived from the Anglo-Norman family of Say, the Anglo-Norman immigrant being supposed to have given the name of Sey-toun to the lands granted to him in East Lothian. The family honours include the earldoms of Wintoun (cr. 1600) and Dunfermline; of Eglinton through marriage with the Montgomeries; and through alliance with a Gordon heiress a Seton became the ancestor of the earls and marquesses of Huntly and dukes of Gordon. The Setons were connected by marriage with the royal family of Scotland, and also with the Dunbars, Lindsays, Hays and Maitlands.

SIR CHRISTOPHER SETON, son and heir of John de Seton, a Cumberland gentleman, and his wife Erminia Lascelles, was born probably in 1278, since his age is given in March 1299 as twenty-one, in an inquisition into the lands of his deceased father. He did homage for these in October of that year, and was in the service of Edward I. at Lochmaben in 1304. In 1305 he came into possession of lands which had been granted by Sir John Seton to Robert Bruce and his wife Christian, who was perhaps a Seton. He had married about 1301 Christian Bruce, sister of King Robert, who was possibly his second cousin. He was present at his brother-in-law's coronation at Scone in 1306, and saved his life at the battle of Methven later in the same year. According to Dugdale he shut himself up in Lochdoon Castle in Ayrshire, and on the surrender of that castle was hanged as a traitor at Dumfries by order of Edward I. He left no heirs. His widow was in March 1307 in receipt of three pence a day from Edward I. for her support at the monastery of Sixhill in Lincolnshire. She was afterwards placed in the custody of Sir Thomas de Gray. His Cumberland estates, with the exception of his mother's dower, were given to Robert de Clifford. Another Seton, John de Seton, described as having no lands or chattels, was hanged for helping in the defence of Tibbers Castle, and for aiding in the murder of John Comyn, with other prisoners of war, at Newcastle in August 1306.

SIR ALEXANDER SETON (d. *c.* 1360) was probably the brother of Sir Christopher. He received considerable grants of land from King Robert Bruce, and was one of the signatories of the letter addressed by the Scottish nobles to the pope to assert the independence of Scotland. He was twice sent on embassies to England, and in 1333 he defended the town of Berwick against the English. He agreed with the English to surrender the town on a certain date unless he received relief before that time, giving his eldest surviving son Thomas as a hostage. On the refusal of the Scots to surrender at the expiry of the term Thomas Seton was hanged in sight of the garrison. This incident is

related by Fordun and Boece, but with inconsistencies that have rendered it suspect. An elder son, Alexander, had perished in 1332 in opposing the landing of Edward Baliol; according to some authorities the third son, William, was hanged with his brother, but he is generally said to have been drowned during the siege; his daughter Margaret married Alan de Wintoun. The tragic death of young Thomas Seton was the subject of a ballad of "Seton's Sons," printed in Sheldon's *Minstrelsy of the Scottish Border*; of a tragedy, *The Siege of Berwick* (1794, printed 1882) by Edward Jerningham, and of another by James Miller (1824).

SIR WILLIAM SETON of Seton (fl. 1371–1393) is said to have been ennobled with the title of Lord Seton, and his heirs laid claim that the barony of Seton was the oldest in Scotland. By his wife Catherine Sinclair he had eight children. John succeeded him; Alexander married Elizabeth, daughter and heiress of Sir Adam de Gordon, by whom he became the ancestor of the Gordons of Huntly.

SIR JOHN of Seton (d. *c.* 1441) was taken prisoner at Homildon Hill in 1402. He was hostage in England for the earl of Douglas in 1405, and again in 1423 for James I. He married Lady Janet Dunbar, daughter of the 10th earl of March. His son Sir William was killed at Verneuil, fighting on the French side, leaving as heir GEORGE (d. 1478), 1st Lord Seton, who was created a lord of parliament in 1448 as Lord Seton. By his first marriage with Margaret, daughter of John Stewart, earl of Buchan, he had a son John, who died during his father's lifetime. He was succeeded by his grandson GEORGE, 2nd Lord Seton (d. 1508), who was a scholar of St Andrews and Paris, and in common report a necromancer. He was captured by the Flemings, and on his release fitted out and maintained a ship for the purpose of harassing Flemish travellers. His son GEORGE, 3rd Lord Seton, was killed at Flodden in 1513. He redeemed estates which his father had sacrificed to support his enterprises against the Flemings. By his marriage with Janet, daughter of Patrick Dunbar, 1st earl of Bothwell, he left a son GEORGE, 4th Lord Seton (d. 1549), who allowed Cardinal Beaton to escape from custody in 1543, and received considerable grants of land in the sequel. The castle and church of Seton were burnt by Hertford in revenge for the part he had taken against the English in 1544.

GEORGE, 5th Lord Seton (1530?–1585), was a firm friend of Mary, queen of Scots. He was present at her marriage with the dauphin in 1557, and three years later he was again in France because of his adherence to the old religion. When Mary returned to Scotland he became privy councillor and master of the household, but four years later he again found it advisable to retire to France. Mary and Darnley spent their honeymoon at Seton Palace, and Mary found a retreat there after the murder of Rizzio and again after the murder of Darnley. She spent the night before Carberry Hill under Seton's roof, and he was waiting for her on her escape from Lochleven in May 1568. He took her to his castle at Niddrie, Linlithgowshire, and thence to Hamilton. A week later he was taken prisoner at Langside. He was set free after the assassination of the regent Moray, and made his way to Flanders, where he was said to have made his living as a wagoner. He was, in fact, entrusted by Mary's supporters with a mission to the duke of Alva, and sought in vain to secure for service in Scotland two regiments of Scots then in Spanish pay. He returned home in 1571, being apparently reconciled with the government, but he retained his Catholicism and his friendship for Mary, who wrote to Elizabeth in 1581 desiring a passport for Lord Seton that he might alleviate her solitude. In 1581 he was one of Morton's judges, and in 1583 he was sent as ambassador to France, where he sought interference on Queen Mary's behalf. He died soon after his return on the 8th of January 1585. The 5th Lord Seton figures in Sir Walter Scott's *Abbot*. He was succeeded by his second and eldest surviving son, Robert, who became 6th Lord Seton and 1st earl of Wintoun. His third son, Sir John Seton of Barns, was a gentleman of the bedchamber to Philip II. of Spain. He was recalled to Scotland by James VI., and served as lord of session from 1587 to 1594.

MARY SETON, one of the "Four Maries" attendant on the queen, is supposed to have been the 5th Lord Seton's half-sister, being the daughter of the 4th lord by his second wife, a Frenchwoman named Mary Pieris, maid of honour to Mary of Guise. She had been educated with Queen Mary in France, being about a year older than her mistress, with whom she returned to Scotland in 1561. She helped Mary to escape from Lochleven by assuming her clothes. Later on she joined her at Carlisle, and remained with her in her various prisons until 1583, when prison life had undermined her health and spirits. She retired to the abbey of St Pierre at Reims, and she was still living there, an old lady of seventy-four, in poverty in 1614.

ROBERT SETON (d. 1603) succeeded his father as 6th lord in 1585, and was created earl of Wintoun in 1600. He married, about 1582, Margaret, eldest daughter of Hugh Montgomerie, 3rd earl of Eglinton. His son Robert and George were successively earls of Wintoun; the third, Alexander, became, in right of his mother, 6th earl of Eglinton; the fourth, Thomas, was the ancestor of the Setons of Oliveston.

GEORGE, 4th earl of Wintoun (1640–1704), succeeded his grandfather, George Seton, 3rd earl, in 1650. He saw some service in the French army, and fought against the Covenanters at Pentland and at Bothwell Bridge. By his second marriage, with Christian Hepburn, he had a son George, who quarrelled with his father and is said to have been working as a journeyman blacksmith abroad when he succeeded to the title in 1704. In 1715 the 5th earl joined Kenmure with 300 men at Moffat, but it was against his advice that the Jacobite army invaded England. He was lying in the Tower under sentence of death when he succeeded in making his escape, and proceeding to the continent, he became well known in Rome, where he was grand master of the Roman lodge of freemasons. He died there in 1749. With him the earldom became extinct, but it was revived in 1840 in favour of the earls of Eglinton.

Some of the cadet branches of the family remain to be noticed. The Setons of Parbroath in Fife, represented by American descendants, are descended from Sir George Seton (fl. 1589–1595). The Setons of Touch, near Stirling, descended from Alexander Seton, 1st earl of Huntly. They were hereditary armour-bearers and squires of the body to the king, dignities which passed, in the female line, to the Seton-Stewarts in 1786. From the Setons of Touch were descended the Setons of Culbeg or Abercorn. The Setons of Preston (Linlithgow) and Ekolsund (Sweden) have been connected with the Swedish army since the 18th century when George Seton, a merchant, settled in Stockholm. The Setons of Meldrum descended from William Seton, brother of the 1st earl of Huntly. The Pitmedden branch was an offshoot from Meldrum; the baronetcy was created (1686) for the judge Sir Alexander Seton, Lord Pitmedden (*c.* 1639–1719). The Setons of Mounie again were a branch of the Pitmedden family; one of their house, Lieut.-Colonel Alexander Seton, 74th Highlanders, was in charge of the troops on the ill-fated "Birkenhead" in 1852. The Setons of Cariston, descended from John, second son of the 6th Lord Seton, obtained the barony of Cariston in 1553. Other branches are Seton-Gordon of Embo, with a baronetcy created in 1631, and Seton of Garleton, with a baronetcy created in 1664. The viscounty of Kingston was created for Alexander Seton (d. 1691), third son of the 3rd earl of Wintoun, and became extinct on the attainder of James, 3rd viscount, in 1715. See HUNTLY, EARLS AND MARQUESSES OF.

AUTHORITIES.—Sir Richard Maitland, *History of the House of Seton*, continued by A. Seton, 1st Viscount Kingston (mod. ed., Glasgow 1829, and Edinburgh 1830); G. Seton, *The History of the House of Seton* (2 vols., 1896); Sir R. Douglas, *Scots Peerage*, new ed. by Sir J. B. Paul; *Calendar of Documents relating to Scotland* in the "Rolls" series; and G. E. C(okayne), *Complete Peerage*.

SETTEE, a long upholstered seat, usually high-backed and with arms at each end. Its ancestors were the settle and the chair—it has alternately resembled the one and the other. It is broadly distinguished from the many varieties of sofa by being intended for sitting rather than reclining—its seat is of the same height as that of a chair; its arms and much of its detail are chair-like. It dates from about the middle of the 17th century, but examples of that early period are exceedingly rare. There is a famous one at Knole, made about midway between the restoration of Charles II. and the revolution of 1688. By that time the settee had acquired the splendid upholstery and convoluted woodwork which adorned the end of the Stuart period. Early in the 18th century the conjoined double or triple chair form

became fashionable. The form was artless, and the absence of upholstery, save on the seat, produced a somewhat angular effect. This type of settee was in essence two chairs with one set of arms. Chippendale made many such pieces, some of them of great beauty. As the taste for carved furniture waned these sturdy settees were replaced by lighter ones, often graceful enough in outline—Hepplewhite and Sheraton were distinguished practitioners—but partaking more and more of the "stuffed-over" character. The desire for comfort and ease gradually drove out the original idea that the settee was intended only for sitting bolt upright. Its modern varieties are many, but in all of them the frame, once so lavishly ornamented, is almost concealed by upholstery.

SETTEMBRINI, LUIGI (1813–1877), Italian man of letters and politician, was born in Naples. At the age of twenty-two he was appointed professor of eloquence at Catanzaro, and married Raffaela Luigia Faucitano (1835). While still a young man he had been affected by the wave of liberalism then spreading all over Italy, and soon after his marriage he began to conspire mildly against the Bourbon government. Betrayed by a priest, he was arrested in 1839 and imprisoned at Naples; although liberated three years later he lost his professorship and had to maintain himself by private lessons. Nevertheless he continued to conspire, and in 1847 he published anonymously a "Protest of the People of the Two Sicilies," a scathing indictment of the Bourbon government. On the advice of friends he went to Malta on a British warship, but although, when King Ferdinand II. granted a constitution (16th of February 1848), he returned to Naples and was given an appointment at the ministry of education, he soon resigned on account of the prevailing chaos, and retired to a farm at Posilipo. When reaction set in, once more Settembrini was arrested as a suspect (June 1849) and imprisoned. After a monstrously unfair trial, he and two other "politicals" were condemned to death, and nineteen others to varying terms of imprisonment (February 1851). The death sentences were, however, commuted to imprisonment for life, and Settembrini was sent to the dungeons of San Stefano. There he remained for eight years. His friends, including Antonio Panizzi, then in England, made various unsuccessful attempts to liberate him, and at last he was deported with sixty-five other political prisoners. The exiles received an enthusiastic welcome in London, but Settembrini after a short stay in England joined his family at Florence in 1860. On the formation of the Italian kingdom he was appointed professor of Italian literature at the university of Naples, and devoted the rest of his life to literary pursuits. In 1875 he was nominated senator. He died in 1877. His chief work is his *Lezioni di letteratura italiana*, of which the dominant note is the conviction that Italian literature "is as the very soul of the nation, seeking, in opposition to medieval mysticism, reality, freedom, independence of reason, truth and beauty" (P. Villari).

See L. Settembrini, *Ricordanze*, 2 vols., edited by F. de Sanctis (Naples, 1879–1880); *Epistolario di Luigi Settembrini*, edited by F. Fiorentino; P. Villari, *Saggi critici* (Florence, 1884); Countess Martinengo Cesaresco, *Italian Characters* (London, 1901).

SETTLE, ELKANAH (1648–1724), English poet and playwright, was born at Dunstable on the 1st of January 1648. He entered Trinity College, Oxford, in 1666, but left the university without taking a degree. His first tragedy, *Cambyses, King of Persia*, was produced at Lincoln's Inn Fields in 1667. The success of this play led the earl of Rochester to encourage the new writer as a rival to Dryden. Through his influence Settle's *Empress of Morocco* (1671) was twice acted at Whitehall, and proved a signal success on the stage. It is said by Dennis to have been "the first play that was ever sold in England for two shillings, and the first play that was ever printed with cuts." These illustrations represent scenes in the theatre, and make the book very valuable. The play was printed with a preface to the earl of Norwich, in which Settle described with scorn the effusive dedications of other dramatic poets. Dryden was obviously aimed at, and he co-operated with Crowne and Shadwell in an abusive pamphlet entitled "Notes and Observations on the Empress of Morocco" (1674), to which Settle replied in "Some Notes and Observations on the Empress of Morocco revised" (1674). In the second part of *Absalom and Achitophel*, in a passage certainly by Dryden's hand, he figures as "Doeg." Neglected by the court party he took an active share in the anti-popish agitation. When this subsided he turned round to expose Titus Oates, and with the Revolution he veered towards the Whig party. But he had lost the confidence of both sides, and "recanting Settle" accordingly abandoned politics for the appointment (1691) of city poet. In his old age he kept a booth at Bartholomew Fair, where he is said to have played the part of the dragon in a green leather suit devised by himself. He became a poor brother of the Charterhouse, where he died on the 12th of February 1724.

Settle's numerous works include, beside numerous political pamphlets and occasional poems, *Ibrahim, the Illustrious Bassa* (1676), a tragedy taken from Madeleine de Scudéry's romance; *The Female Prelate; being the History of the Life and Death of Pope Joan* (1680), a tragedy; *The Ambitious Slave: or A Generous Revenge* (1694); *The World in the Moon* (1697), an opera, of which the first scene was formed by a moon fourteen feet across; and *The Virgin Prophetess, or The Fate of Troy* (1701), an opera.

SETTLE, a market town in the Skipton parliamentary division of the West Riding of Yorkshire, England, 41½ m. N.W. from Leeds by the Midland railway. Pop. (1901) 2302. It lies in the upper part of the Ribble valley, amid the wild scenery of the limestone hills of the Pennine system. The district includes several caves, such as Victoria Cave, close to the town, where bones of animals, and stone, bone and other implements and ornaments have been discovered. Other points of interest are Malham Cove and tarn, the ravine of Gordale Scar, the cliffs of Attermyre, Giggleswick Scar and Castleberg (the last immediately above Settle itself), the Clapham and Weathercote caves, the chasm of Helln Pot and the waterfall of Stainforth Foss. In the town are cotton factories and a tannery. To the west of the town is the grammar school of Giggleswick, one of the principal public schools in the north of England, founded in 1512.

SETTLE, a wooden bench, usually with arms and a high back, long enough to accommodate three or four sitters. It is most commonly movable, but occasionally fixed as in the "boxes" of those old coffee-houses of which a few examples still remain in London, and perhaps elsewhere. It shares with the chest and the chair the distinction of great antiquity. Its high back was a protection from the draughts of medieval buildings—a protection which was sometimes increased by the addition of winged ends or a wooden canopy. It was most frequently placed near the fire in the common sitting-room. Constructed of oak, or other hard wood, it was extremely heavy, solid and durable. Few English examples of earlier date than the middle of the 16th century have come down to us; survivals from the Jacobean period are more numerous. Settles of the more expensive type were often elaborately carved or incised; others were divided into plain panels. A well-preserved specimen, with its richly polished oak, darkened by time and beeswax, is a handsome piece of furniture often still to be found in its original environment—the farm-house kitchen or the manorial hall. Its vogue did not long outlast the first half of the 18th century, to which period most of the existing specimens belong.

SETTLEMENT, in law, a mutual arrangement between living persons for regulating the enjoyment of property, and the instrument by which such enjoyment is regulated. Settlements may be either for valuable consideration or not: the latter are usually called voluntary, and are in law to some extent in the same position as revocable gifts; the former are really contracts, and in general their validity depends upon the law of contract. They may accordingly contain any provisions not contrary to law or public policy.[1]

The elements of the modern settlement are to be found in Roman law. The *vulgaris, pupillaris* or *exemplaris substitutio* (consisting in the appointment of successive heirs in case of the

[1] In this English law allows greater freedom than French. By § 791 of the Code Napoléon, in a contract of marriage the succession to a living person cannot be renounced.

death, incapacity or refusal of the heir first nominated) may have suggested the modern mode of giving enjoyment of property in succession. Such a *substitutio* could, however, only have been made by will, while the settlement of English law is, in the general acceptation of the term, exclusively an instrument *inter vivos*. The *dos* or *donatio propter nuptias* corresponds to a considerable extent with the marriage settlement, the instrument itself being represented by the *dotale instrumentum* or *pacta dotalia*. In the earliest period of Roman law no provision for the wife was required, for she passed under *manus* of her husband, and became in law his daughter, entitled as such to a share of his property at his death. In course of time the plebeian form of marriage by *usus*, according to which the wife did not become subject to *manus*, gradually superseded the older form, and it became necessary to make a provision for the wife by contract. Such provision from the wife's side was made by the *dos*, the property contributed by the wife or some one on her behalf towards the expenses of the new household. *Dos* might be given before or after marriage, or might be increased after marriage. It was a duty enforced by legislation to provide *dos* where the father possessed a sufficient fortune. *Dos* was of three kinds: *profectitia*, contributed by the father or other ascendant on the male side; *adventitia*, by the wife herself or any person other than those who contributed *dos profectitia*; *receptitia*, by any person who contributed *dos adventitia*, subject to the stipulation that the property was to be returned to the person advancing it on dissolution of the marriage. The position of the husband gradually changed for the worse. From being owner, subject to an obligation to return the *dos* if the wife predeceased him, he became a trustee of the *corpus* of the property for the wife's family, retaining only the enjoyment of the income as long as the marriage continued. The contribution by the husband was called *donatio propter nuptias*.[1] The most striking point of difference between the Roman and the English law is that under the former the children took no interest in the contributions made by the parents. Other modes of settling property in Roman law were the life interest or *usus*, the *fideicommissum*, and the prohibition of alienation of a *legatum*.

The oldest form of settlement in England was perhaps the gift in frankmarriage to the donees in frankmarriage, and the heirs between them two begotten (Littleton, § 17). This was simply a form of gift in special tail, which became up to the reign of Queen Elizabeth the most usual kind of settlement. The time at which the modern form of settlement of real estate came into use seems to be doubtful. There does not appear to be any trace of a limitation of an estate to an unborn child prior to 1556. In an instrument of that year such a limitation was effected by means of a feoffment to uses. The plan of granting the freehold to trustees to preserve contingent remainders[2] is said to have been invented by Lord Keeper Sir O. Bridgeman in the 17th century, the object being to preserve the estate from forfeiture for treason during the Commonwealth.[3] The settlement of chattels is no doubt of considerably later origin, and the principles were adopted by courts of equity from the corresponding law as to real estate.

Settlement in English law is, so far as regards real property, used for two inconsistent purposes—to "make an eldest son," as it is called, and to avoid the results of the right of succession to real property of the eldest son by making provision for the younger children. The first result is generally obtained by a strict settlement, the latter by a marriage settlement, which is for valuable consideration if ante-nuptial, voluntary if post-nuptial. But these two kinds of settlement are not mutually exclusive: a marriage settlement may often take the form of a strict settlement and be in substance a resettlement of the family estate. (See CONVEYANCING.)

In Scotland a *disposition and settlement* is a mode of providing for the devolution of property after death, and so corresponds rather to the English will than to the English settlement. The English marriage settlement is represented in Scotland by the *contract of marriage*, which may be ante- or post-nuptial.

In the United States settlements other than marriage settlements are practically unknown. Marriage settlements are not in common use, owing to the fact that most states long ago adopted the principles of the English Married Women's Property Acts.

The word "settlement" is also used to denote such residence of a person in a parish, or other circumstances pertaining thereto, as would entitle him to obtain poor relief (see POOR LAW). On the English Stock Exchange it is a term for the series of operations by which bargains are concluded, or carried over (see ACCOUNT and STOCK EXCHANGE). The word is also applied generally to the termination of a disputed matter by the adoption of terms.

SETTLEMENT, ACT OF, the name given to the act of parliament passed in June 1701, which, since that date, has regulated the succession to the throne of Great Britain and Ireland. Towards the end of 1700 the need for the act was obvious, if the country was to be saved from civil war. William III. was ill and childless; his sister-in-law, the prospective queen, Anne, had just lost her only surviving child, William, duke of Gloucester; and abroad the supporters of the exiled king, James II., were numerous and active. In these circumstances the Act of Settlement was passed, enacting that, in default of issue to either William or Anne, the crown of England, France[4] and Ireland was to pass to "the most excellent princess Sophia, electress and duchess dowager of Hanover," a grand-daughter of James I., and "the heirs of her body being Protestants." The act is thus responsible for the accession of the house of Hanover to the British throne. In addition to settling the crown the act contained some important constitutional provisions, of which the following are still in force. (1) That whosoever shall hereafter come to the possession of this crown shall join in communion with the Church of England as by law established. (2) That in case the crown and imperial dignity of this realm shall hereafter come to any person not being a native of this kingdom of England, this nation be not obliged to engage in any war for the defence of any dominions or territories which do not belong to the Crown of England, without the consent of parliament. (3) That after the said limitation shall take effect as aforesaid, judges' commissions be made *quamdiu se bene gesserint* and their salaries ascertained and established; but upon the address of both houses of parliament it may be lawful to remove them. This clause established the independence of the judicial bench. (4) That no pardon under the great seal of England be pleadable to an impeachment by the Commons in parliament. The act as originally passed contained four other clauses. One of these provided that all matters relating to the government shall be transacted in the Privy Council, and that all resolutions "shall be signed by such of the Privy Council as shall advise and consent to the same"; and another declared that all office-holders and pensioners under the Crown shall be incapable of sitting in the House of Commons. The first of these clauses was repealed, and the second seriously modified in 1706. Another clause was framed to prevent the sovereign from leaving England, Scotland or Ireland without the consent of parliament; this was repealed just after the accession of George I. Finally a clause said that "no person born out of the kingdoms of England, Scotland or Ireland, or the dominions thereunto belonging (although he be naturalized or made a denizen) except such as are born of English parents, shall be capable to be of the Privy Council, or a member of either House of Parliament, or enjoy any office or place of trust, either civil or military, or to have any grant of lands, tenements or hereditaments from the Crown to himself, or to any other or others in trust for him." By the Naturalization Act of 1870 this clause is virtually repealed with regard to all persons who obtain a certificate of naturalization. This and some of the other clauses amount practically to censures on the policy of William III.

The importance of the Act of Settlement appears from the fact that, in all the regency acts, it is mentioned as one of the

[1] See Hunter, *Roman Law*, p. 150; Maine, *Early History of Institutions*, Lect. xi.

[2] The appointment of such trustees was rendered unnecessary by acts of 1845 and 1877.

[3] See Joshua Williams, *Papers of the Juridical Society*, i. 45

[4] The title of king of France was retained by the British sovereigns until 1801. Scotland accepted the Act of Settlement by Art. II. of the Act of Union.

acts to the repeal of which the regent may not assent. To maintain or affirm the right of any person to the crown, contrary to the provisions of the act, is high treason by an act of 1707.

See T. P. Taswell-Langmead's *English Const. Hist.* (1905); H. Hallam, *Constitutional History*, vol. iii. (1855); and L. von Ranke, *Englische Geschichte* (1859–1868).

SETUBAL (formerly called in English *St Ubes* and in French *St Yves*), a seaport of Portugal, in the district of Lisbon (formerly included in the province of Estremadura), 18 m. S.E. of Lisbon by the Barreiro-Pinhal Novo-Setubal railway. Pop. (1900) 22,074. Setubal is built on the north shore of a deep estuary, formed by the rivers Sado, Marateca and São Martinho, which discharge their waters into the Bay of Setubal 3 m. below the city. Setubal is overtopped on the west by the treeless red heights of the Serra da Arrabida. There are five forts for the defence of the harbour; the castle of St Philip, built by Philip III. of Spain (1578–1621), commands the city. Setubal is the third seaport and fourth largest city of Portugal. It exports large quantities of fine salt, oranges and muscatel grapes; it has many sardine-curing and boat-building establishments, and manufactures of fish-manure and lace. Its port is officially included in that of Lisbon. Under John II. (1481–1495) Setubal was a favourite royal residence, and one of the churches dates from this period; but most of the ancient buildings were destroyed by the great earthquake of 1755. There are some fine public buildings, statues and fountains of later date, including a statue of the poet M. M. de B. du Bocage (1766–1806), who was a native of Setubal. In the sandhills of a low-lying promontory in the bay opposite Setubal are the so-called ruins of "Troia," uncovered in part by heavy rains in 1814 and excavated in 1850 by an antiquarian society. These ruins of "Troia," among which have been brought to view a beautiful Roman house and some 1600 Roman coins, are those of Cetobriga, which flourished A.D. 300–400. In the neighbourhood, on a mountain 1600 ft. high, is the monastery of Arrabida.

SEUME, JOHANN GOTTFRIED (1763–1810), German author, was born at Poserna, near Weissenfels, on the 29th of January 1763. He was educated, first at Borna, then at the Nikolai school and university of Leipzig. The study of Shaftesbury and Bolingbroke weakened his interest in theology, and, breaking off his studies, he set out for Paris. On the way he was seized by Hessian recruiting officers and sold to England, whereupon he was drafted to Canada. After his return in 1783 he deserted at Bremen, but was captured and brought to Emden; a second attempt at flight also failed. In 1787, however, a citizen of Emden became surety for him to the amount of 80 talers, and he was allowed to visit his home. He did not return, but paid off his debt in Emden with the remuneration he received for translating an English novel. He taught languages for a time in Leipzig, and became tutor to a Graf Igelström, whom, in 1792, he accompanied to Warsaw. Here he became secretary to General von Igelström, and, as a Russian officer, experienced the terrors of the Polish insurrection. In 1796 he was again in Leipzig and, resigning his Russian commission, entered the employment of the publisher Göschen. In December 1801 he set out on his famous nine months' walk to Sicily, described in his *Spaziergang nach Syrakus* (1803). Some years later he visited Russia, Finland and Sweden, a journey which is described in *Mein Sommer im Jahr 1805* (1807). His health now began to fail, and he died on the 13th of June 1810, at Teplitz. His reputation rests on the two books just mentioned, to which may be added his autobiography, *Mein Leben* (1813, continued by C. A. H. Clodius). These works reflect Seume's sterling character and sturdy patriotism; his style is clear and straightforward; his descriptions realistic and vivid. As a dramatist (*Miltiades*, 1808), and as a lyric poet (*Gedichte*, 1801), he had but little success.

Seume's *Gesammelte Schriften* were first edited by J. P. Zimmermann (1823–1826); his *Sämtliche Werke* (1826–1827) passed through seven editions. The most recent edition is J. G. Seume's *Prosaische und poetische Werke* (10 vols., 1879). See O. Planer and C. Reissmann, *J. G. Seume. Geschichte seines Lebens und seiner Schriften* (1898).

SEVASTOPOL, or SEBASTOPOL, an important naval station of Russia on the Black Sea, on the S.W. coast of the Crimea, in 44° 37′ N. and 33° 31′ E., 956 m. from Moscow, with which it is connected by rail via Kharkov. Pop. (1882) 26,150; (1897) 50,710. The estuary, which is one of the best roadsteads in Europe and could accommodate the combined fleets of Europe, is a deep and thoroughly sheltered indentation among chalky cliffs, running east and west for nearly 4 m., with a width of three-quarters of a mile, narrowing to 930 yds. at the entrance. It has a depth of 6 to 10 fathoms, with a good bottom, and large ships can anchor at a cable's length from the shore. The main inlet has also four smaller indentations—Quarantine Bay at its entrance, Yuzhnaya (Southern) Bay, which penetrates more than 1 m. to the south, with a depth of 4 to 9 fathoms, Dockyard Bay and Artillery Bay. A small river, the Chornaya, enters the head of the inlet. The main part of the town, with an elevation of 30 to 190 ft., stands on the southern shore of the chief inlet, between Yuzhnaya and Artillery Bays. A few buildings on the other shore of the chief bay constitute the "northern side." Before the Crimean War of 1853–56 Sevastopol was a well-built city, beautified by gardens, and had 43,000 inhabitants; but at the end of the siege it had not more than fourteen buildings which had not been badly injured. After the war many privileges were granted by the government in order to attract population and trade; but both increased slowly, and at the end of seven years the population numbered only 5750.

The present town is well built and is becoming a favourite watering-place on account of its sea-bathing and numerous sanatoria. It has a zoological marine station (1897), a museum commemorative of the siege (1895), a cathedral of Classical design and another finished in 1888, monuments of Admirals Nakhimov (1898) and Kornilov (1895) and of General Todleben, and two navigation schools. In 1890 Sevastopol was made a third-class fortress, and the commercial port has been transferred to Theodosia.

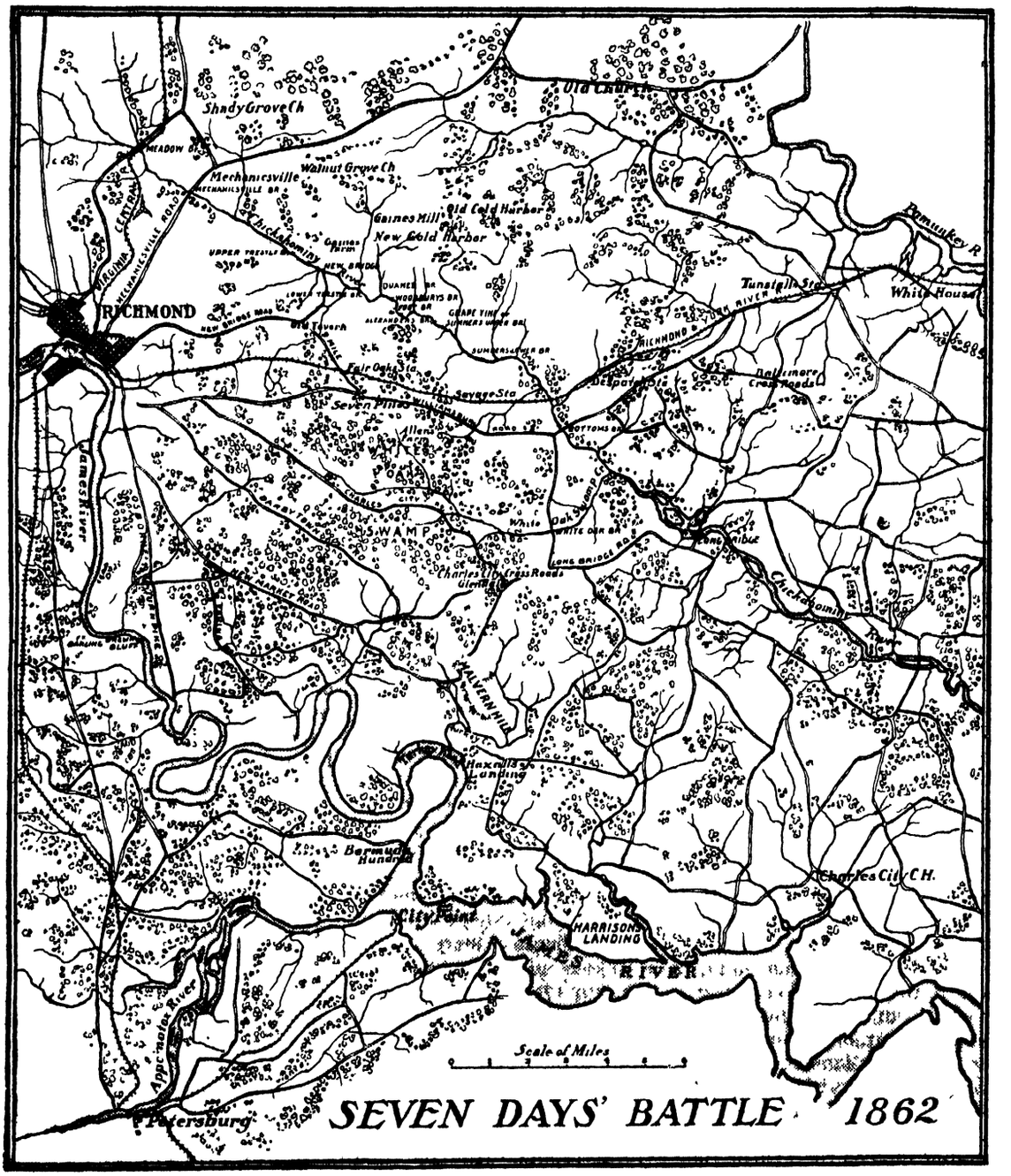
The peninsula between the Bay of Sevastopol and the Black Sea was known in the 7th century as the Heracleotic Chersonese. In the 5th century B.C. a Greek colony was founded here and remained independent for three centuries, when it became part of the kingdom of the Bosporus, and subsequently tributary to Rome. Under the Byzantine empire Chersonesus was an administrative centre for its possessions in Taurida. Vladimir, prince of Kiev, conquered Chersonesus (Korsuñ) before being baptized there, and restored it to the Greeks on marrying (988) the princess Anna. Subsequently the Slavs were cut off from relations with Taurida by the Mongols, and only made occasional raids, such as that of the Lithuanian prince Olgierd. In the 16th century a new influx of colonists, the Tatars, occupied Chersonesus and founded a settlement named Akhtyar. This village, after the Russian conquest in 1783, was selected for the chief naval station of the empire in the Black Sea and received its present name ("the August City"). In 1826 strong fortifications were begun. In 1854 the allied English, French and Turkish forces laid siege to the southern portion of the town, and on the 17th of October began a heavy bombardment. Sevastopol sustained a memorable eleven months' siege, and on the 8th of September 1855 was evacuated by the Russians. The fortifications were blown up by the allies, and by the Paris treaty the Russians were bound not to restore them (see CRIMEAN WAR). In November 1870, during the Franco-German War, the Russian government decided again to make Sevastopol a naval arsenal.

SEVEN CHAMPIONS OF CHRISTENDOM, the name given in medieval tales to the seven national saints—of England, Scotland, Ireland, Wales, France, Spain and Italy—*i.e.* Saints George, Andrew, Patrick, David, Denis, James and Anthony. The classical version of their achievements is that of Richard Johnson (1573–*c.* 1659), *Famous Historie of the Seaven Champions of Christendom* (3 parts, 1596, 1608, 1610: many editions). The oldest known copy is dated 1597; there is also a poetical version by Sir George Buc (published 1623).

SEVEN DAYS' BATTLE, a name given to a series of combats in the neighbourhood of Richmond, Virginia, during the American Civil War, June 26–July 2, 1862. The Federal Army of the Potomac, advancing from the sea and the river Pamunkey

over the Chickahominy on Richmond, had come to a standstill after the battle of Seven Pines (or Fair Oaks), and General Robert Lee, who succeeded Joseph Johnston in command of the Confederates, initiated the series of counter attacks upon it which constitute the "Seven Days."

McClellan had at his disposal 32 brigades and 67 batteries organized in five corps each of two or three divisions. His cavalry consisted of 10 regiments and 22 companies. Lee's army consisted of 40 brigades and 59 batteries organized in eleven divisions and an independent brigade: four divisions were grouped under Jackson and three under Magruder. The reserve artillery consisted of 23 batteries and Stuart's cavalry corps of 3000 sabres. McClellan lingered north of Richmond, despite President Lincoln's constant demand that he should "strike a blow" with the force he had organized and taken to the Yorktown peninsula in April, until General Lee had concentrated 73,000 infantry in his front; then the Federal commander, fearing to await the issue of a decisive battle, ended his campaign of invasion in the endeavour to "save his army"; and he so far succeeded that on July 3 he had established himself on the north bank of the James in a position to which reinforcements and supplies could be brought from the north by water without fear of molestation by the enemy. But he lost 15,000 men in the course of his seven days' retreat, and 20% of the remainder became ineffective from disease contracted in the swamps of the Chickahominy, while enormous quantities of valuable stores at White House on the Pamunkey had been burnt to avoid seizure by the enemy McClellan described this flight to the James as a change of base, but his resolve to abandon the attitude of an invader was formed when General Lee in the middle of June had caused Stuart's cavalry to reconnoitre the flanks and rear of McClellan's army, and had summoned Jackson's corps from the Shenandoah Valley (*q.v.*). The news soon reached McClellan, who thereupon prepared to evacuate White House on June 25 and move his trains southward to the James covered by his army. Jackson had preceded his troops in order personally to confer with Lee, and had then appointed the morning of June 26 for his appearance north of the Chickahominy to lead the march and attack McClellan's right wing under General Fitz John Porter. Jackson was to be supported by the divisions of A. P. Hill, Longstreet and D. H. Hill. Lee's other divisions under Magruder, Huger and Holmes were to defend the lines which covered Richmond from the east, and so prevent McClellan effecting a counter-stroke. Huger had demonstrated on the Williamsburg Road on June 25 in order to draw McClellan's attention to his left wing, and though on June 26 Jackson had failed to appear, General A. P. Hill at 3 p.m. crossed the Chickahominy and attacked the enemy's right wing at Beaver Dam Creek assisted by D. H. Hill, while Longstreet crossed at Mechanicsville. General Lee and President Davis were present and witnessed the loss of 2000 men in a frontal attack which continued till 9 p.m. Meanwhile General Jackson, with Stuart's cavalry corps, "marched by the fight without giving attention, and went into camp at Hundley's Corner half a mile in rear of the enemy's position."



The Federal detachment retreated during the night to a stronger position in rear at Gaines's Mill near Cold Harbor, and on June 27 the Confederates again attacked Porter's corps. Lee's six divisions formed an échelon. D. H. Hill moving towards the enemy's right was followed by Jackson's corps (three divisions), while A. P. Hill engaged the enemy in front and Longstreet in reserve moved along the left bank of the Chickahominy. The resistance of the Federals was stubborn; at 5 p.m. General Lee required Longstreet to attack the enemy's left, and at this moment he procured the assistance of some part of Jackson's corps which had become separated from the remainder. About sunset the Federals under Porter (three

divisions) yielded to the pressure of the attack at all points, and withdrew in the night across the Chickahominy, leaving 5000 prisoners in the hands of General Lee. The Confederates lost 7000 men on June 27.

Lee's right wing had in the meantime demonstrated against the main body of the Federals about Fair Oaks, on the south bank of the river. On June 28 complete inactivity supervened among the Confederates north of the Chickahominy save that Stuart's cavalry and Ewell's division were advanced as far as the railway to reconnoitre, but on this day McClellan was making good his retreat southwards to the James with little interference, for Magruder was instructed to "hold his lines at all hazards," and accordingly acted on the defensive except that Jones's division opposed a Federal division under W. F. Smith near Fair Oaks. On June 29 General Lee became aware of the situation and then issued orders for his six divisions to cross the Chickahominy in pursuit. Jackson's corps and D. H. Hill's division were to follow the enemy, while Longstreet and A. P. Hill were to move their divisions via New Bridge to the Darbytown or James River Road to cut off McClellan from the James. Stuart was to operate at his discretion north of the Chickahominy, and it seems that he was attracted by the enemy's abandoned depot at White House more than by McClellan's retreating army. On this day Magruder with two divisions attacked superior forces about Fair Oaks and was repulsed, and again attacked at Savage Station with like results. General Lee, however, rebuked Magruder for slackness in pursuit. Holmes's division was moving in front of Longstreet on the James River Road, but two Federal divisions were holding the route at Willis Church and at Jordan's Ford. On June 30 Jackson got into action with Whiting's division at White Oak Swamp, while Longstreet encountered the Federals at Frazier's Farm (or Glendale). Longstreet was supported by A. P. Hill and together they lost 3200 men; it was hoped that Jackson's corps would come up during the engagement and attack the enemy's rear, and Huger's division assail his right, but Federal artillery stopped Huger, and of Jackson's three divisions only one came into action. Magruder and Holmes were engaged to their own advantage at Turkey Bridge. Longstreet and Hill were thus opposed to five Federal divisions, while General McClellan was pushing his wagons forward to Malvern Hill, on which strong position the Army of the Potomac was concentrated at nightfall. On July 1 Jackson's corps and D. H. Hill's division had been drawn again into the main operation and followed the Federal line of retreat to Malvern Hill with Huger and Magruder on their right. The divisions of Longstreet and A. P. Hill were in support.

General Lee had thus on the seventh day concentrated his army of ten divisions in the enemy's front; but Jackson's dispositions were unfortunate and General Lee's plan of attack was thus upset; and while seeking a route to turn the enemy's right the Confederate commander was apprised that a battle had been improvised by the divisions in advance. In the result these troops were repulsed with a loss of 6000 men, a circumstance hardly to be wondered at, since McClellan had entrenched eight divisions on the strongest position in the country, and was aided by his siege artillery and also by a flanking fire from his gunboats on the river near Haxall's Landing. General Lee's offensive operations now ended, though Stuart's cavalry rejoined the main army at night and followed the enemy on July 2 to Evelington Heights, while Lee rested his army. Stuart discovered a position which commanded the Federal camp, and maintained his cavalry and horse artillery in this position until the afternoon of July 3, when, his ammunition being expended, he was compelled to retire before a Federal force of infantry and a battery. Longstreet and Jackson had been despatched to his support, but the former did not arrive before nightfall and the latter failed to appear until the next day (July 4). Stuart afterwards moved farther down the James, and shelled McClellan's supply vessels in the river until recalled by General Lee, who on July 8 withdrew his army towards Richmond.

The operations resulted in re-establishing the confidence of the Confederates in their army which Johnston's retreat from Yorktown had shaken, in adding prestige to President Davis and his government, and in rectifying the popular view of General Lee as a commander which had been based upon his failure to recover West Virginia in the autumn of 1861. In the north a feeling of despondency overtook Congress at the "lame and impotent conclusion" of a campaign of invasion which was expected to terminate the war by the defeat of the Confederate army, the capture of Richmond and the immediate overthrow of the Confederacy. (G. W. R.)

SEVENOAKS, a market town in the Sevenoaks parliamentary division of Kent, England, 22 m. S.E. by S. of London by the South-Eastern and Chatham railway. Pop. of urban district (1901) 8106. It is beautifully situated on high ground among the wooded undulations of the North Downs, above the valley of the river Darent. The town consists principally of two streets which converge at the south end, near which is the church of St Nicholas, of the 13th, 14th and 15th centuries. It contains monuments of the Amherst family and a tablet to William Lambarde (d. 1601), which was removed from the old parish church of Greenwich when that was demolished. Lambarde was author of the *Perambulation of Kent*, and founded the College of the Poor of Queen Elizabeth at Greenwich. The grammar school founded in 1418 by Sir William Sevenoke was reconstituted as a first-grade modern school in 1877. There is also a school founded by Lady Margaret Boswell, wife of Sir William Boswell, ambassador to Charles I. at The Hague, and almshouses founded by Sir William Sevenoke in connexion with his school. Close to Sevenoaks is Knole Park, one of the finest old residences in England, which in the time of King John was possessed by the earl of Pembroke, and after passing to various owners was bought by Archbishop Bourchier (d. 1486), who rebuilt the house. He left the property to the see of Canterbury, and about the time of the dissolution it was given up by Cranmer to Henry VIII. By Elizabeth it was conferred first on the earl of Leicester and then on Thomas Sackville, afterwards earl of Dorset. By this earl it was in great part rebuilt and fitted up in regard to decoration much as it now exists. The gateway in the outer court and the Perpendicular chapel are from Archbishop Bourchier's time. The great hall, with elaborately carved music-gallery, is mainly the work of the first earl.

SEVEN SLEEPERS OF EPHESUS, THE, according to the most common form of an old legend of Syrian origin, first referred to in Western literature by Gregory of Tours (*De glor. mart.* c. 95), seven Christian youths of Ephesus, who, in the Decian persecution (A.D. 250), hid themselves in a cave. Their hiding-place was discovered and its entrance blocked. The martyrs fell asleep in a mutual embrace. Nearly 200 years later a herdsman of Ephesus rediscovered the cave on Mount Coelian, and, letting in the light, awoke the inmates, who sent one of their number (Jamblicus) to buy food. The lad was astonished to find the cross displayed over the city gates, and, on entering, to hear the name of Christ openly pronounced. By tendering coin of the time of Decius at a baker's shop he roused suspicion, and was taken before the authorities as a dishonest finder of hidden treasure. He confirmed his story by leading his accusers to the cavern where his six companions were found, youthful and beaming with a holy radiance. The emperor Theodosius II., hearing what had happened, hastened to the spot in time to hear from their lips that God had wrought this wonder to confirm his faith in the resurrection of the dead. This message delivered, they again fell asleep.

Gregory says he had the legend from the interpretation of "a certain Syrian"; in point of fact the story is common in Syriac sources. It forms the subject of a homily of Jacob of Sarug (*ob.* A.D. 521), which is given in the *Acta sanctorum*. Another Syriac version is printed in Land's *Anecdota*, iii. 87 seq.; see also Barhebraeus, *Chron. eccles.* i. 142 seq., and compare Assemani, *Bib. Or.* i. 335 seq. Some forms of the legend give eight sleepers—*e.g.* an ancient MS. of the 6th century now in the British Museum (*Cat. Syr. MSS.* p. 1090). There are considerable variations as to their names. The legend rapidly attained a wide diffusion throughout Christendom; its currency in the East is testified by its acceptance by Mahomet (*sur.* xviii.), who calls them *Aṣḥâb al-Kahf*, "the men of the cave."

According to Bīrūnī (*Chronology*, tr. by Sachau, p. 285) certain undecayed corpses of monks were shown in a cave as the sleepers of Ephesus in the 9th century. The seven sleepers are a favourite subject in early medieval art. The story is well told in Gibbon's *Decline and Fall of the Roman Empire*, ch. xxxiii.

SEVEN WEEKS' WAR, the name given to the war of 1866 between Prussia on the one side, and Austria, Bavaria, Hanover, Saxony and allied German states on the other. Concurrently with this war another was fought in Venetia between the Italians and the Austrian army of the South, for which see ITALIAN WARS (1848–1870).

In 1850 Prussia, realizing from the breakdown of her mobilization for the war then impending with Austria that success was impossible, submitted to the Austrian demands, but her statesmen saw from the first that the "surrender of Olmütz," as it was termed, rendered eventual war with Austria "a military necessity." Preparation was begun in earnest after the accession of King William I., who selected Bismarck as his chancellor, Moltke as his chief of staff and Roon as his minister of war, and gave them a free hand to create the political situation and prepare the military machinery necessary to exploit it. Within six years the mobilization arrangements were recast, the war against Denmark in 1864 proving an opportune test of the new system. The number of field battalions was nearly doubled, two-thirds of the artillery received breech-loading rifled guns, the infantry had for some years had the breech-loading "needle-gun," and steps were initiated to train an adequate number of staff officers to a uniform appreciation of strategical problems, based on Moltke's personal interpretation of Clausewitz's *Vom Kriege*. There was, however, a fundamental disagreement in the tactical ideas of the senior and those of the junior officers. The former, bred in the tradition of the Napoleonic battle, looked for the decision only from the employment of "masses"; the latter, trained with the breech-loader and without war experience, expected to decide battles by infantry fire only. Both overlooked the changes brought by the introduction of the long-range rifle (muzzle- and breech-loading alike), which had rendered impossible the "case shot preparation" which had formed the basis of Napoleon's tactical system. The men were trained for three years in the infantry and four years in the cavalry and artillery, but the war was not popular and many went unwillingly.

In contemporary military opinion, the Austrians were greatly superior in all arms to their adversary. Their rifle,[1] though a muzzle-loader, was in every other respect superior to the Prussian needle-gun, and their M.L. rifled guns with shrapnel shell were considered more than sufficient to make good the slight advantage then conceded to the breech-loader. The cavalry was far better trained in individual and real horsemanship and manœuvre, and was expected to sweep the field in the splendid cavalry terrain of Moravia. All three arms trained their men for seven years, and almost all officers and non-commissioned officers had considerable war experience. But the Prussians having studied their allies in the war of 1864 knew the weakness of the Austrian staff and the untrustworthiness of the contingents of some of the Austrian nationalities, and felt fairly confident that against equal numbers they could hold their own.

The occasion for war was engineered entirely by Bismarck; and it is doubtful how far Moltke was in Bismarck's confidence, though as a far-seeing general he took advantage of every opening which the latter's diplomacy secured for him. The original scheme for the strategic deployment worked out by Moltke as part of the routine of his office contemplated a defence of the kingdom against not only the whole standing army of Austria, but against 35,000 Saxons, 95,000 unorganized Bavarians and other South Germans, and 60,000 Hanoverians, Hessians, &c., and to meet these he had two corps (VII. and VIII.) on the Rhine, the Guard and remaining six in Brandenburg and Prussia proper. Bismarck diverted three Austrian corps by an alliance with Italy, and by consenting to the neutralization of the Federal fortresses set at liberty von Beyer's division for field service in the west. Moltke thereupon brought the VIII. corps and half the VII. to the east and thus made himself numerically equal to his enemy, but elsewhere left barely 45,000 men to oppose 150,000. The magnitude of the risk was sufficiently shown at Langensalza. The direction of the Prussian railways, not laid out primarily for strategic purposes, conditioned the first deployment of the whole army, with the result that at first the Prussians were distributed in three main groups or armies on a front of about 250 m. As there had been no money available to purchase supplies beforehand, each of these groups had to be scattered over a wide area for subsistence, and thus news as to the enemy's points of concentration necessarily preceded any determination of the plan of campaign.

Of the lines of concentration open to the Austrians, the direction of the roads and railways favoured that of Olmütz so markedly that Moltke felt reasonably certain that it would be chosen, and the receipt of the complete *ordre de bataille* of the Austrian army of the north secured by the Prussian secret service on the 11th of June set all doubts at rest.

According to this, the Austrian troops already in Bohemia, 1st corps, Count Clam-Gallas, 30,000 strong, were to receive the Saxons if the latter were forced to evacuate their own country, and to act as an advanced guard or containing wing to the main body under Feldzeugmeister von Benedek (2nd, 3rd, 4th, 8th, 10th corps) which was to concentrate at Olmütz, whence the Prussian staff on insufficient evidence concluded the Austrians intended to attack Silesia, with Breslau as their objective. On this date (June 11th) the Prussians stood in the following order: The army of the Elbe, General Herwarth von Bittenfeld, three divisions only, about Torgau; the I. army, Prince Frederick Charles (II., III., IV. corps), about Görlitz; the II. army under the crown prince (I., V., VI.) near Breslau; the Guard and a reserve corps of Landwehr at Berlin. As the army of the Elbe was numerically inferior to Clam-Gallas and the Saxons, the reserve corps was at once despatched to reinforce it, and the Guard was sent to the crown prince. Further, in deference to political (probably dynastic) pressure, the crown prince was ordered eastwards to defend the line of the Neisse, thus increasing the already excessive length of the Prussian front. Had the Austrians attacked on both flanks forthwith, the Prussian central (I.) army could have reached neither wing in time to avert defeat, and the political consequences of the Austrian victory might have been held to justify the risks involved, for even if unsuccessful the Austrians and Saxons could always retreat into Bavaria and there form a backbone of solid troops for the 95,000 South Germans.

Advance of the Elbe and I. Armies.—This was one of the gravest crises in Moltke's career. To overcome it he at length obtained authority (June 15th) to order the army of the Elbe into Saxony, and on the 18th the Prussians entered Dresden, the Saxons retiring along the Elbe into Bohemia; and on the same day the news that the Austrian main body was marching from Olmütz towards Prague arrived at headquarters. Moltke took three days to solve the new problem, then, on the 22nd, he ordered the I. and II. armies to cross the Austrian frontier and unite near Gitschin, a point conveniently situated about the convergence of the roads crossing the Bohemian mountains. As during this operation the II. army would be the most exposed, the I., to which the army of the Elbe had now been attached, was to push on its advance to the utmost. Apparently with this purpose in view, Prince Frederick Charles was instructed to break up his army corps into their constituent divisions, and move each division as a separate column on its own road, the reserve of cavalry and artillery following in rear of the centre. The consequences were the reverse of those anticipated. On the afternoon of the 26th the advance guards of the I. army and army of the Elbe came in contact with the Austrians at Hühnerwasser and Podol and drove the latter back after a sharp engagement, but, having no cavalry, could neither observe their subsequent proceedings nor estimate their strength. The prince, seeing the opportunity for a battle, immediately issued orders for an

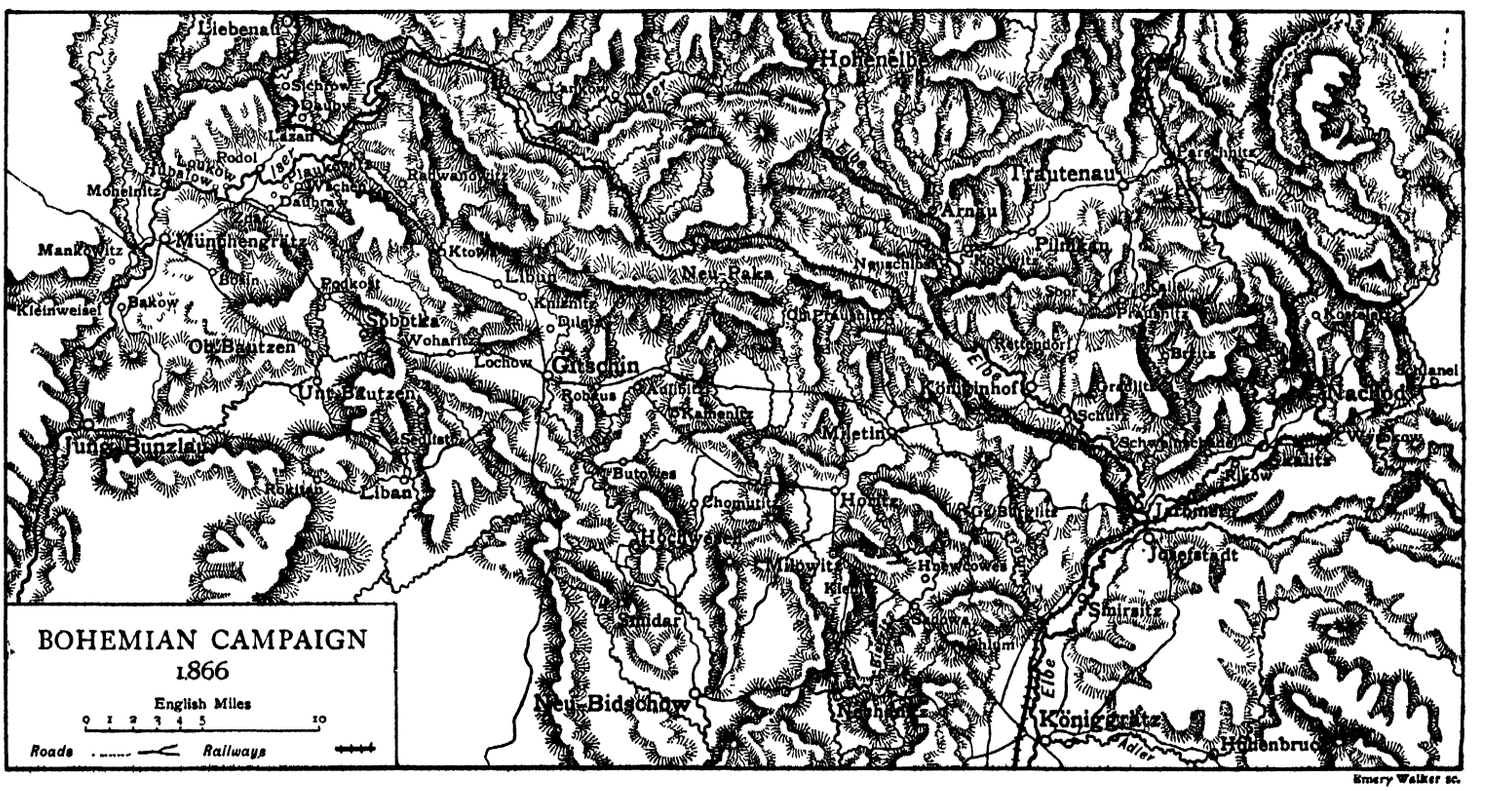
[1] The Lorenz rifle carried a ·57 bullet and was sighted to 1000 yds.; the needle-gun with a much lighter bullet was sighted to 400 only.

enveloping attack on Münchengrätz by his whole army, but, owing to distances and the number of units now requiring direction, it was late in the following day before all were in readiness for action. The Austrians then slipped away, and the whole of the next day was spent in getting the divisions back to their proper lines of advance. Clam-Gallas then retired deliberately to Gitschin and took up a new position. The Prussians followed on the 29th, but, owing to the lie of the roads, they had to march in two long columns, separated by almost a day's march, and when the advanced guard of the left column, late in the afternoon, gained touch with the enemy, the latter were in a position to crush them by weight of numbers, had they not suddenly been ordered to continue the retreat on Miletin.

Battles of the II. Army: Trautenau and Nachod.—Meanwhile the situation of the II. army had become critical. On its right wing the I. corps (General v. Bonin) had received orders on the 27th to seize the passages over the Aupa at Trautenau. This was accomplished without much difficulty, but the main body was still in the defiles in rear, when about 3 p.m. the leading troops were attacked by an overwhelming Austrian force and at Soor and Königinhof (Guard corps) on the 28th and 29th, and at Schweinschädel (Steinmetz) on the 29th, the Prussians in every encounter proving themselves, unit for unit, a match for their adversaries. It is customary to ascribe their successes to the power of the breech-loader, but there were actions in which it played no part, cavalry *versus* cavalry encounters, and isolated duels between batteries which gave the Prussian gunners a confidence they had not felt when first crossing the frontier.

Junction of the Prussian Armies.—By the morning of the 30th it was clear that the junction between the two armies could be completed, whenever desired, by a forward march of a few miles. But Moltke, wishing to preserve full freedom for manœuvre for each army, determined to preserve the interval between them, and began his dispositions to manœuvre the Austrians out of the position he had selected as the best for them to take up, on the left or farther bank of the Elbe.

This is so characteristic of von Moltke's methods and of the tactical preconceptions of the time that it deserves more detailed notice. Neither army had covered its front by a cavalry screen, both preferring to retain the mounted troops for battlefield purposes. Hence, though they were only a few miles apart, each was ignorant



Emery Walker sc.

driven back in confusion; the confusion spread and became a panic, and the I. corps was out of action for the next forty-eight hours. Almost at the same hour, a few miles to the south-eastward, the advanced guard of the V. corps (Steinmetz) began to emerge from the long defile leading from Glatz to Nachod, and the Prussians had hardly gained room to form for action beyond its exit before they too were attacked. Steinmetz was a different man from Bonin, and easily held his own against the disconnected efforts of his adversary, ultimately driving the latter before him with a loss of upwards of 5000 men. Still the situation remained critical next day, for the I. corps having retreated, the Guard corps (next on its left) was endangered, and Steinmetz on his line of advance towards Skalitz (action of Skalitz, June 28th) could only count on the gradual support of the VI. corps. Benedek's resolution was, however, already on the wane. From the first his supply arrangements had been defective, and the requisitions made by his leading troops left nothing for the rest to eat. While trying to feed his army he omitted to fight it, and, with the chance of overwhelming the Prussians by one great effort of marching, he delayed the necessary orders till too late, and the Prussian II. army made good its concentration on the upper Elbe with insignificant fighting of the other's position. Moltke, knowing well the danger for a great army of being forced into a battle with an unfordable river behind it, and with his naturally strong bent towards the defensive in tactics, concluded that Benedek would elect to hold the left bank of the Elbe, between the fortified towns of Josephstadt and Königgrätz, with his right thrown back and covered by the lower courses of the Aupa and the Mettau. Frontal attack on such a position being out of the question, he decided, after weighing well the weaknesses of the Austrian flanks, to direct his principal efforts against the left (*i.e.* southern), although that entailed the uncovering of the communication of the II. army and a flank march of almost the whole of the I. and II. armies across the front of the Austrians in position. As an eminent French critic (General Bonnal) says, this was but to repeat Frederick the Great's manœuvre at Kolin (*q.v.*), and, the Austrians being where they actually were and not where Moltke decided they ought to be, the result might have been equally disastrous. Nevertheless the necessary movements were initiated by orders at noon on the 2nd of July, and one phrase in these saved the situation. According to these orders, the Elbe army was directed to Chlumetz on the way to Pardubitz, the I army diagonally to the south-east across the front of the Austrian position. Two corps of the II. army were to make a demonstration against Josephstadt on the 3rd of July, and the other two were to move in a general direction south-west to keep touch with the I. Prince Frederick Charles was warned to guard the left flank of his marching troops and authorized to attack any forces of the enemy he might encounter in that direction, if not too strong for him. On receipt of these orders (about 3.30 p.m. July 2nd) the

prince immediately despatched officers' patrols towards the Elbe, and about 6 p.m. these, having crossed the Bistritz, discovered the enemy in considerable force, at least three corps, behind the line of low hills which here border that stream. The remainder of the Austrian main body, the whole of which was in fact still on the right bank of the Elbe, was hidden from view behind high ground farther to the eastward.

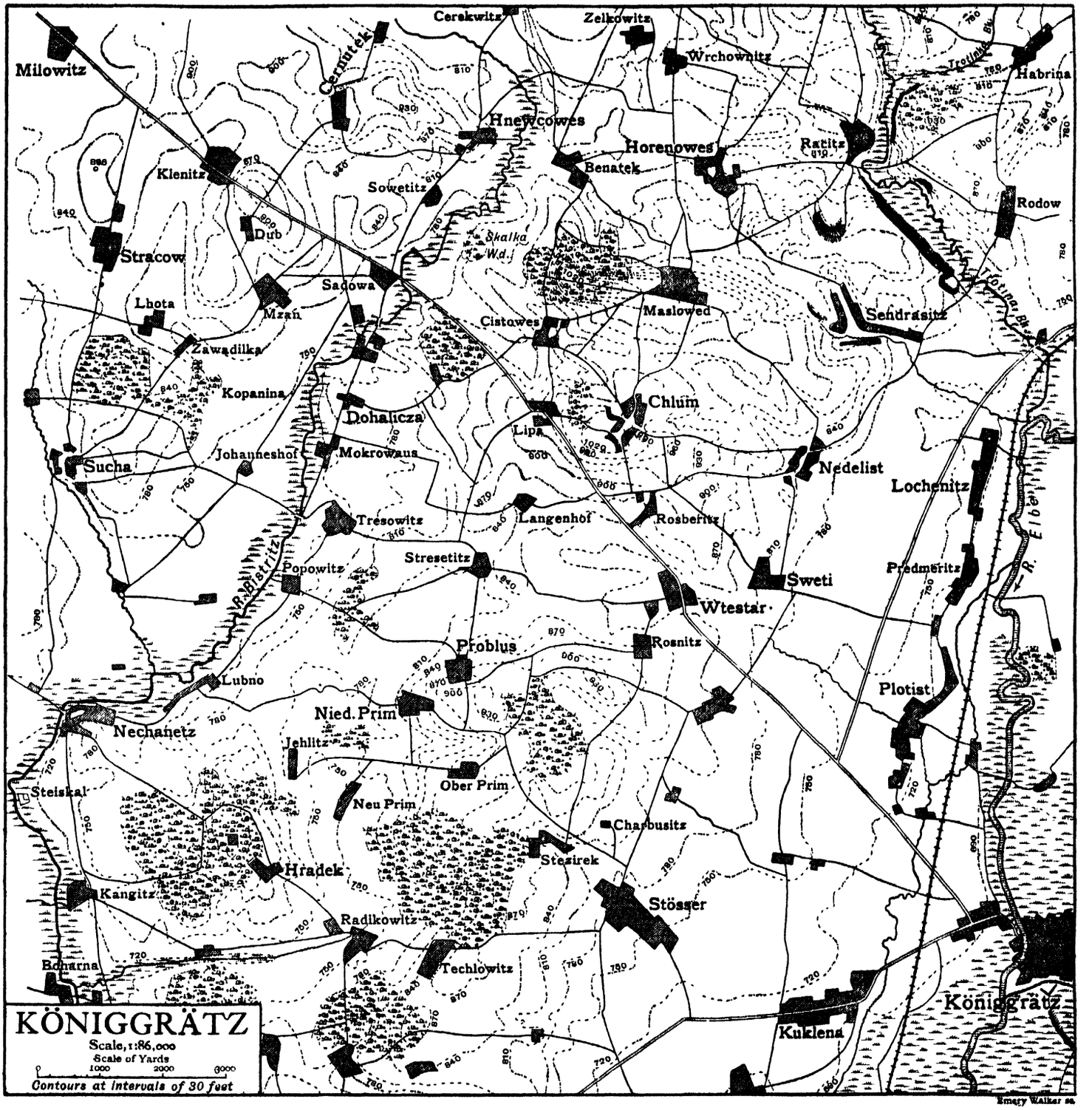
The 2nd of July.—The three Austrian corps were exactly the target Prince Frederick Charles desired. He promised himself with the I. and the Elbe armies an easy victory if he attacked them. Orders in this sense were issued about 7 p.m. They instructed every corps under his command to be in readiness for action towards the Bistritz at 3 a.m. on the 3rd, and in a concluding paragraph announced that the crown prince had been requested to co-operate from the north. A copy of the orders and an explanatory letter were in fact despatched to the II. army, another copy also went direct to the king. Both appear to have been delayed in transmission, for the former only reached the crown prince's quarters at 2 a.m. He was then asleep and had given orders that he was not to be awakened. His chief of the staff, Blumenthal, was absent at the royal headquarters, and since the bearer of the order had not been warned of the importance of the despatch he carried, no one roused the prince. At 3 a.m. Blumenthal returned and read the letter, and without troubling to disturb his chief he dealt with the matter himself in what is certainly one of the most remarkable documents ever issued in a grave crisis by a responsible staff officer. Briefly he informed Prince Frederick Charles that the orders for the II. army based on the instructions received from the royal headquarters, having been already issued, the co-operation of the I. corps alone might be looked for.

Meanwhile the duplicates had reached Moltke, and he, knowing well the temperament of the "Red Prince" and the impossibility of arresting the intended movement, obtained the royal sanction to a letter addressed to the crown prince, in which the latter was ordered to co-operate with his whole command. This vital despatch was sent off in duplicate at midnight and reached von Blumenthal at 4 a.m. In face of this no evasion was possible. Army orders were issued at 5 a.m., but still the urgency of the situation was so little understood that had they been verbally adhered to the force of the II. army could hardly have been brought to bear before 5 p.m., by which time the defeat of the I. army might well have been an accomplished fact. Fortunately, however, the initiative of the Prussian subordinates was sufficient to meet the strain.

Battle of Königgrätz (Sadowa).—Thick mist and driving rain delayed the I. and Elbe armies, but by 5 a.m. the troops had reached their allotted positions. The 7th division now moved forward, taking as point of direction the wood of Maslowed (or Swiep Wald), and supported on the right by the 8th division which was to seize the bridge of Sadowa. The leading troops of the former easily rushed the Austrian outposts covering the wood, but the reserves of the Austrian outposts counter-attacked. The firing drew other troops towards the critical point, and very shortly the wood of Maslowed became the scene of one of the most obstinate conflicts in military history. In about two hours the 12 Prussian battalions and 3 batteries found themselves assailed by upwards of 40 Austrian battalions and 100 guns, and against such swarms of enemies each man felt that retreat from the wood across the open meant annihilation. The Prussians determined to hold on at all costs. The 8th division, belonging to the same corps, could not see their comrades sacrificed before their eyes, and pushed on through Sadowa to relieve the pressure on the right of the 7th division. Meanwhile fresh Austrian batteries appeared against the front of the 8th division, and fresh Prussians in turn had to be engaged to save the 8th. Fortunately the Prussians here derived an unexpected advantage from the shape of the ground, and indeed from the weather. The heavy rain, which had delayed the commencement of the action, had swollen the Bistritz so as to check their advance and thus postpone the decision, whilst the mist and driving rain hid the approaching troops from the Austrian gunners, whose shells burst almost harmlessly on the sodden ground. Then when once across the stream it was discovered that unlike the normal slopes in the district the hillside in front of them showed a slight convexity under cover of which they were able to re-form in regular order. The advantage of the breech-loader now began to assert itself, for the Austrian skirmishers who covered the front of the guns could only load when standing up, while the Prussians lay down or fired from cover. The defenders were therefore steadily driven up the hill, and then cleared the front to give the guns room to act. But the Austrian gunners were intent on the Prussian batteries farther back, which as the light improved had come into action. The Prussian infantry crept nearer and nearer, till at under 300 yds. range and from cover they were able to open fire on the Austrian gunners under conditions which rendered the case fire of the latter practically useless; but here was the opportunity a great cavalry leader on the Austrian side might have seized to restore the battle, for the ground, the shortness of the distance, and the smoke and excitement of the cannonade were all in favour of the charge. Such a charge as prelude to the advance of a great infantry bayonet attack must have swept the exhausted Prussians down the hill like sheep, but the opportunity passed, and the gunners finding their position untenable, limbered up, not without severe losses, and retired to a second position in rear. This withdrawal took place about 2 p.m., and the crisis on the Prussian side may be said to have lasted from about 11 a.m. By this time every infantry soldier and gun within call had been thrown into the fight, and the Austrians might well have thrown odds of three to one upon the Prussian centre and have broken it asunder.

Arrival of the II. Army.—But suddenly the whole aspect of affairs was changed. The 2nd and 4th Austrian corps found themselves all at once threatened in flank and rear by heavy masses of Prussian infantry, the leading brigades of the crown prince's army, and they began to withdraw towards the centre of their position in ordered brigade masses, apparently so intent on keeping their men in hand that they seem never to have noticed the approach of the Prussian reserve artillery of the Guard which (under Prince Kraft zu Hohenlohe-Ingelfingen) was straining forward over heavy soil and through standing corn towards their point of direction, a clump of trees close to the tower of the church of Chlum. Not even deigning to notice the retreating columns, apparently too without escort, the batteries pressed forward till they reached the summit of the ridge trending eastward from Chlum towards the Elbe, whence the whole interior of the Austrian position was disclosed to them, and then they opened fire upon the Austrian reserves which lay below them in solid masses of army corps. Occurring about 2.30, and almost simultaneously with the withdrawal of the Austrian guns on their left already alluded to, this may be said to have decided the battle, for although the Saxons still stood firm against the attacks of the Elbe army, and the reserves, both cavalry and infantry, attempted a series of counterstrokes, the advantage of position and moral was all on the side of the Prussians. The slopes of the position towards the Austrians now took on the usual concave section, and from the crest of the ridge every movement could be seen for miles. The Austrian cavalry, on weak and emaciated horses, could not gallop at speed up the heavy slopes ($\frac{1}{20}$), and the artillery of both Prussian wings practically broke every attempt of the infantry to form for attack.

Close of the Battle.—Still the Austrians made good their retreat. Their artillery driven back off the ridges formed a long line from Stösser to Plotist facing the enemy, and under cover of its fire the infantry at length succeeded in withdrawing, for the Prussian reserve cavalry arrived late on the ground, and the local disconnected efforts of the divisional cavalry were checked by the still intact Austrian squadrons. Whereas at 2.30 absolute destruction seemed the only possible fate of the defeated army, by 6 p.m., thanks to the devoted heroism of the artillery and the initiative of a few junior commanders of cavalry,



it had escaped from the enclosing horns of the Prussian attack. In spite of heavy losses the Austrians were perhaps better in hand and more capable of resuming the battle next morning than the victors, for they were experienced in war, and accustomed to defeat, and retired in good order in three organized columns within easy supporting distance of each other. On the other hand, the Prussians were new to the battlefield, and the reaction after the elation of victory was intense; moreover, if what happened at Hühnerwasser affords a guide, the staff would have required some days to disentangle the units which had fought and to assign them fresh objectives.

Final Operations.—The convergence of the Prussian armies on the battlefield ended in the greatest confusion. The Elbe army had crossed the front of the I. army, and the II. army was mixed up with both. The reserve cavalry reached the front too late in the day to pursue. Thus the Austrians gained 24 hours, and the direction of their retreat was not established with any degree of certainty for several days. Moreover the little fortresses of Josephstadt and Königgrätz both refused to capitulate, and the whole Prussian armies were thus compelled to move down the Elbe to Pardubitz before they could receive any definite new direction. Meanwhile Benedek had in fact assigned only one corps with the reserve cavalry to oppose a Prussian advance towards Vienna, and the remaining seven retired to Olmütz, where they were on the flank of a Prussian advance on Vienna, and had all the resources of Hungary behind them to enable them to recuperate. They were also still in railway communication with the capital. On purely military grounds the Prussians should have marched at once towards the Austrian field army, *i.e.* to Olmütz. But for political reasons Vienna was the more important objective, and therefore the I. and Elbe armies were directed towards the capital, whilst the II. army only moved in the direction of the Austrian main body. Political motives had, however, in the meantime exercised a similar influence on the Austrian strategy. The emperor had already consented to cede Venetia to Italy, had recalled two corps from the south (see ITALIAN WARS, 1848–1870) to

the capital, and had appointed the archduke Albert to command the whole army. The Army of the North, which had reached Olmütz on the 10th of July, now received orders to move by road and rail towards Vienna, and this operation brought them right across the front of the II. Prussian army. The cavalry established contact on the 15th in the neighbourhood of Tobitschau and Rochetinitz (action of Tobitschau, July 15th), and the Austrians finding their intention discovered, and their men too demoralized by fear of the breech-loader to risk a fresh battle, withdrew their troops and endeavoured to carry out their concentration by a wide circuit down the valley of the Waag and through Pressburg. Meanwhile the Prussian main army was pursuing its advance under very adverse circumstances. Their railway communication ended abruptly at the Austrian frontier; the roads were few and bad, the country sparsely cultivated and inhospitable, and the troops suffered severely. One third of the cavalry broke down on a march of 97 m. in five days, and the infantry, after marching 112 m. in ten days, had to have a two days' halt accorded them on the 17th. They were then in the district about Brunn and Iglau, and on the 18th the royal headquarters reached Nikolsburg. News had now been received of the arrival of Austrian reinforcements by rail at the capital both from Hungary and Italy, and of the preparation of a strong line of provisional defences along the Florisdorf position directly in front of Vienna. Orders were therefore issued during the 18th for the whole army to concentrate during the following days in the position held by the Austrians around Wagram in 1809, and these orders were in process of execution when on the 21st an armistice was agreed upon to commence at noon on the 22nd. The last fight was that of Blumenau near Pressburg on the 22nd; this was broken off at the stated time.

Langensalza.—In western Germany the Prussian forces, depleted to the utmost to furnish troops for the Bohemian campaign, were opposed to the armies of Hanover and Bavaria and the 8th Federal corps (the last consisting of Hessians, Württembergers, Badensers and Nassauers with an Austrian division drawn from the neutralized Federal fortresses), which were far superior in number. These minor enemies were, however, unready and their troops were mostly of indifferent quality. Hanover and Hesse-Cassel, which were nearest to Prussia and therefore immediately dangerous, were dealt with promptly and without waiting for the decision in the main theatre of war. The 13th Prussian division (v. Goeben) was at Minden, Manteuffel's troops from the Elbe duchies at Altona, v. Beyer's division (Federal fortress garrisons) at Wetzlar. On the 15th and 16th of June Beyer moved on Cassel, while the two other Prussian generals converged on Hanover. Both places were in Prussian hands before the 20th. The Hessians retired upon Hanau to join the 8th Federal corps; only the Hanoverians remained in the north, and they too, threatened by Beyer's advance, marched from their point of concentration at Göttingen southward for the Main. With proper support from Bavaria the Hanoverians could perhaps have escaped intact; but the Bavarians considered that their allies (about 20,000) were strong enough by themselves to destroy whichever of the converging Prussian columns tried to bar their way, and actually the Hanoverian general v. Arentschild won a notable success over the improvised Prussian and Coburg division of General v. Flies, which advanced from Gotha and barred the southward march of the Hanoverians at Langensalza. The battle of Langensalza (June 27th) showed that the risks Moltke deliberately accepted when he transferred so many of the western troops to the Bohemian frontier were by no means imaginary, for v. Flies, outnumbered by two to one, sustained a sharp reverse before the other columns closed in. But the strategical object of General Vogel v. Falckenstein, the Prussian commander-in-chief in the west, was achieved next day. By the morning of the 29th Manteuffel and Goeben lay north, v. Flies's column (backed by a fresh brigade) south of Langensalza, and Beyer approached from Eisenach. Whatever had been the prospects of the Hanoverian army five days previously, it was now surrounded by twice its numbers, and on the 29th of June the capitulation of Langensalza closed its long and honourable career.

The Main Campaign.—The Prussian army, now called the "Army of the Main," of three divisions (one being unusually strong), had next to deal with the 7th (Bavarians) and 8th (other South Germans) Federal corps in the valley of the Main. These were nominally over 100,000 strong and were commanded by Prince Charles of Bavaria. The *ordre de bataille* of the 8th corps is interesting. It was commanded by Prince Alexander of Hesse; the 1st division (3 infantry brigades, 1 cavalry brigade, 6 batteries) came from Württemberg; the 2nd division (2 infantry and 1 cavalry brigades, 5 batteries) from Baden, the least anti-Prussian of all these states; the 3rd division (2 infantry and 1 cavalry brigades, 1 rifle battalion, 4 batteries) from Hesse-Darmstadt; the 4th division consisted of an Austrian brigade of 7 battalions (three of which were Italians), a Nassau brigade, and two batteries and some hussars of Hesse-Cassel. The remainder of the Hesse-Cassel troops, which had retired southward before Beyer's advance on Cassel, went to the Rhine valley about Mainz. The centre of the *rayon* of the 8th corps was Darmstadt, and the Bavarian line extended from Coburg to Gemünden. It appears that Prince Charles wished to march via Jena and Gera into Prussia, as Napoleon had done sixty years before, but the scheme was negatived by the Austrian government, which exercised the supreme command of the allies. The Bavarians did, however, advance, and made for the Eisenach-Gotha region, where the Prussian-Hanoverian struggle was in progress. Meanwhile the 8th Federal corps advanced also, but actuated probably by political motives it took the general direction of Cassel, and between the two German corps a wide gap opened, of which Vogel v. Falckenstein was not slow to take advantage. On the day of Königgrätz the Prussians moved into position to attack the Bavarians, and on the 4th of July v. Goeben won the victory of Wiesenthal (near Dermbach). The 7th corps thereupon drew back to the Franconian Saale, the 8th to Frankfurt, and on the 7th of July the Prussian army was massed about Fulda between them. Vogel v. Falckenstein moved forward again on the 8th, and on the 10th the Bavarians were again defeated in a series of actions around Kissingen, Waldaschach and Hammelburg. Meanwhile Prince Alexander's motley corps began its advance from Frankfurt up the Main valley to join the Bavarians, who had now retired on Schweinfurt. The army of the Main, however, had little difficulty in defeating the 8th corps at Laufach on the 13th and Aschaffenburg on the 14th of July. The Prussians occupied Frankfurt (16th). Vogel v. Falckenstein was now called to Bohemia, and v. Manteuffel was placed in command of the army of the Main for the final advance. The 7th and 8th corps now at last effected their junction about Würzburg, whither the army of the Main marched from Frankfurt to meet them. The Federals advanced in their turn, the Bavarians on the right, the 8th on the left, and the opponents met in the valley of the Tauber. More partial actions, at Hundheim (23rd), Tauber Bischofsheim (24th), Gerchsheim (25th), Helmstadt (25th) and Rossbrunn (26th) ended in the retreat of the Germans to Würzburg and beyond; the armistice (Aug. 2nd) then put an end to operations. A Prussian reserve corps under the grand duke of Mecklenburg-Schwerin, formed at Leipzig, had meanwhile overrun eastern Bavaria up to Nuremberg.

This campaign presents the sharpest contrast to that of Bohemia. Small armies moving freely within a large theatre of war, the occupation of hostile territory as a primary object of operations, the absence of a decision-compelling spirit on either side, the hostile political "view" over-riding the hostile "feeling"—all these conditions remind the student of those of 17th and 18th century warfare. But the improved organization, better communications and supplies, superior moral, and once again the breech-loader *versus* a standing target, which caused the Prussian successes, at least give us an opportunity of comparing the old and the new systems under similar conditions, and even thus the principle of the "armed nation" achieved the decision in a period of time which, for the old armies, was wholly insufficient.

The various treaties of Prague, Berlin and Vienna which followed the armistice secured the annexation by Prussia of Hanover, the Elbe duchies, the electorate of Hesse, Nassau and Frankfurt, the dissolution of the existing confederation and the creation of a new North German Confederation under the hegemony of Prussia, and the payment of war indemnities to Prussia (the Austrian share being £6,000,000). Venetia was ceded by Austria to Napoleon III. and by him to King Victor Emmanuel.

BIBLIOGRAPHY.—Prussian General Staff, *Der Feldzug 1866 in Deutschland* (Berlin, 1867; English translation, *The War in Germany, 1866*, War Office, London, 1872, new edition, 1907; French translation, *La Campagne de 1866*, Paris, 1868); Austrian Official (*K.K Generalstabsbureau für Kriegsgesch.*), *Österreichs Kämpfe 1866* (Vienna, 1867; French translation, *Les Luttes d'Autriche*, Brussels, 1867); Friedjung, *Der Kampf um die Vorherrschaft in Deutschld.* (Stuttgart, 1899); H. M. Hozier, *The Seven Weeks' War* (1867; new edition, London, 1906); *Antheil des k. sächsischen Armee-Corps am Feldzuge 1866* (Dresden, 1869); v. Willisen, *Die Feldzüge 1859 u. 1866* (Berlin, 1868); Lettow-Vorbeck, *Geschichte des Krieges v. 1866 in Deutschland* (Berlin, 1899); *Moltkes Militär-Korrespondenz 1866* (Berlin, 1896); H. Bonnal, *Sadowa* (Paris, 1901; English translation, London, 1907); G. J. R. Glünicke, *The Campaign in Bohemia* (London, 1907); A. Strobl, *Trautenau* (Vienna, 1901); Kühne, *Kritische u. unkritische Wanderungen über d. Gefechtsfelder &c.* (Berlin, 1870–1875); Jähns, *Schlacht bei Königgrätz* (Leipzig, 1870); v. Quistorp, *Der grosse Kavalleriekampf bei Stresetitz (Königgrätz)* (Berlin, 1897); *Moltkes Feldzugsplan* (Berlin, 1892); *Über die Verwendung der Kavallerie 1866* (Berlin, 1870); Dragomirov, *Schilderung des österr.-preuss. Krieges 1866* (Berlin, 1868); V. Verdy du Vernois, *Im Hauptquartiere der II. Armee 1866* (Berlin, 1900); Harbauer, *Trautenau, Custozza, Lissa* (Leipzig, 1907); Kovařik, *FZM von Benedek und der Krieg 1866* (see also article BENEDEK, LUDWIG, RITTER VON); Anon. *V. Königgrätz bis an die Donau* (Vienna, 1906); Duval, *Vers Sadowa* (Nancy, 1907); *Feldzugsjournal des Oberbefehlshabers des VIII. Bundes-A.-K.* (Leipzig, 1867); Bavarian General Staff, *Antheil der k. bayer. Armee am Kriege 1866* (Munich, 1868); F. Hoenig, *Die Entscheidungskämpfe des Mainfeldzuges* (Berlin, 1895); F. Regensberg, *Langensalza* (Stuttgart, 1906); V. Goeben, *Treffen bei Kissingen* and *Gefecht bei Dermbach* (Leipzig, 1870); H. Kunz, *Feldzug der Mainarmee 1866* (Berlin, 1890); Schimmelpfennig, *Die kurhessische Armee-Division* (Melsungen, 1892); *Antheil der badischen Feld-Div. 1866* (Lahr, 1867); *Die Operationen des VIII. Bundes-A.-K.* (Leipzig, 1868); v. d. Wengen, *Gesch. d. Kriegsereignisse zwischen Preussen u. Hannover 1866* (Gotha, 1885), and *Gen. Vogel v. Falckenstein u. d. hannov. Feldzug* (Gotha, 1887).

(F. N. M.; C. F. A.)

SEVEN WISE MASTERS, THE, a cycle of stories of Oriental origin. A Roman emperor causes his son to be educated away from the court in the seven liberal arts by seven wise masters. On his return to court his stepmother the empress seeks to seduce him. To avert some danger presaged by the stars he is bound over to a week's silence. During this time the empress accuses him to her husband, and seeks to bring about his death by seven stories which she relates to the emperor; but her narrative is each time confuted by tales of the craft of women related by the sages. Finally the prince's lips are unsealed, the truth exposed, and the wicked empress is executed.

The cycle of stories, which appears in many European languages, is of Eastern origin. An analogous collection occurs in Sanskrit, but the Indian original is unknown. Travelling from the east by way of Arabic, Persian, Syriac and Greek, it was known as the book of Sindibâd, and was translated from Greek into Latin in the 12th century by Jean de Hauteseille (Joannes de Alta Silva), a monk of the abbey of Haute-Seille near Toul, with the title of *Dolopathos* (ed. H. Oesterley, Strassburg, 1873). This was translated into French about 1210 by a *trouvère* named Herbers as *Li Romans di Dolopathos*; another French version, *Li Romans des sept sages*, was based on a different Latin original. The German, English, French and Spanish chap-books of the cycle are generally based on a Latin original differing from these. Three metrical romances probably based on the French, and dating from the 14th century, exist in English. The most important of these is *The Sevyn Sages* by John Rolland of Dalkeith, edited for the Bannatyne Club (Edinburgh, 1837).

The Latin romance was frequently printed in the 15th century, and Wynkyn de Worde printed an English version about 1515. See G. Paris, *Deux Rédactions du roman des sept sages de Rome* (Paris, 1876, Soc. des. anc textes fr.); Büchner, *Historia septem sapientum . . .* (Erlangen, 1889); K. Campbell, *A Study of the Romance of the Seven Sages with special reference to the middle English versions* (Baltimore, 1898); D. Comparetti, *Researches respecting the Book of Sindibâd* (Folk-Lore Soc., 1882).

SEVEN WISE MEN OF GREECE, THE, a collective name for certain sages who flourished *c.* 620–550 B.C. The generally accepted list is Bias, Chilon, Cleobulus, Periander, Pittacus, Solon, Thales (see separate articles), although ancient authorities differ as to names and number. They obtained great influence in their respective cities as legislators and advisers, and a reputation throughout the Greek world. Their rules of life were embodied in poems and short sayings in common use.

See O. Bernhardt, *Die sieben Weisen Griechenlands* (1864); F. Bohren, *De septem sapientibus* (1867); "Septem sapientium carmina et apophthegmata," with short biographies in F. Mullach, *Fragmenta philosophorum Graecorum*, i. (1860); H. Wulf in *Dissertationes philologicae Halenses*, xiii. (1896).

SEVEN WONDERS OF THE WORLD, the name conferred on a select group of ancient works of art which had obtained pre-eminence among the sight-seers of the Alexandrian era. The earliest extant list, doubtless compiled from the numerous guide books then current in the Greek world, is that of the epigrammatist Antipater of Sidon (2nd century B.C.). A second and slightly divergent list from the hand of a Byzantine rhetorician has been incorporated in the works of Philo of Byzantium. The monuments are as follows: (1) the pyramids of Egypt, (2) the gardens of Semiramis at Babylon, (3) the statue of Zeus at Olympia (see PHEIDIAS), (4) the temple of Artemis at Ephesus, (5) the Mausoleum at Halicarnassus (see MAUSOLEUM), (6) the Colossus at Rhodes, (7) the Pharos (lighthouse) of Alexandria, or the Walls of Babylon.

See "Philo" *De septem mundi miraculis* (ed. Hercher, Paris, 1858).

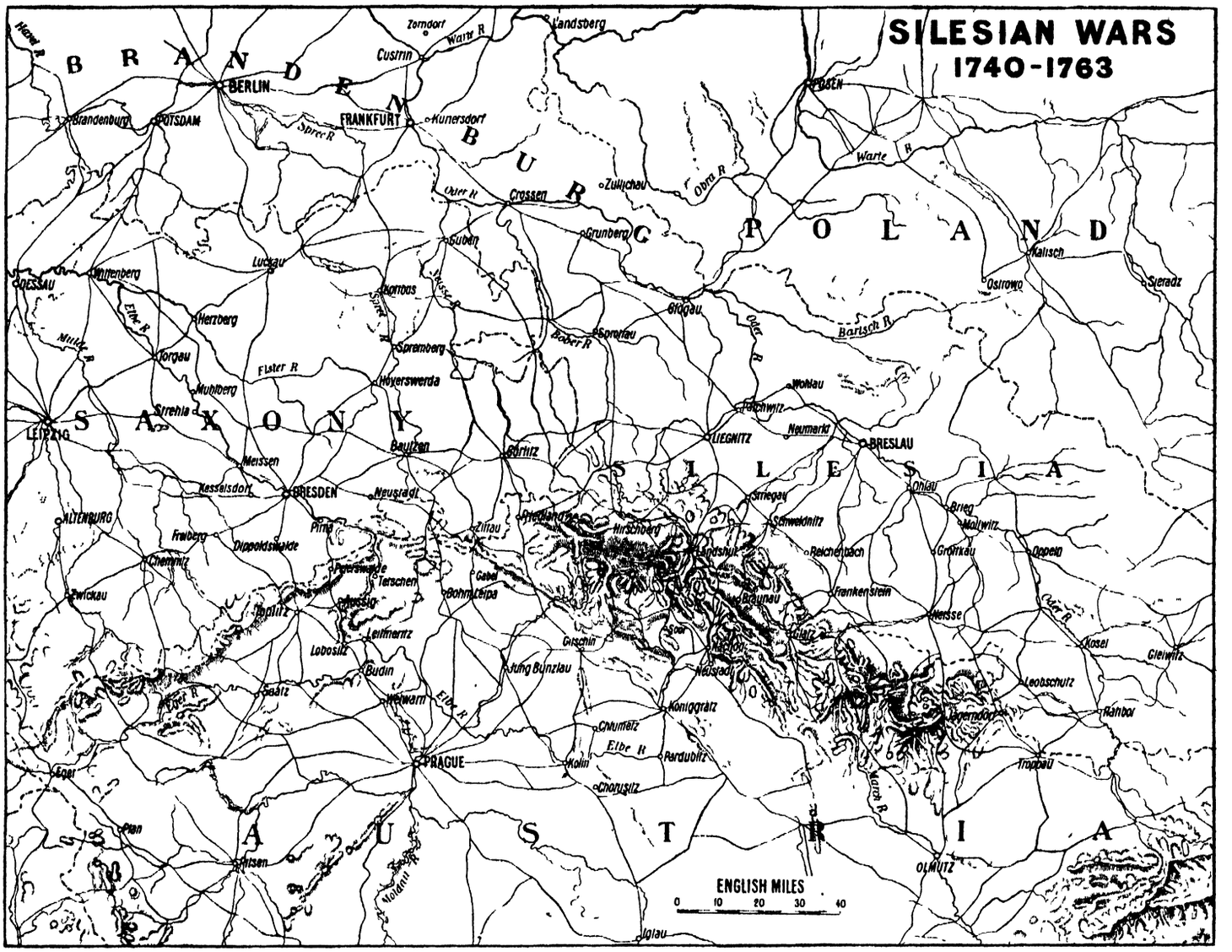
SEVEN YEARS' WAR (1756–1763), the name given to the European war which arose from the formation of a coalition between Austria, France, Russia, Sweden and Saxony against Prussia, with the object of destroying, or at least crippling, the power of Frederick the Great. Prussia was joined by England, and between England and France, as usual, a maritime and colonial war broke out at the first pretext; this war laid the foundations of the British empire, for ere the seven campaigns had been fought in Europe, the French dominion in Canada and the French influence in India, in spite of Dupleix, Lally and Montcalm, had been entirely overthrown by the victories of Clive, Amherst and Wolfe. Great as was the effect of these victories on the history of the world, however, it is at least questionable whether the steadfast resistance of Prussia, almost single-handed as she was—the resistance which laid the solid, if then unseen, foundations of modern Germany—is not as important a phenomenon, and from the technical military standpoint Rossbach and Leuthen, Zorndorf and Kunersdorf possess an interest which it would be possible perhaps to claim for Plassy and for Quebec, but not for border conflicts in Canada and India. It is not only battles, the distinct and tangible military events, that make up the story of Frederick's defence. There are countless marches and manœuvres, devoid of interest as regards their details; but, as indications of the equilibrium of forces in 18th-century warfare, indispensable to a study of military history as a whole.

Learning of the existence and intentions of the coalition, Frederick determined to strike first, and to that end, during the months preceding the outbreak of hostilities, he concentrated his 150,000 men as follows:—11,000 men in Pomerania to watch the Swedes, 26,000 on the Russian frontier, 37,000 men under Field Marshal Schwerin in Silesia, and a main body of 70,000 in three columns ready to advance into Saxony at a moment's notice, the king being in chief command. On the 29th of August 1756 the Saxon frontier was crossed. Dresden was occupied on the 10th of September, the Saxon army, about 14,000 strong, falling back before the invaders to the entrenched camp of Pirna, an almost inaccessible plateau parallel to the Elbe and close to the Bohemian frontier. The secret of the Prussian intentions had been so well kept that the Austrians were still widely disseminated in Bohemia and Moravia. 32,000 men under Field Marshal Browne were at Kolin, and 22,000 under Piccolomini at Olmütz, when on the 31st of August the news of the invasion arrived, and such was their unreadiness that Browne could not advance till the 6th of September, Piccolomini until the 9th. Meanwhile the Prussians, leaving detachments to watch the exits from Pirna, moved up the Elbe and took post at Aussig to cover the investment of the Saxons. Learning of Browne's approach on the 28th of September, the king, assuming the command of the covering force, advanced yet farther up the Elbe to meet him, and the two armies met at Lobositz (opposite Leitmeritz) on the morning of the 1st of October. The battle began in a thick fog, rendering dispositions very difficult, and victory fell to the Prussians, principally owing to the tenacity displayed by their infantry in a series of disconnected local engagements. The nature of the ground rendered pursuit impossible, and the losses on both sides were approximately equal—viz. 3000 men—but the result sealed the fate of the Saxons, who after a few half-hearted attempts to escape from their entrenchments surrendered on the 14th of October, and were taken over bodily into the Prussian service. Prussian administrators were appointed to govern the captured country and the troops took up winter quarters.

Pirna.

Campaign of 1757.—The Coalition had undertaken to provide 500,000 men against Prussia, but at the beginning of the year only 132,000 Austrians stood ready for action in northern Bohemia. Against these the king was organizing some 250,000, 45,000 of whom were paid for by British subsidies and disposed to cover Hanover from a French attack. After leaving detachments to guard his other frontiers, Frederick was able to take the field with nearly 150,000 men, but these also were scattered to guard a frontier some 200 m. in length—the left wing in Silesia under Schwerin and the duke of Brunswick-Bevern, the centre and right under the king. In April the operations began. Schwerin and Bevern crossed the mountains into Bohemia and united at Jung Bunzlau, the Austrians falling back before them and surrendering their magazines. The king marched from Pirna and Prince Maurice of Dessau from Zwickau on Prague, at which point the various Austrian commands were ordered to concentrate. On the morning of the 5th the whole army, except a column under Field Marshal Daun, was united here under Prince Charles of Lorraine, and the king, realizing the impossibility of

Battle of Prague.



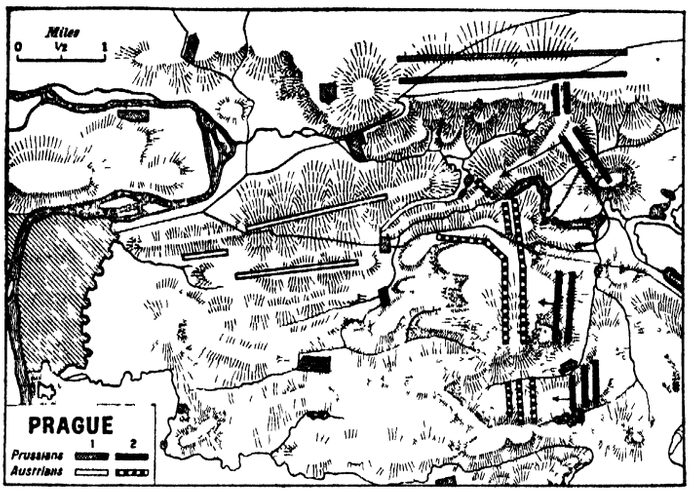
storming the heights before him, left a corps under Keith and a few detachments to watch Prague and the fords across the river, and marched during the night upstream and, crossing above the Austrian right, formed his army (about 64,000) for attack at right angles to the Austrian front. The ground had not been reconnoitred, and in the morning mist many mistakes in the deployment had been made, but as Daun was known to be but 20 m. away and the Austrian army was changing its front to meet the unexpected attack, the king threw caution to the winds and sending Zieten with his cavalry by a wide détour to cover his left, he ordered the whole to advance. One of the most savage battles in history was the result. Almost immediately the Prussian infantry became entangled in a series of morasses, the battalion guns had to be left behind and the troops had to correct their alignment under the round shot fired by the Austrians, who had completed their change of front in time and now stood ready to sweep the open glacis before them. Before the storm of bullets and the grape and canister of the heavy and battalion guns the Prussian first line faltered and fell in thousands. Their attempts to prepare the way for the bayonet assault broke down. Schwerin was killed. But the second line carried the survivors on, and in the nick of time Zieten's cavalry drove the Austrian horsemen off the field and broke in on the flank and rear of their infantry. This turned the scale, and the Austrians retreated into Prague in hopeless confusion, leaving some 10,000 men (14·8 %) on the ground, and 4275 prisoners, out of about 66,000, in their enemy's hands. The Prussians lost 11,740 men killed and wounded and 1560 prisoners, and in all 20·8 % of their strength. The actual fighting seems only to have lasted about two hours, though firing did not cease till late at night; 16,000 Austrians managed in the confusion to evade capture and join Daun, who made no movement either on this or succeeding days to come to the assistance of his comrades, but began a leisurely retreat towards Vienna.

The Prussians immediately began the siege of the town, and after a month's delay Daun, now at the head of some 60,000 men, moved forward to the relief of the city. Learning of his approach, the king, taking with him all the men who could be spared from the investment and uniting all available detachments, moved to meet him with only 34,000 men, and on the 18th of June he found Daun strongly entrenched. He immediately endeavoured to march past him and attack him on the right flank as at Prague, but the Austrian light troops harassed his columns so severely during the movement that without orders they wheeled up to drive them off and, being thus thrown into disarray, they took three divergent objectives. Their disunited attacks all fell upon superior numbers, and after a most obstinate struggle they were badly beaten with a loss in killed and wounded of 6710 (18·6 %) and 5380 prisoners with 22 colours and 45 guns. The fighting lasted 5½ hours. The Austrian loss was only 8000 out of 53,500, or 15·2 %, of whom only 1500 were taken prisoners.

Kolln.

This disaster entailed raising the siege of Prague, and the Prussians fell back on Leitmeritz. The Austrians, reinforced by the 48,000 troops in Prague, followed them 100,000 strong, and, falling on Prince August Wilhelm of Prussia, who was retreating eccentrically (for commissariat reasons) on Zittau, inflicted a severe check upon him. The king was compelled to abandon Bohemia, falling back on Bautzen. Having re-formed his men and calling in Keith's 27,000 men from Pirna,

he again advanced, but found the enemy so strongly posted at Burkersdorf (south of Bischofswerda) that he relinquished his purpose and retreated on Bernstadt.

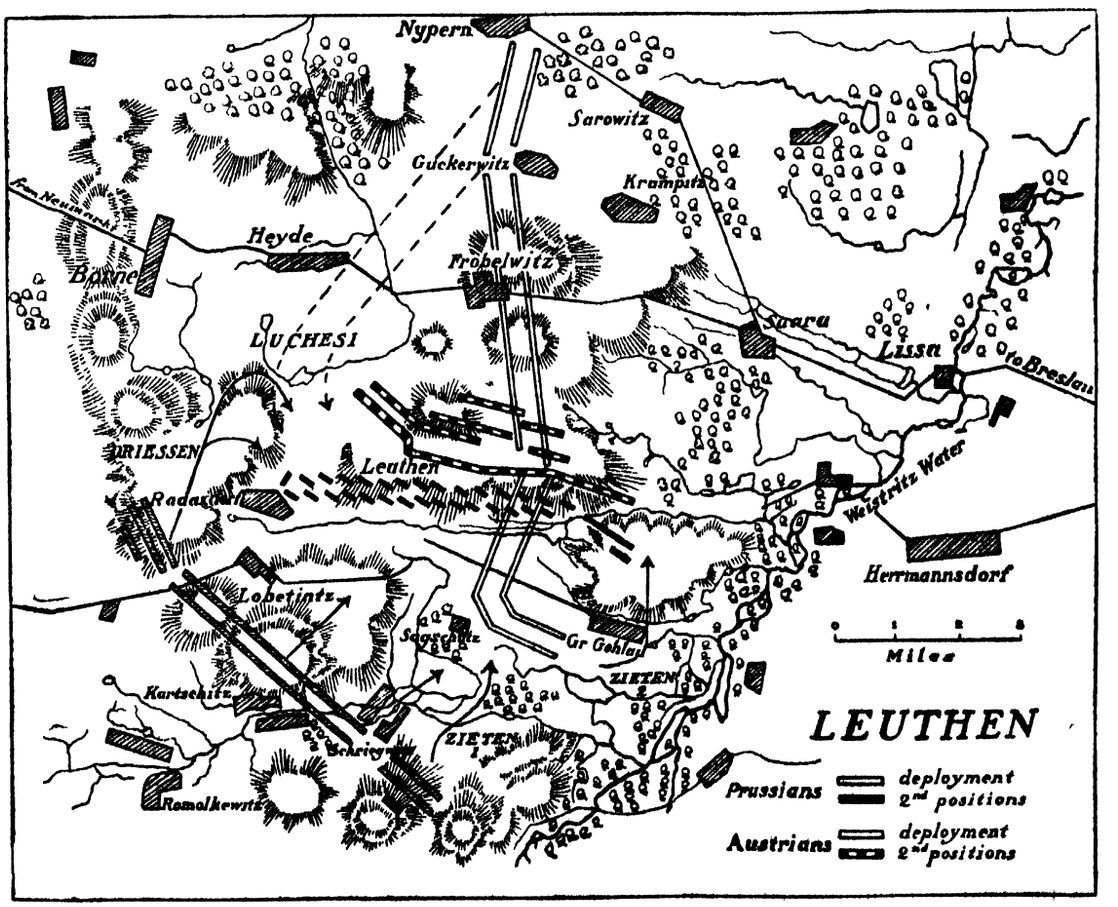


Meanwhile his enemies had been gathering around him. France had despatched 100,000 men under d'Estrées against Hanover, where Cumberland with 54,000 stood to meet him, and another 24,000 men were marching through Franconia to unite with the "Army of the Holy Roman Empire" under the prince of Saxe-Hildburghausen. Fortunately this latter army was not as formidable as its title, and totalled only some 60,000 most undisciplined and heterogeneous combatants. In the north 100,000 Russians under Apraxin were slowly advancing into East Prussia, where Lehwald with 30,000 was preparing to confront them, and 16,000 Swedes had landed in Pomerania. On the 26th of June Cumberland had been beaten at Hastenbeck by d'Estrées, and the French overran Hanover and Brunswick. The king, leaving Bevern with only 13,600 men in Silesia to watch the Austrians, began to march across Germany to succour Cumberland. Arrived at Leipzig on the 3rd of September, he heard of Lehwald's defeat at Gross-Jägerndorf on the 30th of August and immediately afterwards of Cumberland's convention of Kloster Seven, which gave up Hanover to the French. Fearing that the French army now set free in Hanover might unite with the Army of the Empire under Hildburghausen and with 150,000 men march direct on Berlin, Frederick, taking with him 23,000 men, marched to join Prince Ferdinand in the district about Halberstadt, hoping to strike his blow before the enemy's junction could be completed. Mobility, therefore, was the first consideration, and arrangements for supply having been made in advance along his road, his troops covered 170 m. in 12 days (September 1–13). But Hildburghausen, not having been joined by d'Estrées, refused to fight and fell back into the wooded districts of Thuringia and Franconia. Bad news now reached Frederick from Silesia; leaving Ferdinand to observe Hildburghausen, he marched with all haste to Eckersberg to support Bevern. Arrived here, he found more bad news from Berlin, which had been entered by a body of Austrian raiders under Hadik and plundered. Prince Maurice and Seydlitz were sent by forced marches to its aid, and before them Hadik retired at once (October 18th). Finding the Austrians for the moment quiescent and hearing that Hildburghausen was again advancing, the king now concentrated all available men on Leipzig and marched to support Prince Ferdinand. Hildburghausen took up a position about Meucheln on the 2nd of November, and on the 5th moved off to repeat Frederick's manœuvre of Prague against its inventor. The battle of Rossbach (*q.v.*) followed. In this Seydlitz and the Prussian cavalry won imperishable renown. Aided only by the fire of 18 guns and of 7 battalions of infantry, only two of which fired more than five rounds, the Prussian squadrons swept down upon the marching columns of the Allies and in about 40 minutes the whole 64,000 were in full flight. Never was a victory more timely, for the Prussian army was almost worn out and more bad news was even then on the way.

Frederick in the west.

Rossbach

Bevern in Silesia, who had been beaten at Moys near Görlitz (September 7th) and in the battle of Breslau on the 22nd of October, had been compelled to retire behind the Oder, leaving the fortresses of Schweidnitz and Breslau to their fate, and both had capitulated within a few days. Leaving a small reinforcement for Ferdinand, the king now moved by forced marches to Liegnitz. The distance, about 170 m. through difficult country, was covered again in 12 days, but the numbers were small, only 13,000, which shows how tremendous had been the drain upon the men of the previous six weeks' exertions. On the night of the 4th of December, having joined the beaten forces of Bevern at Parschwitz, making in all 43,000 men of very unequal fighting value, he decided to attack the 72,000 Austrians who lay across the Breslau road, their centre marked by the village of Leuthen (*q.v.*). His position appeared so



desperate that he sent for all his generals, laid the facts before them, announced his decision to attack and offered to accept any man's resignation without prejudice to his character should he deem the risk too hazardous. Needless to say, not one accepted the offer.

Covered by the low rolling hillocks of the district, the army now moved off to its right across the Austrian front, the advance led by Zieten and half the cavalry, the rear covered by Driessen with the remaining half—some 40 weak squadrons. The infantry having gained a position sufficiently on the Austrian flank, now wheeled into line and attacked in échelon of battalions from the right. The battle soon became desperate, and the Austrian cavalry on their right wing under Luchesi, unaware of Driessen's presence as a flank guard, issued out of their lines, wheeled to their left and swept down upon the refused flank of the Prussian infantry; but they never reached them, for Driessen, seizing his opportunity, set his squadrons in motion and attacked. The Austrians, completely surprised, were ridden down and driven back on to the front of their own infantry, and the pressure of the fugitives threw the rear of their left wing into confusion and in a short time the ruin of their army was completed. When the news of Driessen's charge was brought to the king his astonishment was expressed in the single phrase, "What, that old fool Driessen?" The fighting, however, had been desperate, and though the Austrians out of their 72,000 lost 37% including 20,000 prisoners, with 116 guns and 51 colours, the Prussians lost 6200 (14%) making with the other battles of the year a total of nearly 75,000 men, and not including losses in minor skirmishes and on the march.

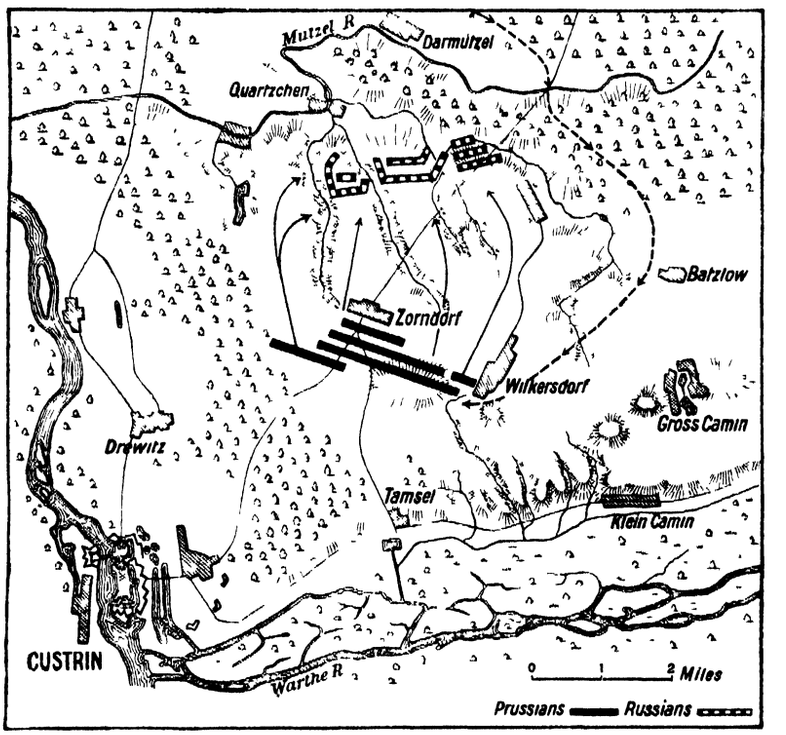
Leuthen.

Campaign of 1758.—The raid upon Berlin had accomplished nothing, and the advance of the Russian main body had died out for want of resolution to seize the opportunities offered by Frederick the Great's absence. The Czarina, annoyed by his slowness, recalled Apraxin and appointed Fermor in his place. Utilizing the winter snows, he collected some 31,000 men and crossed the frontiers of East Prussia (January 10th, 1758) and attempted to annex the province, driving out all the Prussian officials who refused to swear fealty to Catherine. This took time, and when the period of thaw supervened the Russians were immobilized and could not advance until approaching summer had dried the roads again. For the moment, therefore, no danger threatened Frederick from this quarter, and Rossbach had effectually tamed the French. The Swedes, too, showed little energy, the "roadless" period affecting them equally with the Russians.

Frederick therefore resolved to seize the opportunity to renew his invasion of Austria. As a beginning he recaptured Schweidnitz in April with 5000 prisoners. The Austrian field army under Daun lay about Königgrätz, covering all the passes out of Silesia; but covered by the newly formed "Free Corps" (his answer to the semi-savage Croats, Pandours and Tolpatches of the Austrians), Frederick marched right across their front on Olmütz, whilst a special corps (30,000) under Prince Henry threatened their left from Saxony and the Elbe. He had with him about 40,000 men. But Olmütz lay 90 m. from the Prussian frontier, and the Austrian light troops swarmed in the intervening district. Ultimately a great Prussian convoy was destroyed in the action of Domstädl, and the siege of Olmütz had to be raised (July 1st); but instead of marching back the way he had come Frederick led his troops through Bohemia practically in the rear of Daun's army, and on the 14th of July entered Daun's empty entrenchments at Königgrätz. Fermor's Russians were now again in the field and had reached Posen, burning and plundering horribly. By skilful manœuvring the king deceived the Austrians till the roads to Silesia by Skalitz and Nachod were open and then by a rapid march passed over into Silesia, reaching Grüssau (near Landshut) on the 8th of August. Leaving Keith with half his force to hold this district, he then marched to Frankfurt-on-the-Oder, taking with him only some 15,000 men, to strengthen the wing already engaged against the Russians. Frankfurt was reached on the 20th of August. Fermor was then besieging Cüstrin with 52,000 men, and hearing of the king's approach he raised the siege and placed himself behind a formidable obstacle facing north, near Zorndorf, from which direction the king was approaching. Seeing that the same obstacle that prevented him from attacking the Russians prevented them equally from attacking him, the king marched right round Fermor's eastern flank—the Russians gradually forming a fresh front to meet him—so that when the Prussian attack began on the morning of the 25th of August they stood in three irregular squares, divided from each other by marshy hollows, and thus unable to render one another support. The king made his first effort against the square on the right—Seydlitz with his squadrons covering the movement. But the Russian troops fought with far more spirit than the Austrians had ever shown, and things were going very badly with the Prussians when Seydlitz, who in the meanwhile had succeeded in making paths across the Zabern-grund on which the Russian right rested, flung himself upon

Siege of Olmütz.

Zorndorf.



the great square, and rode over and destroyed the whole mass in a prolonged mêlée in which quarter was neither given nor asked. Relieved by this well-timed charge, the king now re-formed the infantry already engaged, and concentrated all his efforts on the south-west angle of the great centre square. Again the Russians more than held their own, issuing forth from their squares and capturing many field-pieces. Some of the Prussian infantry was actually broken and in full flight when Seydlitz, with his ranks re-formed and his horses rested, returned and again threw himself upon the square exactly as on the previous occasion and with the same result—the square, as a formation, was broken, but groups still stood back to back and the most savage butchery ensued. The combatants could not be separated and only darkness put a stop to the slaughter. Of 36,000 Prussians 12,500 were killed or wounded, 1000 prisoners or missing (37·5 %), and of 42,000 Russians about 21,000 had fallen (50 %).

In the night the survivors gradually rallied, and morning found the Russians in a fresh position a couple of miles to the northward, but Frederick's troops were too weary to renew the attack. Gradually the Russians withdrew towards Landsberg and Königsberg, and the king, leaving Dohna to follow them up, marched with the remainder of his forces on the 2nd of September for Saxony, covering 22 m. a day. They arrived only in the nick of time, for Daun had united with portions of the Empire Army and was threatening to crush

Prince Henry under the weight of more than two-fold numbers. The prince had been driven into an entrenched position above Gahmig near Dresden and Daun was about to attack, but the mere name of Frederick was enough, and learning of his arrival Daun fell back to Stolpen on the 12th of September.

The Prussian army now lay around Grossenhain, Prince Henry's force covering Dresden and the Elbe bridges. The Empire Army was at Pirna, Daun at Stolpen, and in these positions they remained until the 26th of September, the Prussians getting the rest they so urgently needed. On that date, however, the state of truce was broken and the king moved towards Bischofswerda, where Daun's subordinate Loudon was posted. The latter retired, opening the road to Bautzen. The king arrived at Bautzen on the 7th of October and had to wait until the 10th for provisions from Dresden. He then moved forward to Hochkirch, where he found Daun strongly entrenched across his path at Kittlitz with 90,000 men, the Prussians having only 37,000. The king determined to attack the Austrian right. So confident had the Prussians become in the belief that Daun would never take the offensive himself that the most elementary precautions of safety were forgotten and only Zieten kept his horses saddled. During the night of the 13th the Austrians, leaving their watch-fires burning and moving silently through the woods, which covered much of the ground, formed up almost all round the Prussian camp. At 5 a.m. the attack was delivered from all quarters simultaneously and a most desperate struggle ensued. Nothing but the superb discipline of the Prussians saved the situation. Zieten with his squadrons managed to keep a way of escape open, and after a most obstinate conflict the wreck of the army succeeded in withdrawing, leaving 101 guns and 9450 men on the ground or in their enemies' hands (25·5 %). The Austrians, in spite of the advantage of a well-conceived surprise, lost 7590 men and were too shaken for pursuit. They fell back to their old camp, where they remained for a week, thus giving Frederick time to bring up reinforcements from Dresden (6000 men) and, starting on the 23rd, he marched right round the Austrian right and raised the siege of Neisse, the prime object with which he had set out. Daun, learning that the king had gone past him into Silesia, now laid siege to Dresden. On the 15th of November he heard that Frederick was marching to its relief through Lusatia and incontinently gave way, retiring on Pirna. The king was in Dresden again on the 20th.

Hochkirch.

Campaign of 1759.—The drain on Frederick's resources had been prodigious. On the battlefields of the previous three years he had lost at least 75,000 men, not counting the waste of life in his marches and skirmishes; but he still managed to keep 150,000 men in the field, though for want of the old two years' training in loading, firing and manœuvring the average efficiency had much diminished. In cavalry, too, he was relatively weaker, as there was no time to train the remounts. His enemies felt their losses far less and were beginning to understand his tactics; fortunately they remained incapable of combined action.

After minor operations on the frontiers the Russians took the field. Fermor had been superseded by Soltikov, and Dohna with his 18,000 men proved quite inadequate to arrest the Russians' progress. He was superseded by Wedell, who, on the 23rd of July, with 26,000 men boldly attacked the 70,000 Russians whilst on the march near Züllichau. He was defeated with a loss of 6000 and fell back to Crossen bridge, 5 m. below Crossen, which Soltikov occupied next day, thence he moved down the river towards Frankfurt, keeping on the eastern bank. Daun had detached Loudon and Hadik with 35,000 men to join him, and it became vital to Frederick to prevent the combination. Leaving Prince Henry at Schmöttseifen to watch Daun, he marched with all available forces and joined Wedell on the 6th of August at Müllrose near Frankfurt, after vainly searching for the Hadik-Loudon force. Here he was joined on the 10th by Finck with 10,000 men, bringing his whole force up to 50,000 against the Russian and Austrian 90,000, who lay entrenched in the sandhills about Kunersdorf. On the 11th he crossed his whole force over the Oder at Reitwein and on the 12th marched forward, intending to envelop the Russians on both flanks; but his columns lost their way in the woods and their attacks were delivered successively. In spite of their usual disciplined gallantry, the Prussians were completely beaten, even Seydlitz and his squadrons failed to achieve the impossible, and the night closed down on the greatest calamity Frederick had ever experienced. Of 43,000 men 20,720 (48·2 %) were left on the ground and 178 guns and 28 colours fell into the hands of the enemy; and the allied Austro-Russian force only lost 15,700. The battle had only lasted six hours. In the depression following this terrible day he wrote to Schmettau, commanding at Dresden, telling him to expect no help, and on the 4th of September Dresden fell.

Kunersdorf.

As usual Frederick was saved by the sluggishness of his enemies, who attempted no pursuit, and being reinforced the day after the battle by 23,000 men, and having ordered up Kleist (who had been watching the Swedes), he was again at the head of an army. Week after week went by, during which he countered all attempts of Daun and Soltikov to combine, and ultimately the Russians, having consumed all the food and forage in the districts they occupied, were compelled to fall back on their own frontiers. Then, uniting with Prince Henry, the king turned to fall upon Daun; but his contempt for his adversary proved his own undoing. Contrary to all his own teaching, he sent a detachment of 12,000 men under Finck to work round the Austrians' flank by Dippoldiswald to Maxen, but the latter, learning of the movement and calling up a wing of the Empire Army to their assistance, fell upon Finck with 42,0 0 men and compelled him to surrender after two days' hard fighting. The combination having failed, the two armies stood facing one another till far into the winter. But for Prince Ferdinand's glorious victory at Minden on the 1st of August, the year would have been one catalogue of disaster to the Prussian arms, and these operations must now be mentioned.

Maxen.

In the early part of 1758 Prince Ferdinand with 30,000 men had advanced from Lüneburg and was joined by Prince Henry with 8600 from Halberstadt. The approach of the latter threatened the right wing of the French army under Clermont, which was posted along the Aller, and the whole line gave way and retreated without making any serious stand behind the Rhine. Prince Ferdinand followed and defeated them on the 23rd of June at Crefeld. Clermont was relieved by Contades and at the same time Soubise, who had at last reorganized his command, shattered by the disaster of Rossbach, moved forward through Hesse and compelled Prince Ferdinand to withdraw from his very advanced position. No engagement followed: Soubise fell back upon Frankfurt and Prince Ferdinand held a line through Münster, Paderborn and Cassel during the winter.

Fortunately events in Canada and the glory of his victories had made Frederick's cause thoroughly popular in Great Britain, and at last it became possible to detach a considerable force of British troops to Prince Ferdinand's assistance, whose conduct turned the scale in the critical moment of the campaign. During the winter the French had organized their forces in two columns—based on Frankfurt and Wesel respectively. Broglie was now in command of the former; Contades still led the latter.

In April Prince Ferdinand advanced to drive the French out of Hesse and Frankfurt, and actually reached Bergen, a village some 10 m. to the north, but here he was defeated by Broglie (13th April) and forced to retreat the way he had come, the French following along their whole front and by sheer weight of numbers manœuvring him successively out of each position he assumed. On the 10th of July Broglie surprised Minden, thus securing a bridge over the Weser and free access into Hanover, and light troops overran the south of the electorate. On the 16th Contades with the left column joined Broglie and the French now had some 60,000 men against the 45,000 Ferdinand could muster. The latter's position was extremely difficult, for the French had only to continue in possession of the bridges at Minden to ruin the whole country by their exactions, and the position they held was too well protected on the flanks and too strong in front for direct attack.

Minden.

Nevertheless Prince Ferdinand drew up before it and met the French plundering raids by a threat on their communication with Cassel, and as a further inducement to tempt Contades to attack him, he detached a column under Wangenheim, which entrenched itself across the only outlet by which the right of the French army could debouch from behind the marshes which lie in the angle between the Weser and the Bastau, a small tributary joining the former below Minden. The bait took, and during the early hours of the 1st of August the French army moved out to attack Wangenheim. But Ferdinand's troops had been lying in instant readiness for action, and as soon as the outposts gave the alarm they were in motion in eight columns, *i.e.* practically deployed for action to meet the French as they emerged from their positions. Unfortunately the outpost reports were delayed by about wo hours, owing to the heavy gale and storm that was prevailing, and the French had made far greater progress with their deployment than Ferdinand had reckoned on. An almost front-to-front engagement ensued. Things were going badly with the Prussians when, through a mistake in the delivery of an order, the British brigade (12th, 20th, 23rd, 25th, 37th, 51st), followed by some Hanoverian battalions, began to advance straight upon the masses of French cavalry who stood protected by the cross-fire of several batteries. Once launched, neither fire nor shock could check their progress; halting for a moment to pour volleys into the charging squadrons hastily thrown against them, they swiftly resumed their advance. French infantry too were hurled against them, but were swept away by fire and bayonet, and presently they had pierced right through the French line of battle. Now came the moment when cavalry should have been at hand to complete the victory, and this cavalry, the Blues, the 1st and 3rd Dragoons, Scots Greys and 10th Dragoons under Lord George (afterwards Viscount) Sackville (*q.v.*) stood ready, waiting only the order to advance. This Sackville refused to give, though called on three times by the prince; no satisfactory explanation of his conduct has ever been discovered, but he was tried by a general court-martial and cashiered. Nevertheless, so brilliant had been the conduct of all the troops engaged, especially of the infantry brigade that the victory was won even in spite of this failure of the cavalry, and before evening the French were retreating as a demoralized mass towards Cassel, leaving some 10,000 men, 17 colours and 45 guns in the hands of the victors, who on their side out of 43,000 had lost 2600 killed and wounded. Of the six British regiments that went into action 4434 strong, 1330 (30 %) had fallen, but their feat is not to be measured only by the losses victoriously borne—these were not unusual in the period—but by the astounding discipline they maintained throughout the advance, resuming their march after beating off cavalry charges with the cool precision of a review in peace-time. Ferdinand followed up his victory by a pursuit which was vigorous for three days and had all but reached the Rhine when his movement was stayed by the necessity of detaching 12,000 men to the king to make good the losses of Kunersdorf.

Campaign of 1760.—The year opened gloomily for Frederick. His embarrassment both for men and money was extreme, and his enemies had at last agreed on a combined plan against him. They purposed to advance in three columns concentrically upon him: Daun with 100,000 men in Saxony, Loudon with 50,000 from Silesia, Soltikov's Russians from East Prussia; and, against whichever column the king turned, the others were to continue towards Berlin. Only in Hanover were the conditions more favourable, for Ferdinand had 70,000 (20,000 British) against the 125,000 of the French.

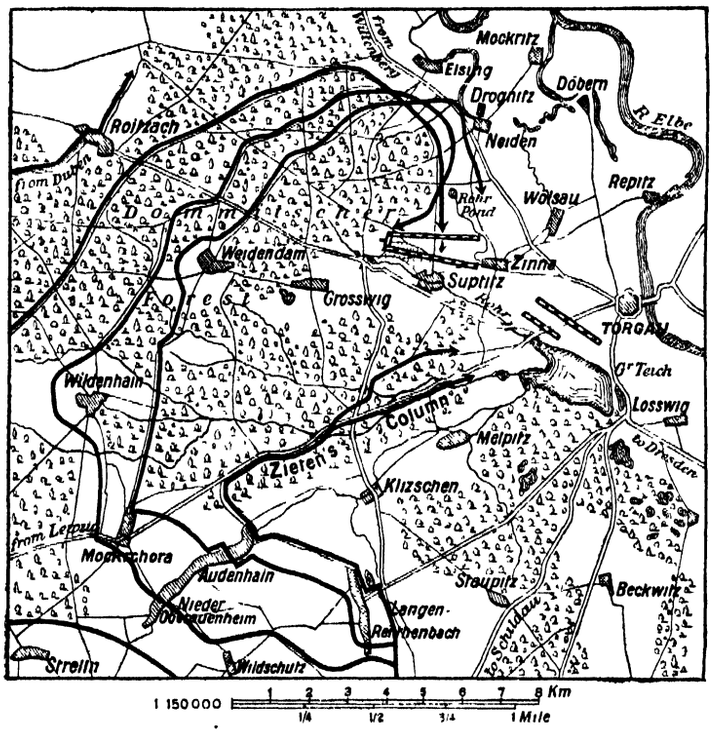
Early in April the king stood with 40,000 men, west of the Elbe near Meissen facing Daun, Prince Henry with 34,000 in Silesia from Crossen to Landeshut, 15,000 under Forcade and Jung-Stutterheim in Pomerania facing the Swedes and Russians. Towards the end of May Loudon moved to besiege Glatz, and Fouqué, who commanded at Landeshut, marched with 13,000 to cover Breslau. Loudon at once seized Landeshut, and Fouqué, returning in response to urgent orders from the king, was attacked by Loudon with 31,000 men and almost destroyed. Meanwhile, Prince Henry had moved to Landsberg against the Russians, but failed to seize his opportunities and thus Silesia lay open to the Austrians. Frederick decided to march with his main body against Loudon and attack him if unsupported, but, if his movement induced Daun to move to Loudon's support, then to double back and besiege Dresden. For this purpose a siege train was held in readiness at Magdeburg. He marched rapidly on Bautzen, then hearing that Daun was approaching to support Loudon he returned and besieged Dresden (July 12th). The town was bombarded, there being no time for regular siege approaches, but it held out, and by the 28th of July Daun's army returning had almost surrounded Frederick. The siege had to be raised, and during the night of the 29th of July the Prussians slipped away to Meissen. On the same day Frederick learnt that Glatz, the key to Southern Silesia, had fallen into the hands of the Austrians, but as a set-off the news shortly afterwards arrived of Prince Ferdinand's brilliant victory at Warburg, in which the British cavalry led by the marquis of Granby amply wiped out the disgrace incurred by Sackville. On the 1st of August Frederick began his march into Silesia, summoning Prince Henry from Landsberg to join him, which he did by a splendid march of some 90 m. in three days. The king's march was almost as remarkable, for the roads were very bad and the Austrians had freely obstructed them, nevertheless in five days he reached Bautzen, having marched more than 100 m. from his starting-point, and crossed five considerable rivers on his way. Thence he continued more easily to Bunzlau. Daun was in front of him and Lacy with clouds of light troops on his right, the Russians under Czernicheff with Loudon not far away to his left front, 114,000 men in all to his 30,000, but he held to his decision to reach Schweidnitz. With this purpose in view he moved south-east on Jauer, marching 25 m. on the 9th of August, but the enemy was still in front of him and hovering on his flanks. On the 10th he tried the Liegnitz road with the same result, and his position became desperate as his food was almost exhausted. He had already covered 15 m. that day, but at 11 P.M. he called on his men for a night march and formed up again on his old position next morning, the 11th of August. He appeared to be completely surrounded, and things looked so desperate that Mitchell, the British ambassador, burnt his papers and cipher key. At sunset on the 12th, however, Frederick again broke camp and by a night march evaded the enemy's scouts and reached Liegnitz at noon on the 13th, the Austrians appearing a couple of hours later. The troops rested during the 13th and 14th, but at nightfall, leaving their watch-fires burning, marched off by the Glogau road, the only way of escape still open. The Austrians, however, had planned a night attack, and Loudon's columns were moving to close this last loophole of escape. Fortunately for the Prussians they arrived just a few minutes too late, and in the combat that ensued 15,000 Prussians inflicted a loss of 10,000 men and 82 guns upon their assailants, afterwards resuming their march undisturbed. ***Liegnitz.***

But the danger was not yet over. Czernicheff was known to be in the immediate vicinity; so as to get him out of the way, Frederick gave to a peasant a despatch addressed to Prince Henry containing the words: "Austrians totally defeated to-day, now for the Russians. Do what we agreed upon." The peasant was to take care to be captured by the Russians and only give up the paper to save his life. The plan worked as he had anticipated, the paper duly reached Czernicheff's hands and he immediately evacuated the dangerous neighbourhood. Elated with his success the king now abandoned his retreat on Glogau and determined to press on at all hazards to Breslau, which in spite of many anxious moments he reached on the 17th of August.

The Russians now abandoned the campaign in the open field and besieged Colberg on the Baltic coast. Frederick in Silesia manœuvred for some weeks between Breslau, Schweidnitz and Glatz, but was suddenly recalled by the news of the capture of Berlin on the 9th of October by Cossacks and portions of the Empire Army and Austrians from Saxony. On the 11th of October the king was in full march, but the news of his approach was enough and the enemy dispersed, the

Austrians and Empire Army making for Torgau. Daun, relieved of Frederick's pressure, now also moved to Torgau, leaving Loudon in Silesia, and had concentrated over 64,000 men at and around Torgau before Frederick had collected an attacking force of 45,000. The position held by the Austrians was an entrenched camp fronting in all directions, but it was too cramped for their numbers and difficult to leave for a counter-stroke. Frederick determined to attack it both front and rear, and leaving Zieten to act against the former, he marched off at 6.30 of the 3rd of November to attack it as soon as Zieten should have thoroughly attracted the enemy's attention. But for once Zieten failed; he allowed himself to be drawn off by the Austrian light troops, and Frederick, in ignorance of the real state of affairs, launched his grenadiers against a thoroughly intact enemy, strongly entrenched, with, it is said, 400 guns in position to sweep the approaches. The grenadiers were simply swept away by grape and case—only 600 out of 6000 remained, and Prussian batteries hurrying up to their support were destroyed before they had time to load. The attack was, however, renewed

Torgau.



by fresh brigades as they came to hand, and the Prussian artillery did something to diminish the intensity of the Austrian case fire. The action began at 2 p.m. At 4.30, as the sun was setting, the king's last reserve of horse and foot at last succeeded in breaking the Austrian line and in the darkness there ensued a confused slaughter as at Zorndorf. The result was still in the balance when at length Zieten reached the field and attacked at once. For an hour or so the struggle still raged, but the Austrians were by now completely spent and withdrew gradually into the fortress and then across the river. Out of 44,000 the Prussians had lost 13,120 men (30 %), out of 65,000 the Austrians only 11,260 (17·3 %), but of these over 7000 were prisoners. Both sides, however, were completely paralysed by the struggle, and the year ended without further effort on either side.

On the western theatre of war Prince Ferdinand after the victory of Warburg had pressed the French back to the Rhine and besieged Wesel, but was compelled to raise the siege after suffering the defeat of Kloster-Kamp (16th Oct.) and to withdraw to Lippstadt and Warburg.

Campaign of 1761.—Torgau proved to be Frederick's last great battle. All parties were now so completely exhausted that they no longer were able to face the risks of a decision on the field. In the west Prince Ferdinand was first in the field, and in February and March he drove the French southward as far as Fulda, but an attempt to capture Marburg failed and the gradual pressure of French numerical superiority, together with the reduction of the British contingent on the death of George II., compelled him to retreat gradually until by the beginning of October both Brunswick and Wolfenbüttel fell into their hands. In the east the king had barely 100,000 men against 300,000 Austrians and Russians. Leaving Prince Henry to observe Daun in Saxony he marched to join von der Goltz, who with 23,000 stood about Schweidnitz. The Russians (50,000) under Buturlin were approaching from Posen, and Loudon with 72,000 men starting from Glatz manœuvred to join them. After two months' skirmishing and marching the Allies effected their junction between Liegnitz and Jauer, having completely severed Frederick's communications with Prussia. But Frederick depended for his food and immediate supplies on Southern Silesia, and not caring to risk a battle with odds of three to one against him he withdrew into the entrenched camp of Bunzelwitz, where the Allies did not dare to attack him. Ultimately, as usual, the Russian commissariat broke down, and in September Buturlin withdrew the way he had come. Relieved of this antagonist, Frederick manœuvred to draw Loudon out of his positions and compel him to fight in the open, but Loudon refused the challenge and after an attempt to surprise Schweidnitz, which failed, withdrew into winter quarters. Prince Henry in Saxony held his own against Daun.

England now threatened to withdraw her subsidies, and as the Prussian armies had dwindled to 60,000 men the end seemed very near. But a turn of fortune was already at hand. On the 5th of January 1762 the tsarina died, and her successor, Peter III., at once offered peace. On the 16th of March an armistice was agreed to, and shortly afterwards the treaty of St Petersburg was signed, by which Pomerania was given back to Prussia and a contingent of 18,000 men placed at Frederick's disposal. The withdrawal of the Russians led in turn to the withdrawal of the Swedes, and thus only France and Austria remained—the former bled white by the strain of her colonial disasters, the latter too weary to make further great exertions. Though the war dragged on for some months, and Prince Henry, assisted by Seydlitz, won the victory of Freiberg over the Empire Army (29th Oct. 1762), no great battle was attempted, and although a revolution at St Petersburg deprived Frederick of Russian assistance, in the autumn Ferdinand drove the French back over the Rhine, and thereupon an armistice was agreed upon by all. Final terms of peace were adjusted on *status quo ante* basis at Hubertusberg on the 15th of February 1763. Prussia had maintained all her possessions and made good her claim to rank for all time with the Great Powers. (F. N. M.)

BIBLIOGRAPHY.—The three principal works on the "Third Silesian" part of the war are the Prussian General Staff, *Der siebenjährige Krieg* (Berlin, 1901–); Austrian Official "Kriegsarchiv," *Kriege der Kaiserin Marie Theresia* (in progress), and Carlyle's *Frederick the Great*. See also C. B. Brackenbury, *Frederick the Great*; Bernhardi, *Friedrich der Grosse als Feldherr* (Berlin, 1881); biographies of Prince Henry, Zieten, Seydlitz, Maurice of Dessau, &c.; von Arneth, *Maria Theresia und der Siebenjährige Krieg* (Vienna, 1875); the older histories of the war by Tempelhoff, Archenholz and Lloyd; Jomini, *Traité des grandes opérations militaires*; Masslowski, *Die russische Armee im 7jähr. Kriege* (Berlin, 1893). The main authorities for Ferdinand's Campaign are Westphalen, *Feldzüge des Herzogs Ferdinand von Braunschweig*, and J. W. Fortescue, *Hist. British Army*, vol. ii

NAVAL OPERATIONS

The naval operations of the Seven Years' War began nearly a year before the declaration of hostilities. In June 1755 a British squadron under Boscawen was sent into the Straits of Belle Isle to intercept French ships carrying soldiers and stores to Quebec, in retaliation for aggressions on British possessions in North America. On the 8th of June Boscawen seized two French line-of-battle ships fitted as transports, the "Alcide" and the "Lys." A general seizure of French merchant ships followed, and thousands of French sailors were in prison in England by the early days of 1756. The government of Louis XV. did not reply by a declaration of war, but prepared to retaliate by a threat of invasion, which created something like a panic in Great Britain. The government, then in the weak hands of the marquess of Newcastle, accumulated warships in the Channel,

and on the 3rd of February 1756 issued a proclamation which instructed the inhabitants of the southern counties of England to drive their cattle inland in case of a French landing, and thereby much aggravated the prevailing fear. But the invasion scheme was so far only a cover for an attack on Minorca, then held by Great Britain.

A squadron of twelve sail of the line was prepared at Toulon under La Galissonière, a veteran admiral who had entered the navy in the reign of Louis XIV. It escorted transports carrying 15,000 troops under the duc de Richelieu. The danger to Minorca, where the garrison had been allowed to fall below its due strength, was well known to the British ministers. On the 11th of March they appointed Admiral John Byng to command a squadron which was to carry reinforcements. He did not, however, leave St Helens till the 6th of April. Byng had with him ten sail of the line, and carried 3000 soldiers for the garrison. The ships were indifferently manned, and the admiralty refused to strengthen him by drafts from the ships it proposed to retain in the Channel. In order to find room for the soldiers, the marines of the squadron were left behind. There was therefore a danger that, if an encounter with the French fleet took place after the reinforcements were landed, the British squadron would be short-handed. Byng reached Gibraltar on the 2nd of May. The French invasion of Minorca had been carried out on the 19th of April. The governor of Gibraltar, General Fowke, refused to part with any of his soldiers to reinforce Minorca. On the 8th of May Byng sailed, and on the 19th he was in communication by signal with General Blakeney, governor of the fortress. Before the soldiers could be landed the French fleet came in sight. Byng had been joined by three ships of the line at Gibraltar, and had therefore thirteen ships to twelve. One of the French vessels, the "Foudroyant" (84), was a finer warship than any in the British line, but in effective power Byng was at least equal to his opponent, and if his ships were poorly manned La Galissonière was in worse case. The British admiral rejected one of his small line-of-battle ships in order to engage in the then orthodox manner—van to van, centre to centre, and rear to rear, ship against ship. By the manœuvres of the afternoon of the 19th and morning of the 20th he gained the weather gage, and then bore down on the enemy at an angle, the van of the English steering for the van of the French. The sixth ship in his line, the "Intrepid" (74), having lost her foretopmast, became unmanageable and threw the vessels behind her out of order. Thus the six in front were exposed to the fire of all the French, who ran past them and went off. Byng could have prevented them by bearing down, but refused to alter the formation of his fleet. Being now much disturbed by the crippled state of the ships in his van, he made no effort either to land the soldiers he had on board or to renew the action; and after holding a council of war on the 24th of May, which confirmed his own desire to retreat, he sailed for Gibraltar (see BYNG, JOHN, for his trial and execution). The loss of Minorca, which was the consequence of this retreat, gave the French a great advantage in the Mediterranean. During the rest of the year no very vigorous measures were taken on either side, though the British government reinforced its squadrons both in the Mediterranean and on the coast of America.

In 1757 the naval war began to be pushed with a vigour hitherto unprecedented. The elder Pitt became the effective head of the government, and was able to set about ruining the French power at sea. Owing to the long neglect of the French navy, it was so inferior in strength to the British that nothing short of the worst mismanagement on Pitt's part could have deprived Great Britain of victory. Some of the minister's measures were not indeed wise. He sent out, during the last months of 1757 and the whole of 1758, a series of combined expeditions against the French coast, which were costly and for the most part unsuccessful. They terminated in September 1758 with a disaster to the troops engaged in St Cas Bay. Yet these assaults on the French coast did much to revive the spirit of the nation, by removing the fear of invasion. Meanwhile a sound aggressive policy was followed in distant seas during 1758. In the East Indies the squadron which had been engaged during 1757 in co-operating with Clive in the conquest of Bengal was strengthened. Under the command of Sir George Pocock it was employed against the French squadron of M. d'Aché, who brought a body of troops from Europe under General Lally-Tollendal to attack the possessions of the East India Company on the Coromandel coast. The two actions fought at sea on the 29th of April and the 1st of August in the Bay of Bengal were not victories for Sir George Pocock, but neither were they defeats. The French admiral was so uncertain of his power to overcome his opponent that he sailed for the islands of the Indian Ocean so soon as Lally and the authorities at Pondicherry would allow him to go. In America the strong squadron of Boscawen rendered possible the capture of Louisburg, on the 26th of July, and cleared the way for the conquest of Canada in the following year. During 1759 the French government, trusting that the multiplicity of the calls upon its fleet would compel Great Britain to scatter its naval forces, laid plans for a great invasion (for the details of this plan and its results, see QUIBERON, BATTLE OF). But the British navy proved numerous enough not only to baffle invasion at home but to effect large conquests of French possessions abroad. In North America the co-operation of the navy rendered possible the capture of Quebec by Wolfe. In the West Indies, though an attack on Martinique was repulsed, Guadaloupe was taken in January. In the East Indies the squadron of M. d'Aché reappeared in the Bay of Bengal in September. He fought another undecided action with Sir George Pocock on the 8th, and gave some small help to the French army. But the bad state of his squadron forced him to retreat soon, and the resources of the French being now exhausted in those seas, he did not reappear. The British navy was left in complete command of the Bay of Bengal and the coast of Malabar. On shore, Lally, cut off from reinforcements, was crushed, and Pondicherry fell.

During 1760 and 1761 the French fleet made no attempt to keep the sea. The British navy went on with the work of conquering French possessions. During 1760 it co-operated on the Lakes and on the St Lawrence in the final conquest of Canada. Between April and June of 1761 it covered the capture of the island of Belle-Île on the French coast, which both strengthened its means for maintaining blockade and gave the British government a valuable pledge to be used for extorting concessions when the time for making peace came. The complete ruin of French merchant shipping and the collapse of the navy left the maritime population free to seek a livelihood in the privateers. Commerce-destroying was carried on by them with considerable success. The number of British merchant ships taken has been put as high as one-tenth of the whole. But this percentage was the price paid for the enormous advantage gained by the ruin of the French as commercial rivals. The merchant shipping of Great Britain increased largely in the course of the war, and from it dates her commercial predominance.

By the close of 1761 the helplessness of France at sea had been demonstrated, but the maritime war was revived for a few months by the intervention of Spain. A close alliance, known as "the family compact," was made between the royal houses of that country and France in the course of 1761. The secret was divulged, and Pitt would have made war on Spain at once. He was overruled and retired. So soon, however, as the treasure ships from America had reached Spain, at the close of 1761, the Spanish government declared war. Its navy was incapable of offering a serious resistance to the British, nor did it even attempt to operate at sea. The British government was left unopposed to carry out the plans which Pitt had prepared against Spain. The only aggressive movement undertaken by the Spanish government was an attack on Portugal, which was the close ally of Great Britain and gave her most useful help by allowing her the free use of Portuguese ports. As the king of Portugal refused to join the French and Spanish alliance, his country was invaded by a Spanish army. Great Britain supported her ally. A regiment of cavalry and seven battalions of foot were landed. They gained several small actions against the invaders, and had

the most active share in the operations which forced them to retire. But the most effective blows delivered against Spain were directed at her colonies. The British troops, left free by the recent success against the French in America, were employed in an attack on Havana. A powerful fleet left England on the 5th of March, bringing troops which were joined by others in the West Indies; Sir George Pocock, who had returned from the East Indies, was in command. Under his direction the fleet reached its destination without loss, and Havana was assailed. The citadel known as the Moro Castle made a stout defence, and some of the ships suffered severely in a bombardment. But the worst losses of the besiegers were due to the climate of Cuba, aided by bad sanitary arrangements. Of the 10,000 troops landed, three-fourths are said to have suffered from fever or dysentery, and the majority of the sick died. Yet the Moro was taken on the 30th of September, and Havana, which could have made a longer resistance, surrendered on the 10th of October. Martinique, the last important possession of France in the New World except her half of San Domingo, had fallen in February. In the East Indies, where the surrender of Pondicherry had left other forces free, a combined expedition triumphed easily in October over the natives of Manila, under the direction of the archbishop, who acted as governor. The preliminaries of the peace of Paris were signed on the 3rd of November 1762.

See Beatson, *Naval and Military Memoirs of Great Britain* (London, 1804); Captain Mahan, *Influence of Sea Power upon History*; Lacour Gayet, *La Marine militaire de la France sous le règne de Louis XV* (Paris, 1902). (D. H.)

SEVERIANA, VIA, an ancient highroad of Italy, running S.E. from Ostia to Terracina, a distance of 73 m. along the coast, and taking its name, no doubt, from the restoration of an already existing road by Septimius Severus, who was a great benefactor of Ostia. It ran along the shore at first, just behind the line of villas which fronted upon the sea, and are now half a mile inland, or even upon its edge (for an inscription records its being damaged by the waves). Farther S.E. it seems to have kept rather more distant from the shore, and it probably kept within the lagoons below the Circean promontory. As is natural in a sandy district where building materials are rare, remains of it are scanty.

See R. Lanciani in *Monumenti dei Lincei*, xiii. (1903), 185; xvi. (1906), 241; T. Ashby in *Mélanges de l'École française de Rome* (1905), 157 sqq. (T. As.)

SEVERINUS, pope in 640, successor of Honorius. He occupied the papal chair only three months after his consecration, having had to wait a year and a half for its ratification by the emperor. During this long vacancy the exarch of Ravenna, supported by the military body of Rome (*exercitus Romanus*), occupied the Lateran and seized the treasure of the Church.

SEVERN, JOSEPH (1793–1879), English portrait and subject painter, was born at Hoxton on the 7th of December 1793, his father, a musician, coming of an old Gloucestershire family. During his earlier years he practised portraiture as a miniaturist; and, having studied in the schools of the Royal Academy, in 1818 he gained the gold medal for his "Una and the Red Cross Knight in the Cave of Despair." In 1819 he exhibited at the Academy his "Hermia and Helena." He was an intimate friend of Keats the poet, whom he accompanied to Italy in 1820 and nursed till his death in 1821. His picture of "The Death of Alcibiades" then obtained for him an Academy travelling studentship, and he returned to Rome, where he lived till 1841, marrying in 1828 the daughter of Lord Montgomerie, a ward of Lady Westmoreland, one of his chief patrons, and mingling in the congenial art circles of the city. In 1861, after living in England for nineteen years, mainly for the education of his children, he was appointed British consul at Rome, a post which he held till 1872, and during a great part of the time he also acted as Italian consul. His most remarkable work is the "Spectre Ship" from the *Ancient Mariner*. He painted "Cordelia watching by the Bed of Lear," the "Roman Beggar," "Ariel," "The Fountain," and "Rienzi," executed a large altar-piece for the church of St Paul at Rome, and produced many portraits, including one of Baron Bunsen and several of Keats. He died at Rome on the 3rd of August 1879. He had six children, of whom Walter, Arthur and Ann (wife of Sir Charles Newton) were well-known artists.

See the *Life and Letters*, by William Sharp (1892).

SEVERN, a river of Wales and England. It rises on the N.E. side of Plinlimmon, on the S.W. border of Montgomeryshire, and flows with a nearly semicircular course of about 210 m. to the Bristol Channel; the direct distance from its source to its mouth is about 80 m. Its Welsh name is Hafren, and its Roman name was *Sabrina*. Through Montgomeryshire its course is at first in a S.E. direction, and for the first 15 m. it flows over a rough precipitous bed. At Llanidloes it bends towards the N.E., passing Newtown and Welshpool; this part of the valley bearing the name of the Vale of Powis. It receives the Vyrnwy near Melverley, and forms a mile of the Welsh border, and then turning in an E.S.E. direction enters Shropshire, and waters the broad rich plain of Shrewsbury, after which it bends southward past Ironbridge and Bridgnorth to Bewdley in Worcestershire. In Shropshire it receives a number of tributaries, the chief of which is the Tern. Continuing its southerly course through Worcestershire it passes Stourport, where it receives the Stour (left), and Worcester, shortly after which it receives the Teme (right). It enters Gloucestershire close to Tewkesbury, where it receives the Upper Avon (left), after which, bending in a S.W. direction, it passes the city of Gloucester, below which it becomes estuarine and tidal. A high bore or tidal wave, for which the Severn is notorious, may reverse the flow as high up as Tewkesbury Lock (13½ m. above Gloucester), and has sometimes caused great destruction. The estuary merges into the Bristol Channel at the point where it receives on the left the Lower or Bristol Avon, and on the right the Wye.

The source lies at an elevation of about 2000 ft.; the fall from Llanidloes is about 550 ft., from Newtown 365 ft. and from Shrewsbury, 90 m. above Gloucester, 180 ft. The scenery of the upper valley is wild and picturesque, and that of the lower river is at some points very beautiful. The course between the height of the Wrekin and Wenlock Edge (despite the manufacturing towns on the banks at this point), the valley above Bewdley, where the Forest of Wyre borders the left bank, and the fine position of Worcester, with its cathedral rising above the river, may be noticed. The distance from Gloucester to Avonmouth is 44 m., but the upper part of the estuary is tortuous, and, owing to the bores and shifting shoals, difficult of navigation. On this account the Gloucester and Berkeley Ship Canal, 16¾ m. in length, was constructed, admitting vessels of 350 tons to Gloucester from the docks at Sharpness on the estuary. The navigation extends up to Arley, above Bewdley, 47 m. from Gloucester, but is principally used up to Stourport (43 m.), from which the Staffordshire and Worcestershire canal gives access to the Wolverhampton industrial district and the Trent and Mersey navigation. The Berkeley canal and the Worcester and Birmingham canal are maintained by the Sharpness New Docks and Gloucester and Birmingham navigation company. There is connexion with the Thames by the Stroudwater canal from Framilode on the estuary, joining the Thames and Severn canal near Stroud. The Wye is in part navigable; the Bristol Avon gives access to the great port of Bristol, and the Upper Avon is in part navigable. The Severn is a good salmon river, and is famous for its lampreys, while many of the tributaries afford fine trout-fishing, such as the Teme and the Vyrnwy. The drainage area of the Severn is 6850 sq. m., including the Wye and the Bristol Avon, or 4350 sq. m. without these rivers.

Severn Tunnel.—The first bridge above the mouth of the Severn is that near Sharpness, which carries the Great Western and Midland joint railway between Berkeley Road and Lydbrook Junction. But the Severn tunnel, carrying the Great Western railway under the estuary 14 m. below the bridge, forms the direct route between the south of England and South Wales. Before the tunnel was made there was a steam ferry at a point known as "New Passage," where a ferry had existed from early times. The steam ferry was opened in connexion with the Bristol and South Wales Union railway in 1863, and was subsequently taken over by the Great Western company. Parliamentary powers to construct the tunnel were obtained by this company in 1872, and work began in the following year. The originator of the scheme and chief engineer was Mr Charles Richardson, and Sir John Hawkshaw was consulting engineer. The principal

difficulty encountered in the construction was the tendency to flooding, owing both to the river breaking into the works, and, more especially, to the underground springs encountered, one of which when tapped completely flooded the works at a rate of 6000 gallons per minute, and delayed the work for more than a year. In 1879, after this disaster, the contract for the whole work was let to Mr T. A. Walker. The total length of the tunnel is 4 m. 624 yds., of which 2¼ m. are beneath the river. On the east side the cutting leading to the tunnel has a gradient of 1 in 100, which is continued in the tunnel itself until the deepest part is reached beneath the river-channel known as "the Shoots," which has a depth of about 60 ft. at low tide and 100 at high tide (ordinary spring). Beneath this the rails run level for 12 chains, after which the ascent of the tunnel and cutting on the west side is on a gradient of 1 in 90. At Sudbrook on the west side there is a pumping and ventilating station. The tunnel was completed in 1886; the time for passenger trains between Bristol and Cardiff was immediately reduced by nearly one half, and the value of the new route was especially apparent in connexion with the mineral traffic between the South Wales coal-field and London and the ports of the south of England.

SEVERUS,[1] **LUCIUS SEPTIMIUS** (A.D. 146–211), Roman emperor, was born in 146 at Leptis Magna on the coast of Africa. Punic was still the language of this district, and Severus was the first emperor who had learned Latin as a foreign tongue. The origin of his family is obscure. Spartianus, his biographer in the *Historia Augusta,* doubtless exaggerates his literary culture and his love of learning; but the taste for jurisprudence which he exhibited as emperor was probably instilled into him at an early age. The removal of Severus from Leptis to Rome is attributed by his biographer to the desire for higher education, but was also no doubt due in some degree to ambition. From the emperor Marcus Aurelius he early obtained, by intercession of a consular uncle, the distinction of the broad purple stripe. At twenty-six, that is, almost at the earliest age allowed by law, Severus attained the quaestorship and a seat in the senate, and proceeded as *quaestor militaris* to the senatorial province of Baetica, in the Peninsula. While Severus was absent in Africa in consequence of the death of his father, the province of Baetica, disordered by Moorish invasions and internal commotion, was taken over by the emperor, who gave the senate Sardinia in exchange. On this Severus became military quaestor of Sardinia. His next office, in 174 or 175, was that of legate to the proconsul of Africa, and soon after he was tribune of the plebs. This magistracy, though far different from what it had been in the days of the republic, was still one of dignity, and brought promotion to a higher grade in the senate. In 178 or 179 Severus became praetor by competition for the suffrages of the senators. Then, probably in the same year, he went to Hispania Citerior as *legatus juridicus*; after that he commanded a legion in Syria. After the death of Marcus Aurelius he was unemployed for several years, and, according to his biographer, studied at Athens. He became consul about 189. In this time also falls the marriage with his second wife, afterwards famous as Julia Domna, whose acquaintance he had no doubt made when an officer in Syria. Severus was governor in succession of Gallia Lugdunensis, Sicily and Pannonia Superior; but the dates at which he held these appointments cannot be determined. He was in command of three legions at Carnuntum, the capital of the province last named, when news reached him that Commodus had been murdered by his favourite concubine and his most trusted servants.

Up to this moment Severus had not raised himself above the usual official level. He had seen no warfare beyond the petty border frays of frontier provinces. But the storm that now tried all official spirits found his alone powerful enough to brave it. Three imperial dynasties had been ended by assassination. The Flavian line had enjoyed much shorter duration and less prestige than the other two, and the circumstances of its fall had been peculiar in that it was probably planned in the interest of the senate, and the senate reaped the immediate fruits. But the crises which arose on the deaths of Nero and of Commodus were alike. In both cases it was left to the army to determine by a struggle which of the divisional commanders should succeed to the command-in-chief, that is, to the imperial throne. In each case the contest began with an impulsion given to the commanders by the legionaries themselves. The soldiers of the great commands competed for the honour and advantages to be won by placing their general on the throne. The officer who refused to lead would have suffered the punishment of treason.

There is a widespread impression that the Praetorian guards at all times held the Roman empire in their hands, but its erroneousness is demonstrated by the events of the year 193. For the first time in the course of imperial history the Praetorians presumed to nominate as emperor a man who had no legions at his back. This was Pertinax, who has been well styled the Galba of his time—upright and honourable to severity, and zealous for good government, but blindly optimistic about the possibilities of reform in a feeble and corrupt age. After a three months' rule he was destroyed by the power that lifted him up. According to the well-known story, true rather in its outline than in its details, the Praetorians sold the throne to Didius Julianus. But at the end of two months both the Praetorians and their nominee were swept away by the real disposers of Roman rule, the provincial legions. Four groups of legions at the time were strong enough to aspire to determine the destiny of the empire—those quartered in Britain, in Germany, in Pannonia and in Syria. Three of the groups took the decisive step, and Severus in Pannonia, Pescennius Niger in Syria, Clodius Albinus in Britain, received from their troops the title of Augustus. Severus outdid his rivals in promptness and decision. He secured the aid of the legions in Germany and of those in Illyria. These, with the forces in Pannoni , made a combination sufficiently formidable to overawe Albinus for the moment. He probably deemed that his best chance lay in the exhaustion of his competitors by an internecine struggle. At all events he received with submission an offer made by Severus, who confirmed Albinus in his power and bestowed upon him the title of Caesar, making him the nominal heir-apparent to the throne.

Before the action of Severus was known in Rome, the senate and people had shown signs of turning to Pescennius Niger, that he might deliver them from the poor puppet Didius Julianus and avenge on the Praetorians the murder of Pertinax. Having secured the co-operation or neutrality of all the forces in the western part of the empire, Severus hastened to Rome. To win the sympathy of the capital he posed as the avenger and successor of Pertinax, whose name he even added to his own, and used to the end of his reign. The feeble defences of Julianus were broken down and the Praetorians disarmed and disbanded without a blow. A new body of household troops was enrolled and organized on different principles from the old. In face of the senate, as Dio tells us, Severus acted for the moment like "one of the good emperors in the olden days." After a magnificent entry into the city he joined the senate in execrating the memory of Commodus, and in punishing the murderers of Pertinax, whom he honoured with splendid funeral rites. He also encouraged the senate to pass a decree directing that any emperor or subordinate of an emperor who should put a senator to death should be treated as a public enemy. But he refrained from asking the senate to sanction his accession.

The rest of Severus' reign is in the main occupied with wars. The power wielded by Pescennius Niger, who called himself emperor, and was supposed to control one half of the Roman world, proved to be more imposing than substantial. The magnificent promises of Oriental princes were falsified as usual. Niger himself, as described by Dio, was the very type of mediocrity, conspicuous for no faculties, good or bad. This character had no doubt commended him to Commodus as suited for the important command in Syria, which might have proved a source of danger in abler hands. The contest between Severus and Niger was practically decided after two or three engagements, fought by Severus' officers. The last battle, which took place at Issus, ended in the defeat and death of Niger (194). After this the emperor spent two years in successful attacks upon the peoples bordering on Syria, particularly in Adiabene and Osrhoene. Byzantium, the first of Niger's possessions to be attacked, was the last to fall, after a glorious defence.

[1] For Marcus Aurelius Alexander Severus, Roman emperor from 222 to 235, see ALEXANDER SEVERUS.

Late in 196 Severus turned westward, to reckon with Albinus. He was better born and better educated than Severus, but in capacity far inferior. As Severus was nearing Italy he received the news that Albinus had been declared emperor by his soldiers. The first counter-stroke of Severus was to affiliate himself and his elder son to the Antonines by a spurious and posthumous adoption. The prestige of the old name, even when gained in this illegitimate way, was evidently worth much. Bassianus, the elder son of Severus, thereafter known as Aurelius Antoninus, was named Caesar in place of Albinus, and was thus marked out as successor to his father. Without interrupting the march of his forces, Severus contrived to make an excursion to Rome. Here he availed himself with much subtlety of the sympathy many senators were known to have felt for Niger. Though he was so far faithful to the decree passed by his own advice that he put no senator to death, yet he banished and impoverished many whose presence or influence seemed dangerous or inconvenient to his prospects. Of the sufferers probably few had seen or communicated with Niger.

The collision between the forces of Severus and Albinus was the most violent that had taken place between Roman troops since the contest at Philippi. The decisive engagement was fought in February of the year 197 on the plain between the Rhone and the Saône, to the north of Lyons, and resulted in a complete victory for Severus.

Thus, released from all need for disguise, he "poured forth on the civil population all the wrath which he had been storing up for a long time" (Dio). He frightened the senate by calling himself the son of Marcus and brother of Commodus, whom he had before insulted. He read a speech in which he declared that the severity and cruelty of Sulla, Marius and Augustus had proved to be safer policy than the clemency of Pompey and Julius Caesar, which had wrought their ruin. He ended with an apology for Commodus and bitter reproaches against the senate for their sympathy with his assassins. Over sixty senators were arrested on a charge of having adhered to Albinus, and half were put to death. In most instances the charge was a pretence to enable the emperor to crush the forward and dangerous spirits in the senate. The murderers of Commodus were punished; Commodus himself was deified; and on the monuments from this time onward Severus figures as the brother of that reproduction of all the vice and cruelty of Nero with the refinement left out.

The next years (197–202) were devoted by Severus to one of the dominant ideas of the empire from its earliest days—war against the Parthians. The results to which Trajan and Verus had aspired were now fully attained, and Mesopotamia was definitely established as a Roman province. Part of the time was spent in the exploration of Egypt, in respect of which Dio takes opportunity to say that Severus was not the man to leave anything human or divine uninvestigated. The emperor returned to a well-earned triumph, commemorated to this day by the arch in Rome which bears his name. During the six years which followed (202–208) Severus resided at Rome and gave his attention to the organization of the empire. Severus had confided much of the administration of the empire to Plautianus, the commander of the reorganized Praetorians, who is described by the ancient historians as a second Sejanus. In 203 Plautianus fell, owing, it is said, to an intrigue set on foot by Caracalla, who had shortly before married the daughter of his victim.

Severus spent the last three years of his life (208–211) in Britain, amid constant and not very successful warfare, which he is said to have provoked partly to strengthen the discipline and powers of the legions, partly to wean his sons from their evil courses by hard military service. He died at York on the 4th of February 211. There are traditions that his death was in some way hastened by Caracalla. This prince had been, since about 197, nominally joint emperor with his father, so that no ceremony was needed for his recognition as monarch.

The natural gifts of Severus were of no unusual order. He had a clear head, promptitude, resolution, tenacity and great organizing power, but no touch of genius. That he was cruel cannot be questioned, but his cruelty was of the calculating kind, and always directed to some end. He threw the head of Niger over the ramparts of Byzantium, but merely as the best means of procuring a surrender of the stubbornly defended fortress. The head of Albinus he exhibited at Rome, but only as a warning to the capital to tamper no more with pretenders. The children of Niger were held as hostages and kindly treated so long as they might possibly afford a useful basis for negotiation with their father; when he was defeated they were killed, lest from among them should arise a claimant for the imperial power. Stern and barbarous punishment was always meted out by Severus to the conquered foe, but terror was deemed the best guarantee for peace. He felt no scruples of conscience or honour if he thought his interest at stake, but he was not wont to take an excited or exaggerated view of what his interest required. He used or destroyed men and institutions alike with cool judgment and a single eye to the secure establishment of his dynasty. The few traces of aimless savagery which we find in the ancient narratives are probably the result of fear working on the imagination of the time.

As a soldier Severus was brave, but he can hardly be called a general, in spite of his successful campaigns. He was rather the organizer of victory than the author of it. The operations against Niger were carried out entirely by his officers. Dio even declares that the final battle with Albinus was the first at which Severus had ever been present. When a war was going on he was constantly travelling over the scene of it, planning it and instilling into the army his own pertinacious spirit, but the fighting was usually left to others. His treatment of the army is the most characteristic feature of his reign. He broke with the decent conventions of the Augustan constitution, ignored the senate, and based his rule upon force. The only title he ever laid to the throne was the *pronunciamiento* of the legions, whose adherence to his cause he commemorated even on the coinage of the realm. The legions voted him the adopted son of Marcus Aurelius; the legions associated with him Caracalla in the government of the empire. Severus strove earnestly to wed the army as a whole to the support of his dynasty. He increased enormously the material gains and the honorary distinctions of the service, so that he was charged with corrupting the troops. Yet it cannot be denied that, all things considered, he left the army of the empire more efficient than he found it. He increased the strength of it by three legions, and turned the Praetorians, heretofore a flabby body without military experience or instinct, into a chosen corps of veterans. Their ranks were filled by promotion from all the legions on service, whereas previously there had been special enlistment from Italy and one or two of the neighbouring provinces. It was hoped that these picked men would form a force on which an emperor could rely in an emergency. But to meet the possibility of a legionary revolt in the provinces, one of the fundamental principles of the Augustan empire was abrogated: Italy became a province, and a legion was quartered at Alba Fucens under the direct command of the emperor. Further to obviate the risk of revolution, the great commands in the provinces were broken up, so that, excepting on the turbulent eastern frontier, it was not possible for a commander to dispose of troops numerous enough to render him dangerous to the government.

But, while the policy of Severus was primarily a family policy, he was by no means careless of the security and welfare of the empire. Only in one instance, the destruction of Byzantium, did he weaken its defences for his own ends—an error for which his successors paid dearly, when the Goths came to dominate the Euxine. The troublesome Danubian regions received the special attention of the emperor, but all over the realm the status and privileges of communities and districts were recast in the way that seemed likely to conduce to their prosperity. The administration acquired more and more of a military character, in Italy as well as in the provinces. Retired military officers now filled many of the posts formerly reserved for civilians of equestrian rank. The praefect of the Praetorians received large civil and judicial powers, so that the investment of Papinian with the office was less unnatural than it seems at first sight. The alliance between Severus and the jurisconsults had important consequences. While he gave them new importance in the body politic, and co-operated with them in the work of legal reform, they did him material service by working an absolutist view of the government into the texture of Roman law. Of the legal changes of the reign, important as they were, we can only mention a few details. The emperor himself was a devoted and upright judge, but he struck a great blow at the purity of the law by transferring the exercise of imperial jurisdiction from the forum to the palace. He sharpened in many respects the law of treason, put an end to the time-honoured *quaestiones perpetuae*, altered largely that important section of the law which defined the rights of the fiscus, and developed further the social policy which Augustus had embodied in the *lex Julia de adulteriis* and the *lex Papia Poppaea*.

Severus boldly adopted as an official designation the autocratic title of *dominus*, which the better of his predecessors had renounced. During his reign the senate was powerless; he took all initiative into his hands. He broke down the distinction between the servants of the senate and the servants of the emperor. All nominations to office or function passed under his scrutiny. The estimation of the old consular and other republican titles was diminished. The growth of capacity in the senate was checked by cutting off the tallest of the poppy-heads early in the reign. The senate became a mere

registration office for the imperial determinations, and its members, as has been well said, a choir for drawling conventional hymns of praise in honour of the monarch. Even the nominal restoration of the senate's power at the time of Alexander Severus, and the accession of so-called "senatorial emperors" later on, did not efface the work of Septimius Severus, which was resumed and carried to its fulfilment by Diocletian.

No period in the history of Latin literature is so barren as the reign of Severus. Many later periods—the age of Stilicho, for example—shine brilliantly by comparison. The only great Latin writers are the Christians Tertullian and Cyprian. The Greek literature of the period is richer, but not owing to any patronage of the emperor, except perhaps in the case of Dio Cassius, who, though no admirer of Severus, attributes to encouragement received from him the execution of the great historical work which has come down to our time. The numerous restorations of ancient buildings and the many new constructions carried out by Severus show that he was not insensible to the artistic glories of the past; and he is known to have paid much attention to works of art in foreign countries where his duties took him. But he was in no sense a patron or connoisseur of art. As to religion, if we may trust Dio, one of the most superstitious of historians, Severus was one of the most superstitious of monarchs. But apart from that it is difficult to say what was his influence on the religious currents of the time. He probably did a good deal to strengthen and extend the official cult of the imperial family, which had been greatly developed during the prosperous times of the Antonines. But what he thought of Christianity, Judaism or the Oriental mysticism to which his wife Julia Domna gave such an impulse in the succeeding reign, it is impossible to say. We may best conclude that his religious sympathies were wide, since tradition has not painted him as the partisan of any one form of worship.

AUTHORITIES.—Severus himself wrote an autobiography which was regarded as candid and trustworthy on the whole. The events of the reign were recorded by several contemporaries. The first place among these must be given to Dio Cassius, who stands to the empire in much the same relation as Livy to the republic. He became a senator in the year when Marcus Aurelius died (180) and retained that dignity for more than fifty years. He was well acquainted with Severus, and was near enough the centre of affairs to know the real nature of events, without being great enough to have personal motives for warping the record. Though this portion of Dio's history no longer exists in its original form, we have copious extracts from it, made by Xiphilinus, an ecclesiastic of the 11th century. The faults which have impaired the credit of Dio's great work in its earlier portions—his lack of the critical faculty, his inexact knowledge of the earlier Roman institutions, his passion for signs from heaven—could do little injury to the narrative of an eye-witness; and he gives the impression of unusual freedom from passion, prejudice and insincerity. His Greek, too, stands in agreeable contrast to the debased Latin of the *Scriptores historiae Augustae*. The Greek writer Herodian was also a contemporary of Severus, but the mere fact that we know nothing of his life is in itself enough to show that his opportunities were not so great as those of Dio. The reputation of Herodian, who was used as the main authority for the times of Severus by Tillemont and Gibbon, has not been proof against the criticism of later scholars. His faults are those of rhetoric and exaggeration. His narrative is probably in many places not independent of Dio. The Augustan historians, unsatisfactory compilers, form a principal source for the history of the reign. The numerous inscriptions belonging to the age of Septimius Severus enable us to control at many points and largely to supplement the literary records of his reign, particularly as regards the details of his administration. The juridical works of Justinian's epoch embody much that throws light on the government of Severus.

The principal modern works relating to this emperor, after Tillemont and Gibbon, are—J. J. Schulte, *De imperatore L. Septimio Severo* (Münster, 1867); Höfner, *Untersuchungen zur Geschichte des Kaisers L. Septimius Severus* (Giessen, 1875); *Untersuchungen zur römischen Kaisergeschichte*, ed. by M. Budinger; H. Schiller, *Geschichte der römischen Kaiserzeit* (Gotha, 1880–1883); De Ceuleneer, *Essai sur la vie et le règne de Septime Sévère* (Brussels, 1880); Réville, *La Religion à Rome sous les Sévères* (Paris, 1886); Fuchs, *Geschichte des Kaisers L. Septimius Severus* (1884). On Julia Domna see M. G. Williams, in *American Journal of Archaeology*, vi. (1902), pp. 259-306. (J. S. R.)

SEVERUS, SULPICIUS (*c.* 363–*c.* 425), Christian writer, was a native of Aquitania. He was imbued with the culture of his time and of his country, which was then the only true home of Latin letters and learning. Almost all that we know of Severus' life comes from a few allusions in his own writings, and some passages in the letters of his friend Paulinus, bishop of Nola. In his early days he was famous as a pleader, and his knowledge of Roman law is reflected in parts of his writings. He married a wealthy lady belonging to a consular family, who died young, leaving him no children. At this time Severus came under the powerful influence of St Martin, bishop of Tours, by whom he was led to devote his wealth to the Christian poor, and his own powers to a life of good works and meditation. To use the words of his friend Paulinus, he broke with his father, followed Christ, and set the teachings of the "fishermen" far above all his "Tullian learning." He rose to no higher rank in the church than that of presbyter. He is said to have been led away in his old age by Pelagianism, but to have repented and inflicted long-enduring penance on himself. His time was passed chiefly in the neighbourhood of Toulouse, and such literary efforts as he permitted to himself were made in the interests of Christianity. In many respects no two men could be more unlike than Severus, the scholar and orator, well versed in the ways of the world, and Martin, the rough Pannonian bishop, ignorant, suspicious of culture, champion of the monastic life, seer and worker of miracles. Yet the spirit of the rugged saint subdued that of the polished scholar, and the works of Severus are only important because they reflect the ideas, influence and aspirations of Martin, the foremost ecclesiastic of Gaul.

The chief work of Severus is the *Chronica* (*c.* 403), a summary of sacred history from the beginning of the world to his own times, with the omission of the events recorded in the Gospels and the Acts, "lest the form of his brief work should detract from the honour due to those events." The book was a text-book, and was used as such in the schools of Europe for about a century and a half after the *editio princeps* was published by Flacius Illyricus in 1556. Severus nowhere clearly points to the class of readers for whom his book is designed. He disclaims the intention of making his work a substitute for the actual narrative contained in the Bible. "Worldly historians" had been used by him, he says, to make clear the dates and the connexion of events and for supplementing the sacred sources, and with the intent at once to instruct the unlearned and to "convince" the learned. Probably the "unlearned" are the mass of Christians and the learned are the cultivated Christians and pagans alike, to whom the rude language of the sacred texts, whether in Greek or Latin, would be distasteful. The literary structure of the narrative shows that Severus had in his mind principally readers on the same level of culture with himself. He was anxious to show that sacred history might be presented in a form which lovers of Sallust and Tacitus could appreciate and enjoy. The style is lucid and almost classical. Though phrases and even sentences from many classical authors are inwoven here and there, the narrative flows easily, with no trace of the jolts and jerks which offend us in almost every line of an imitator of the classics like Sidonius. It is free from useless digressions. In order that his work might fairly stand beside that of the old Latin writers, Severus ignored the allegorical methods of interpreting sacred history to which the heretics and the orthodox of his age were wedded.

As an authority for times antecedent to his own, Severus is of little moment. At only a few points does he enable us to correct or supplement other records. Bernays has shown that he based his narrative of the destruction of Jerusalem by Titus on the account given by Tacitus in his "Histories," a portion of which has been lost. We are enabled thus to contrast Tacitus with Josephus, who warped his narrative to do honour to Titus. In his allusions to the Gentile rulers with whom the Jews came into contact from the time of the Maccabees onwards, Severus discloses some points which are not without importance. But the real interest of his work lies, first, in the incidental glimpses it affords all through of the history of his own time; next and more particularly, in the information he has preserved concerning the struggle over the Priscillianist heresy, which disorganized and degraded the churches of Spain and Gaul, and particularly affected Aquitaine. The sympathies here betrayed by Severus are wholly those of St Martin. The bishop had withstood Maximus, who ruled for some years a large part of the western portion of the empire, though he never conquered Italy. He had reproached him with attacking and overthrowing his predecessors on the throne, and for his dealings with the church. Severus loses no opportunity for laying stress on the crimes and follies of rulers, and on their cruelty, though he once declares that, cruel as rulers could be, priests could be crueller still. This last statement has reference to the bishops who had left Maximus no peace till he had stained his hands with the blood of Priscillian and his followers. Martin, too, had denounced the worldliness and greed of the Gaulish bishops and clergy. Accordingly we find that Severus, in narrating the division of Canaan among the tribes, calls the special attention of ecclesiastics to the fact that no portion of the land was assigned to the tribe of Levi, lest they should be hindered in their service of God. "Our clergy seem," he says, "not merely forgetful of the lesson but ignorant of it, such a passion for possessions has in our days fastened like a pestilence on their souls." We here catch a glimpse of the circumstances which were winning over good men to monasticism in the West, though the evidence of an enthusiastic votary of the solitary life, such as Severus was, is probably not free from exaggeration. Severus also fully sympathized with the action of St Martin touching Priscillianism. This mysterious Western

offshoot of Gnosticism had no single feature about it which could soften the hostility of a character such as Martin's, but he resisted the introduction of secular punishment for evil doctrine, and withdrew from communion with those bishops in Gaul, a large majority, who invoked the aid of Maximus against their erring brethren. In this connexion it is interesting to note the account given by Severus of the synod held at Rimini in 359, where the question arose whether the bishops attending the assembly might lawfully receive money from the imperial treasury to recoup their travelling and other expenses. Severus evidently approves the action of the British and Gaulish bishops, who deemed it unbecoming that they should lie under pecuniary obligation to the emperor. His ideal of the church required that it should stand clear and above the state.

After the *Chronica* the chief work of Severus is his *Life of Martin*, a contribution to popular Christian literature which did much to establish the great reputation which that wonder-working saint maintained throughout the middle ages. The book is not properly a biography, but a catalogue of miracles, told in all the simplicity of absolute belief. The power to work miraculous signs is assumed to be in direct proportion to holiness, and is by Severus valued merely as an evidence of holiness, which he is persuaded can only be attained through a life of isolation from the world. In the first of his *Dialogues* (fair models of Cicero), Severus puts into the mouth of an interlocutor (Posthumianus) a pleasing description of the life of coenobites and solitaries in the deserts bordering on Egypt. The main evidence of the virtue attained by them lies in the voluntary subjection to them of the savage beasts among which they lived. But Severus was no indiscriminating adherent of monasticism. The same dialogue shows him to be alive to its dangers and defects. The second dialogue is a large appendix to the Life of Martin, and really supplies more information of his life as bishop and of his views than the work which bears the title *Vita S. Martini*. The two dialogues occasionally make interesting references to personages of the epoch. In Dial. 1, cc. 6, 7, we have a vivid picture of the controversies which raged at Alexandria over the works of Origen. The judgment of Severus himself is no doubt that which he puts in the mouth of his interlocutor Posthumianus: "I am astonished that one and the same man could have so far differed from himself that in the approved portion of his works he has no equal since the apostles, while in that portion for which he is justly blamed it is proved that no man has committed more unseemly errors." Three *Epistles* on the death of Martin (ad Eusebium, ad Aurelium diaconum, ad Bassulam) complete the list of Severus' genuine works. Other letters (to his sister), on the love of God and the renunciation of the world, have not survived.

AUTHORITIES.—The text of the *Chronica* rests on a single 11th century MS., one of the Palatine collection now in the Vatican; of the other works MSS. are abundant, the best being one of the 6th century at Verona. Some spurious letters bear the name of Severus; also in a MS. at Madrid is a work falsely professing to be an epitome of the *Chronica* of Severus, and going down to 511. The chief editions of the complete works of Severus are those by De Prato (Verona, 1741) and by Halm (forming vol. i. of the *Corpus scriptorum ecclesiasticorum Latinorum*, Vienna, 1866). There is a most admirable monograph on the *Chronica* by J. Bernays (Berlin, 1861). See also Goelzer, *Grammaticae in Sulp. Severum observationes* (1884) (thesis).

SEVERY (probably connected with the English word "sever"), in architecture, any main compartment or division of a building. The word has been supposed to be a corruption of Ciborium, as Gervase of Canterbury uses the word in this sense; but he probably alludes to the *vaulted* form of the upper part of the web of each severy.

SEVIER, JOHN (1745–1815), American frontiersman, first governor of Tennessee, was born in Rockingham county, Virginia, on the 23rd of September 1745, of Huguenot ancestry, the family name being Xavier. He settled on the Watauga on the western slope of the Alleghanies in 1772, and served as a captain in Lord Dunmore's War in 1774. Early in 1776 the Watauga settlements were annexed to North Carolina, and Sevier, who from the beginning had been a member of the Watauga government, now represented the district in the provincial congress, which met at Halifax in November–December 1776 and adopted the first state constitution, and in 1777 he was a member of the state House of Commons. He took part in the campaign of 1780 against the British, especially distinguishing himself in the battle of King's Mountain, where he led the right wing. In December 1780 he defeated the Cherokees at Boyd's Creek (in the present Sevier county, Tennessee), laying waste their country during the following spring. Later in the same year (1781), under General Francis Marion, he fought the British in the Carolinas and Georgia. In 1784, when North Carolina first ceded its western lands to the Federal government, he took part in the revolt of the western settlements; he was president of the first convention which met in Jonesboro on the 23rd of August, and opposed the erection of a new state, but when the state of Frankland (afterwards Franklin, in honour of Benjamin Franklin) was organized in March 1785, he became its first and only governor (1785–1788), and as such led his riflemen against the Indians; in May 1788, after the end of his term, men in his command massacred several Indians from a friendly village, and thus provoked a war in which Sevier again showed his ability as an Indian fighter. He was arrested by the North Carolina authorities, partly as a leader of the independent government and partly for the Indian massacre, but escaped. About this time he attempted to make an alliance with Spain on behalf of the state of Franklin. In 1789 he was a member of the North Carolina Senate, and in 1790–1791 of the National House of Representatives. After the final cession of its western territory by North Carolina to the United States in 1790 he was appointed brigadier-general of militia for the eastern district of the "Territory South of the Ohio"; and conducted the Etowah campaign against the Creeks and Cherokees in 1793. When Tennessee was admitted into the Union as a state, Sevier became its first governor (1796–1801) and was governor again in 1803–1809. He was again a member of the National House of Representatives in 1811–1815, and then was commissioner to determine the boundary of Creek lands in Georgia. He died near Fort Decatur, Georgia, on the 24th of September 1815.

See J. R. Gilmore, *The Rear-Guard of the Revolution* (New York, 1886), and *John Sevier as a Commonwealth Builder* (New York, 1887); errors in Gilmore's books are pointed out in Theodore Roosevelt's *The Winning of the West* (New York, 1894–1896).

SÉVIGNÉ, MARIE DE RABUTIN-CHANTAL, MARQUISE DE (1626–1696), French letter-writer, was born at Paris on the 5th of February 1626. The family of Rabutin (if not so illustrious as Bussy, Madame de Sévigné's notorious cousin, affected to consider it) was one of great age and distinction in Burgundy. It was traceable in documents to the 12th century, and the castle which gave it name still existed, though in ruins, in Madame de Sévigné's time. The family had been *gens d'épée* for the most part, though François de Rabutin, the author of valuable memoirs on the sixth decade of the 16th century, belonged to it. Marie's father, Celse Bénigne de Rabutin, Baron de Chantal, was the son of the celebrated "Sainte" Chantal, friend and disciple of St Francis of Sales; her mother was Marie de Coulange[s]. Celse de Rabutin, a great duellist, was killed during the English descent on the Isle of Rhé in July 1627. His wife did not survive him many years, and Marie was left an orphan at the age of seven years and a few months. She then passed into the care of her grandparents on the mother's side; but they were both aged, and the survivor of them, Philippe de Coulanges (or Coulange), died in 1636, Marie being then ten years old. Her uncle Christophe de Coulanges, abbé de Livry, was chosen as her guardian. He was somewhat young for the guardianship of a girl, being only twenty-nine, but readers of his niece's letters know how well "Le Bien Bon"—for such is his name in Madame de Sévigné's little language—acquitted himself of the trust. He lived till within ten years of his ward's death, and long after his nominal functions were ended he was in all matters of business the good angel of the family, while for half a century his abbacy of Livry was the favourite residence both of his niece and her daughter. Coulanges was much more of a man of business than of a man of letters, but either choice or the fashion of the time induced him to make of his niece a learned lady. Jean Chapelain and Gilles Ménage are specially mentioned as her tutors, and Ménage at least fell in love with her. Tallemant des Réaux gives more than one instance of the cool and good-humoured raillery with which she received his passion, and the earliest letters of hers that we possess are addressed to Ménage. Another literary friend of her youth was the poet Denis Sanguin de Saint-Pavin. Among her own sex she was intimate with all the coterie of the Hôtel Rambouillet, and her special ally was Mademoiselle de la Vergne, afterwards Madame de la Fayette. In person she was extremely attractive, though the minute critics of the time

(which was the palmy day of portraits in words) objected to her divers deviations from strictly regular beauty, such as eyes of different colours and sizes, a "square-ended" nose and a somewhat heavy jaw. Her beautiful hair and complexion, however, were admitted even by these censors, as well as the extraordinary spirit and liveliness of her expression. Her long minority, under so careful a guardian as Coulanges, had also raised her fortune to the amount of 100,000 crowns—a large sum for the time, and one which with her birth and beauty might have allowed her to expect a brilliant marriage. There had been some talk of her cousin Bussy, but fortunately for her this came to nothing. She married Henri, marquis de Sévigné, a Breton gentleman of good family, allied to the oldest houses of that province, but of no great estate. The marriage took place on August 4, 1644, and the pair went almost immediately to Sévigné's manor-house of Les Rochers, near Vitré, a place which Madame de Sévigné was in future years to immortalize. It was an unfortified chateau of no great size, but picturesque, with the peaked turrets common in French architecture, and surrounded by a park and grounds. The abundance of trees gave it the repute of being damp and somewhat gloomy. Fond, however, as Madame de Sévigné was of society, it may be suspected that the happiest days of her brief married life were spent there. For there at any rate her husband had less opportunity than in Paris of neglecting her, and of wasting her money and his own. Very little good is said of Henri de Sévigné by any of his contemporaries. He was one of the innumerable lovers of Ninon de l'Enclos, and made himself even more conspicuous with a certain Madame de Gondran, known in the nickname slang of the time as "La Belle Lolo." He was wildly extravagant. That his wife loved him and that he did not love her was generally admitted. At last his vices came home to him. He quarrelled with the Chevalier d'Albret about Madame de Gondran, fought with him and was mortally wounded on the 4th of February 1651; he died two days afterwards. There is no reasonable doubt that his wife regretted him a great deal more than he deserved. Though only six and twenty, and more beautiful than ever, she never married again despite frequent offers, and no aspersion was ever thrown, save in one instance, on her fame. For the rest of her life she gave herself up to her children. These were two in number, and they divided their mother's affections by no means equally. The eldest was a daughter, Françoise Marguerite, who was born on the 10th of October 1646, whether at Les Rochers or in Paris is not certain. The second, a son, Charles, was born at Les Rochers in the spring of 1648. To him Madame de Sévigné was an indulgent, a generous (though not altogether just) and in a way an affectionate mother. Her daughter, the future Madame de Grignan, she worshipped with an almost insane affection, which only its charming literary results and the delightful qualities which accompanied it in the worshipper, though not in the worshipped, save from being ludicrous if not revolting.

After her husband's death Madame de Sévigné passed the greater part of the year 1651 in retirement at Les Rochers, but she returned to Paris in November of that year. For nearly ten years little of importance occurred in her life, which was passed at Paris in a house she occupied in the Place Royale (not as yet in the famous Hôtel Carnavalet), at Les Rochers, at Livry or at her own estate of Bourbilly in the Mâconnais. She had, however, in 1658, a quarrel with her cousin Bussy. Notwithstanding Bussy's various delinquencies the cousins had always been friends; and the most amusing and characteristic part of Madame de Sévigné's correspondence, before the date of her daughter's marriage, is addressed to him. She had a strong belief in family ties; she recognized in Bussy a kindred spirit, and she excused his faults as *Rabutinades* and *Rabutinages*. But a misunderstanding about money brought about a quarrel, which in its turn had a long sequel, and results not unimportant in literature. Bussy and his cousin had jointly come in for a considerable legacy, and he asked her for a loan. If this was not positively refused, there was a difficulty made about it, and Bussy was offended. A year later, at the escapade of Roissy (see Bussy), according to his own account, he improvised (according to probability he had long before written it) the famous portrait of Madame de Sévigné which appears in his notorious *Histoire amoureuse*, and is a triumph of malice. Circulated at first in manuscript and afterwards in print, this caused Madame de Sévigné the deepest pain and indignation, and the quarrel between the cousins was not fully made up for years, though after Bussy's disgrace and imprisonment in 1666 the correspondence was renewed. What might have been, and to some extent was, a much more serious matter occurred in 1661 at the downfall of the Superintendent Fouquet. It was announced on indubitable authority that communications from her had been found in the coffer where Fouquet kept his love letters. She protested that the notes in question were of friendship merely, and Bussy (one of the not very numerous good actions of his life) obtained from Le Tellier, who as minister had examined the letters, a corroboration of the protest. But these letters were never published, and there have always been those who held that Madame de Sévigné regarded Fouquet with at least a very warm kind of friendship. It is certain that her letters to Pomponne describing his trial are among her masterpieces of unaffected, vivid and sympathetic narration.

During these earlier years Madame de Sévigné had a great affection for the establishment of Port Royal, which was not without its effect on her literary work. That work, however, dates in its bulk and really important part almost entirely from the last thirty years of her life. Her letters before the marriage of her daughter, though by themselves they would suffice to give her a very high rank among letter-writers, would not do more than fill one moderate-sized volume. Those after that marriage fill nearly ten large volumes in the latest and best edition. We do not hear very much of Mademoiselle de Sévigné's early youth. For a short time, at a rather uncertain date, she was placed at school with the nuns of Sainte-Marie at Nantes. But for the most part her mother brought her up herself, assisted by the Abbé de la Mousse, a faithful friend, and for a time one of her most constant companions. La Mousse was a great Cartesian, and he made Mademoiselle de Sévigné also a devotee of the bold soldier of Touraine. But she was bent on more mundane triumphs than philosophy had to offer. Her beauty is all the more incontestable that she was by no means generally liked. Bussy, a critical and not too benevolent judge, called her "la plus jolie fille de France," and it seems to be agreed that she resembled her mother, with the advantage of more regular features. She was introduced at court early, and as she danced well she figured frequently in the ballets which were the chief amusement of the court of Louis XIV. in its early days. If, however, she was more regularly beautiful than her mother she had little or nothing of her attraction, and like many other beauties who have entered society with similar expectations she did not immediately find a husband. Various projected alliances fell through for one reason or another, and it was not till the end of 1668 that her destiny was settled. On January 29 in the next year she married François d'Adhémar, comte de Grignan, a Provençal, of one of the noblest families of France, and a man of amiable and honourable character, but neither young, nor handsome, nor in reality rich. He had been twice married and his great estates were heavily encumbered. Neither did the large dowry (300,000 livres) which Madame de Sévigné, somewhat unfairly to her son, bestowed upon her daughter, suffice to clear encumbrances, which were constantly increased in the sequel by the extravagance of Madame de Grignan as well as of her husband.

Charles de Sévigné was by this time twenty years old. He never appears to have resented his mother's preference of his sister; but, though thoroughly amiable, he was not (at any rate in his youth) a model character. Nothing is known of his education, but just before his sister's marriage he volunteered for a rather harebrained expedition to Crete against the Turks, and served with credit. Then his mother bought him the commission of *guidon* (a kind of sub-cornet) in the Gendarmes Dauphin, in which regiment he served for some years. But though he always

fought well he was not an enthusiastic soldier, and was constantly and not often fortunately in love. He followed his father into the nets of Ninon de l'Enclos, and was Racine's rival with Mademoiselle Champmeslé. The way in which his mother was made confidante of these discreditable and not very successful loves is characteristic both of the time and of the country. In 1669 M. de Grignan, who had previously been lieutenant-governor of Languedoc, was transferred to Provence. The governor-in-chief was the young duke of Vendôme. But at this time he was a boy, and he never really took up the government, so that Grignan for more than forty years was in effect viceroy of this important province. His wife rejoiced greatly in the part of vice-queen; but their peculiar situation threw on them the expenses without the emoluments of the office, so that the Grignan money affairs hold a larger place in Madame de Sévigné's letters than might perhaps be wished.

In 1671 Madame de Sévigné, with her son, paid a visit to Les Rochers, which is memorable in her history and in literature. The states of Brittany were convoked that year at Vitré. This town being in the immediate neighbourhood of Les Rochers, Madame de Sévigné's usually quiet life at her country-house was diversified by the necessity of entertaining the governor, the duc de Chaulnes, of appearing at his receptions and so forth. All these matters are recorded in her letters, together with much good-natured raillery on the country ladies of the neighbourhood and their ways. She remained at Les Rochers during the whole summer and autumn of 1671, and did not return to Paris till late in November. The country news is then succeeded by news of the court. At the end of the next year, 1672, one great wish of her heart was gratified by paying a visit to her daughter in her vice-royalty of Provence. Madame de Grignan does not seem to have been very anxious for this visit—perhaps because, as the letters show in many cases, the exacting affection of her mother was somewhat too strong for her own colder nature, perhaps because she feared such a witness of the ruinous extravagance which characterized the Grignan household. But her mother remained with her for nearly a year, and did not return to Paris till the end of 1673. During this time we have (as is usually the case during these Provençal visits and the visits of Madame de Grignan to Paris) some letters addressed to Madame de Sévigné, but comparatively few from her. A visit of the second class was the chief event of 1674. 1675 brought with it the death of Turenne (of which Madame de Sévigné has given a noteworthy account, characteristic of her more ambitious but not perhaps her more successful manner), and also serious disturbances in Brittany. Notwithstanding these it was necessary for Madame de Sévigné to make her periodical visit to Les Rochers. She reached the house in safety, and the friendship of Chaulnes protected her both from violence and from the exactions which the miserable province underwent as a punishment for its resistance to excessive and unconstitutional taxation. No small part of her letters is occupied by these affairs.

The year 1676 saw several things important in Madame de Sévigné's life. For the first time she was seriously ill—it would appear with rheumatic fever—and she did not thoroughly recover till she had visited Vichy. Her letters from this place are among her best, and picture life at a 17th-century watering-place with unsurpassed vividness. In this year, too, took place the trial and execution of Madame de Brinvilliers. This event figures in the letters, and the references to it are among those which have given occasion to unfavourable comments on Madame de Sévigné's character. In the next year, 1677, she moved into the Hôtel Carnavalet, a house which still remains and is inseparably connected with her memory, and she had the pleasure of welcoming the whole Grignan family to it. They remained there a long time; indeed nearly two years seem to have been spent by Madame de Grignan partly in Paris and partly at Livry. The return to Provence took place in October 1678, and next year Madame de Sévigné had the grief of losing La Rochefoucauld, the most eminent and one of the most intimate of her close personal friends and constant associates. In 1680 she again visited Brittany, but the close of that year saw her back in Paris to receive another and even longer visit from her daughter, who remained in Paris for four years. Before the end of the last year of this stay (in February 1684) Charles de Sévigné, after all his wandering loves, and after more than one talked-of alliance, was married to a young Breton lady, Jeanne Marguerite de Mauron, who had a considerable fortune. In the arrangements for this marriage Madame de Sévigné practically divided all her fortune between her children (Madame de Grignan of course receiving an unduly large share), and reserved only part of the life interest. The greed of Madame de Grignan nearly broke her brother's marriage, but it was finally concluded, and proved happy in a somewhat singular fashion. Both Sévigné and his wife became deeply religious, and at first Madame de Sévigné found their household (for she gave up Les Rochers to them) not at all lively. But by degrees she grew fond of her daughter-in-law. During this year she spent a considerable time in Brittany, first on business, afterwards on a visit to her son, and partly it would appear for motives of economy. But Madame de Grignan continued with only short absences to inhabit Paris, and the mother and daughter were practically in each other's company until 1688. The proportion of letters therefore that we have for the decade 1677–1687 is much smaller than that which represents the decade preceding it; indeed the earlier period contains the great bulk of the whole correspondence. In 1687 the Abbé de Coulanges, Madame de Sévigné's uncle and good angel, died, and in the following year the whole family were greatly excited by the first campaign of the young marquis de Grignan, Madame de Grignan's only son, who was sent splendidly equipped to the siege of Philippsbourg. In the same year Madame de Sévigné was present at the Saint-Cyr performance of *Esther*, and some of her most amusing descriptions of court ceremonies and experiences date from this time. 1689 and 1690 were almost entirely spent by her at Les Rochers with her son; and on leaving him she went across France to Provence. There was some excitement during her Breton stay, owing to the rumour of an English descent, on which occasion the Breton militia was called out, and Charles de Sévigné appeared for the last time as a soldier; but it came to nothing. 1691 was passed at Grignan and other places in the south, but at the end of it Madame de Sévigné returned to Paris, bringing the Grignans with her; and her daughter stayed with her till 1694. The year 1693 saw the loss of two of her oldest friends—Bussy Rabutin, her faithless and troublesome but in his own way affectionate cousin, and Madame de la Fayette, her life-long companion, and on the whole perhaps her best and wisest friend. Another friend almost as intimate, Madame de Lavardin, followed in 1694. Madame de Sévigné spent but a few months of this latter year alone, and followed her daughter to Provence. She never revisited Brittany after 1691. Two important marriages with their preparations occupied most of her thoughts during 1694–1695. The young marquis de Grignan married the daughter of Saint-Amant, an immensely rich financier; but his mother's pride, ill-nature and bad taste (she is said to have remarked in full court that it was necessary now and then to "manure the best lands," referring to Saint-Amant's wealth and low birth, and the Grignans' nobility) made the marriage not very happy. His sister Pauline, who, in the impossibility of dowering her richly, had a narrow escape of the cloister, made a marriage of affection with the marquis de Simiane, and eventually became the sole representative and continuator of the families of Grignan and Sévigné.

Madame de Sévigné survived these alliances but a very short time. During an illness of her daughter she herself was attacked by smallpox in April 1696, and she died on the 17th of that month at Grignan, and was buried there. Her idolized daughter was not present during her illness. But in her will Madame de Sévigné still showed her preference for this not too grateful child, and Charles de Sévigné accepted his mother's wishes in a letter showing the good-nature which he had never lacked. But the two families were, except as has been said for Madame de Simiane and her posterity, to be rapidly broken up. Charles de Sévigné and his wife had no children, and he himself, after occupying some public posts (he was king's lieutenant in Brittany

in 1697), went with his wife into religious retirement at Paris in 1703, and after a time sequestered himself still more in the seminary of Sainte-Magloire, where he died on March 26, 1713. His widow survived him twenty years. Madame de Grignan had died on August 16, 1705, at a country-house near Marseilles, of the very disease which she had tried to escape by not visiting her dying mother. Her son, who had fought at Blenheim, had died of the same malady at Thionville the year before. Marie Blanche, her eldest daughter, was in a convent, and, as all the comte de Grignan's brothers had either entered the church or died unmarried, the family, already bankrupt in fortune, was extinguished in the male line by Grignan's own death in 1714, at a great age. Madame de Simiane, whose connexion with the history of the letters is important, died in 1737.

The chief subjects of public interest and the principal family events of importance which are noticed in the letters of Madame de Sévigné have been indicated already. But, as will readily be understood, neither the whole nor even the chief interest of her correspondence is confined to such things. In the latest edition the letters extend to sixteen or seventen hundred, of which, however, a considerable number (perhaps a third) are replies of other persons or letters addressed to her, or letters of her family and friends having more or less connexion with the subjects of her correspondence. As a rule her own letters, especially those to her daughter, are of great length. Writing as she did in a time when newspapers were not, or at least were scanty and jejune, gossip of all sorts appears among her subjects, and some of her most famous letters are pure *reportage* (to use a modern French slang term), while others deal with strictly private matters. Thus one of her best-known pieces has for subject the famous suicide of the great cook Vatel owing to a misunderstanding as to the provision of fish for an entertainment given to the king by Condé at Chantilly. Another (one of the most characteristic of all) deals with the projected marriage of Lauzun and Mademoiselle de Montpensier; another with the refusal of one of her own footmen to turn hay-maker when it was important to get the crop in at Les Rochers; another with the fire which burnt out her neighbour's house in Paris. At one moment she tells how a forward lady of honour was disconcerted in offering certain services at Mademoiselle's levée; at another how ill a courtier's clothes became him. She enters, as has been said, at great length into the pecuniary difficulties of her daughter; she tells the most extraordinary stories of the fashion in which Charles de Sévigné sowed his wild oats; she takes an almost ferocious interest and side in her daughter's quarrels with rival beauties or great officials in Provence.

Almost all writers of literary letters since Madame de Sévigné's days, or rather since the publication of her correspondence, have imitated her more or less directly, more or less consciously, and it is therefore only by applying that historic estimate upon which all true criticism rests that her full value can be discerned. The charm of her work is, however, so irresistible that, read even without any historical knowledge and in the comparatively adulterated editions in which it is generally met with, that charm can hardly be missed. Madame de Sévigné was a member of the strong and original group of writers—Retz, La Rochefoucauld, Corneille, Pascal, Saint-Évremond, Descartes and the rest—who escaped the influence of the later 17th century, while they profited by the reforms of the earlier. According to the strictest standard of the Academy her phraseology is sometimes incorrect, and it occasionally shows traces of the quaint and affected style of the *Précieuses*; but these things only add to its savour and piquancy. In lively narration few writers have excelled her, and in the natural expression of domestic and maternal affection none. She had an all-observant eye for trifles and the keenest possible appreciation of the ludicrous, together with a hearty relish for all sorts of amusements, pageants and diversions, and a deep though not voluble or over-sensitive sense of the beauties of nature. But with all this she had an understanding as solid as her temper was gay. Unlike her daughter, she was not a professed blue-stocking or philosophess. But she had a strong affection for theology, in which she inclined (like the great majority of the religious and intelligent laity of her time in France) to the Jansenist side. Her favourite author in this class was Nicole. She has been reproached with her fondness for the romances of Mlle de Scudéry and the rest of her school. But probably many persons who make that reproach have themselves never read the works they despise, and are ignorant how much merit there is in them. In purely literary criticism Madame de Sévigné was no mean expert. Her preference for Corneille over Racine has much more in it than the fact that the elder poet had been her favourite before the younger began to write; and her remarks on La Fontaine and some other authors are both judicious and independent. Nor is she wanting in original reflections of no ordinary merit. But to enjoy her work in its most enjoyable point—the combination of fluent and easy style with quaint archaisms and tricks of phrase—it must be read as she wrote it, and not in the trimmed and corrected version of Perrin and Madame de Simiane.

Great part of her purely literary merit lies in the extraordinary vividness of her presentation of character. But her own has not united quite such a unanimity of suffrage as her ability in writing. In her own time there were not wanting enemies who maintained that her letters were written for effect, and that her affection for her daughter was ostentatious and unreal. But no competent judge can admit this view. On the other hand, her excessive affection for Madame de Grignan, her blindness to anything but her daughter's interest; her culpable tolerance of her son's youthful follies on the one hand and the uneven balance which she held in money matters between him and his sister on the other; the apparent levity with which she speaks of the sufferings of Madame de Brinvilliers, of galley slaves, of the peasantry, &c.; and the freedom of language which she uses herself and tolerates from others,—have all been cast up against her. Here the historic estimate sufficiently disposes of some of the objections, a little common sense of others and a very little charity of the rest. If too much love felt by a mother towards a daughter be a fault, then Madame de Sévigné was one of the most offending souls that ever lived; but it will hardly be held damning. The singular confidences which Madame de Sévigné received from her son and transmitted to her daughter would even at the present day be less surprising in France than in England. They are only an instance, adjusted to the manners of the time, of the system of sacrificing everything to the maintenance of confidence between mother and son. Here too, as well as in reference to the immediately kindred charge of crudity of language, and to that want of sympathy with suffering, especially with the sufferings of the people, it is especially necessary to remember of what generation Madame de Sévigné was and what were her circumstances. That generation was the generation which Madame de Rambouillet endeavoured with only partial success to polish and humanize, to which belong the almost incredible yet trustworthy *Historiettes* of Tallemant, and in which Bussy Rabutin's *Histoire amoureuse* did not make him lose all caste as a gentleman and man of honour. It is absurd to expect at such a time, and in private letters, the delicacy proper to quite different times and circumstances. It is not true that Madame de Sévigné shows no sympathy with the oppression of the Bretons, though her incurable habit of humorous expression—of *Rabutinage*, as she says—makes her occasionally use light phrases about the matter. But it is in fact as unreasonable to expect modern political sentiments from her as it is to expect her to observe the canons of a 20th-century propriety. On the whole she may be as fairly and confidently acquitted of any moral fault, as she may be acquitted of all literary faults whatsoever. Her letters are wholly, what her son-in-law said well of her after her death, *compagnons délicieux*; and, far from faultless as Madame de Grignan was, none of her faults is more felt by the reader than her long visits to her mother, during which the letters ceased.

The bibliographic history of Madame de Sévigné's letters is of considerable interest in itself, and is moreover typical of much other contemporary literary history. From Madame de Sévigné herself we know that her own letters were copied and handed about, sometimes under specified titles, as early as 1673. None of them, however, was published until her correspondence with Bussy Rabutin appeared in his *Memoirs and Correspondence*, partly in the year of her death, partly next year. The remainder were not printed in any form for thirty years. Then between 1725 and 1728 appeared seven unauthorized editions, containing more or fewer additions from the copies which had been circulated privately. The bibliography of these must be sought in special works (see especially the *Grands Écrivains* edition, vol. xi.). They have interest, however, chiefly because they stirred up Madame de Simiane, the writer's only living representative, to give an authorized version. This appeared under the care of the Chevalier de Perrin in 6 vols. (Paris, 1734–1737). It contained only the letters to Madame de Grignan, and these were subjected to editing rather careful than conscientious, the results of which were never thoroughly removed until recently. In the first place, Madame de Simiane, who possessed her mother's replies, is said to have burnt the whole of these from religious motives; this phrase is explained by Madame de Grignan's Cartesianism, which is supposed to have led her to expressions alarming to orthodoxy. In the second, scruples partly having to do with the susceptibilities of living persons, partly concerning Jansenist and other prejudices, made her insist on numerous omissions. Thirdly, and most unfortunately, the change of taste seems to have required still more numerous alterations of style and language, such as the substitution of "Ma Fille" for Madame de Sévigné's usual and charming "Ma Bonne," and many others. Perrin followed this edition up in 1751 with a volume of supplementary letters not addressed to Madame de Grignan, and in 1754 published his last edition of the whole, which was long the standard (8 vols., Paris). During the last half of the 18th century numerous editions of the whole or parts appeared with important additions, such as that of 1756, giving for the first time the letters to Pomponne on the Fouquet trial; that of 1773, giving letters to Moulceau; that of 1775, giving for the first time the Bussy letters separate from his memoirs, &c. An important collected edition of all these fragments, by the Abbé de Vauxcelles, appeared in 1801 (Paris, An IX.) in 10 vols.; five years later Gouvelle (Paris, 1806, 8 vols.) introduced the improvement of chronological order; this was reprinted in 12 vols. (Paris, 1819) with some more unpublished letters which had separately appeared meanwhile. In the same year appeared the first edition of M. de Monmerqué. From that date

continual additions of unpublished letters were made, in great part by the same editor, and at last the whole was remodelled on manuscript copies (the originals unfortunately are available for but few) in the edition called *Des Grands Écrivains*, which M. de Monmerqué began, but which owing to his death had to be finished by MM. Regnier, Paul Mesnard and Sommer (Paris, 1862–1868). This, which supersedes all others (even a handsome edition published during its appearance by M. Silvestre de Sacy), consists of twelve volumes of text, notes, &c., two volumes of lexicon and an album of plates. It contains all the published letters to and from Madame de Sévigné, with the replies where they exist, with all those letters to and from Madame de Simiane (many of which had been added to the main body) that contain any interest. To it must be added two volumes (printed uniformly) of *Lettres inédites*, published by M. Ch. Capmas in 1876 and containing numerous variants and additions from a MS. copy discovered in an old curiosity shop at Dijon. Of less elaborate and costly editions that in the collection Didot (6 vols., Paris, v.d.) is the best, though, in common with all others except the *Grands Écrivains* edition, it contains an adulterated text.

Works on Madame de Sévigné are innumerable. Besides essays by nearly all the great French critics from Sainte-Beuve (*Portraits de femmes*) to M. Brunetière (*Études critiques*), the work of F. Combes, *Madame de Sévigné, historien* (1885), and G. Boissier's volume in the *Grands Écrivains Français* (1881), should be consulted. The biography by Paul Mesnard is nearly exhaustive, but the most elaborate biographical book is that of Walckenaer (3rd ed., Paris, 1856, 5 vols.), to which should be added the remarkable *Histoire de Mme de Sévigné* of Aubenas (Paris and St Petersburg, 1842). In English an excellent little book by Miss Thackeray (Lady Ritchie) (1881) may be recommended, and also Janet Aldis's *Mme de Sévigné: The Queen of Letter-writers* (1907). Most of the editions have portraits. (G. Sa.)

SEVILLE, an inland province of southern Spain, one of the eight provinces into which Andalusia was divided in 1833; bounded on the N. by Badajoz, N.E. by Cordova, S. by Málaga and Cadiz and W. by Huelva. Pop. (1900) 555,256; area 5428 sq. m. The province is bisected by the navigable river Guadalquivir (*q.v.*), which here receives the Genil and Guadaira on the left, and the Guadalimar on the right. West of the Guadalquivir the surface is broken by low mountain ranges forming part of the Sierra Morena; the eastern districts are comparatively flat and very fertile, except along the frontiers of Cadiz and Málaga, where rise the Sierras of Gibalbin and Algodonales; and there are extensive marshes near the Guadalquivir estuary. Coal, copper, iron ore, silicate of alumina, marble and chalk are the chief mineral products; the province is famous for its oranges, and also exports wheat, barley, oats, maize, olives, oil, wine and chick-peas. Iron-founding and the manufacture of gunpowder and ordnance are carried on by the state, and a great expansion of the other manufactures—leather, pottery, soap, flour, cork products, &c.—took place after 1875 owing to the construction of railways between all the larger towns. Cattle-breeding is an important industry in the plains and marshes. Seville (*q.v.*) is the capital and chief river-port. Other towns described in separate articles are Écija (pop. 1900, 24,372), Osuna (17,826), Carmona (17,215), Utrera (15,138), Moron de la Frontera (14,190), Marchena (12,468), Lebrija (10,997).

SEVILLE (Span. *Sevilla*, Lat. *Ispalis* or *Hispalis*, Moorish *Ishbīliya*), the capital of the Spanish province of Seville, and the chief city of Andalusia, on the left bank of the river Guadalquivir, 54 m. from the Atlantic Ocean, and 355 m. by rail S.S.W. of Madrid. Pop. (1900) 148,315. Seville is an archiepiscopal see, a port with many thriving industries, and in size the fourth city in the kingdom, ranking after Madrid, Barcelona and Valencia. Its history, and its treasures of art and architecture render it one of the most interesting places in Europe. It is built in a level alluvial plain, as productive as a garden. Few parts of the city are more than 30 ft. above sea-level, and owing to the frequency of floods an elaborate system of defences against the Guadalquivir and its affluents the Guadaira, Tamarguillo and Tagarete, was undertaken in 1904. This entailed the construction (spread over many years) of dykes, walls and surface drains, the raising of certain streets and railway embankments and the diversion of the lower Tagarete along a new channel leading into the Tamarguillo. The climate is pleasant at all seasons except in summer, when a shade temperature of 116° Fahr. has been recorded. Water is provided by a British company, and a smaller quantity is obtained from Carmona, but the supply is inadequate.

On the right or western bank of the river is the suburb of the Triana, inhabited to a great extent by gipsies. Seville retains its Moorish appearance in the older quarters, although their narrow and tortuous alleys are lighted by electricity, and traversed, wherever they afford room, by electric tramways. In the more modern districts there are broad avenues and boulevards, the chief of which is the beautiful Paseo de los Delicias, along the river and below the city.

The animated and picturesque street-life of Seville has often been painted and described, or even, as in Mozart's *Figaro* and *Don Giovanni*, Rossini's *Barbiere di Siviglia* and Bizet's *Carmen*, set to music. The townsfolk, and the peasants who have come to town for bull-fights, fairs or carnival, have preserved many of the curious old customs which tend to die out in the other large cities of Spain; they continue to wear the vivid costumes which suit the sunny climate of Andalusia; and their own gaiety, wit and grace of manner are proverbial. Nowhere in Spain are the great Church festivals celebrated with so much splendour; Easter at Seville is especially famous, and at this season the city is usually crowded with foreigners. The stately reserve and formality of Madrid society are almost as unknown here as the feverish industrialism and political passion of Barcelona or Valencia; loyalty, good humour and light-hearted hedonism have always been characteristic of Seville.

Principal Buildings.—The cathedral, dedicated to Santa Maria de la Sede, is the largest church in the world, after St Peter's at Rome and the Mezquita at Cordova, being 414 ft. long, 271 ft. wide and 100 ft. high to the roof of the nave. The west front is approached by a high flight of steps, and the platform on which the cathedral stands is surrounded by a hundred shafts of columns from the mosque which formerly occupied the site. The work of building began in 1402 and was finished in 1519, so that the one style of Spanish Gothic is fairly preserved throughout the interior, however much the exterior is spoiled by later additions. Unfortunately the west front remained unfinished until 1827, when the central doorway was completed in a very inferior manner; but this has been renewed in a purer style. The fine relief above it representing the Assumption was added in 1885. At the east end are two Gothic doorways with good sculpture in the tympana; and on the north side the Puerta del Perdon, as it is called, has some exquisite detail over the horse-shoe arch, and a pair of fine bronze doors. The gateway in the southern façade, designed by Casanova, dates from 1887. The interior forms a parallelogram containing a nave and four aisles with surrounding chapels, a centre dome, 121 ft. high, and at the east end a royal sepulchral chapel, which was an addition of the 16th century. The thirty-two immense clustered columns, the marble floor (1787–1795) and the seventy-four windows filled with painted glass, mostly by Flemish artists of the 16th century, produce an unsurpassed effect of magnificence. The reredos is an enormous Gothic work containing forty-four panels of gilt and coloured wood carvings begun by the Fleming Dancart in 1479 and completed by Spanish artists in 1526; the silver statue of the Virgin is by Francisco Alfaro (1596). The archbishop's throne and the choir-stalls (1475–1548) are fine pieces of carving, and amongst the notable metal-work are the railings (1519) by Sancho Nuñoz, and the lectern by Bartolomé Morel of the same period. The bronze candelabrum for tenebrae, 25 ft. in height, is a splendid work by B. More (1562). In the Sacristia Alta is a silver repoussé reliquary presented by Alphonso the Wise in the 13th century; and in the Sacristia Mayor, which is a good plateresque addition made in 1535 from designs by Diego de Riaño (d. 1532), there is a magnificent collection of church plate and vestments, including the famous silver monstrance (1580–1587), 12 ft. high, by Juan de Arfe (Arphe). At the west end of the nave is the grave of Ferdinand, the son of Columbus, and at the east end in the royal chapel (1514–1566) lies the body of St Ferdinand of Castile (1200–1252), which is exposed three times in the year. This chapel also contains the tombs of Alphonso the Wise (1252–1284) and Pedro I. (1350–1369) and a curious life-size image of the Virgin, which was presented to St Ferdinand by St Louis of France in the 13th century. It is in carved wood with movable arms, seated on a silver throne and with hair of spun gold. The chief pictures in the cathedral are the "Guardian Angel," the "St Anthony,"[1] and other works of Murillo; the "Holy Family" of Alfonso Miguel de Tobar (1678–1738); the "Nativity" and "La Generacion" of Luis de Vargas; Valdés Leal's "Marriage of the Virgin," and Guadelupe's "Descent from the Cross." In the Sacristia Alta are three fine paintings by Alexo Fernandez, and in the Sala Capitular are a "Conception" by Murillo and a "St Ferdinand" by Francisco Pacheco. The organs (1777 and 1827) are among the largest in the world. A curious and unique ritual is observed by the choir boys on the festivals of Corpus Christi and the Immaculate Conception—a solemn dance with castanets being performed by

[1] This was stolen in 1874, sold in New York for £50, and returned by its purchaser, Mr Schaus.

ten of them before the altar; the custom is an old one but its origin is obscure. The Sagrario (1618–1662) on the north of the cathedral is a Baroque addition by Miguel de Zumarraga and Fernandez de Iglesias, which serves as the parish church.

At the north-east corner of the cathedral stands the Giralda, a bell tower of Moorish origin, 295 ft. in height. The lower part of the tower, or about 185 ft., was built in the latter half of the 12th century by Yūsuf I.; the upper part and the belfry, which is surmounted by a vane formed of a bronze figure 14 ft. high representing Faith, were added (1568) by Fernando Ruiz in the Renaissance style. The ascent is made by a series of inclined planes. The exterior is encrusted with delicate Moorish detail, and the tower is altogether the finest specimen of its kind in Europe. At the base lies the Court of Oranges, of which only two sides now remain; the original Moorish fountain, however, is still preserved. But the chief relic of the Arab dominion in Seville is the Alcazar, a palace comparable in interest and beauty only with the Alhambra of Granada. It was begun in 1181 during the best periods of the Almohades, and was surrounded by walls and towers, of which the Torre del Oro, a decagonal tower on the river side, is now the principal survival. The Torre del Oro (1220) has an 18th-century superstructure. Pedro I. made considerable alterations and additions in the Alcazar during the 14th century, and worse havoc was afterwards wrought by Charles V., Philip III. and Philip V. Restorations have been effected as far as possible, and the palace is now an extremely beautiful example of Moorish work. The façade, the hall of ambassadors and the Patio de las Muñecas are the most striking portions, after which may be ranked the Patio de las Doncellas and the chapel of Isabella. Among other Moorish remains in Seville may be mentioned the minaret of San Marcos, 75 ft. high. The Casa de Pilatos is Moorish and Renaissance of the 16th century, and in addition to its elegant courtyard surrounded by a marble colonnade, contains some fine decorative work. Somewhat similar in style are the 15th-century Casa de los Pinelos (Casa de Abades) and the 15th-century palace of the dukes of Alva (Palacio de las Dueñas or de las Pinedas). The following are the most notable churches in Seville: Santa Maria la Blanca, an old Jewish synagogue; San Pedro, 14th-century Gothic; Santa Marina, with the oldest Christian sculptures in Seville; San Marcos, badly restored, but with a remarkable mudejar portal; San Clemente el Real with beautiful blue and white tile-work (*azulejos*) of 1588; the Gothic Parroquia of Santa Ana, in the Triana suburb; and Omnium Sanctorum, built by Pedro I., with a Moorish tower and Roman foundations. The church of La Caridad belongs to an almshouse founded in 1661 by the Sevillian Don Juan, Miguel de Mañara. It possesses six masterpieces by Murillo, and two by Valdes Leal. The chapel of the convent of Santa Paula dates from 1475, and has a portal magnificently decorated with *azulejos*. Other churches, though generally deficient in architectural interest, are enriched by paintings or sculptures of Pacheco, Montañes, Alonso Cano, Valdes Leal, Roelas, Campaña, Morales, Vargas and Zurbaran. The museum was formerly the church and convent of La Merced. It now contains priceless examples of the Seville school of painting, which flourished during the 16th and 17th centuries. Among the masters represented are Velazquez and Murillo (both natives of Seville), Zurbaran, Roelas, Herrera the Elder, Pacheco, Juan de Castillo, Alonso Cano, Cespedes, Bocanegra, Valdes Leal, Goya and Martin de Vos. The school founded in 1256 by Alfonso X. became a university in 1502; its present buildings were originally a Jesuit college built in 1567 from designs either by Herrera or by the Jesuit Bartolomé de Bustamente, but devoted to their present use in 1767 on the expulsion of the Jesuits. The university has faculties of law, philosophy, natural science and medicine. The Casa del Ayuntamiento, in the Renaissance style, was begun in 1527 and has a fine staircase and hall and handsome carved doors. The Lonja, or exchange, was designed by Herrera in his severe classical style, and completed in 1598; the brown and red marble staircase which leads to the Archivo de Indias is the best part of the design. The archives contain 30,000 volumes relating to the voyages of Spanish discoverers, many of which are still unexamined. The archbishop's palace dates from 1697; the most notable features are the Churrigueresque doorway and staircase. The palace of San Telmo was formerly the seat of a naval college founded by Ferdinand Columbus. An immense doorway is its principal architectural feature, but its picture gallery is interesting and important. Other noteworthy buildings are the Mudejar palaces of the duke of Osuna and the count of Peñaflor; the house occupied by Murillo at the time of his death (1682); the civil hospital built in 1559 and enlarged in 1842; the foundling hospital (1558); the bull-ring, with room for 14,000 spectators; and fragments of the city walls, which formerly had a circumference of more than 10 m., with 12 gateways and 166 towers.

Commerce and Industries.—The port of Seville, in 37° 10′ N. and 6° 10′ W. has always been one of the chief outlets of the wealth of Spain. It is the terminus of three railways to Madrid, and of other lines to Cadiz, Almorchon, Ciudad Real, Huelva, Badajoz and Lisbon. Three of these lines have branches down to the water-side on the quays. The quay on the left bank, 4500 ft. long, is provided with powerful cranes, and sheds for merchandise. Navigation up the Guadalquivir from its mouth to Seville (where the river is still tidal) is less dangerous for steamers than for sailing vessels, but is nevertheless uncertain. The construction of a ship-canal 4 m. long from the Punta de los Remedios to the Punta del Verde—two points between which the windings of the river render navigation especially difficult—was first proposed in 1859, and was undertaken in 1907. Dredging operations were begun at the same time, so that on completion of the canal vessels drawing 25 ft. (instead of 16 ft.) could come up to Seville. The principal exports are Manzanilla, Amontillado and other wines, oranges and lemons, iron, copper and lead ores, mercury, olives, oil, cork and wool; the imports include coal, wood, iron, manufactured goods, hemp, flax and colonial produce. There are manufactures of machinery, tobacco, chocolate, soap, porcelain, beer, liqueurs, brandies, corks and silk. The royal artillery works and iron foundries are very important. The porcelain and earthenware factory in the Carthusian convent (Cartuja,[1] founded 1401) employs more than 2000 hands. Pottery has been the characteristic industry of the Triana from time immemorial; the patron saints of Seville, Justa and Rufina, are said by tradition to have been potters here. Equally important is the great tobacco and cigar factory, where 6000 women are employed.

History.—Seville appears originally to have been an Iberian town. Under the Romans the city was made the capital of Baetica in the second century B.C., and became a favourite resort for wealthy Romans. It was captured in 45 B.C. by Julius Caesar, who gave it the name of Colonia Julia Romula, and made it one of the *conventus juridici*. The emperors Hadrian, Trajan and Theodosius were born in the neighbourhood at Italica (now Santiponce), where are the remains of a considerable amphitheatre. The chief existing monument of the Romans in Seville itself is the remains of an aqueduct, on four hundred and ten arches, by which water from Alcalá de Guadaira was supplied to the town. At the beginning of the 5th century the Silingian Vandals made Seville the seat of their empire, until it passed in 531 under the Visigoths, who chose Toledo for their capital. After the defeat of Don Roderick at Guadalete in 712 the Moors took possession of the city after a siege of some months. Under the Moors Seville continued to flourish. Idrisi speaks in particular of its great export trade in the oil of Aljarafe. The district was in great part occupied by Syrian Arabs from Emesa, part of the troops that entered Spain with Balj in 741 at the time of the revolt of the Berbers. It was a scion of one of these Emesan families, Abū 'l-Kāsim Mahommed, cadi of Seville, who on the fall of the Spanish caliphate headed the revolt of his townsmen against their Berber masters (1023) and became the founder of the Abbādid dynasty, of which Seville was capital, and which lasted under his son Mo'taḍid (1042–1069) and grandson Mo'tamid (1069–1901) till the city was taken by the Almoravides. The later years of the Almoravide rule were very oppressive to the Moslems of Spain; in 1133 the people of Seville were prepared to welcome the victorious arms of Alphonso VII., and eleven years later Andalusia broke out in general rebellion. Almohade troops now passed over into Spain and took Seville in 1147. Under the Almohades Seville was the seat of government and enjoyed great prosperity; the great mosque (now destroyed) was commenced by Yūsuf I. and completed by his son Almanzor. In the decline of the dynasty between 1228 and 1248 Seville underwent various revolutions, and ultimately acknowledged the Hafsite prince, but Ferdinand III. restored it to Christendom in 1248. Ferdinand brought temporary ruin on the city, for it is said that 400,000 of the inhabitants went into voluntary exile. But the position of Seville was too favourable for trade for it to fall into permanent decay, and by the 15th century it was again in a position to derive full benefit from the discovery of America. After the reign of Philip II. its prosperity gradually waned with that of the rest of the Peninsula; yet even in 1700 its silk factories gave employment to thousands of workpeople; their numbers, however, by the end of the 18th century had fallen to four hundred. In 1800 an outbreak of yellow fever carried off 30,000 of the inhabitants, and in 1810 the city suffered severely from the French under Soult, who plundered to the extent of six millions sterling. Politically Seville has always had the reputation of peculiar loyalty to the throne from the time when, on the death of Ferdinand III., it was the only city which remained faithful to his son Alphonso the Wise. It was consequently much

[1] The interesting 15th-century tombs formerly in the Cartuja are now in the church of the university.

favoured by the monarchs, and frequently a seat of the court. For its loyalty during the revolt of the Comuneros it received from Charles V. the motto *Ab Hercule et Caesare nobilitas; a se ipsa fidelitas*. In 1729 the treaty between England, France and Spain was signed in the city; in 1808 the central junta was formed here and removed in 1810 to Cadiz; in 1823 the cortes brought the king with them from Madrid; and in 1848 Seville combined with Malaga and Granada against Espartero, who bombarded the city but fled on the return of Queen Maria Christina to Madrid.

See P. de Madrazo, *Sevilla y Cádiz* (Madrid, 1884–1886); R. Contreras, *Estudio de los monumentos drabes de Sevilla y Córdova* (Madrid, 1885); J. Gestoso y Perez, *Sevilla monumental y artistica* (3 vols., Seville, 1889–1892); A. F. Calvert, *Seville* (London, 1907); J. Guichot y Parodi, *Historia del Ayuntamiento de la ciudad de Sevilla* (3 vols., Seville, 1896–1898); J. Cascales y Muñoz, *Sevilla intellectual* (Madrid, 1896); W. M. Gallichan, *The Story of Seville* (London, 1903).

SÈVRES, a town of northern France, in the department of Seine-et-Oise, on the left bank of the Seine, midway between Paris and Versailles, about 3 m. from the fortifications of the former. Pop. (1906) 7949. The town owes its celebrity to the porcelain manufactory established there in 1756 and taken over by the State three years later. In the museum connected with the works are preserved specimens of the different kinds of ware manufactured in all ages and countries and the whole series of models employed at Sèvres from the beginning of the manufacture, for an account of which see CERAMICS. A technical school of ceramics is attached to the factory.

SEWALL, SAMUEL (1652–1730), American jurist, was born at Horton, near Bishopstoke, Hants, England, on the 28th of March 1652. He was taken to New England in 1661; graduated at Harvard in 1671; studied divinity; and was resident fellow of Harvard in 1673–1674, and keeper of the college library in 1674. In 1683 he was deputy to the General Court for Westfield; from 1681 to 1684 he managed the only licensed printing press in Boston; and as a member of the Board of Assistants in 1684–1686 and in 1689–1690 he was *ex officio* a judge of the Superior Court. He was a member of the Council in 1691–1725, and in 1692 he was made one of the special commissioners of oyer and terminer to try persons accused of witchcraft in Suffolk, Essex and Middlesex counties. This court condemned nineteen. Sewall in January 1697 stood in meeting while a bill was read in which he took "the blame and shame" of the "guilt contracted upon the opening of the late commission of oyer and terminer at Salem," and asked pardon. He was a judge of the Superior Court from 1692 to 1728, and in 1718–1728 was its chief justice; in 1715–1728 he was judge of probate for Suffolk county. He died in Boston on the 1st of January 1730. Sewall has been called the "last of the Puritans" and his character is attractively portrayed in Whittier's *Prophecy of Samuel Sewall*. He was a strict Calvinist and opposed the growing liberal control of Harvard College; he contributed to the cause of Indian missions, built an Indian meeting-house (probably in Sandwich), was one of the commissioners of the Society for the Propagation of the Gospel in New England and Parts Adjacent, and for more than twenty years its secretary and treasurer.

He wrote: *The Selling of Joseph, a Memorial* (1700), the first anti-slavery tract printed in America; with Edward Rawson, anonymously, *The Revolution in New England Justified* (1691; reprinted in *Force's Tracts* and in *The Andros Tracts*); *Phaenomena quaedam apocalyptica ad aspectum novi orbis configurata* (1697) and *Talitha Cumi, or an Invitation to Women to look after their Inheritance in the Heavenly Mansions*, both full of strange Biblical interpretation; and a journal begun in 1673, which, with his other papers, was bought by the Massachusetts Historical Society in 1869, and was published in vols. xiv.-xlviii. of its *Collections*.

See the sketch in J. L. Sibley, *Biographical Sketches of Graduates of Harvard University*, ii. (1881), 345-371; an article by C. H. C. Howard in vol. xxxvii. (Salem, 1901) of the *Essex Institute Historical Collections*; N. H. Chamberlain, *Samuel Sewall and the World He Lived In* (Boston, 1897); and G. E. Ellis, *An Address on the Life and Character of Chief Justice Samuel Sewall* (Boston, 1885).

His son, JOSEPH SEWALL (1686–1769), became pastor of the Old South Church in 1713, and was a powerful preacher who sided with Whitefield. A descendant, SAMUEL EDWARD SEWALL (1799–1888), a lawyer, was prominent in the anti-slavery movement, first as a Garrisonian and afterwards as a member of the Liberty and Free-Soil parties; he was counsel for a number of fugitive slaves, and after the Civil War he worked for the improvement of the legal status of women.

See Nina M. Tiffany, *Samuel E. Sewall: A Memoir* (Boston, 1898).

SEWANEE, a village of Franklin county, Tennessee, about 15 m. E. of Winchester, the county-seat, and (by rail) 95 m. S.S.E. of Nashville. Pop. about 1200. Sewanee is served by the Tracy City branch of the Nashville, Chattanooga & St Louis railway. It is on a spur of the Cumberland mountains about 2000 ft. above the sea and about 1000 ft. above the surrounding country. It is a resort for sufferers from malaria and pulmonary complaints. There are mineral springs, coal mines and sandstone quarries here, all on the "domain," about 10,000 acres, of the University of the South, a Protestant Episcopal institution of higher learning, founded in 1857, largely through the efforts of Bishop Leonidas Polk, but not opened until 1868. The principal buildings of the University, on a tract of 1000 acres, are all of Sewanee sandstone; they include Walsh Memorial (1890), with offices and college class-rooms; the Library (formerly Convocation Hall, 1886; remodelled 1901), with a tower copied from Magdalen College, Oxford; Thompson Hall (1883; enlarged 1901), with science lecture-rooms and laboratories; Hoffman Memorial (1898), a dormitory; All Saints' Chapel (1909), a copy of King's College Chapel, Cambridge; a Gymnasium (1901); Quintard Memorial (1901), the home of the Sewanee Military Academy (until 1908 the Sewanee Grammar School), the preparatory department of the University; and St. Luke's Memorial (1878), the home of the Theological Department; and St Luke's Memorial Chapel (1907). The University is governed by a board of trustees consisting of the bishop, one clergyman and two laymen from each of 19 Protestant Episcopal dioceses in the Southern States.

SEWARD, ANNA (1747–1809), English writer, often called the "Swan of Lichfield," was the elder daughter of Thomas Seward (1708–1790), prebendary of Lichfield and of Salisbury, and author. Born at Eyam in Derbyshire, she passed nearly all her life in Lichfield, beginning at an early age to write poetry partly at the instigation of Dr Erasmus Darwin. Her verses include elegies and sonnets, and she also wrote a poetical novel, *Louisa*, of which five editions were published. Miss Seward's writings, which include a large number of letters, are decidedly commonplace, and Horace Walpole said she had "no imagination, no novelty."

Sir Walter Scott edited her *Poetical Works* in three volumes (Edinburgh, 1810); to these he prefixed a memoir of the authoress, adding extracts from her literary correspondence. He refused, however, to edit the bulk of her letters, and these were published in six volumes by A. Constable as *Letters of Anna Seward 1784–1807* (Edinburgh, 1811). Miss Seward also wrote *Memoirs of the Life of Dr Darwin* (1804). See E. V. Lucas, *A Swan and her Friends* (1907); and S. Martin, *Anna Seward and Classic Lichfield* (1909).

SEWARD, WILLIAM HENRY (1801–1872), American statesman, was born on the 16th of May 1801 in the village of Florida, Orange county, New York. He graduated from Union College in 1820, having taught school for a short time at Savannah, Georgia, to help pay his expenses; was admitted to the bar at Utica, N.Y., in 1822, and in the following year began the practice of law at Auburn, N.Y., which was his home for the rest of his life. He soon attained distinction in his profession, but drifted into politics, for which he had a greater liking, and early became associated with Thurlow Weed. He was at first an adherent of Daniel D. Tompkins in state, and a National Republican in national politics, after 1828 became allied with the Anti-Masonic party, attending the national conventions of 1830 and 1831, and as a member of the organization he served four years (1830–1834) in the state Senate. By 1833 the Anti-Masonic movement had run its course, and Seward allied himself with the other opponents of the Jackson Democrats, becoming a Whig. In 1834 he received the Whig nomination for governor, but was defeated by William L. Marcy. Four years later he was renominated, was elected, was re-elected in 1840, and served from January 1839 until January 1843. As governor, Seward favoured

a continuance of works of internal improvement at public expense, although this policy had already plunged the state into financial embarrassment. His administration was disturbed by the anti-rent agitation and by the M'Leod incident growing out of the Canadian rebellion of 1837.[1] During this period he attracted much attention by his liberal and humane policy, promoting prison reform, and proposing to admit Roman Catholic and foreign teachers into the public schools of the state. His refusal soon after his inauguration to honour the requisition of the governor of Virginia for three persons charged with assisting a slave to escape from Norfolk, provoked retaliatory measures by the Virginia legislature, in which Mississippi and South Carolina soon joined. Laws were also passed during his term putting obstacles in the way of recovering fugitive slaves. Seward soon became recognized as the leader of the anti-slavery Whigs. He was one of the earliest political opponents of slavery, as distinguished from the radical Abolitionists, or the followers of William Lloyd Garrison, who eschewed politics and devoted themselves to a moral agitation.

On retiring from office Seward returned to the practice of law. His reputation was made in four great criminal cases—those of Abel F. Fitch and others, of Freeman, of Wyatt and of Van Zandt — the last-named bringing him especially the goodwill of opponents of slavery. Toward the end of his career at the bar, however, he changed from a general practitioner to a patent lawyer, and as such had a lucrative practice.

When the Whigs secured a momentary control of the state legislature in 1849 they sent Seward to the United States Senate. The antagonism between free labour and slave labour became the theme of many of his speeches. In his first set speech in the Senate, on the 11th of March 1850, in opposing the pending compromise measures, he attracted the attention of the whole country by his assertion that "there is a higher law than the constitution" regulating "our authority over the domain" (*i.e.* the Territories). When the Democrats, however, declared such language incendiary he tried to explain it away, and by so doing offended his friends without appeasing his opponents. In a speech at Rochester, New York, in 1858 he made the famous statement that there was "an irrepressible conflict between opposing and enduring forces, and it means that the United States must and will, sooner or later, become either entirely a slave-holding nation or entirely a free-labour nation." Although this idea had often been expressed by others, and by Seward himself in his speech of 1848, yet he was severely criticized, and four days later he sought to render this statement innocuous also.

In the election of 1852 Seward supported General Winfield Scott, but not his party platform, because it declared the compromise of 1850 a finality. He naturally opposed the Kansas-Nebraska Bill of 1854, which repealed the Missouri Compromise and established the principle of popular sovereignty in the Territories. Subsequently he actively supported in the Senate the free-state cause in Kansas. In 1854–1855, when it became evident that the Whig party in the North was moribund, Seward helped to lead its scattered remnants into the Republican fold. As the recognized leader of the new party, his nomination by the Republicans for the presidency in 1856 and in 1860 was regarded as certain; but in each instance he was put aside for another. The heterogeneous elements of the new organization could not be made to unite on a man who for so many years had devoted his energies to purely Whig measures, and he was considered less "available" than Fremont in 1856 and than Lincoln in 1860. After Lincoln was elected in 1860 he chose Seward for his secretary of state. The new president was a man comparatively little known outside the state of Illinois, and many of his supporters, doubtful of his ability to deal with the difficult problems of 1861, looked to Seward as the most experienced man of the administration and the one who should direct its policy. Seward himself, apparently sharing these views, although not out of vanity, at first possessed an unbounded confidence in his ability to influence the president and his cabinet. He believed that the Union could be saved without a war, and that a policy of delay would prevent the secession of the border states, which in turn would gradually coax their more southern neighbours back into their proper relations with the Federal government. In informal conferences with commissioners from the seceded states he assured them that Fort Sumter should be speedily evacuated. Finding himself overruled by the war party in the cabinet, on the 1st of April 1861, Seward suggested a war of all America against most of Europe, with himself as the director of the enterprise. The conduct of Spain toward Santo Domingo and of France toward Mexico, and the alleged attitude of England and Russia toward the seceded states were to be the grounds for precipitating this gigantic conflict; and agents were to be sent into Canada, Mexico and Central America to arouse a spirit of hostility to European intervention. Dangers from abroad would destroy the centrifugal forces at home, and the Union would be saved. When this proposal was quietly put aside by the president, and Seward perceived in Lincoln a chief-executive in fact as well as in name, he dropped into his proper place, and as secretary of state rendered services of inestimable value to the nation. To prevent foreign states from giving official recognition to the Confederacy was the task of the hour, and in this he was successful. While he did not succeed in preventing the French occupation of Mexico or the escape of the Confederate cruiser "Alabama" from England, his diplomacy prepared the way for a future adjustment satisfactory to the United States of the difficulties with these powers. While his treaty with Lord Lyons in 1862 for the suppression of the slave trade conceded to England the right of search to a limited extent in African and Cuban waters, he secured a similar concession for American war vessels from the British government, and by his course in the Trent Affair he virtually committed Great Britain to the American attitude with regard to this right.

On the 5th of April 1865 Seward was thrown from his carriage and severely injured. Nine days later, while lying ill at his home at Washington, he was attacked by one Lewis Powell, alias Payne, a fellow-conspirator of John Wilkes Booth, at the same time that Lincoln was assassinated. The secretary's son, Frederick W. Seward, and three other persons who came to his assistance, were also wounded by the assailant. Seward's wife, an invalid, received such a shock that she died within two months, and his only daughter, who witnessed the assault, never recovered from the effects of the scene and died within the year. Seward gradually regained his health, and remained in the cabinet of President Johnson until the expiration of his term in 1869. In the struggle between the Executive and Congress over the method of reconstructing the Southern States, Seward sided with Johnson and thus shared some of the obloquy bestowed upon that unfortunate president. His greatest work in this period was the purchase of Alaska from Russia, in 1867. He also negotiated treaties for the purchase of the Danish West Indies, the Bay of Samana, and for American control of the isthmus of Panama; but these were not ratified by the Senate. After returning to private life, Seward spent two years and a half in travel and died at Auburn on the 10th of October 1872.

His son, FREDERICK WILLIAM SEWARD, was born in Auburn, New York, on the 8th of July 1830, graduated at Union College in 1849 and was admitted to the bar at Rochester, N.Y., in 1851. From 1851 to 1861 he was one of the editors and owners of the Albany *Evening Journal*, and during his father's term at the head of the State Department he was assistant secretary of state. He served in the New York Assembly in 1875, and from 1877 to 1881 was again assistant secretary of state. After 1881 he

[1] In 1837 the vessel "Caroline," which had been used by the Canadian insurgents, was seized by the Canadian authorities in American territory and was destroyed. In 1840 one Alexander M'Leod, a British subject then in New York, asserted that he had aided in the capture; he was promptly arrested and was held for trial on a charge of murder. The British minister demanded from the national government M'Leod's release, but his case was in the New York courts, over which the national government had no jurisdiction. In the trial M'Leod proved an alibi, was acquitted (October 1841), and a serious international complication was thus averted.

devoted his time to the practice of his profession and to lecturing and writing.

The best biography of Seward is that by Frederic Bancroft, *The Life of William H. Seward* (2 vols., New York, 1900); see, also, *The Life and Works of William H. Seward* (5 vols., new ed., Boston, 1883), edited by George E. Baker; *William H. Seward: an Autobiography from 1801 to 1834, with a Memoir of his Life and Selections from his Letters* (3 vols., New York, 1891), by his son, Frederick W. Seward; *William H. Seward's Travels around the World* (New York, 1873), by his adopted daughter, Olive R. Seward; *Lincoln and Seward* (New York, 1874), by Gideon Welles; and *William Henry Seward* (new ed., Boston, 1899), by T. K. Lothrop, in the "American Statesmen Series."

SEWELL, WILLIAM (1804–1874), English divine and author, was born at Newport, Isle of Wight, on the 23rd of January 1804, the son of a solicitor. He was educated at Winchester and Merton College, Oxford, was elected a fellow of Exeter College in 1827, and from 1831–1853 was a tutor there. From 1836–1841 he was Whyte's Professor of Moral Philosophy. Sewell, who took holy orders in 1830, was a friend of Pusey, Newman and Keble in the earlier days of the Tractarian movement, but subsequently considered that the Tractarians leaned too much towards Rome, and dissociated himself from them. When, however, in 1849, J. A. Froude published his *Nemesis of Faith*, Sewell denounced the wickedness of the book to his class, and, when one of his pupils confessed to the possession of a copy, seized it, tore it to pieces, and threw it in the fire. In 1843 he, with some friends, founded at Rathfarnham, near Dublin, St Columba's College, designed to be a sort of Irish Eton, and in 1847 helped to found Radley College. Sewell's intention was that each of these schools should be conducted on strict High Church principles. He was originally himself one of the managers of St Columba, and sub-warden of Radley, but his business management was not successful in either case, and his personal responsibility for the debts contracted by Radley caused the sequestration of his Oxford fellowship. In 1862 his financial difficulties compelled him to leave England for Germany, and he did not return till 1870. He died on the 14th of November 1874.

His publications include translations of the *Agamemnon* (1846), *Georgics* (1846 and 1854) and *Odes and Epodes of Horace* (1850); *An Introduction to the Dialogues of Plato* (1841); *Christian Politics* (1844); *The Nation, the Church and the University of Oxford* (1849); *Christian Vestiges of Creation* (1861).

His elder brother, RICHARD CLARKE SEWELL (1803–1864), practised successfully as a barrister in England, and then went to Australia, where he obtained a large criminal practice. In 1857 he was appointed reader in law to the University of Melbourne. He was the author of a large number of legal works.

A younger brother, HENRY SEWELL (1807–1879), who became a solicitor, acted in London as secretary and deputy-chairman of the Canterbury Association for the Colonization of New Zealand, and eventually went out to the colony, and in 1854 was elected to the House of Representatives. In 1856 he became first premier of New Zealand. Subsequently he held the office of attorney-general (1861–1863) and minister of justice (1864–1865 and 1869–1872). In 1876 he returned to England, where he died on the 14th of May 1879.

Another brother, JAMES EDWARDS SEWELL (1810–1903), warden of New College, Oxford, was educated at Winchester and New College. In 1830 he became a fellow of his College, and practically passed the rest of his life there, being elected to the headship in 1860. The first University Commission had just released the colleges from the fetters of their original statutes, and Sewell was called on to determine his attitude towards the strong reforming party in New College. Though himself instinctively conservative, he determined that it was his duty to give effect to the desire of the majority, with the result that New College led the way in the general reform movement, and from being one of the smallest became the second largest college in Oxford. Sewell was vice-chancellor of the university 1874–1878. He died in his ninety-third year on the 29th of January 1903, having been warden for 43 years, and was interred in the College cloisters.

A sister, ELIZABETH MISSING SEWELL (1815–1906), was the author of *Amy Herbert* and many other High Church novels, and of several devotional books. An edition of her works was published in eleven volumes (1886).

SEWER, a large drain for carrying away by water excreta and other refuse, known therefore collectively as "sewage" (see SEWERAGE below); also, in a wider and older sense, the term for conduits such as are used for the draining of the fens, or of the water-courses, sea-defences, &c., over which the local authorities, known as commissioners of sewers, exercise jurisdiction. In English law a "sewer," as distinguished from a "drain," is that which carries away the sewage of more houses or other buildings than one. Many fanciful derivations of the word have been given, but there seems no doubt that the word is from O. Fr. *seuwiere*, Med. Lat. *seweria*, the sluice of a mill-pond, from the Late Lat. *ex-aquaria*, a means of conducting water out of anything; this is paralleled by Eng. "ewer," a water-jug, which undoubtedly comes from *aquaria*, through O. Fr. *ewe*, for water, mod. *eau*.

The old name "sewer," for a table attendant who placed and removed the dishes from the table, acted as waiter, &c., must be distinguished. In the household ordinances of Edward II. the word seems to appear in the form *asseour*, and in those of Edward IV. as *assewer*, an officer of the household who superintended the serving of a banquet. *Asseour* represents O. Fr. *asseoir*, to seat, set, Lat. *assidere*. The word was early connected with "sewe" or "sew," juice, broth, pottage, cognate with *sucus*, juice.

SEWERAGE, a general term for the process of systematically collecting and removing the fouled water-supply of a community. The matter to be dealt with may conveniently be classified as made up of three parts: (1) excreta, consisting of urine and faeces; (2) slop-water, or the discharge from sinks, basins, baths, &c., and the waste water of industrial processes; (3) surface water due to rainfall. Before the use of underground conduits became general, the second and third constituents were commonly allowed to sink into the neighbouring ground, or to find their way by surface channels to a watercourse or to the sea. The first constituent was conserved in middens or pits, either together with the dust, ashes, kitchen waste and solid waste generally or separately, and was carried away from time to time to be applied as manure to the land. In more modern times the pits in which excrement was collected took the form of covered tanks called cesspools, and with this modification the primitive system of conservancy, with occasional removal by carts, is still to be found in many towns. Even where the plan of removing excrement by sewers has been adopted, the kitchen waste, ashes and solid refuse is still treated by collecting it in pails or bins, whose contents are removed by carts either daily or at longer intervals, the refuse frequently being burned in destructors (*q.v.*). It therefore forms no part of the nearly liquid sewage which the other constituents unite to form.

The first constituent is from an agricultural point of view the most valuable, and from a hygienic point of view the most dangerous, element of sewage. Even healthy excreta decompose, if kept for a short time after they are produced, and give rise to noxious gases; but a more serious danger proceeds from the fact that in certain cases of sickness these products are charged with specific germs of disease. Speedy removal or destruction of excremental sewage is therefore imperative. It may be removed in an unmixed state, either in pails or tanks or (with the aid of pneumatic pressure) by pipes; or it may be defaecated by mixture with dry earth or ashes; or, finally, it may be conveyed away in sewers by gravitation, after the addition of a relatively large volume of water. This last mode of disposal is termed the water-carriage system of sewerage. It is the plan now usually adopted in towns which have a sufficient water supply, and it is probably the mode which best meets the needs of any large community. The sewers which carry the diluted excreta serve also to take slop-water, and may or may not be used to remove the surface water due to rainfall. The water-carriage system has the disadvantage that much of the agricultural value of sewage is lost by its dilution, while the volume of foul matter to be disposed of is greatly increased.

I. COLLECTION OF SEWAGE.—House drains, that is to say,

those parts of the domestic system of drainage which extend from the soil-pipes and waste-pipes to the sewer, are generally made of glazed stoneware pipes having a diameter of 4 in., 6 in., or sometimes 9 or 12 in., according to the estimated amount of waste to be removed. In ordinary domestic dwellings there is rarely any occasion to use pipes of a greater diameter than 6 in., and this only for the main drain, the branches and single lines of piping being 4 in. in diameter. It is a good rule to make the pipes and other fittings, such as channels and bends, as small in diameter as possible, having due regard to efficient capacity. Such a drain is more cleanly than one too large for its purpose, in that it is more thoroughly flushed when in use, the sewage running at a much faster speed through a full pipe than through one only partially full. For this reason a pipe having too great a capacity for the work it has to do is liable to become corroded by sediment deposited from slowly moving waste.

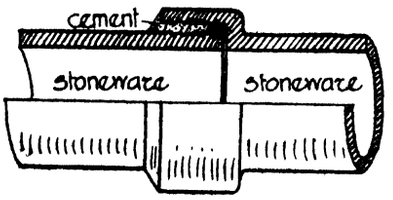


FIG. 1.—Stoneware.

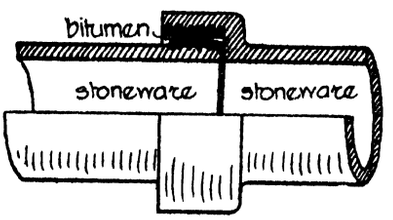


FIG. 2.—Stanford's Joint.

The pipes are made in 2 ft. lengths and are formed with a socket at one end into which the straight end of the next pipe fits loosely. This is wedged in position with a little gasket and the remaining space then carefully filled with neat Portland cement (fig. 1). Pipes are made also with a bituminous substance in the socket and around the spigot end, and by merely pushing the one into the other the joint is made. The bitumen is curved to allow self-adjustment to any slight settlement, so that damage to the joint is avoided (fig. 2). A composite joint may be used having the bitumen lining reinforced with the ordinary Portland cement filling (fig. 3). This type is somewhat more expensive than the ordinary jointing, but it makes a powerful and effective connexion. The method of connecting two lead pipes by a "wiped solder joint" is shown in fig. 4. Fig. 5 shows the method of connecting a lead pipe into the socket of a stoneware one, a brass sleeve piece or ferrule being used to give the necessary stiffness to the end of the lead pipe. This arrangement is frequently used, for example, at the base of a soil-pipe at its junction with the drain. In the next figure (fig. 6) the lead pipe has a brass socket attached to it to take the plain end of a stoneware pipe. This form of connexion is used between a water-closet and a lead trap. The joint shown in figs. 5 and 6 is similarly made when an iron pipe is substituted for a stoneware one, but instead of the Portland cement filling, molten lead is used and carefully caulked to form a water-tight joint.

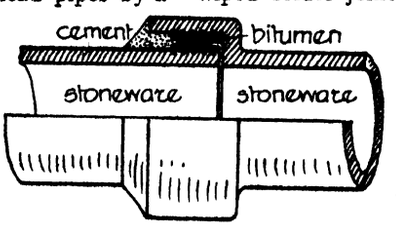


FIG. 3.—Composite Joint.

In the water-carriage system of drainage each house has its own network of drain-pipes laid under the ground, into which are taken the waste-pipes which lead from the closets, urinals, sinks, lavatory basins, and rain-water and other gulleys within and about the house. The many branches are gathered into one or more manholes, and connexion is finally made by means of a single pipe with the common public sewer. Gas from the sewer is prevented from entering the house drains by a disconnecting trap fixed in the manhole nearest the entrance to the sewer. The fundamental maxims of house sanitation are first, that there shall be complete disconnexion between the pipes within and without the house, and second, that the drainage shall be so constructed as to allow for the free admission of air in order to secure the thorough ventilation of all parts of the system and avoid the possibility of the accumulation of gas in any of the waste- or drain-pipes. The drains must be planned to conduct the waste material from the premises as quickly as possible without leakage or deposit by the way. The pipes should be laid in straight lines from point to point to true gradients of between 2 to 4 in. in 10 ft. Junctions with branch pipes and any bends necessary should be gathered, as far as practicable, in inspection chambers fitted with open channels instead of closed pipes. This allows of easy inspection and testing, and provides means of access for the drain-rods in cases of blockage. Sometimes it is desired, for reasons of economy or otherwise, to avoid the use of a manhole at a change of direction in the drain. A branch pipe which may have a specially shaped junction for cleaning the pipes in both directions is taken up with a slope to the ground or floor level and there finished with an air-tight cover which may be removed to allow the introduction of drain-rods should the pipes become blocked. Junctions of one pipe with another should be made obliquely in the direction of the floor. Stoneware pipes should be laid upon a bed of concrete not less than 6 in. thick and benched up at the sides with concrete to prevent any movement. When such pipes pass under a building they should be entirely surrounded by a concrete casing at least 6 in. in thickness. No drain should lie under a building if it is possible to avoid it, for injury is very liable to occur through some slight settlement of the building, and in a position such that the smells escaping from the damaged pipe would rise up through the floor into the building this would be an especially serious matter. The expense and annoyance of having the ground opened up for the repair of defects in the pipes beneath is another strong argument against drains being placed under a house. Where this is really necessary, however, pipes of cast-iron are recommended instead of the ordinary stoneware pipes, as being stronger; being made in lengths of 6 and 9 ft., they have a great advantage over the 2 ft. long stoneware tubes, for the joints of the latter are frequently a source of weakness. The joints, fewer in number, are made with molten lead (fig. 7), or flanged pipes are used and the joints packed with rubber and bolted (fig. 8).

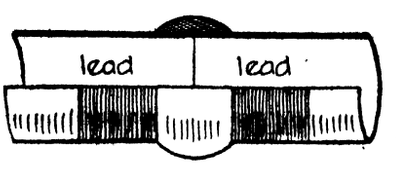


FIG. 4.—Lead-wiped Joint.

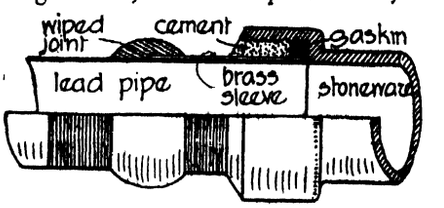


FIG. 5.—Lead into Stoneware.

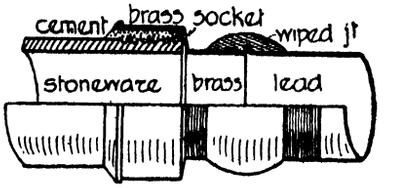


FIG. 6.—Stoneware into Lead.

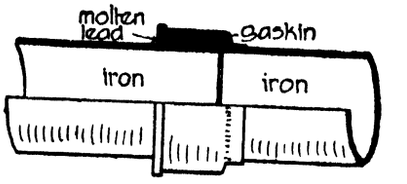


FIG. 7.—Iron Spigot and Socket Joint.

The principle of disconnexion adopted between the indoor and outdoor pipes should be retained between the latter and the sewer, and the domestic system should be cut off from the public drain by means of a disconnecting trap. This appliance is usually placed in a small chamber or manhole, easy of access for inspection, built close to the boundary of the premises, and as near as possible to the sewer into which the house drain discharges.

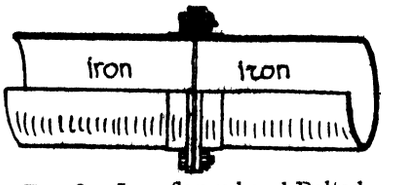


FIG. 8.—Iron-flanged and Bolted Joint.

Fig. 9 shows a section and plan of such a manhole built in accordance with the London drainage by-laws. There are five inlets from branch drains discharging by specially-shaped glazed channels into the main channel in the centre. It will be seen that in case of blockage it would be a simple matter to clear any of the pipes with

the drain-rods. The cap to the clearing arm has a chain attached by which it can be removed in case of flooding. The channels are benched up at the sides with cement, and the manhole is rendered on the inside with a cement lining. A fresh air inlet is taken out near the top of the chamber and is fitted with a mica flap inlet valve. The cover is of cast-iron in a cast-iron frame shaped with grooves to afford a double seal, the grooves being filled with a composition of tallow and fine sand. Where there is a danger of a backflow from the sewer due to its becoming flooded, a hinged flap should be placed at the junction of drain and sewer to prevent sewage from entering the house drain. A ball trap designed for this purpose may be used in place of a flap, and is more satisfactory, for the latter is liable to become corroded and work stiffly. In the ball-trap appliance the flowing back of the sewage forces a copper ball to fit tightly against the drain outlet, the ball dropping out of the way of the flow directly the pressure is relaxed.

The water-carriage system of drainage is undoubtedly the most nearly perfect yet devised. At the same time it is a very costly system to install with its network of sewers, pumping stations, and arrangements for depositing the sewage either in the sea or river, or upon the land or "sewage farm." In country districts and small towns and villages, however, excreta are often collected in small vessels

Earth-closets.

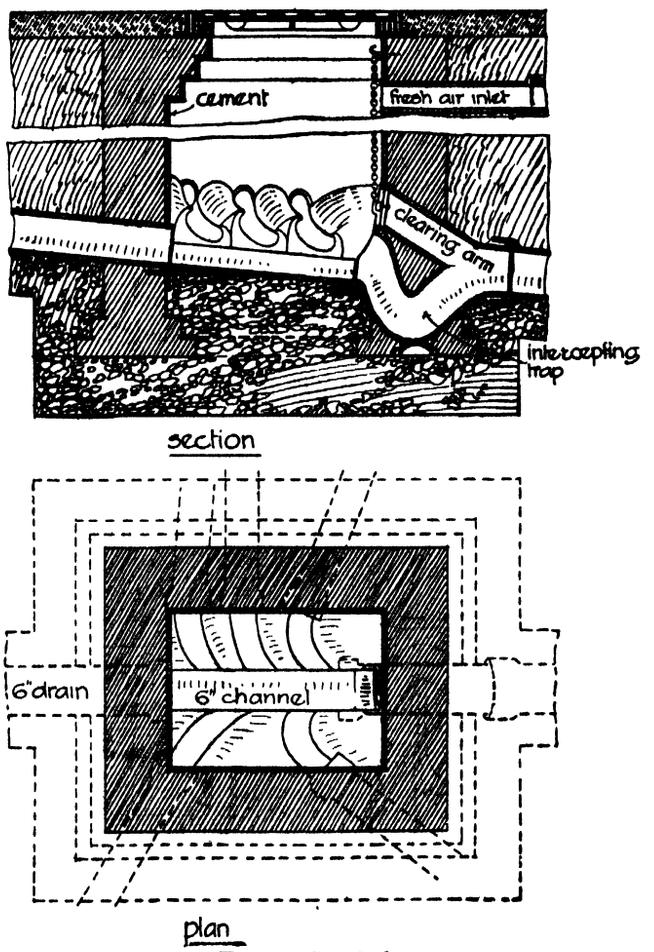


FIG. 9.—Manhole.

and removed in tank carts and deposited upon the land. The dry-earth system introduced by the Rev. Henry Moule (1801–1880), and patented in 1860, takes advantage of the oxidizing effect which a porous substance such as dry earth exerts by bringing any sewage with which it is mixed into intimate contact with the air contained in its pores. The system is of rather limited application from the fact that it leaves other constituents of sewage to be dealt with by other means. But so far as it goes it is excellent, and where there is no general system of water-carriage sewerage an earth-closet will in careful hands give perfect satisfaction. Numerous forms of earth-closet are sold in which a suitable quantity of earth is automatically thrown into the pan at each time of use (fig. 10), but a box filled with dry earth and a hand scoop will answer the purpose nearly as well. A plan much used in towns on the continent of Europe is to collect excrement in air-tight vaults which are emptied at intervals into a tank cart by a suction pump. Another pneumatic system adopted on the continent has the cesspools at individual houses permanently connected with a central reservoir by pipes through which the contents of the former are sucked by exhausting air from the reservoir at the central station.

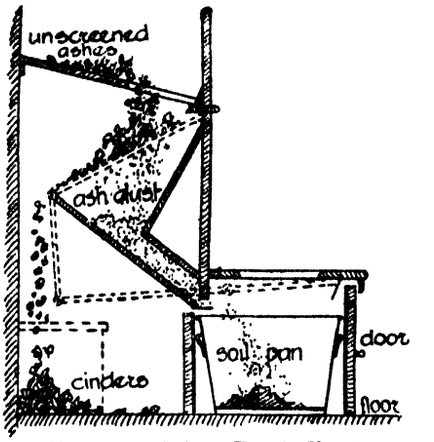


FIG. 10.—Ash or Earth-Closet.

Testing drains.

Newly laid drains should be carefully tested before the trenches are filled in to detect any defects in the pipes or joints. These should be made good and the test again applied until the whole system is in perfect order. Cement joints should be allowed to set for at least forty-eight hours before the test is made. There are several methods of testing. For the stone-ware drains laid under the ground the *water test* is generally adopted. After the lower end of the length of drain to be tested has been securely stopped (fig. 11) the drain is filled with water from its upper end until the desired pressure is obtained. To obtain the required head of water extra lengths of pipe are sometimes taken up temporarily at the upper end of the drain or, as an alternative, both ends of the pipe may be plugged and water introduced under pressure by a force pump through a small aperture provided in the plug. The exact pressure may then be ascertained by a water pressure gauge. An escape of water through some defective portion of the drain is indicated by the subsidence of the level of the water in the upper part of the drain or by a diminution of the pressure shown by the gauge. Then the defect must be located and remedied and the drain re-tested until all weak points are eliminated. This process must be repeated in each section of the drainage system until the whole is found to be sound and tight. It is not necessary to test drains laid with ordinary socket joints made in cement with a greater pressure than is obtained with a 5 ft. or 6 ft. head of water. A foot head of water gives at its base a pressure of ·433 lb per square inch, so that a head of 6 ft. would result in a pressure of just over 2½ lb per square inch. Cast-iron drain-pipes with caulked lead joints will withstand a pressure of nearly 90 lb per square inch of internal surface, but in actual practice it is sufficient if they are tested with a pressure of 10 lb or say a head of 20 to 24 ft.

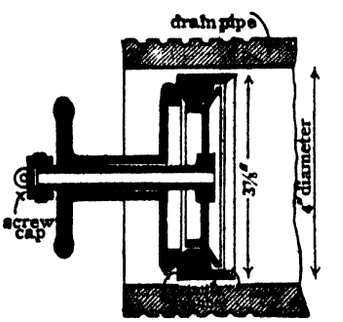


FIG. 11.—Drain Stopper.

The *atmospheric* or *air test* is sometimes applied instead of the water test. The drain is plugged, as in the latter, and air is then pumped into the pipes until the desired pressure is registered by the gauge attached to the apparatus. This pressure should be maintained without appreciable diminution for a stipulated period before the drains are passed as sound.

The *smoke test* is generally used for testing vertical shafts such as soil-pipes and ventilators to which the water test cannot be conveniently applied owing to the excessive pressure produced at the lower portion of the pipe by the head of water. It is applied by stopping the ends of the pipes and introducing smoke by a drain rocket or by a smoke-producing machine which forces volumes of thick smoke through an aperture in the stopper. The pipes and joints are then carefuly inspected for any evidence of leakage.

The *scent test* is occasionally employed for testing soil and ventilating pipes, but the apparatus must be carefully handled to avoid the material being spilt in the building and thus misleading the operator. The test is made by introducing into the drain some substance possessing a powerful odour such as oil of peppermint, calcium carbide or other suitable material, and tracing any defect by means of the escaping odour. This is not so effective a method as the smoke test, as there is more difficulty in locating leakages. Gulleys, traps and other similar fittings should be tested by pouring in water and observing whether siphonage or unsealing occurs. This of course will not happen if the appliances are of good design and properly ventilated. A section of a drain plug or stopper is shown in fig. 11. It has a band of india-rubber which expands when the screw is turned and presses tightly against the inside of the drain-pipe. In the centre of the plug is a capped aperture which allows for smoke

testing and also allows the water gradually to escape after a test by water.

Existing drains which have become defective and require to be made good must be exposed, taken up and relaid with new pipes, unless advantage be taken of a method which, it is claimed, renders it possible to make them permanently watertight so as to withstand the water test under pressure, and at the same time to disinfect them and the surrounding subsoil. This end is accomplished with the aid of patent machines which on being passed through the drain-pipe first remove all obstructions and accumulations of foul matter and then thoroughly cleanse and disinfect it, saturating the outside concrete and contaminated soil adjacent to any leak with strong disinfectants. Subsequently, loaded with the best Portland cement, another machine is passed through the drain, and, by powerful evenly-distributed circular compression, forces the cement into every hole, crack or crevice in the pipes and joints. This work leaves the inner surface of the pipes perfectly clean and smooth. After the usual time has been allowed for the cement to set the air test is applied, and the drain is claimed to be equal to, if not better than, a new drain, because the foundation is not disturbed by the process, and the risk of settlement, which is often the cause of leaky drains, is remote.

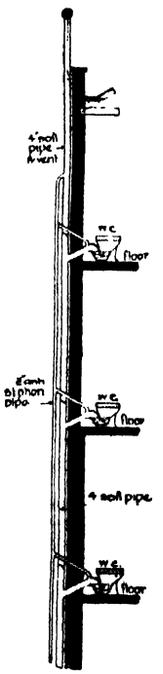


FIG. 12. — Soil Pipe with Anti-siphonage Pipe.

Traps. Every sanitary fitting should be trapped by a bend on the waste-pipe; this is generally made separately and fixed up near to the sink, closet or basin, as the case may be. The traps of small wastes such as those of sinks and lavatories should be fitted with a brass screw cap to facilitate clearing when a stoppage occurs. Their object is to hold a quantity of water sufficient to prevent the access of foul air through the waste-pipe into the house. The depth of the water "seal" should not be less than 2 in., or it may become easily unsealed in hot weather through the evaporation of the water. Unsealing may be caused, too, by "siphonage," when a number of fittings are attached to the same main waste without the branches being properly ventilated just below each trap. The discharge from one fitting in this case would create a partial vacuum in the other branches and probably suck the sealing water from one or more of the traps. To obviate such an occurrence an "anti-siphonage" pipe is fixed having its upper end open to the air and provided with branches tapping such waste-pipe just below the trap. Then, with this contrivance, a discharge from any fitting, instead of causing air to be sucked in through the trap of another fitting, thereby breaking the seal and allowing foul drain air to enter the house, merely draws the necessary air through the anti-siphonage pipe, leaving the other traps with their seals intact (fig. 12). There are many forms of traps for use in different positions although the principle and purposes of all are identical. Two forms commonly used are known as the S and the P trap. The bell trap and the D trap are obsolete.

Gulleys. To collect the rain and waste water from areas, yards, laundry and other floors and similar positions an open trapped gulley is used. It is usually of stoneware and fitted with an open iron grating which admits the water (fig. 13). Many of these gulleys are made too shallow and speedily get choked if the water they receive is charged with mud or sand. To obviate this difficulty



FIG. 13.—Gulley.

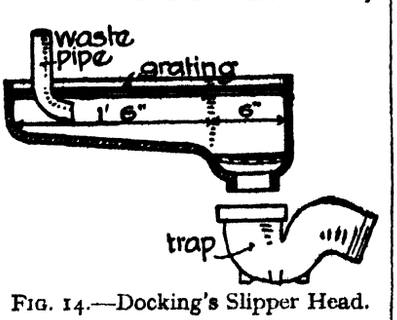


FIG. 14.—Docking's Slipper Head.

the gulleys are made with a deep container and are often fitted with a perforated basket of galvanized iron which catches the solid matter and has a handle which allows for its easy removal when necessary. Gulleys with slipper or channel heads as shown in fig. 14 are required to be fitted in some districts to receive the waste from sinks. The warm waste water from scullery and pantry sinks contains much grease, and should discharge into a trapped gulley specially constructed to prevent the passage of the grease into the drain (fig. 15). It should be of ample size to contain sufficient cold water to solidify the fat which enters it. This forms in cakes on the top of the water and should be frequently broken up and removed.

Great attention has been directed to the design of sanitary fittings, with the object of making them as nearly self-cleansing as possible. In the fixing of closets the wood casings which used to be fixed around every water-closet are going steadily out of use, their place being taken by a hinged seat supported on metal brackets — an arrangement which allows every part of the appliance to be readily cleaned with a cloth. In hospitals and similar institutions a form of closet is made fitted with lugs which are built into the wall; in this way support is obtained without any assistance from the floor, which is left quite clear for sweeping. Lavatory basins and sinks are also supported on cantilevers in the same way, and the wood enclosures which were formerly often fixed around these appliances are now generally omitted.

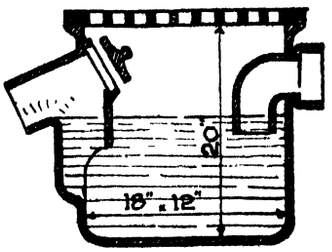


FIG. 15.—Stoneware Grease Trap.

Water-closets. There are several distinct types of water-closets. Each type is made in many different patterns, both good and bad from a sanitary point of view, and, whatever the type decided upon, care is necessary in selecting to obtain one efficient and hygienic in shape and working. The principal kinds of closets now in use are the washdown, siphonic, valve, washout and hopper.

Washdown closets (fig. 16) are most commonly used. They are inexpensive to buy and to fix, and being made in one piece and simple in construction without any mechanical working parts are not liable to get out of order. When strongly made or protected by brick or concrete work they will stand very rough usage. The objection is sometimes raised with regard to washdown closets that they are noisy in action. This must be allowed with many patterns, but some of the latest designs have been greatly improved in this respect, and when fitted with a silent flushing cistern are not open to this objection.

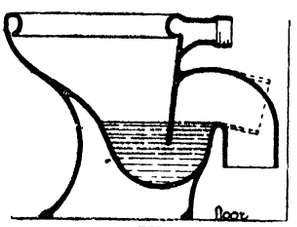


FIG. 16.—Washdown.

Siphonic closets (fig. 17) are a type of washdown in which the contents of the pan are removed by siphonic action, an after flush arrangement providing for the resealing of the trap. They are practically silent in action and with a flush of three gallons work very satisfactorily. Where the restrictions of the water company require the usual two gallon flush the ordinary washdown pan should be used.

Valve closets (fig. 18) are considered by many authorities on sanitation to be preferable to all other types. For domestic buildings,

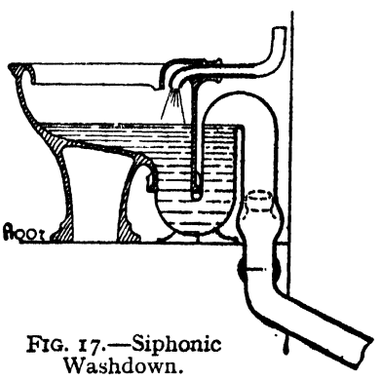


FIG. 17.—Siphonic Washdown.

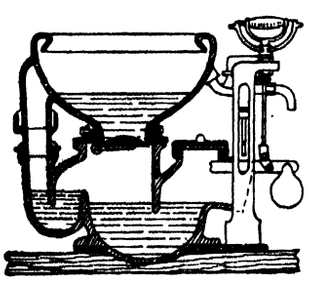


FIG. 18.—Valve.

hotels, and where not subjected to the hardest wear, they are undoubtedly of great value. They should have a three gallon flush, and on this account they cannot be used in many districts owing to the water companies' regulations stipulating that a flush of not more than two gallons may be used.

The *washout closet* (fig. 19) is a type that never attained much popularity as it has been found by practical experience to be unsanitary and objectionable. The standing water is too shallow, and the receiving basin checks the force of the flush and the trap is therefore frequently imperfectly cleared.

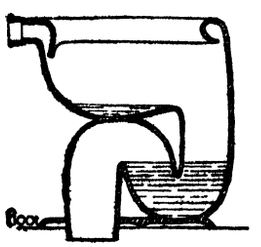


FIG. 19.—Washout.

Hopper closets are of two kinds—the long hopper and the short hopper. These are the forerunners of the washdown closet which the short hopper pan resembles, but instead of pan and trap being made in one piece the fitting consists of a fireclay or stoneware hopper, with straight sloping sides and central outlet jointed to a trap of lead or other material. The joint should be placed so as to be always kept under water by

the seal of the trap. The long hopper pan is a most objectionable type of closet which should be rigorously avoided as it easily becomes foul and is most insanitary. In most districts its use is prohibited.

A water-waste preventer is a small tank fixed usually 4 or 5 ft. above a closet or urinal and connected therewith by a flushing pipe of 1¼ in. or greater internal diameter. This tank usually contains a siphon, and the flush is actuated by pulling a chain which admits water to the siphon; the contents are then discharged with some force down the flushing pipe into the pan of the closet, clearing out its contents and replacing the fouled water with clean. The flushing tank is automatically refilled with water by a valve fitted with a copper ball which rising on the surface of the incoming water shuts off the flow when the tank is full. Fig. 20 is a sectional drawing of one of the latest patterns and clearly shows its construction. The water-supply is shown near the top with the regulating ball valve attached. An overflow is provided and a pipe is led from this to an external outlet. The capacity of the ordinary domestic flushing cistern is two gallons, which is the maximum quantity allowed by most water companies. A three gallon flush is much better, however, and where this larger quantity is allowed should be adopted. Larger tanks for ranges of closets or urinals are often made to flush automatically when full, and for these the rate of water supply may be

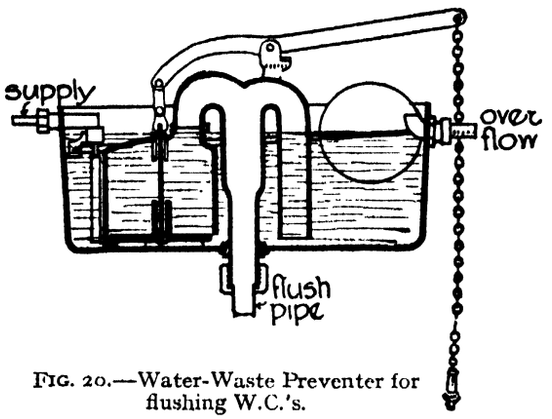


FIG. 20.—Water-Waste Preventer for flushing W.C.'s.

fast or very slow as desired, for the siphons are so constructed that even a drop-by-drop supply will start a full flush.

Regulations as to W.C.'s.

The by-laws of the London County Council contain very full regulations respecting the construction and fitting up of water-closets. These may be summarized as follows:—A water-closet or urinal must be furnished with an adequate flushing cistern distinct from any cistern used for drinking water. The service pipe shall lead to the flushing cistern and not to any other part of the closet. The pipe connecting the cistern with the pan shall have a diameter of not less than 1¼ in. in any part. The apparatus for the application of water to the apparatus must provide for the effectual flushing and cleansing of the pan, and the prompt and effectual removal therefrom, and from the trap connected therewith of all solid and liquid filth. The pan or basin shall be of non-absorbent material, of such shape, capacity and construction as to contain a sufficient quantity of water and to allow all filth to fall free of the sides directly into the water. No "container" or similar fitting shall be fixed under the pan. There shall be fixed immediately beneath or in connexion with the pan an efficient siphon trap constructed to maintain a sufficient water seal between the pan and the drain or soil pipe. No D trap or other similar trap is to be connected with the apparatus. If more than one water-closet is connected with a soil-pipe the trap of each closet shall be ventilated into the open air at a point as high as the top of the soil-pipe, or into a soil-pipe above the highest closet. This ventilating (or anti-siphonage) pipe shall be not less than 2 in. in diameter, and connected at a point not less than 3 and not more than 12 in. from the highest part of the trap (fig. 12).

Baths.

Baths may be made of many different materials; copper, cast-iron, zinc and porcelain are those most generally employed. Metal baths have the great advantage of becoming hot with the water, while baths of porcelain, stoneware and marble, which are bad conductors of heat, impart to the user a sense of chilliness even though the water in the bath be hot. Copper baths are best; they may be finished on the inside by tinning, enamelling or nickel plating. Iron baths, usually tapering in shape, are very popular and are usually finished in enamel, but sometimes tinned. Fig. 21 illustrates a good type of cast-iron bath with standing waste. A good feature of this bath lies in the fact that all parts are accessible and easily cleaned. Porcelain baths are cumbersome and take a long time to heat, but they are often used for public baths. The practice of enclosing the bath with a wood casing is fast dying out; it is insanitary in that it harbours dust and vermin. Baths are now usually elevated upon short legs, so that every part of them and of the adjacent floor and wall is accessible for cleaning.

Fig. 22 is a section of a good type of scullery sink, and shows the waste and trap with brass clearing cap. The fitting is supported upon galvanized iron cantilever brackets which are built into the wall.

Urinals.

Like closets, urinals have undergone much improvement in design and manufacture. The best types are of glazed ware, and have vertical curved backs and sides about 4 ft. high with a flushing rim round the top and terminating in a base discharging into an open glazed channel waste, which, in the case of a range of urinals, collects the discharge from all and conveys it into

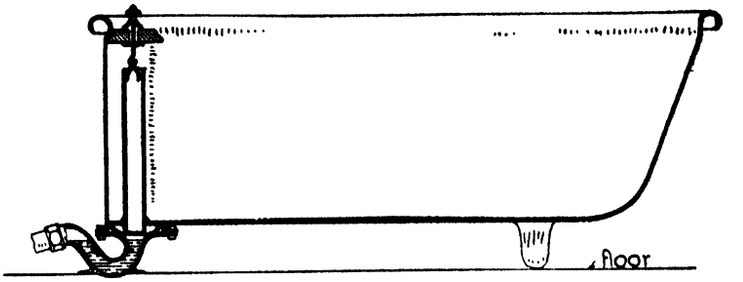


FIG. 21.—Bath, with Standing Waste.

a trapped gulley at one end of the range. This is the type usually fixed in street conveniences and similar positions. Plate and iron urinals are often fixed, but there is more difficulty in keeping them clean on account of the sharp angle and the unsuitability of the material. Urinals are seldom fixed in private houses or offices, an ordinary washdown pedestal closet with hinged "tip-up" seat serving every purpose. Such seats are often fitted with balance weights to cause them to lift automatically when not in use as a closet. Unless kept very clean and well flushed with water, urinals are liable to become a nuisance.

In London among other towns the system of drainage is a "combined" one, that is, the storm water and the domestic sewage and waste is all collected in one sewer. For many reasons it is more satisfactory to have the two drains quite separate. In many districts this is done, but it entails the provision of a double system of drainage for each house, one drain being provided for rain-water, the other for sewage. Where combined drainage is installed an excess of water poured into the sewers during a storm often results in back flow and the flooding of basements and cellars with sewage. Such an occurrence might take place where there is a separate sewer for the storm water, but in this case the flooding would be with comparatively harmless rain-water instead of sewage and filth. Figs. 23 and 24 show two ground plans of the same house, a semi-detached suburban residence, one with combined drainage and the other with separate drains for storm water and sewage. In both figures the rain-water drains are shown in a dotted line, and other drains in a full line.

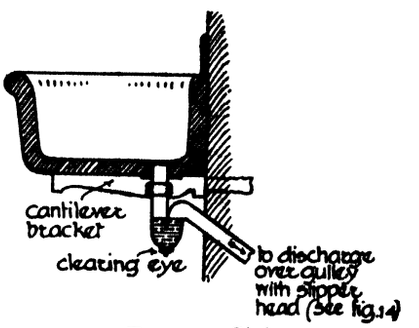


FIG. 22.—Sink.

In fig. 23, A is a 4 in. cast-iron rain-water down-pipe. B is a 4 in. ventilating-pipe taken up to a point above the building. C is a trapped gulley such as is shown in fig. 13. D is a gulley with channel head (fig. 14) into which are taken the discharges from the scullery sink on the ground floor, and from the bath and lavatory on the first floor. E is an untrapped manhole, with open channel bends and sealed cast-iron cover, from which any branch of the drains can easily be cleared by the use of drain-rods. F is a soil-pipe from a water-closet on the first floor, and is carried up above the roof to serve as a ventilator. G is a trapped gulley as fig. 13, taking the discharge from the rain-water pipe over it and serving also to drain the yard; H and J are similar gulleys. K is a manhole with trap for intercepting the foul gases from the sewer and preventing them from entering the house drains. The manhole is fitted with a sealed cast-iron cover and has an inlet at L with mica flap valve to admit fresh air to the drains; in construction it is similar to the one shown in fig. 9, but has only two branches entering it instead of five. In fig. 24, A is a rain-water pipe discharging to the gulley B, which is untrapped to allow of the ventilation of the branch C-B. C is a length of piping brought up to the surface of the ground and finished with a cap, which is removed when it is found necessary to clear away any obstruction. A special shaped junction here allows the rods to be pushed up either branch as required. D and E are trapped gulleys as already described. F is an untrapped gulley serving to ventilate the drain. G, H and J the same as for fig. 23. K is a pair of manholes built side by side, one for storm water and the other for sewage. Both are fitted with intercepting traps, and the sewage chamber is ventilated by an air inlet at L as in fig. 23. The cover of the storm water manhole need not be sealed, and if necessary could be fitted with a grating and be used to drain the forecourt.

The London by-laws regulating drainage are very full and are strictly enforced. They include requirements regarding the size, form, gradient and methods of construction and repair of drains, together with regulations affecting the design and fixing of traps, fittings and other apparatus connected with sanitary arrangements. Some of the headings of the different clauses of the by-laws are subjoined:—water-closets; earth-closets; drainage of subsoil; drainage of surface water; rain-water pipes; materials, &c., for drains; size of drains; drain to be laid on bed of concrete 6 in. thick; if under buildings to be encased with 6 in. of concrete; drain to be benched up with concrete to half its diameter; fall of drain; joints of drain; drain to be water-tight; thickness and weight of iron pipes; thickness of sockets and joints of stoneware pipes; drains under buildings; composition of concrete; every inlet to drain to be trapped; drain beneath wall to be protected by arch, flagstone, or iron lintel; drain connected with sewer to be trapped and means of access to trap provided; no right-angled junctions to be formed either vertical or horizontal; at least two untrapped openings to be provided for ventilation, each fitted with a grating or cowl with apertures for passage of air equal in area to that

Drainage by-laws.

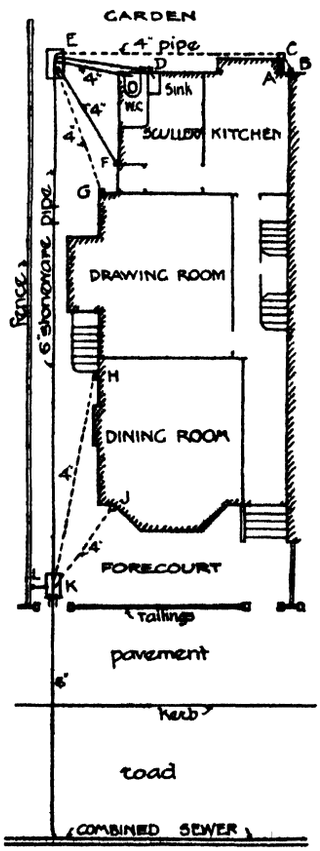


FIG. 23.—"Combined" System.

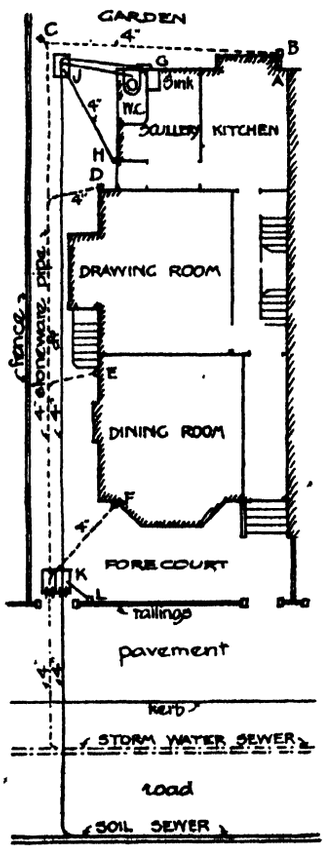


FIG. 24.—"Separate" System.

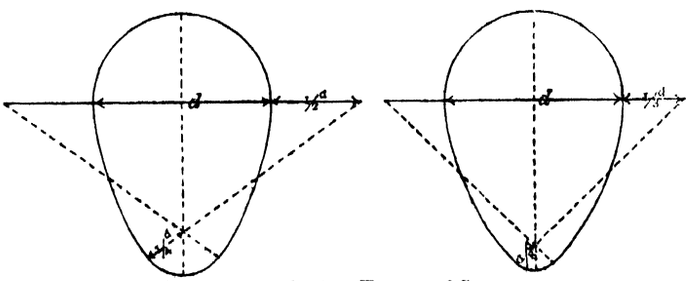
of the pipe to which it is fitted; ventilating shafts to be at least 4 in. in diameter, and if possible all bends and angles to be avoided; ventilating shafts to be of the same material, construction and weight as soil-pipes; no unnecessary inlets to drains to be made within buildings; waste-pipes from sinks and lavatories to be of lead, iron or stoneware, trapped immediately beneath the fitting; bell traps, dip traps and D traps are prohibited; waste-pipes to discharge in the open air into a properly trapped gulley; soil-pipes wherever practicable to be situate outside the building and to be of drawn lead or heavy cast-iron; if fixed internally the pipes to be of lead with wiped joints; iron pipes to have socket joints not less than 2½ in. in depth and to be made with molten lead or flanged joints securely bolted with some suitable insertion; the soil-pipe not to be connected with any rain-water or waste-pipe, and no trap to be placed between the soil-pipe and the drain; the soil-pipe to be circular with an internal diameter of not less than 3½ in., and to be taken up above the building and its end left open as an outlet for foul air; methods of connecting a lead pipe with an iron one; connexion of stoneware and lead, connexion of iron and stoneware; ventilation of trap of water-closet with an anti-siphonage pipe of not less than 2 in. diameter and ventilated into the open air or into the soil-pipe at a point above the highest fitting on the soil-pipe; construction of slop sinks and urinals.

The by-laws respecting health and building in New York City are embodied in a large number of clauses. The more detailed health regulations are found in the Sanitary Code 1903. These are by-laws framed by the Board of Health under the authority of section 1172 of the New York Charter 1897. These must be taken in conjunction with the statute bearing on plumbing in New York City which was made by the Department of Buildings, 1896, and to which there have been several small amendments. Section 141 of the Building Code also deals with sanitation and in the Tenement House Act 1901, 1902, 1903, chap. 4, secs. 91 to 100 inclusive, deals with sanitary matters. From a general point of view the requirements of the American by-laws as to materials and methods of construction vary in a very slight degree from those in force under the London authorities. It is in the regulations affecting the execution of the work that we find a great difference, and these in New York are of a more stringent character than in any other capital. Thus no sanitary, plumbing or lighting work may be undertaken without first submitting for approval to the Department of Buildings complete and suitable drawings and particulars of the materials to be used. Such a notice is necessary even in the case of repairs and alterations to existing work. As a further guarantee of the work being satisfactory it is ordained that no such work shall be executed except under the superintendence of a registered plumber. Every master plumber in the city of New York or others working therein as such must obtain a certificate of competency from the Examination Board and be registered afresh every year during the month of March, as without such certificate or licence no work can be undertaken; any person violating such requirements shall upon conviction be fined for each offence $250 or undergo three months' imprisonment or both, while in the case of any certificated plumber or his employés wilfully breaking, with his knowledge, any of the rules and regulations relating to drainage and plumbing, the certificate of the master is to be forfeited in addition to the aforementioned fine.

II. CONVEYANCE OF SEWAGE.—For small sewers, circular pipes of glazed stoneware or of moulded cement are used, from 6 in. to 18 in. and even 20 in. in diameter. The pipes are made in short lengths, and are usually jointed by passing the end or spigot of one into the socket or faucet of the next. Into the space between the spigot and faucet a ring of gasket or tarred hemp should be forced, and the rest of the space filled up with cement. Other methods of jointing have already been described and illustrated. The pipes are laid with the spigot ends pointing in the direction of the flow, with a uniform gradient, and, where practicable, in straight lines. In special positions, as under the bed of a stream, cast-iron pipes are used for the conveyance of sewage. Where the capacity of an 18-in. circular pipe would be insufficient, built sewers are used in place of stoneware pipes. These are sometimes circular or oval, but more commonly of an egg-shaped section, the invert or lower side of the sewer being a curve of shorter radius than the arch or upper side. The advantage of this form lies in the fact that great variations in the volume of flow must be expected, and the egg-section presents for the small or dry-weather flow a narrower channel than would be presented by a circular sewer of the same total capacity. Figs. 25 and 26 show two common forms

Pipe sewers.

Built sewers.



FIGS. 25 and 26.—Forms of Sewer.

of egg-sections, with dimensions expressed in terms of the diameter of the arch. Fig. 26 is the more modern form, and has the advantage of a sharper invert. The ratio of width to height is 2 to 3.

Built sewers are most commonly made of bricks, moulded to suit the curved structure of which they are to form part. Separate invert blocks of glazed earthenware, terra-cotta or fire-clay are often used in combination with brickwork. The bricks are laid over a templet made to the section of the sewer, and are grouted with cement. The thickness of brickwork for sewers over 3 ft. in diameter should not be less than 9 in., but for smaller sewers laid in good ground at depths not exceeding 20 ft. from the surface a thickness of 4½ in. will suffice if well backed up with concrete. The thickness of brickwork for a

sewer of any size may be determined in feet by the formula $dr/100$, where d = depth of excavation in feet and r = external radius in feet.

An egg-shaped sewer, made with two thicknesses of brick, an invert block, and a concrete setting, is illustrated in fig. 27.

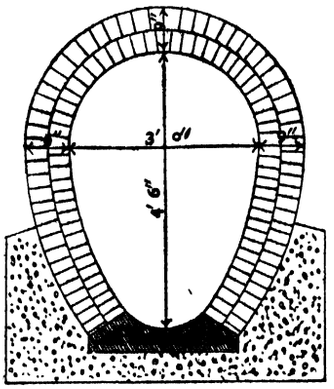


FIG. 27. -Brick Sewer.

Concrete is largely used in the construction of sewers, either in combination with brickwork or alone. For this purpose the concrete consists of from 5 to 7 parts of sand and gravel or broken stone to 1 of Portland cement. It may be used as a cradle for or as a backing to a brick ring, or as the sole material of construction by running it into position round a mould which is removed when the concrete is sufficiently set, the inner surface of the sewer being in this case coated with a thin layer of cement. A development in the construction of concrete sewers, whether laid in sectional pipes or constructed and moulded *in situ*, is the use of iron or steel bars and wires embedded in the material as a reinforcement. Such conduits can be constructed of any size and designed to withstand high pressures. Fig. 28 is a section of a concrete sewer having a diameter of more than 9 ft. constructed with round rod reinforcement. With regard to the method for calculating the proportions, generally speaking the thickness of the concrete shell should in no place be less than one-twelfth of the greatest internal diameter of the tube, while the steel reinforcement should be designed to resist the whole of the tensile stress. Where the safe tensile stress in the steel is 8 tons per sq. in. P = the pressure in pounds per sq. in., and r = the internal radius in inches; the weight of the reinforcement per sq. ft. $= Pr/450$, while its area at each side of the pipe per longitudinal foot, when f = safe tensile stress in the reinforcement in pounds, is $12\,Pr/f$.

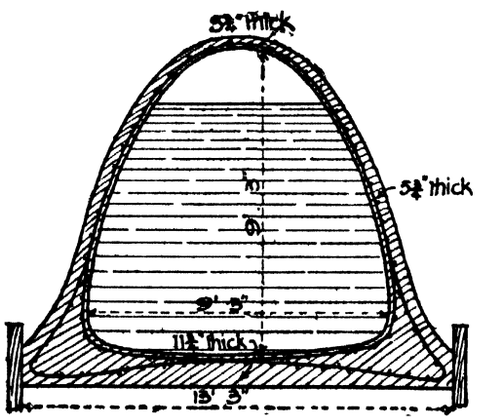


FIG. 28.—Reinforced Concrete Sewer. Section.

In determining the dimensions of sewers, the amount of sewage proper may be taken as equal to the water supply (generally about 30 gallons per head per diem), and to this must be added (when the "combined" system is adopted) an allowance for the surface water due to rainfall. The latter, which is generally by far the larger constituent, is to be estimated from the maximum rate of rainfall for the district and from the area and character of the surface. In the sewerage of Berlin, for example, the maximum rainfall allowed for is $\frac{7}{8}$ of an inch per hour, of which one-third is supposed to enter the sewers. In any estimate of the size of sewers based on rainfall account must of course be taken of the relief provided by storm-overflows, and also of the capacity of the sewers to become simply charged with water during the short time to which very heavy showers are invariably limited. Rainfall at the rate of 5 or 6 in. per hour has been known to occur for a few minutes, but it is unnecessary to provide (even above storm-overflows) sewers capable of discharging any such amount as this; the time taken by sewers of more moderate size to fill would of itself prevent the discharge from them from reaching a condition of steady flow; and, apart from this, the risk of damage by such an exceptional fall would not warrant so great an initial expenditure. Engineers differ widely in their estimates of the allowance to be made for the discharge of surface water, and no rule can be laid down which would be of general application.

Dimensions of sewers.

In order that sewers should be self-cleansing, the mean velocity of flow should be not less than $2\frac{1}{2}$ ft. per second. The gradient necessary to secure this is calculated on principles which are stated in the article HYDRAULICS (*q.v.*). The velocity of flow, V, is

$$V = c\sqrt{im},$$

where i is the inclination, or ratio of vertical to horizontal distance; m is the "hydraulic mean depth," or the ratio of area of section of the stream to the wetted perimeter; and c is a coefficient depending on the dimensions and the roughness of the channel and the depth of the stream. A table of values of c will be found in § 98 of the article referred to. This velocity multiplied by the area of the stream gives the rate of discharge. Tables to facilitate the determination of velocity and discharge in sewers of various dimensions, forms and gradients will be found in Latham's and other practical treatises.

Velocity of discharge.

Where the contour of the ground does not admit of a sufficient gradient from the gathering ground to the place of destination, the sewage must be pumped to a higher level at one or more points in its course. To minimize this necessity, and also for other reasons, it is frequently desirable not to gather sewage from the whole area into a single main, but to collect the sewage of higher portions of the town by a separate high-level or interception sewer.

Interception sewers.

It is undoubtedly necessary to construct overflows for storm water in connexion with combined systems of sewerage. No combined sewer of such size as will make it comparatively self-cleansing under normal conditions can hope to carry off the volume of water resulting from heavy rain. It might be thought that the overflow resulting from a storm would consist of nearly pure rain-water, but this is not the case, as the pressure of storm water has the effect of scouring out from the sewers a great deal of foul matter that is deposited when the flow is small. This being the case it is obviously bad policy to take the overflow into a stream, which would thereby suffer contamination. A better plan is to direct the discharge into a dry ditch or channel where the liquid may soak into the soil and the solid particles by contact with the air may quickly become oxidized. In agricultural districts it might be possible by arrangement with farmers to run the overflow over grass-land, as it has good manurial properties.

Storm-water overflows.

Occasionally when a sewer has to cross a stream or other obstruction it is found impossible to bridge or carry the pipe across and preserve its proper gradient. In such cases it must be carried under the obstruction by means of an inverted siphon. The exact form that should be given to inverted siphons is disputed, but it is generally agreed that they are expedients to be avoided wherever possible. The majority take roughly the form of the stream section, that is, they have two sloping pieces corresponding with the banks with a flat cross-piece under the bed of the stream. The pipes are invariably of iron and should be laid in duplicate, as they are liable to silt up in the flat length. For this reason it is usual in constructing a siphon to place permanent chains in the pipes, and these are periodically pulled backward and forward to stir up the silt. Brushes may also be attached to the chains and pulled through from end to end. At either end of the siphon pipes there are manholes into which the pipes are built. Penstock valves also should be provided at each end so that sewage can be shut out of one or both of the siphons as desired for clearing purposes.

Inverted siphons.

Tumbling bays being prohibited, the usual method of leading a high-level sewer into a low-level sewer is by means of a ramp. This is constructed in connexion with a manhole into which the end of the high-level sewer is taken and finished usually with a flap valve. Some distance back along this sewer a wide-throated junction is put in the invert of the sewer, and from this junction a ramp-pipe is taken down to the invert of the low-level sewer, so that the sewage in the upper sewer instead of having a direct fall runs down the slope of the ramp. The ramp-pipe is usually constructed of iron and is of smaller section than the high-level sewer because of the greater fall and pressure.

Connexion between high- and low-level sewers.

In the low-lying parts of towns storage tanks are often constructed to receive the sewage of such districts. They are periodically emptied of their contents, which are pumped up into the main sewers through which the sewage travels to the outfall. This storing of sewage should be avoided whenever possible. It is much better to provide for raising it as it is produced either by an installation of one or more automatic lifts, such as Adams's sewage lifts, or, where a large amount of material is to be dealt with, necessitating continual pumping, by a Shone ejector worked by compressed air.

Sewer gas is a term applied to the air, fouled by mixture with gases which are formed by the decomposition of sewage, and by the organic germs which it carries in suspension, that fills the sewer in the variable space above the liquid stream. It is universally recognized that sewer gas is a medium for the conveyance of disease, and in all well-designed systems of sewerage stringent precautions are taken to keep it out of houses. It is equally certain that the dangerous character of sewer gas is reduced, if not entirely removed, by free admixture with the oxygen of fresh air. Sewers should be liberally ventilated, not

Ventilation of sewers.

only for this reason, but to prevent the air within them from ever having its pressure raised (by sudden influx of water) so considerably as to force the "traps" which separate it from the atmosphere of dwellings. The plan of ventilation now most approved is the very simple one of making openings from the sewer to the surface of the street at short distances—generally shafts built of brick and cement—and covering these with metallic gratings. Under each grating it is usual to hang a box or tray to catch any stones or dirt that may fall through from the street, but the passage of air to and from the sewer is left as free as possible. The openings to the street are frequently made large enough to allow a man to go down to examine or clean the sewers, and are then called "manholes." Smaller openings, large enough to allow a lamp to be lowered for purposes of inspection, are called "lampholes," and are often built up of vertical lengths of drain-pipe, 6 in. or 9 in. in diameter, and finished at the surface with a cover similar to that used for a manhole but smaller. A length of 150 ft. of pipe sewer is about the limit that can be sighted through. Lampholes are mostly used in the construction of pipe and other small sewers.

To facilitate inspection and cleaning, sewers are, as far as possible, laid in straight lines of uniform gradient, with a manhole or lamphole at each change of direction or of slope and at each junction of mains with one another or with branches. The sewers may advantageously be stepped here and there at manholes. Sir R. Rawlinson pointed out that a difference of level between the entrance and exit pipes tends to prevent continuous flow of sewer gas towards the higher parts of the system, and makes the ventilation of each section more independent and thorough. When the gradient is slight, and the dry-weather flow very small, occasional flushing must be resorted to. Flap valves or sliding penstocks are introduced at manholes; by closing these for a short time sewage (or clean water introduced for the purpose) is dammed up behind the valve either in higher parts of the sewer or in a special flushing chamber, and is then allowed to advance with a rush. Many self-acting arrangements for flushing have been devised which act by allowing a continuous stream of comparatively small volume to accumulate in a tank that discharges itself suddenly when full. A valuable contrivance of this kind is Rogers Field's siphon flush tank. When the liquid in the tank accumulates so that it reaches the top of the annular siphon, and begins to flow over the lip, it carries with it enough air to produce a partial vacuum in the tube. The siphon then bursts into action, and a rapid discharge takes place, which continues till the water-level sinks to the foot of the bell-shaped cover. Adams's "Monster Flusher" is constructed on similar principles and is of simple and strong design. Its flushing-power is claimed to be greater than that of the ordinary siphon. By the use of this appliance, which is automatic in action, shallow sewers can be effectively flushed. Fig. 29 is a section of a flushing chamber fitted with this siphon. Such flushing apparatus may be operated by a water-supply from an ordinary tap which may be regulated for a large or small flow. The capacity of flush tanks is a little difficult to determine. As a rule 250 to 400 gallons are allowed for 9-in. sewers, 400 to 600 gallons for 12-in., and 600 to 800 gallons for 15-in. sewers, the amount increasing by 200 gallons for each 3-in. additional diameter.

Flushing of sewers.

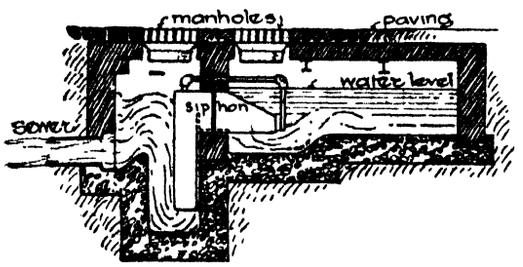


FIG. 29.—Flushing Chamber for Shallow Sewers.

III. DISPOSAL OF SEWAGE.—The composition of domestic sewage is now fairly well known and is generally reduced for the purposes of comparison to a standard; that is to say, ordinary sewage is that due to a water-supply of about 30 gallons per head per diem. If the supply is less, and there is no leakage of subsoil water into the drainage system, the sewage will be stronger; conversely, if there is leakage, &c., the sewage will be more dilute, but obviously, the quantity of impurities will, for any given population, be the same in amount. The subjoined table shows the kind of sewage referred to:—

Average Domestic Sewage, in Grains per Gallon.

Total Solids in Solution.	Organic Carbon.	Organic Nitrogen.	Ammonia	Chlorine.	Suspended.		
					Mineral.	Organic.	Total Combined Nitrogen.
50·54	3·287	1·543	4·70	7·46	16·92	14·36	5·41

For all practical purposes we may say that average sewage contains two tons of suspended matters in each million gallons, one-half of which is mineral matter. When, however, we come to a consideration of trade waste, the question becomes difficult in the extreme, because of the great variety of trades, and the ever varying quantities added to the sewage. Some of the principal trade wastes are from dye-works, print-works, bleach-works, chemical works, tanneries, breweries, paper-makers, woollen-works, silk-works, iron-works and many others. In some cases one only of these trade wastes finds its way to the sewers; in others, several of them may be found. In some instances, again, these trade wastes are of an alkaline nature, in others they are acid; the mixtures may be either, and of greatly varying character. Next comes the manner in which sewage is discharged at the works. The flow is variable throughout the entire 24 hours, but in the case of sewers discharging domestic sewage only, such sewage being of the standard strength, it will be a close approximation to the facts to say that about two-thirds is discharged between the hours of 7 A.M. and 7 P.M., one-half during the eight hours of maximum flow, two-fifths during the six hours of maximum flow, and about 7½ % per hour during the two hours of maximum flow. These data will be sufficient for the design of the works intended for dealing with the sewage. Separate calculations must be made if there is trade refuse, or much leakage of subsoil water. In very large systems, again, the maxima are rather less because of the time occupied by the sewage in travelling to the outfall from the more remote parts of the district. In cases where one set of sewers is employed for both sewage and rainfall the sewage flow may be increased more than a hundredfold within a few minutes by heavy rainstorms. Of course the sewage disposal works can only deal with a small proportion of such flow, and the balance is discharged into some convenient water-course or other suitable place. Even when the separate system is employed, as in the case of the smaller towns, the flow may be increased ten to fifteen times by rain, because it is unusual to carry two sets of drains to the backs of the houses. In designing outfall works, therefore, all these circumstances must be carefully considered. Again, when the sewage is pumped, as is frequently the case, the size of the tanks must often be increased, because in the smaller installations the whole of the day's sewage is frequently pumped out in a few hours; this fact must also be remembered when designing filters.

Nearly every town upon the coast turns its sewage into the sea. That the sea has a purifying effect is obvious. The object to be attained is its dispersion in a large volume of sea-water. As it is lighter than salt water it tends to rise after leaving the sewer; the outfall should, therefore, if practicable, terminate in deep water, so that the two liquids may become well mixed. The currents must be studied by means of floats, and in most cases the sewage must be discharged upon the ebb tide only, and then perhaps not throughout the entire period, the object being to prevent it from being carried towards the shore. That the purification is effected mainly by means of living organisms is well established, and it has been urged by competent authorities that this system is not wasteful, since the organic matter forms the food of the lower organisms, which in turn are devoured by fish. Thus the sea is richer, if the land is the poorer, by the adoption of this cleanly method of disposal. The next step is the partial purification of the sewage by means of a chemical process. When a town lies some distance up an estuary, as for example London, Glasgow, Rochester and many others, the dilution may be insufficient to prevent a nuisance, or the suspended matters may be deposited upon the foreshore to be uncovered at low water. The first stage of purification is then employed, namely, clarification in tanks. Practice varies with regard to tank capacity, but as a general rule it should be at least equal to half a day's dry weather flow. This will enable the works manager to turn out a good effluent, even in wet weather, when the volume is much increased. With regard to the practical effect of any particular treatment, it is now recognized that the matters in solution are scarcely touched by any chemical process that can be employed, but the removal of the suspended matter is a great

gain, as has been proved in the case of London. Briefly, a good chemical process will do about one-half of the work of purification; and in many cases it is not necessary to go further. With regard to the kind of chemical to use, lime, either alone or in conjunction with aluminium sulphate or with ferrous sulphate, is most frequently employed. When the resulting sewage sludge has to be filter-pressed, lime is almost essential for the primary treatment of the sewage, in order to destroy the glutinous nature of the sludge. In the case of large towns like London, Manchester and Salford, the sludge is shipped in specially designed steamers, of 600 tons to 1000 tons burden, and discharged into the sea at a distance from the coast. The London outfall works have a fleet of six steamers, which convey the sludge out to Barrow Deep, a channel in the North Sea about 10 m. east of the Nore lightship. Each vessel has four oblong tanks having a total capacity of 1000 tons of sludge, which can be discharged in seven minutes when the valves are fully opened. The sludge is discharged about 10 ft. under the water and being agitated by the action of the ship's screws is very completely diffused. The sand and earthy matters soon subside and the organic matter is rapidly consumed by the organic life in the sea-water. A careful microscopical examination and chemical analysis failed to detect more than the merest trace of the mineral portion of the sludge, either in dredgings from the bottom of the channels or on the surface of the sandbanks. The cost of the disposal works out at about 4⅛d. per ton of sludge.

In the case of towns situated on rivers above the range of tidal waters, the further purification is effected either on land, or by means of artificial filters, or a combination of the two. The question of land treatment is frequently considered from the standpoint of so many persons to the acre; but the best method is to ascertain how many gallons per day an acre of land will purify. As the quality of land varies greatly, the proper volume to be applied per acre can only be ascertained after a good deal of experience. The range lies between about 3000 gallons per acre per day in the case of poor land, to about 30,000 gallons in the same period in the case of the best. Let us assume an instance of the latter kind. The works have been designed on a basis of 1000 persons per acre, producing 30,000 gallons of sewage per day; the land being of a highly suitable character, and the sewage having been clarified, success is assured. But, conversely, through faulty construction of the sewers, the sewage amounts, say, to 60 gallons per head; the land, unable to deal with the liquid, quickly becomes water-logged and offensive, and the works are a failure. Precisely the same remarks apply to artificial filters, which are always designed upon the basis of so many gallons per square yard of filtering material. Many failures of both land and filters have been due to the fact that the actual sewage flow was greatly in excess of the original estimates. We may say that clay soils lie at one end of the scale, and very porous sands or gravels at the other; obviously, therefore, each case must be considered on its merits. It should be remembered that when such moderate quantities as 3000 gallons per acre per day are applied to land, there is no necessity to remove the suspended matter; broad irrigation being resorted to, the land readily assimilates the solids, and thus one source of expense may be eliminated.

The artificial filters are now generally called bacteria beds; although filters have been in constant use in some cases, as for instance at Wimbledon, for a great number of years. The first filters constructed at these works were made in 1876, and were about 7000 sq. yds. in extent. With the growth of population additions have been made of at least five times that area. One of the original beds was used for crude sewage, but the mineral matter choked it completely, and experience pointed to the necessity of clarifying the sewage before filtration. Whether the treatment should be in open or in closed tanks, or whether chemicals should be added, has been much debated; but seeing that ordinary sewage contains one ton of suspended mineral matter in each million gallons, it is clear that if this is not removed before filtration, it will be retained in the filters and ultimately choke them, as happened at Wimbledon. The common cesspool has been resuscitated and improved under the name of a septic tank. In this the disintegration of the suspended matter is brought about by anaërobic organisms, and the liquid in passing slowly through the tank absorbs most of the gases due to the breaking down of the organic matter. There is no oxidation at this stage. The liquid is next passed through artificial filters, of which there are many types. What is known as a "contact" filter was constructed, probably for the first time on a large scale, at the London (Barking) works. The object sought to be attained wa that of making each cubic yard of filtering material perform the same amount of work, and the least expensive way was apparently to close the outlet, and charge the filter with liquid, allowing it to remain in contact for about two hours, and then drawing it off so that the bed could be thoroughly aërated. No doubt a better way would be to distribute the sewage in the form of a shower of liquid, and work the beds continuously, but this involves a good deal of expense for spreading appliances, and a fall is necessary in the works, which is not always obtainable. Probably the most complete installation of the kind last referred to is that at Salford. Iron pipes are led over the surface of the filters, and spraying nozzles are placed at short intervals, so that the sewage is applied in the form of a heavy shower. But whatever form the filters and appliances may assume, the final result is the same. If the beds are properly aërated, the aërobic organism establishes itself in prodigious numbers, and attacks the organic matter, breaking it down into harmless, soluble and gaseous products. It is, of course, assumed that the filters are adequate in area, and are properly managed. With regard to the materials to be employed in making sewage filters, it is now well established that the size of the particles has a more important bearing than their composition. At the same time, it may be remarked that materials with very rough surfaces, as for instance coke breeze, are more effective than those with smooth surfaces. Doubtless the former classes afford, in the interstices, a lodging for the bacteria, and no doubt a given quantity of material with rough surfaces will harbour greater numbers than the same amount of smooth.

A reference must be made to the Manchester experiments. The experts' report suggested the provision of 60 acres of filters for dealing with the sewage of the city, which is said to average 30 million gallons per day in dry weather. But after inquiry into the merits of the proposal the officials of the Local Government Board recommended that the filters should be 92 acres in extent, and that the effluent should be finished on land. Storm water filters to take the excess after the sewage was diluted six times were also recommended, such filters being designed to pass 500 gallons per sq. yd. per diem. In this case clarified sewage was to be dealt with on filters 3 ft. 4 in. in depth, composed of clinkers broken to pass a sieve with meshes of 1½ in., but retained on one with meshes of ½ in. It will be observed, therefore, that the bacterial treatment of sewage has scarcely as yet emerged from the experimental stage, but it will certainly be adopted in many cases where it is impracticable to obtain good land in sufficient quantity for the purification of the sewage. With regard to the disposal of sewage-sludge in inland towns, until it has been fairly established by a long trial that bacteria will dispose of this material, the reduction of its bulk by means of filter-presses will be found to be the most satisfactory method of dealing with it. The practical effect is the conversion of 5 tons of offensive mud into 1 ton of hard cake, which may be readily handled and carted. The cost is usually about 2s. 6d per ton of cake, and a million gallons of average sewage produce about 8 tons.

The chief works of reference upon this subject are:—Colonel E. C. S. Moore, *Sanitary Engineering*; L. Parkes and H. Kenwood, *Hygiene and Public Health*; A. J. Martin, *The Sewage Problem*; A. P. Poley, *Law Affecting Sewers and Drains*; J. J. Cosgrove, *Principles and Practice of Plumbing, The Purification of Sewage*; Colonel E. C. S. Moore, *New Tables for the Complete Solution of Ganguillet and Kutter's Formula for the Flow of Liquid in Open Channels, Pipes, Sewers and Conduits*; W. J. Dibden, *The Purification of Sewage and Water*; W. Spinks, *House Drainage Manual*; S. Rideal, *Sewage and the Bacterial Purification of Sewage. Municipal Engineers' Specification.* (J. Bt.)

SEWING[1] MACHINES. The sewing machine, as is the case with most mechanical inventions, is the result of the efforts of many persons, although it would appear that the most meritorious of these worked in ignorance of the labours and successes of others in the same field. Many of the early attempts to sew by machinery went on the lines of imitating ordinary hand-sewing, and all such inventions proved failures. The method of hand-sewing is of necessity slow and intermittent, seeing that only a definite length of thread is used, which passes its full extent through the cloth at every stitch, thus causing the working arm, human or otherwise, to travel a great length for every stitch made, and demanding frequent renewals of thread.

The foundation of machine-sewing was laid by the invention of a double-pointed needle, with the eye in the centre, patented by Charles F. Weisenthal in 1755, with the object of avoiding the necessity for inverting the needle in sewing or embroidering. Many of the features of the sewing machine are distinctly specified in a patent secured in England by Thomas Saint in 1790, in which he, *inter alia*, described a machine for stitching, quilting, or sewing. Saint's machine, which appears to have been intended principally for leather work, was fitted with an awl which, working vertically, pierced a hole for the thread. A spindle and projection laid the thread over this hole, and a descending forked needle pressed a loop of thread through it. The loop was caught on the under side by a reciprocating hook; a feed moved the work forward the extent of one stitch; and a second loop was formed by the same motions as the first. It, however, descended within the first, which was thrown off by the hook as it caught the second, and being thus secured and tightened up an ordinary tambour or chain stitch was formed. Had Saint hit on the idea of the eye-pointed needle his machine would have been a complete anticipation of the modern chain-stitch machine.

The inventor who first devised a real working machine was a poor tailor, Barthélemy Thimmonier, of St Étienne, who obtained letters patent in France in 1830. In Thimmonier's apparatus the needle was crocheted, and descending through the cloth it brought up with it a loop of thread which it carried through the previously made loop, and thus it formed a chain on the upper surface of the fabric. Though the machine was rather clumsy, made principally of wood, as many as eighty were being worked in Paris in 1841, making army clothing, when an ignorant and furious crowd wrecked the establishment and nearly murdered the unfortunate inventor. Thimmonier, however, was not discouraged, for in 1845 he twice patented improvements on it, and in 1848 he obtained both in England and the United Kingdom patents for further improvements. The machine was then made entirely of metal, and vastly improved on the first model. But the troubles of 1848 blasted the prospects of the resolute inventor. His patent rights for Great Britain were sold; a machine shown in the Great Exhibition of 1851 attracted no attention, and he died in 1857 unfriended and unrewarded.

The most important ideas of an eye-pointed needle and a double thread or lock-stitch are strictly of American origin, and that combination was first conceived by Walter Hunt of New York about 1832–1834. Hunt reaped nothing of the enormous pecuniary reward which has been shared among the introducers of the sewing machine, and it is therefore all the more necessary that his great merit as an inventor should be insisted on. He constructed a machine having a vibrating arm, at the extremity of which he fixed a curved needle with an eye near its point. By this needle a loop of thread was formed under the cloth to be sewn, and through that loop a thread carried in an oscillating shuttle was passed, thus making the lock-stitch of all ordinary two-thread machines. Hunt's invention was purchased by a blacksmith named Arrowsmith, and a good deal was done towards improving its mechanical details, but no patent was sought, nor was any serious attempt made to draw attention to the invention. After the success of machines based on his two devices was fully established, Hunt in 1853 applied for a patent; but his claim was disallowed on the ground of abandonment. The most important feature in Hunt's invention—the eye-pointed needle—was first patented in the United Kingdom by Newton and Archbold in 1841, in connexion with glove-stitching.

Apparently unconscious of the invention of Walter Hunt, Elias Howe, a native of Spencer, Mass., directed his attention to machine-sewing about the year 1843. In 1844 he completed a rough model, and in 1846 he patented his sewing machine (fig. 1). Howe was thus the first to patent a lock-stitch machine, but his invention had the two essential features—the curved eye-pointed needle and the under-thread shuttle—which were invented by Walter Hunt twelve years previously. Howe's invention was sold in England to William F. Thomas of Cheapside, London, a corset manufacturer, for £250. Thomas secured in December 1846 the English patent in his own name, and engaged Howe on weekly wages to adapt the machine for his manufacturing purposes. The career of the inventor in London was unsuccessful; and, having pawned his American patent rights in England, he returned in April 1849 in poverty to America. There in the meantime the sewing machine was beginning to excite public curiosity, and various persons were making machines which Howe found to trench on his patent rights. The most prominent of the manufacturers, if not of inventors, ultimately appeared in Isaac Merritt Singer (1811–1875), who in 1851 secured a patent for his machine (fig. 2). Howe now became alert to vindicate his rights, and, after regaining possession of his pawned patent, he instituted suits against the infringers. An enormous amount of litigation ensued, in which Singer figured as a most obstinate defendant, but ultimately all makers became tributary to Elias Howe. It is calculated that Howe received in the form of royalties on machines made up to the period of the expiry of his extended patent (September 1867—he died in the next month) a sum of not less than two millions of dollars.

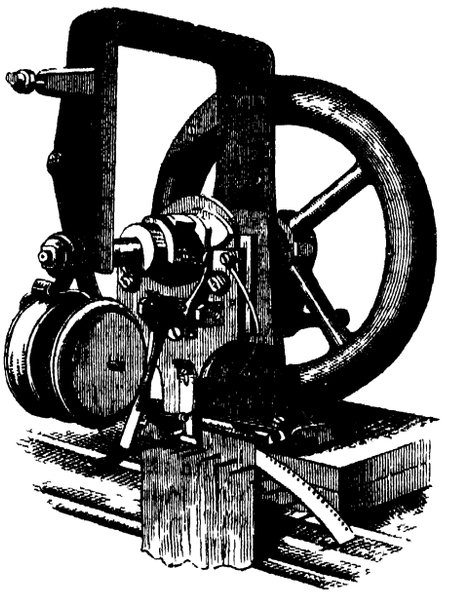


FIG. 1.—Howe's original Machine.

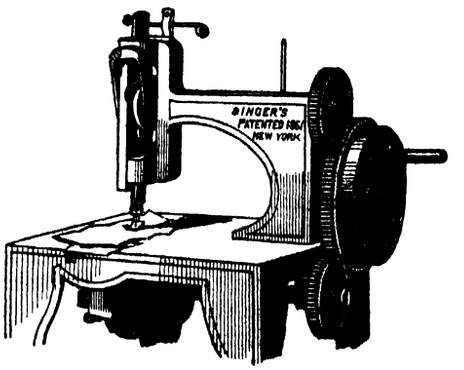


FIG. 2.—Singer's original Machine.

The practicability of machine-sewing being demonstrated, inventions of considerable originality and merit followed in quick succession. One of the most ingenious of all the inventors—who worked also without knowledge of previous efforts—was Mr Allan B. Wilson. In 1849 he devised the rotary hook and bobbin combination, forming the special feature of the Wheeler & Wilson machine. Wilson obtained a patent for his machine, which included the important and effective four-motion feed for moving the work after every stitch, in November 1850. In February 1851 William O. Grover, a tailor, of Boston, patented

[1] "Sew," for stitching with a needle, is a word common to Indo-European languages; cf. Lat. *suere*, Gr. καυσύειν, καττύειν, Sansk. *siv*.

his double chain-stitch action, which formed the basis of the Grover & Baker machine. In 1856 James A. E. Gibbs (1829–1902), a Virginia farmer, devised the chain-stitch machine, improved subsequently by J. Willcox and now known as the Willcox & Gibbs. These together—all American inventions—form the types of the various machines now in common use. Thousands of patents have been issued in the United States and Europe, covering improvements in the sewing machine; but, although its efficiency and usefulness have been greatly increased by numerous accessories and attachments, the main principles of the various machines have not been affected thereby.

In machine sewing three varieties of stitch are made—(1) the simple chain or tambour stitch, (2) the double chain stitch and (3) the lock stitch. In the first variety the machine works with a single thread; the other forms use two, an upper and an under thread.

The structure of the chain stitch is shown in fig. 3. The needle first descends through the cloth, then as it begins to ascend the friction of the thread against the fabric is sufficient to form a small loop into which the point of a hook operating under the cloth plate enters, expanding and holding the loop while the needle rises to its full height. The feed then moves the fabric forward one stitch length, the hook with its loop is also projected so that when next the needle descends its loop is formed within the previous loop. The hook then releases loop No. 1, seizes and expands loop No. 2, and in so doing draws up the previous loop into a stitch, chain-like on the under side but plain on the upper surface of the fabric. The seam so made is firm and elastic, but easily undone, for if at any point a thread is broken the whole of the sewing can be readily run out backwards by pulling the thread, just as in crochet work. To a certain extent this imperfection in the chain-stitch machine is overcome in the Wilcox & Gibbs machine, in which each loop, by means of a rotating hook, is twisted half a revolution after it has passed through its predecessor. The somewhat complicated course of the threads in the double chain stitch of the Grover & Baker machine is shown in fig. 4. The under thread was supplied from an ordinary bobbin and was threaded through a circular needle of peculiar form. The machine was wasteful of thread, and the sewing formed a knotted ridge on the under side of the fabric.

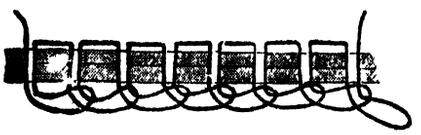


FIG. 3.—Chain Stitch.

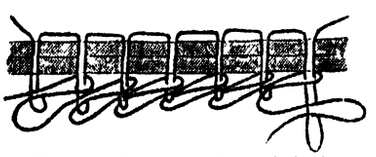


FIG. 4.—Double Chain Stitch.

The lock stitch is that made by all ordinary two-thread sewing machines, and is a stitch peculiar to machine sewing. Its structure is, as shown in fig. 5, very simple, and when by proper tension the threads interlock within the work it shows the same on both sides and is very secure. When, however, the tension on the upper thread is weak, the under thread runs along the surface as at *b*, held more or less tightly by the upper loops. It will be seen that to make the lock stitch the under thread has to be passed quite through the loop of the upper thread. That is done in two principal ways. By the first plan a small metal shuttle, holding within it a bobbin of thread, is carried backward and forward under the cloth plate, and at each forward movement passes through the upper thread loop formed by each succeeding stroke of the needle. Such is the principle devised by Hunt, introduced by Howe, and improved by Singer and many others. The second principal method of forming the lock stitch consists in seizing the loop of the upper thread by a rotating hook, expanding the loop and passing it around a stationary bobbin within which is wound the under thread. The method is the invention of A. B. Wilson, and is known generally as the Wheeler & Wilson principle. The rotary hook seen at *b*, fig. 6, is so bevelled and notched that it opens and expands the upper thread loop, causing it quite to enclose the bobbin of under thread, after which it throws it off and the so-formed lock stitch is pulled up and tightened either by an independent take-up motion as in later machines, or by the expansion of the next loop as in the older forms. The bobbin A, lenticular in form, and its case B, fig. 6, fit easily into a circular depression within the hook, against which they are held by the bobbin holder *a*, fig. 6.

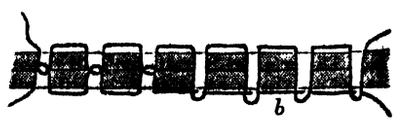


FIG. 5.—Lock Stitch.

Intermediate between the shuttle and the rotary-hook machines is the oscillating-shuttle machine introduced by the Singer Co. The shuttle is hook-formed, not unlike the Wilson hook, and it carries within it a capacious circular bobbin of thread *h*, fig. 7. This shuttle is driven by an oscillating driver *db* within an annular raceway *a a*, and, instead of revolving completely like the Wilson hook, it oscillates only in an arc of 150°, so far as serves to catch and clear the upper thread. The oscillating-shuttle and rotary-hook machines work with great smoothness and rapidity.

Sewing machines are now made in hundreds of varieties for special kinds of work. Some, for example, are capable of performing the most complicated operations in ornamental stitching, a horizontal right and left motion, in addition to the ordinary vertical motions, being for this purpose often imparted to the needle bar; others will sew button-holes at the rate of 8 or 10 a minute; while others again will sew on the buttons, making the required number of stitches, stopping automatically with the needle at its highest point, and cutting the threads off close to the underside of the work. In some cases two or more needles are fitted, producing parallel rows of stitches; with a machine having 12 needles a single operation may make as many as 24,000 stitches a minute. Special forms of machine are designed to meet the requirements of the glove-sewer, the umbrella-maker, &c. In sewing carpets the great weight of the material makes feeding difficult, and therefore machines have been invented that move along the carpet, which itself remains stationary. The earlier forms were hand-worked; the two lengths of carpet were stretched across the room, and the machine travelled along the seam, followed by the operator, who turned it by means of a hand-crank. One of these machines was capable of doing the work of eight or ten hand-sewers. With later forms, operated by electricity or other power and running along a track, the carpet is stretched and sewed so rapidly that one power machine does the work of eight or ten hand machines. The introduction of sewing machines has revolutionized the boot and shoe industry, and books are stitched by machine, the Brehmer wire-sewing machine and Smyth thread-sewing machine being prominent representatives of this class.

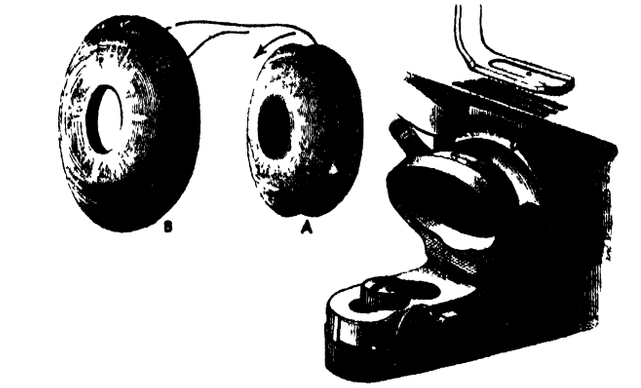


FIG. 6.—Rotary Hook, Bobbin, and Bobbin Case (Wheeler & Wilson Machine).

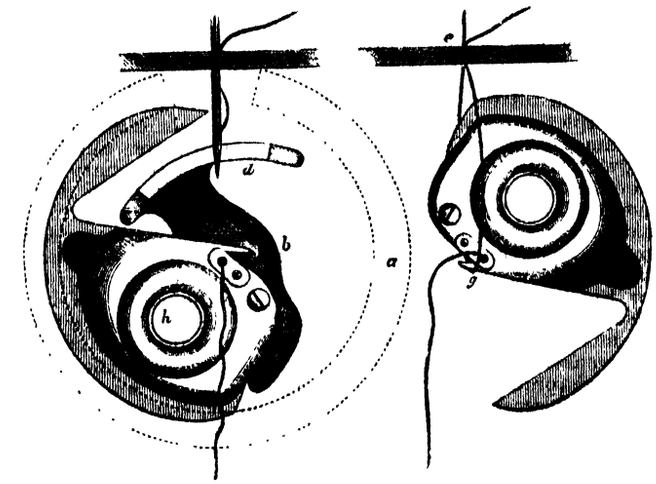


FIG. 7.—Singer Oscillating Shuttle.

SEX (Lat. *sexus*; possibly connected with *secare*, to cut), the character of being either male or female, which can be attributed to the vast majority of animals, but less correctly to the higher plants, where the so-called male and female organs, or flowers, are part of the sexless generation (see REPRODUCTION: *Plants*). The primary distinction of sex resides in the essential organs of reproduction (*q.v.*). An organism that contains the germinal tissue or mass of tissue known as the testis, and producing the

sexual cells known as spermatozoa, is a male; an organism containing the tissue which produces ova is known as a female; one producing both ova and spermatozoa is a true hermaphrodite; and one producing neither, if it belong to the sexual generation, is known as a neuter, although neuters are for the most part incomplete females. The primary sexual tissues and the gametes are described in the article REPRODUCTION (*Animals*).

Associated with the presence of the primary reproductive organs there may be a large number of other characters, and attempts have been made to classify these as secondary and tertiary sexual characters. It is impossible to define a series of logical categories in which any accessory character will find its inevitable place, but a convenient practical distinction first made by John Hunter may be drawn between characters directly auxiliary to the processes of reproduction and those which, although limited to one sex, are not immediately connected with reproductive processes. We may then make the division into (1) Primary Sexual Characters (A. *Essential*: power of producing respectively ova and spermatozoa. B. *Auxiliary*: possession of sexual ducts and reservoirs, intromittent and copulatory organs, organs associated with oviposition, gestation, parturition, and nutrition of the immature young in any stage); and (2) Secondary Sexual Characters (differences between the sexes in size, shape, appearance, ornamentation, armament, colour and coloration, voice, and instincts and habits not directly associated with the reproductive processes).

Those characters which are here grouped as primary are described in the article REPRODUCTION. It is sufficient to repeat that in many animals only the essential primary characters are present. There is much diversity in the possession of secondary sexual characters, and in many cases these apparently are absent. Among mammals it is impossible to distinguish the sex without examination of the reproductive organs or observation of the sexual habits, in such cases as the domestic cat, the tiger and many other feline animals, hyaenas, bears, rabbits, hares, mice and a vast number of others. So also among birds there are many cases where the sexes are alike, as for instance, some hummingbirds, parrots, owls, cranes, kingfishers, and many small birds such as robins and hedge-warblers. In reptiles and batrachians, in fish and a very large number of invertebrates there are no visible secondary sexual characters.

C. Darwin, in the portion of the *Descent of Man* devoted to "Selection in relation to Sex," brought together what remains the most complete and valuable account of the existence and distribution amongst animals of secondary sexual characters, and it would be impracticable here to give more than the most summary description of the groups of facts involved. Among Crustacea the sexes frequently differ, but in most cases the differences concern auxiliary primary characters, such as the possession of intromittent and clasping organs. Differences in size are frequent; in the higher Decapods the males and in the lower Crustacea the females frequently being larger, the disparity being extreme in some of the parasitic Copepods and Isopods where the males are minute and attached to the females, whilst in the Cirripedes, as Darwin himself discovered, very minute complementary males may live as parasites in the mantle cavity of large hermaphrodite or female forms. Amongst Arachnids conspicuous differences in colour and size occur, the males generally being smaller, more active and possessed of relatively longer appendages, and more highly decorated. Amongst Insects, the differences between the sexes may be very great, quite apart from those relating to intromittence, prehension of the female, oviposition, or the higher development of sense organs by which the males can more readily seek out the females. In many cases the males are winged, the females wingless and grub-like. In a few instances, the males are highly pugnacious and are furnished with special weapons for fighting with their rivals. Amongst the Homoptera and Orthoptera there are many instances where the males possess organs capable of producing loud sounds, and these are rudimentary or absent in the females, whilst in other cases, both sexes produce call-notes. Particularly amongst the Coleoptera, the males may differ very greatly from the females in the shape of the body and may be decorated with extraordinary growths of the head and thorax. The most notable sexual differences are in coloration, and whilst there are many instances where both sexes are inconspicuous, and a few where both are brilliant, there are still more where the males differ from the females by the display of more conspicuous patterns and of brighter colours. It may be said of Insects in general that it is the more common case for secondary sexual characters to exist in such a degree that the sexes may be distinguished at a glance.

Among Fishes, secondary sexual characters are common. Spines are developed on the head and pectoral fins of the males of some Rays, but it is probable that these may be auxiliary primary characters, useful in the prehension of the female. In the male salmon, a cartilaginous projection, developed during the breeding season, appears on the upper surface of the point of the lower jaw, whilst in old males the jaws become hook-like and the teeth are greatly increased in size. In the thornback, the adult male has the teeth sharp-pointed and backwardly-directed, while those of the female are flat and pavement-like. In almost all fishes the males when adult are smaller than the females, and may be much smaller. Beards of stiff, hair-like structures, elongated processes of the fins, tubercles and many other structures that may be classed as ornaments, because their function is unknown, occur in males and are absent in females. Differences in pattern and colour are extremely frequent, become much more marked in the breeding season, and are of such a nature that the males are more conspicuous. Among Batrachia, differences between the sexes in size and general shape are not striking, but there are many instances of the males exhibiting crests, or special processes which may be classed as ornaments, and peculiar patterns and bright colours, during the breeding season.

Secondary sexual differences appear in the vast majority of birds. The shape seldom differs markedly, but differences in size are common, sometimes, as in birds of prey, the females, and sometimes, as in the allies of the domestic fowl, the males being larger. In a large number of instances the males are very pugnacious and are better armed, the bones and musculature being heavier, the beaks and claws stronger, while spurs or knobs on the wings and spurs on the legs may be present only in the males or be relatively small in the females. Special ornaments such as crests and wattles, combs, carbuncles, excrescences of the skin, and elongated or peculiarly shaped feathers are extremely frequent, and are developed or intensified in the breeding season, and in the vast majority of cases confined to the males. The voice almost invariably varies with the sex, is associated with the breeding period and is much more highly developed in the male, whilst structural developments such as modifications of the trachea, vocal sacs and resonators and differences in the larynx are frequently present and on the whole distinctive of the males. Differences in colour and pattern are extremely well marked, and these are well known to be associated with the breeding period, which in many cases is preceded by a moult, after which the sexual plumage is assumed, or the colour of the naked parts intensified. In a few exceptional cases such as some button-quails (*Turnix*), painted snipes (*Rhynchaea*), phalaropes (*Phalaropus*), and cassowaries, the females exceed the males in size and brilliancy, and it is interesting to notice that in such cases the usual distinction of habit may be reversed, the females being pugnacious, aggressive, and courtiers of the males, whilst the latter are shy and may attend to the brood. Such exceptions are so rare that they may be called abnormal, for the rule among birds is that where secondary sexual characters are displayed, ornamentation, voice, brilliant pattern and colour, pugnacity and amorousness are distinctive of the male. Secondary sexual differences of the same nature are abundant among mammals. The males are usually larger and have greater strength with corresponding bones and muscles, and courage and pugnacity. Special weapons of offence or defence are common and are usually limited to the males or more highly developed in them; familiar instances are the horns of cattle, sheep and antelopes, the canine teeth, the mane of the lion. The antlers of the stags are certainly used in combats between the males, but in their more extreme development they may be classed as sexual ornaments. The males of many mammals emit powerful odours during the breeding season, whilst their voices, whether as a battle cry or a call to the female, are frequently more powerful. Crests, tufts and mantles, rudimentary in the female, conspicuous in the male, are extremely common. Differences in pattern and colour are rare except in monkeys, but when these exist they are usually found in the male.

The sexes, then, are distinguished by primary and secondary characters, these two categories being convenient rather than logical. The real dividing line is between the essential primary sexual character, the presence of a male or female gonad, and the various auxiliary and secondary differences which appear in every grade of elaboration. It is to be noted, moreover, that all the other sexual characters depend on the activity of the essential primary character. Immature males and females are closely alike; the auxiliary and secondary sexual characters almost invariably begin to appear only when the gonads become mature, and fade away when these are injured or destroyed by accident, disease, senescence or artificial interference, and finally, when the activity of the gonads waxes and wanes periodically, there is a corresponding periodicity in the display of the secondary characters. A number of observations and experiments support the conclusion that the gonads, in addition to their obvious function of producing the sexual cells, discharge secretions into the blood and tissues, and that these internal secretions or hormones,

are the physiological stimulus which awakens the development of the auxiliary and secondary sexual characters.

Auxiliary primary and secondary sexual characters are so many and various that general statements regarding them are difficult and uncertain. In the broadest fashion, however, the following generalizations appear to be true. Secondary sexual characters begin to appear at puberty. Young or immature forms resemble the sex in which such characters are least marked, while the young and the undistinguished sex resemble ancestral forms. The sex that is distinguished is usually the male, and the characters are usually hypertrophies or specializations of characters that appear in the females and the young. (It is to be remembered that specialization may be the result of the suppression of characters as well as their acquisition, and there are a remarkable number of cases in which we may, at least tentatively, picture the bright sexual colour of males as due to the suppression of a pigment which masks them in the female.)

Hermaphroditism is the condition in which gonads producing ova and gonads producing spermatozoa are contained in the same individual. Its distribution in the animal kingdom is irregular, and apparently independent of natural affinity, and the balance of opinion is in favour of regarding it not as a primitive condition, but as a secondary acquisition. C. Claus has pointed out that it is frequent among sessile animals, as for instance Sponges, Anemones, Corals, Polyzoa, bivalve Molluscs, and Tunicates, and sluggish animals such as many of the worms and snails, whilst it is extremely common amongst almost every kind of parasitic animal. The obvious suggestion is that if the condition be primitive, it has been preserved, and if not primitive, acquired, because in animals of such habit, the chances of sexual congress would be greater than if the sexes were separate. Against such an interpretation, however, it must be noticed that in most hermaphrodites the sexual maturity of the male and female gonads is not coincident, so that cross-fertilization commonly occurs. Self-fertilization is said to occur in the fish *Serranus*, and it certainly occurs in many parasitic Trematodes, in Tapeworms and a few Nematodes. The real meaning of the occurrence of the condition remains obscure. Both gonads are present in many Sponges, in the Ctenophora, in many Anemones and Corals, in degenerate Hydroids such as *Hydra*, in most Turbellarians and Trematodes, in all the Tapeworms, in a few Nematodes, in many Chaetopods, in the Leeches, in a few Brachiopods and in many Polyzoa. It is absent in most Echinoderma and Arthropoda, but occurs in Cirripedes and some Isopods. It occurs in some bivalves, such as the common oyster, cockle and clam, and is present in the Euthyneurous Gastropods and in Pteropods. Amongst vertebrates it is rare. A number of observers have urged that the vertebrate embryo passes through a hermaphrodite condition. J. T. Cunningham and F. Nansen have stated that a testis is embedded in the ovary of the young hagfish (*Myxine*) and that this ripens before the ovary, but later observers have disputed their interpretation of the facts. In a few fish and some Batrachia, hermaphroditism has been demonstrated, but it is not certain, whether as a normal or aberrant occurrence, whilst in many of the Batrachian cases, the animals are known to be normally unisexual. The term hermaphroditism, however, has been applied frequently to cases of a different kind, in which there is no evidence of the essential sexual organs being affected, the appearances relating wholly to the auxiliary primary or the secondary sexual characters. It is most probable that such conditions differ entirely from true hermaphroditism. With regard to the auxiliary primary organs, and especially the genital ducts and external organs of sex, in a majority of cases as in vertebrates, the embryonic or youthful condition is undifferentiated, and so to say, contains the initial material which may be elaborated by specialization in one direction or the other, by the proliferation of certain portions and the suppression of others, into the structures characteristic of the male or of the female. Sometimes, growth takes place without normal differentiation, sometimes the specialization in one direction lags, with the result that a dubious appearance arises. Subsequent dissection, or the approach of maturity, however, make it plain that the dubiety was superficial and that the gonad of only one sex was present. Among mammals, including man, every normal male retains relics of the female side of the undifferentiated condition of the accessory sexual organs, whilst every normal female contains similar if less well-marked relics of the male condition. Apparent hermaphroditism depending on a dubious condition of the secondary sexual characters is equally widespread in possible occurrence. Amongst insects which have been much studied, such as the butterflies and moths, many curious conditions have been described; sometimes the pattern and colour of the upper and under sides, sometimes of different parts of the same wing, sometimes of different wings, present the characters of different sexes. Among birds and mammals, the secondary sexual characters of one sex, such as size, pattern or colour, weapons or habits, may appear in animals with the gonads of the other sex, in every degree of development, reaching to an apparently complete reversal. In many cases these abnormal occurrences are associated with arrest of the functional activity of the primary organs of sex, by disease, accident, or decay, and the failure of the necessary stimulus would certainly serve to explain cases where the apparent reversal is no more than the suppression of a specialization in one direction. The facts, however, go further; it appears as if the suppression of femaleness allows the development of a latent maleness.

Determination of Sex.—Answers to the question why a particular individual becomes a male or a female fall into two groups, in one of which it is supposed that external conditions determine the result, in the other that the sexual cells differ from the first. G. Canestrini suggested that the sex was determined by the number of spermatozoa which entered the ovum, but fuller knowledge of the details of fertilization (see REPRODUCTION) has made it plain that only a single spermatozoon normally conjugates with the ovum, whilst polyspermy, if it occur, results only in abnormalities which do not proceed to full development. Professor Thury in 1863 and C. Düsing in 1883 urged that ova fertilized soon after ovulation gave rise to females, whilst those impregnated later produced males. Some evidence exists as to the effect of delay in fertilization; V. Hensen (1881) suggested that females were produced when both ova and spermatozoa were in the most active condition, and H. M. Vernon (1898) has shown that in hybridizing Echinoderms the fresher gamete appears to exert a greater influence, but it cannot be said that there is definite evidence as to the determination of sex on such lines. J. D. Hofacker in 1823 and M. T. Sadler in 1830 collected a large series of statistics from which they drew the conclusion that when the male parent is older, more males are produced, whilst many observers have attempted to draw conclusions from the comparative vigour of the parents. Popular belief and some observations with regard to the breeding of domestic animals have led to the inference that the sex of the offspring tends to be that of the least vigorous parent, and such a theory, as it would appear to imply the existence of a natural law for rectifying the proportions of the sexes, has gained more attention than the facts supporting it would justify, and several unbiassed observers have interpreted the events in the sense that the vigorous parent produces his or her own sex. It is to be noted that such theories of relative vigour do not necessarily imply that external conditions determine the sex, for they would apply equally were it the case that there was a power of selection amongst gametes of predetermined sex. A large number of investigators have been led to believe that conditions of nutrition are of importance, and this view is specially plausible in the case of vertebrates, if it be accepted that the embryos pass through a hermaphrodite condition. E. Yung found that when tadpoles were reared under normal conditions, the proportion of male to female was about as 43 to 57, but that when a flesh diet was provided the percentage of females was very greatly increased. It has been noted that when Aphides are under the favourable conditions of summer temperature and nutrition, they produce only females, but that the advent of autumn brings with it an equality in sex production. Mrs Treat showed that starved

caterpillars turned into males; E. Maupas, in the case of Rotifers, and other observers in the cases of some Crustacea, have similarly pointed to a relation between abundant nutrition and the excessive production of females. In nearly every case, however, other observers have either obtained conflicting results, or placed another interpretation on similar results, whilst in none of the cases has the factor of selective mortality been sufficiently excluded. Even were it proved that a correlation existed between excessive diet and over-production of females, it might be that the incidence of mortality was differential. Many attempts have been made to derive information by examining the statistics of human births in times of plenty and of hardship, but the results are inconclusive. C. Darwin, reviewing the evidence, was disposed to believe that the proportions of the sexes varied, that the tendency to produce male and female offspring was inherited, and that by a process of natural selection it was adjusted to the needs of the species, but he was too cautious to lean to any particular view as to the nature of the determining factors. C. Düsing (1883 and 1885) also believed in the existence of such a power of adaptation or adjustment, and attributed it to the action of a large number of external conditions. P. Geddes and J. A. Thomson (1889) similarly came to the conclusion that factors external to the sexual cells had a predominating importance, and these authors linked the determination of sex with their general theory of the nature of sex. They regarded sex as an expression of an alternating rhythm of anabolism and katabolism to be observed throughout the living world, and supposed that femaleness was specially associated, was in fact an outcrop of the anabolic or constructive processes of living matter, whilst maleness represented the katabolic, destructive or liberating processes. Their view ranges many diverse facts in apparent harmony, but has to encounter many facts that apparently contradict it. In a later work J. A. Thomson himself (1907) assigns less weight to his own theory, and quotes with approval T. H. Morgan's suggestion that the determination of sex may be brought about in different fashions in different cases.

Theories as to sex being predetermined in the sexual cells have been numerous, but it is only recently that any exact evidence appearing to point to such a conclusion has been adduced. When parthenogenesis (see REPRODUCTION) was first being investigated, it was found that eggs which gave rise to females were different from those which produced males, but when it was demonstrated that at least in many cases there was the further difference as to whether the eggs were fertilized or not, it was assumed that the presence or absence of fertilization determined the sex. Physicians have repeatedly propounded the theory that one ovary produces eggs capable of developing only into females, the other only those capable of becoming males, and the suggestion has been made that in the case of human beings ovulation takes place alternately from the ovaries. From this it would follow that were the sex resulting from one fertilization known, the sex of a subsequent fertilization could be predicted, or by choosing the date of fertilization, selected. These views, however, rest on no satisfactory evidence and remain uncorrelated with any observations as to the structure of the eggs themselves. On the other hand, more exact workers, using modern cytological methods, have accumulated striking facts as to the existence of different kinds of sexual cells, the differences relating chiefly to the nuclear changes which occur in ovogenesis and spermatogenesis, and have been established with more certainty in the case of the spermatozoa. E. B. Wilson (1909) has given a full summary and discussion of various interpretations of these observations. In over a hundred species of insects, Myriapods and Arachnids, two kinds of spermatozoa are produced. The spermatozoa are formed in pairs, and the mother cell which gives rise to each pair exhibits, in the ordinary fashion of nuclear division, paired chromosomes, one member of each pair passing into each spermatozoon. The mother cell contains also an unpaired element, consisting in its simplest form of a single large chromosome, but sometimes represented by a group of peculiar chromosomes, which, for convenience, Wilson terms the "X" element, or "heterochromosome." The "X" element passes into one or other of the spermatozoa, from which it results that spermatozoa of two kinds are formed in equal numbers, the difference being the presence or absence of the "X" element. Eggs fertilized by spermatozoa containing the "X" element become females, those fertilized by spermatozoa without it become males. There is evidence that in some cases (*e.g.* bees) the spermatozoa devoid of the "X" element degenerate, with the result that any fertilized eggs must produce females.

E. B. Wilson's suggestion, advanced in the most cautious way, is that the "X" element referred to in the last paragraph is the determinant, or at least the index, of sex, and further that the difference between the male and female organism is that the male comes from an egg which, developing either parthenogenetically or after fertilization, contains only a single unit of the "X" element, while the female starts from an ovum which, whether developing after fertilization or parthenogenetically, contains the two "X" units. The ovum of a sexual egg in the process of maturation discards half its normal complement of the "X" element; if it be fertilized by a spermatozoon containing an "X" unit it gives rise to a female; if it be fertilized by one without this it becomes a male. A large number of different forms of nuclear change have been described in the maturation of normal and parthenogenetic eggs, and by the exercise of a little ingenuity it is easy to select from these various processes modes of nuclear division which if they actually occurred in the appropriate instances would adapt Wilson's hypothesis to cases in which parthenogenetic eggs give rise to males or to females. In some individual instances the process which the hypothesis would demand appears actually to occur.

Various workers on Mendelian lines (see MENDELISM) have endeavoured to correlate the facts discussed by Wilson and their experimental inquiries into the inheritance of primary and secondary sexual characters, with the additional difficulty, absent from Wilson's hypothesis, that their theory requires them to suppose the unfertilized cells to be unisexual. W. E. Castle suggested that both males and females were Mendelian male-female hybrids with respectively male and female dominance, and that in the usual way disruption took place in the formation of the germ cells, with the result that male and female spermatozoa and male and female ova were produced. He assumed further that there was a selection or repulsion in fertilization, so that ova and spermatozoa bearing the same sex never conjugated. C. Correns assumed the male to be sex-hybrid, the female to be homozygous or pure female, the male character being dominant. Ova were, therefore, unisexual, always female, while spermatozoa were either male or female, and when a female egg was fertilized by a female spermatozoon the result naturally was a female, but when it was fertilized by a male spermatozoon the result was a sex-hybrid appearing as a male because of the dominance of male characters. Correns's theory avoids the unlikely supposition of selective fertilization, but breaks down in those cases of parthenogenesis where the unfertilized egg produced by a female gives rise to a male. W. Bateson reverses the theory of Correns and supposes that the female is a hybrid with femaleness dominant, while the male is pure male. The female in fact contains a factor which makes her female whilst the male is a male because it is without this factor. This view, however, leaves unexplained the existence of two kinds of spermatozoa and involves a series of elaborate hypotheses to reconcile it with cases of parthenogenesis. L. Doncaster has elaborated the extremely ingenious suggestion that the Mendelian pairs are not male and female, but male and absence of sex and female and absence of sex. The male is a pure male but produces two kinds of spermatozoa, those with the determinant for sex and those without it. The normal female is a sex-hybrid and produces male and female eggs in equal numbers, and it is assumed that there is a selective fertilization, female eggs being fertilized by male spermatozoa and giving rise to females, whilst male eggs are fertilized by spermatozoa without the sex factor and give rise to males. In cases of parthenogenesis, it is supposed that there are two kinds of females, the result of fertilization by different kinds of spermatozoa, and that those going through different kinds of maturation processes give rise without fertilization to males or to females. Doncaster has discovered many interesting details of the maturation processes in insects which agree with his suggestion. The Mendelian interpretations, however, are more ingenious than conclusive, but at least they combine with other work in supporting the probability that the determination of sex depends on the sexual cells and not on conditions influencing the developing embryo. Similarly they combine with other work in pointing to the conclusion that the male organism differs from the female by the absence of something present in the female. The Mendelian interpretations suggest that male and female sex determinants are different in kind; Wilson's interpretation suggests that they differ only, so to say, in quantity. Both interpretations harmonize with the observed fact that cases in which a female assumes male characters are much more frequent and much more definite than cases in which a male assumes femaleness.

Theory of Sexual Dimorphism.—Males and females may be alike, apart from their possession of male or female gonads, or may differ to almost any degree. It is plain, therefore, that although the presence and the maturity of the gonads may be, and probably are, the immediate stimulus to the appearance of the secondary differences, they cannot be the prime cause. Why, although equally potent sexually, do some males and females differ, others resemble one another? This is a question distinct from that of the primary determination of sex and the mechanism by which it is brought about. C. Darwin's theory of sexual selection remains the only comprehensive suggestion. Like his

theory of the Origin of Species, it is not a theory of the origin of variations. He starts from the observed fact that variations occur and are transmitted; he supposes that by natural selection individuals favoured by suitable variations are preserved, and that in such a fashion the divergence which leads to the origin of species has come about: he also supposes that by sexual selection, or preferential mating, the differences between male and female have been brought about. "Courage, pugnacity, perseverance, strength and size of body, weapons of all kinds, musical organs, both vocal and instrumental, bright colours, stripes and marks, and ornamental appendages, have all been indirectly gained by the one sex or the other, through the influence of love and jealousy, through the appreciation of the beautiful in sound, colour or form, and through the exertion of a choice; and these powers of the mind manifestly depend on the development of the cerebral system" (*Descent of Man*, ii. p. 402). The characters to be accounted for are confined to one sex and are in close relation with the breeding season and breeding habits. In those cases where they differ from the females, the males are the most active in courtship, and the best armed, and are rendered the most attractive in various ways. They fight with their rivals for the possession of the female, or display their attractions before her, and either by conquest or by being preferred have an advantage over less favoured males. Darwin was in some doubt as to how far it could be shown that such favoured individuals had a chance of leaving more progeny, except in cases where males were polygamous or much more numerous than females, but he suggested that on the whole the more vigorous female would be the first to breed and to choose the more attractive males, or be captured by the stronger males. A. R. Wallace was unable to accept the theory of sexual selection except in the most limited way, and in particular laid great stress on the want of evidence, to which Darwin himself has called attention, that females prefer more highly ornamented males. He thought that natural selection was sufficient to explain sexual differences such as the possession of weapons, scents and call-notes. With regard to colour and pattern, he regarded these as natural outcrops of specialized structure, better displayed in more vigorous animals, and therefore likely to increase under natural selection. The inconspicuous patterns and dull colours of females he believed to depend on natural selection, and to be associated with the greater need for females to be inconspicuous whilst engaged in their duties to their young. More recent writers have shown that in a large number of cases brilliant colours and patterns are in themselves really protective (see COLOURS OF ANIMALS), so that the facts left to be explained by the theory of sexual selection are still further restricted.

BIBLIOGRAPHY.—W. Bateson, *Mendel's Principles of Heredity* (1909) (with a good list of Mendelian literature); G. Canestrini, *Opuscula zoologica* (1861–1864); W. E. Castle, "The Heredity of Sex," *Bull. Mus. Comp. Zool.* (Harvard, 1903), xl. No. 4, C. Correns, *Bestimmung u. Vererbung des Geschlechtes* (1907); J. T. Cunningham, *Sexual Dimorphism* (1900), C. Darwin, *Descent of Man* and *Selection in Relation to Sex* (1871); L. Doncaster, "Gametogenesis of the Gall-Fly," *Proc. Roy. Soc. B.*, vol. lxxxii. p. 88 (1910); C. Dusing, *Die Regulierung des Geschlechtsverhältnisses bei der Vermehrung der Menschen, Tiere, und Pflanzen* (1884) and *Jena Zeitsch.* (1885); P. Geddes and J. A. Thomson, *The Evolution of Sex* (2nd ed., 1901) (with valuable lists of references); U. Hensen, "Physiologie der Zeugung," in Hermann's *Handbuch der Physiologie*, vi. p. 304; J. D. Hofacker, *Über die Eigenschaften, welche sich bei Menschen und Tieren auf die Nachkommen vererben* (Tubingen, 1828); A. Russo, *Modificazioni sperimentali dell' elemento epitheliale dell' ovaria dei mammiferi*, Reale Accad. (Lincei, 1907), vi. p. 313; M. T. Sadler, *The Law of Population* (1830); L. Stieda, *Das Sexuale Verhältniss bei Geborenen* (Strassburg, 1875); J. A. Thomson, *Heredity* (1908); Professor Thury, *Über das Gesetz der Erzeugung der Geschlechter* (Leipzig, 1863); H. M. Vernon, *Variation in Animals and Plants* (1903); A. R. Wallace, *Darwinism* (1889); E. B. Wilson, *Recent Researches on the Determination and Heredity of Sex* (1909), p. 53; E. Yung, "De l'influence de la nature des aliments sur la sexualité," in *Comptes Rendus Ac. Sci. Paris*, xciii. (1881). (P. C. M.)

SEXBY, EDWARD (d. 1658), English soldier, "leveller" and conspirator, was a private soldier in Cromwell's regiment of horse when first heard of about 1643. He opposed the proposal to disband the army in 1647; and as one of the "agitators" he resisted all attempts to come to an arrangement with Charles I., and advocated extreme democratic doctrines. He rose to the rank of colonel, but was deprived of his commission in 1651. When Cromwell assumed the title of lord protector, Sexby became one of his most violent opponents, and in 1655 tried to bring together the levellers and the royalists in a combination to overturn the government. Compelled to fly from England, he intrigued with the Spanish government with a view to restoring Charles II., as the only feasible plan for destroying Cromwell; and he was concerned in several plots to assassinate the protector. About 1657 he wrote the celebrated apology for tyrannicide entitled "Killing No Murder," under the pseudonym William Allen, which was printed in Holland and distributed in England. In July 1657 he was arrested in disguise in England, whither he had come to attempt Cromwell's assassination, and he died in the Tower of London on the 13th of January 1658.

SEXPARTITE VAULT, in architecture, a name given to the single bay of a vault, which, in addition to the transverse and diagonal ribs, has been divided by a second transverse rib, forming six compartments. The principal examples are those in the Abbaye-aux-Hommes and Abbaye-aux-Dames at Caen (which were probably the earliest examples of a construction now looked upon as transitional), Notre Dame, Paris, and the cathedrals of Bourges, Laon, Noyon, Senlis and Sens; from the latter cathedral the sexpartite vault was brought by William of Sens to Canterbury, and it is afterwards found at Lincoln and in St Faith's Chapel, Westminster Abbey.

SEXTANT, an instrument for measuring angles on the celestial sphere. The name (indicating that the instrument is furnished with a graduated arc equal to a sixth part of a circle) is now only used to designate an instrument employing reflection to measure an angle; but originally it was introduced by Tycho Brahe, who constructed several sextants with two sights, one on a fixed, the other on a movable radius, which the observer pointed to the two objects of which the angular distance was to be measured.

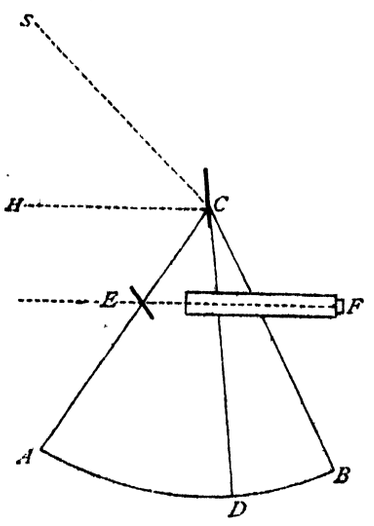
The imperfections of the astrolabe and cross-staff for taking altitudes (see NAVIGATION) were so evident that the idea of employing reflection to remove them occurred independently to several minds. R. Hooke contrived two reflecting instruments. The first, described in his *Posthumous Works* (p. 503), had only one mirror, which reflected the light from one object into a telescope which is pointed directly at the other. Hooke's second plan employed two single reflections, whereby an eye placed at the side of a quadrant could at the same time see the images formed in two telescopes, the axes of which were radii of the quadrant and which were pointed at the two objects to be measured. This plan is described in Hooke's *Animadversions to the Machina Coelestis of Hevelius*, published in 1674, while the first one seems to have been communicated to the Royal Society in 1666. Newton also studied this subject, but nothing was known about his ideas till 1742, when a description in his own handwriting of an instrument devised by him was found among Halley's papers and printed in the *Philosophical Transactions* (No. 465). It consists of a sector of brass, the arc of which, though only equal to one-eighth part of a circle, is divided into 90°. A telescope is fixed along a radius of the sector, the object-glass being close to the centre and having outside it a plane mirror inclined 45° to the axis of the telescope, and intercepting half the light which would otherwise fall on the object glass. One object is seen through the telescope, while a movable radius, carrying a second mirror close to the first, is turned round the centre until the second object by double reflection is seen in the telescope to coincide with the first. But before Newton's plan was published the sextant in its present form had come into practical use. On May 13, 1731, John Hadley described an "octant," employing double reflection, and a fortnight later he exhibited the instrument.[1] On the 20th of May Halley stated to the Royal Society that Newton had invented an instrument founded

[1] Hadley described two different constructions: in one the telescope was fixed along a radius as in Newton's form, in the other it was placed in the way afterwards universally adopted; an octant of the first construction was made in the summer of 1730, according to a statement made to the Royal Society by Hadley's brother George on Feb. 7, 1734

on the same principle, and had communicated an account of it to the society in 1699, but on search being made in the minutes it was only found that Newton had shown a new instrument "for observing the moon and stars for the longitude at sea, being the old instrument mended of some faults," but nothing was found in the minutes concerning the principle of the construction. Halley had evidently only a dim recollection of Newton's plan, and at a meeting of the Royal Society on December 16, 1731, he declared himself satisfied that Hadley's idea was different from Newton's. The new instrument was tried in August 1732 on board the "Chatham" yacht by order of the Admiralty, and was found satisfactory, but otherwise it does not seem to have superseded the older instruments for at least twenty years. Hadley's instrument could only measure angles up to 90°; but in 1757 Captain Campbell of the navy, one of the first to use it assiduously, proposed to enlarge it so as to measure angles up to 120°, in which form it is now generally employed.

Independently of Hadley and Newton the sextant was invented by Thomas Godfrey (1704-1749), a poor glazier in Philadelphia. In May 1732 James Logan wrote to Halley that Godfrey had about eighteen months previously showed him a common sea quadrant "to which he had fitted two pieces of looking-glass in such a manner as brought two stars at almost any distance to coincide." The letter gave a full description of the instrument; the principle was the same as that of Hadley's first octant, which had the telescope along a radius. At the meeting of the Royal Society on January 31, 1734, two affidavits sworn before the mayor of Philadelphia were read, proving that Godfrey's quadrant was made about November 1730, that on November 28 it was brought by G. Stewart, mate, on board a sloop, the "Truman," John Cox, master, bound for Jamaica, and that in August 1731 it was used by the same persons on a voyage to Newfoundland. The statement that a brother of Godfrey, a captain in the West India trade, sold the quadrant at Jamaica to a Captain or Lieutenant Hadley of the British navy, who brought it to London to his brother, an instrument maker in the Strand, is devoid of foundation.[1]

The figure shows the construction of the sextant. ABC is a light framework of brass in the shape of a sector of 60°, the limb AB having a graduated arc of silver (sometimes of gold or platinum) inlaid. It is held in the hand by a small handle at the back, either vertically to measure the altitude of an object, or in the plane passing through two objects the angular distance of which is to be found. It may also be mounted on a stand. CD is a radius movable round C, where a small plane mirror of silvered plate-glass is fixed perpendicular to the plane of the sextant and in the line CD. At D is a vernier read through a microscope, also a clamp and a tangent screw for giving the arm CD a slow motion. At E is another mirror "the horizon glass," also perpendicular to the plane of the sextant and parallel to CB. F is a small telescope fixed across CB, parallel to the plane CAB and pointed to the mirror E. As only the lower half of E is silvered, the observer can see the horizon in the telescope through the unsilvered half, while the light from the sun or a star S may be reflected from the "index glass" C to the silvered half of E and thence through F to the observer's eye. If CD has been moved so as to make the image of a star or of the limb of the sun coincide with that of the horizon, it is seen that the angle SCH (the altitude of the star or solar limb) equals twice the angle BCD. The limb AB is graduated so as to avoid the necessity of doubling the measured angle, a space marked as a degree on the limb being in reality only 30′. The vernier preferably of the extended type, *i.e.* a vernier whose divisions are twice the distance apart of those on the arc, should point to 0° 0′ 0″ when the two mirrors are parallel, or in other words, when the direct and reflected images of a distant object coincide.



Sextant.

The sextant was formerly much used on land for determining latitudes in which case an artificial horizon (see below) is required, but it has now been largely superseded by the portable altazimuth or theodolite, while at sea it continues to be indispensable.

The telescopes employed in sextants are of two kinds: the direct, for the more ordinary observations; and the inverting, for astronomical work, one of the eyepieces of which should be of high magnifying power, not less than 15 diameters. Each eyepiece has two pairs of wires, each pair perpendicular to the other, and dividing the field of view into nine divisions, of which the central is square. Contacts should be made as nearly as possible in the centre of this square. It is convenient if the telescope is fitted with an interrupted thread to screw into the collar of the up and down piece. Both mirrors are supplied with coloured shades of different degrees of shade, and may be used either singly or combined for sea observations; they are subject to errors of refraction, due to non-parallelism of the sides of the glass. Coloured eyepieces of neutral glass of different intensities are fitted to slip on and off the conically ground surface of the eyepieces of the telescope; they are used for index error and for observations in the artificial horizon. Introducing no refraction error, they also ensure the suns being of the same brilliancy; a very important point. The up and down piece, when adjusted to equalize the suns, will bring the axis of the telescope nearly exactly in line with the edge of the silvered surface of the horizon glass, which is the best position for observing, and from this it must never be moved until the equal altitude or other observations are complete.

For observations on shore the sextant should be mounted on a stand. In an improved form of stand, the bearing which carries the sextant is square, and the whole bearing revolving on a centre is controlled by a clamp and tangent screw. The counterpoise should exactly balance the sextant, and they may be fitted to allow for adjustment. A small spirit-level fixed on one of the arms of the sextant stand, and another level pivoting round the pillar on the index bar of the sextant carrying the microscope, working in a plane parallel to that of the instrument, and fixed by means of a set screw, are of use in placing the sextant exactly in the required position when observing faint stars. With the telescope pointing to the centre of the artificial horizon, the direct and reflected images of the sun at any convenient altitude are made to coincide. The levels are then adjusted and permanently fixed by their set screws. To observe a faint star, it is only necessary to set its double altitude on the sextant, turn the instrument and the stand to bring the bubbles of their respective levels in the centre of their runs, and move the stand until the telescope points to the centre of the artificial horizon and in the direction of the star, when the direct and reflected images will be seen in the field. A small electric light fitted on the arm carrying the microscope, and worked by a dry battery, enables the sextant to be read at night.

The artificial horizon in common use consists of a glass trough containing mercury and protected from the wind by a glass roof. The glass in the roof should be of the best quality, and the faces of each pane of the trough accurately parallel. A new form of horizon consists of a shallow rectangular trough of metal gilt. After cleansing the surface by wetting it with a few drops of dilute sulphuric acid, a drop of mercury is rubbed on until the whole surface is bright, when a very small quantity of amalgamated mercury added will form an even horizontal surface. The dross is wiped off with a broad camel-hair brush. In this shallow trough waves are killed almost instantaneously.

The horizon is placed upon a stand, consisting of two iron plates, the upper resting on the lower, supported by three long large-headed screws, by means of which it can be levelled. If the stand is raised off the ground a foot or so, on a firm foundation, thus bringing the artificial horizon closer to the telescope, faint stars are more easily observed, and the movement of the sextant necessary to keep the star in the field, owing to its motion in the heavens, will be lessened. A lantern placed on the ground behind, or a little on one side of, the observer, and faintly showing on the artificial horizon, will sufficiently illuminate the wires of the telescope on a dark night.

Adjustments.—The planes of both the index glass and the horizon glass should be perpendicular to the plane of the instrument, and they should also be parallel to one another when the vernier is set to zero. The line of collimation of the telescope must be parallel to the plane of the sextant. This adjustment, though less liable to alter than either of the others, should be examined from time to time as follows:—With the sextant mounted on a stand, move the index so as to separate the direct and reflected images of a star by a distance nearly equal to the length of the parallel wires of the telescope, and turn the eyepiece until, the direct image of the star coinciding with one extremity of the wire, the reflected image coincides with the other extremity; the wires will then be parallel to the plane of the sextant. Select two bright stars and make a coincidence of the reflected and direct images on the middle of one wire, and then on the middle of the other. If the two readings agree, the

[1] See Professor Rigaud, *Naut. Mag.* vol. ii. No. 21. John Hadley was a country gentleman of independent means, and the fact that he was the first to bring the construction of reflecting telescopes to any perfection has made many authors believe that he was a professional instrument maker. His brother George, who assisted him, was a barrister.

adjustment is correct; if not, the adjusting screws in the collar of the up and down piece must be moved until the coincidence is exact.

"Centring error" is very important, but cannot be corrected. In an indifferent instrument it may be sufficient to vitiate the result of any observations on one side only of the zenith. It arises from the eccentricity of the centres of the index arm and of the arc, and varies with the angle measured, being generally greater as the angle increases; but the index arm becoming bent, or any part of the frame receiving a blow which alters its shape, the flexure of the instrument from varying temperature, and defective graduation, will all produce errors which it is generally impossible to disentangle, and they are all included in the one correction for centring. This correction is found by comparing the angle measured by the sextant (corrected for index error) with the true angle. The most accurate method, because it employs a large number of observations for the same or nearly the same angle, is by observations of pairs of circum-meridian stars in the artificial horizon at various altitudes. Double the difference between the resulting latitude by each star and the mean latitude will be the centring error for an angle equal to the double altitude of that star, that is, the angle actually measured by the sextant, index error being ascertained and applied before working out. Measurement of the angles between stars, compared with their calculated apparent distance, is another method. At Kew Observatory (National Physical Laboratory) the centring error is determined for certain angles by fixed collimators. Including, as it does, errors from so many causes, the correction does not remain perfectly steady, and it should be ascertained from time to time. In a good sextant the error should not exceed one minute over the whole of the arc.

SEXTON (an early corruption of "sacristan," properly the keeper of sacred vessels and vestments, Med. Lat. *sacristanus* or *sacrista*), a minor officer of an ecclesiastical parish. In the early church the sexton was identical with the *ostiarius*, or door-keeper, whose duty it was to open and shut the church at certain hours, guard the church and all it contained, and prevent the heathen and excommunicated from entering. The duties of the modern sexton are practically those of the ancient sacristan. He has the custody of the church keys, is responsible for keeping the church clean, for the bell-ringing and lighting, and looks after the vestments and *instrumenta* of the church, but the duties may vary by custom in different parishes. Where his duties are confined to the care of the vestments and *instrumenta* the right of appointment of a sexton lies in the churchwardens; if his duties are confined to the churchyard the right of appointment is in the incumbent, and where his duties extend to both the right of appointment is jointly in the churchwardens and the incumbent. By custom, however, he may be appointed by the parishioners. He usually has a freehold in his office, and in some parishes is entitled to certain customary fees.

SEXTUS EMPIRICUS (2nd and 3rd centuries A.D.), physician and philosopher, lived at Alexandria and at Athens. In his medical work he belonged to the "methodical" school (see ASCLEPIADES), as a philosopher, he is the greatest of the later Greek Sceptics. His claim to eminence rests on the facts that he developed and formulated the doctrines of the older Sceptics, and that he handed down a full and, on the whole, an impartial account of the members of his school. His works are two, the *Pyrrhonian Hypotyposes* and *Against the Mathematici* (ed. Fabricius, Paris, 1621, and Bekker, Berlin, 1842).

See Brochard, *Les Sceptiques grecs* (1887); Pappenheim, *Lebensverhältnisse des Sextus Empiricus* (Berlin, 1875); Jourdain, *Sextus Empiricus* (Paris, 1858); Patrick, *Sextus Empiricus and the Greek Sceptics* (1899, with trans. of *Pyrrh. Hyp.* i.); also SCEPTICISM.

SEYCHELLES, an archipelago in the Indian Ocean, consisting of forty-five islands — besides a number of rocks or islets —situated between 3° 38′ and 5° 45′ S., and 52° 55′ and 53° 50′ E. Together with the Amirantes, Cosmoledo, Aldabra and other islands they form the British colony of Seychelles. The outlying islands lie south-west of the Seychelles group and between that archipelago and Madagascar. In all ninety islands with a total area of over 156 sq. m. are under the Seychelles government. There are in addition 40,000 to 50,000 sq. m. of coral banks within the bounds of the colony.

The Seychelles lie, with two exceptions, towards the centre of a large submarine bank and are all within the 50 fathoms line. Mahé, the largest and most central island, is 934 m. N.N.W. of Mauritius, 970 m. E. by N. of Zanzibar and 600 m. N.E. of the northernmost point of Madagascar. The other chief islands form two principal groups: (i.) Praslin, 26 m. N.N.E. of Mahé, and the adjacent smaller islands of La Digue, Félicité, East Silver, West Silver, Curieuse and Aride; (ii.) Silhouette, 14 m. W. by N. of Mahé, and North Island. The most easterly island is Frigate, the most southerly Platte; on the northern edge of the reef are Bird and Denis islands. The general aspect of the islands is one of great beauty and fertility, and in the opinion of General C. G. Gordon they formed the Garden of Eden.

Mahé is 17 m. long, and from 4 to 7 broad and of highly irregular shape, with an area of about 55 sq. m. There are small areas of lowlands, chiefly at the mouths of the river valleys, but most of the island is mountainous, and in general the hills rise abruptly from the sea. There are ten heights between 1000 and 2000 ft., and seven over 2000 ft. The highest point is Morne Seychellois, 2993 ft.; next comes Trois Frères, 2390 ft. Both these mountains are in the northern half of the island. The main ridge runs north and south along the line of the greatest diameter, and from the heights descend many torrents, the whole island being well watered. The principal harbour, Port Victoria, is on the north-east coast in 4° 37′ S., 55° 27′ E. It is approached by a deep channel through the coral reef which fringes the entire eastern side of the island. Of the small islands close to Mahé the chief are St Anne and Cerf, off the east, and Conception and Thérèse off the west coast.

Praslin Island is 8 m. long and from 1 to 3 m. broad, has an area of about 27 sq. m. and its highest point is 1260 ft.; La Digue covers 4 sq. m. and its greatest height is 1175 ft.; Silhouette is roughly circular in shape, covers 8 sq. m. and culminates in Mon Plaisir, 2473 ft. None of the other islands exceeds 1½ sq. m.

Geology.—Except Bird and Denis islands, which are of coralline limestone, the Seychelles are of granite, with in places fringing reefs of coral based on granite foundations. The granite is of the same formation or closely related to that of Madagascar and throughout the islands is closely uniform in its composition, but exhibits dikes of finer grain. The rocks are deeply furrowed and cut into ridges, evidence of the long period over which they have been subjected to atmospheric influences. There is no sign of marine action over four-fifths of the islands, which nowhere exhibit any trace of volcanic action, recent or remote. The islands are regarded as a remnant of the continental land which in remote geological ages united South Africa and India. J. Stanley Gardiner supposes that when first cut off the Seychelles were the size of the present bank—about 12,000 sq. m. This cutting off was caused largely by subsidence, though partly by marine action. The subsequent dwindling of the 12,000 sq. m. to 156 divided into many small islands is attributed to marine action which had its chief force in the Eocene and Miocene periods. (Cf. "The Indian Ocean," *Geo. Journ.* vol. xxviii., 1906).

Climate.—The climate is healthy and equable, and for a tropical country the temperature is moderate. It varies on the coast from about 68° to 88° F., falling at night in the higher regions to 60° or 55° F. The mean coast temperature slightly exceeds 79° F. The south-east monsoon blows from May to October, which is the dry season, and the west-north-west monsoon from December to March. During April and November the winds are variable. The average annual rainfall on the coast is 100·8 in.; it increases to about 120 in. at a height of 600 ft. and at heights exceeding 2000 ft. is about 150 in. The Seychelles lie outside the track of the hurricanes which occasionally devastate Réunion and Mauritius and are also immune from earthquakes. The public health is good, and fevers and plague are unknown.

Flora and Fauna.—Both flora and fauna include species and genera peculiar to the Seychelles. Of these the best known is the *Lodoicea sechellarum*, a palm tree indigenous only in Praslin Island—but since introduced into Curieuse—noted for its fruit, the so-called Maldive double coco-nut or *coco de mer*. The nut was long known only from sea-borne specimens cast up on the Maldive and other coasts, was thought to grow on a submarine palm, and, being esteemed a sovereign antidote to poisons (*Lusiad*, x. 136), commanded exorbitant prices in the East. This palm will grow to a height of 100 ft., and shows enormous fern-like leaves. Another tree found only in the islands is the capucin (*Northea sechellarum*), whose massive dead trunks are a striking feature in the landscape. This tree has almost completely fallen a victim to the ravages of a green beetle, probably introduced from Mauritius. The islands were formerly densely wooded, but only patches of forest remain. The central mountain zone of Mahé was in 1909 acquired by the government for reafforestation purposes. This zone also included one of the last remaining portions of indigenous forest. The forests of the coast belt resembled those of the coral islands of the neighbouring parts of the Indian Ocean. Characteristic of this region are the mangrove and *Pandanus*, and, a little inland, the banyan (*Ficus*), *Pisonia* and *Hernandia*. The coco-nut, now a conspicuous feature of the coast

flora, is probably not indigenous. The forests of the granitic land, of which typical patches remain, had the characteristics of a tropical moist region, palms, shrubs, climbing and tree ferns growing luxuriantly, the trees on the mountain sides, such as the *Pandanus sechellarum* sending down roots over the rocks and boulders from 70 to 100 ft. Of timber trees the bois gayac has disappeared, but bois de fer (*Stadtmannia sideroxylon*) and bois de natte (*Maba sechellarum*) still flourish on Silhouette Island. Besides the cutting down for building purposes of the timber trees the jungle was largely cleared for the plantation of vanilla; while a multitude of other tropical plants have been introduced tending to the extermination of the indigenous flora. The most important of the trees introduced since 1900 are various kinds of rubber, including Para (*Hevea Brasiliensis*), which grows well. For other introduced plants see below, *Industries*.

The indigenous fauna, so far as its limited range affords comparison, resembles that of Madagascar. It is deficient in mammals, of which the only varieties are the rat and bat. The dugong, which formerly frequented the waters of the islands, does so no longer. The reptiles include certain lizards and snakes; the crocodile, once common, has been exterminated. Land tortoises have also disappeared,[1] but one freshwater species (*Sternothaerus sinuatus*) is still found; and the adjacent seas contain many turtles. Three coecilians, three batrachians (including a mountain-frequenting frog) and three fresh-water crustaceans are also indigenous, and about twenty-six species of land shells. The islands are the home of a large number of birds, including terns, gannets and white egrets, though most of the indigenous species are extinct. The neighbouring seas abound in fish. Among the domestic animals introduced are the ass and pig.

Inhabitants.—Like Mauritius, Réunion and Rodriguez the Seychelles were uninhabited when first visited by Europeans: though fragments of ruins found on Praslin and Frigate islands may indicate the presence of man in earlier centuries. The islands were colonized by Mauritian and Bourbon creoles; the white element, still prevailingly French, has been strengthened by the settlement of several British families. The first planters introduced slaves from Mauritius, and the negro element has been increased by the introduction of freed slaves from East Africa. There has been also an immigration of Chinese and, in larger numbers, of Indians (mainly from the Malabar coast). An official report issued in 1910 stated that the greater part of the valuable town property had passed into the hands of Indians, and that Indians and Chinese had the bulk of the retail trade. Of the coloured population those born in the Seychelles of negro, or negro-Indian blood are known as "*enfants des îles.*" They speak a rude creole patois, based on French but with a large admixture of Indian, Bantu and English words. The Seychellois are of fine physique, and are excellent and fearless sailors.

At the census of 1881 the inhabitants numbered 14,081, in 1891 the figure was 16,603 and in 1901 the population numbered 19,237, of whom 9805 were males and 9432 females. The population on December 31st, 1909, was officially estimated at 22,409, or 149·59 persons per sq. m. The pure white population is about 600. About two-thirds of the inhabitants are Roman Catholics.

Agriculture and Industries.—Apart from fisheries the wealth of the islands depends upon agriculture, and the industries connected therewith. These are fostered by the government, which in 1901 created an agricultural board and established a botanic station at Victoria. Spices (cloves, cinnamon, nutmegs) were the chief articles of trade in the 18th century, and these with cotton, coffee, tobacco, sugar, maize and rice were the main crops grown until about 1850. Bananas, yams, &c., were also largely cultivated, and there was considerable trade in coco-nut oil, timber, fish and fish oil and tortoise-shell, whaling being carried on, chiefly by Americans and French, in the neighbouring seas. Subsequently cocoa was cultivated extensively, and from about 1890 vanilla largely superseded the other crops; in 1899 the vanilla exported was valued at over £100,000 out of a total export of £140,000, and from 1896 to 1903 the crop represented more than half the total value of the exports. Owing to increased competition, and in some degree to careless harvesting, there was a great fall in prices after 1900, and the Seychellois, though still producing vanilla in large quantities, paid greater attention to the products of the coco-nut palm—copra, soap, coco-nut oil and coco-nuts—to the development of the mangrove bark industry, the collection of guano, the cultivation of rubber trees, the preparation of banana flour, the growing of sugar canes, and the distillation of rum and essential oils. The tortoise-shell and calipee fisheries and the export of salt fish are important industries. Minor exports are cocoa, coco-de-mer and bêche-de-mer. From the leaves of the coco-de-mer are made baskets and hats.

[1] The gigantic land tortoise (*Testudo elephantina*) is found only in the Aldabra Islands.

The imports consist chiefly of cotton goods and hardware from Great Britain; rice, flour and cotton from India, sugar and rum from Mauritius, coffee from Aden, wines and spirits and clothing from France. The value of the imports and exports (exclusive of specie) for the six years 1901–1906 was: imports, £360,520; exports, £377,613. The increase of trade is indicated by the figures for 1907 (a record year) to 1909. In the three years the value of imports was £233,863, that of exports £355,306. Over 75 % of the total trade is with Great Britain or British possessions. The medium of exchange is the Indian rupee (= 16d.), with the subsidiary coinage of Mauritius.

Towns and Communications.—The only town of any size is the capital, Port Victoria (or Mahé), picturesquely situated at the head of an excellent harbour. Many of the houses are built of massive coral, *Portes gaimardi*, hewn into square building blocks which at a distance glisten like white marble. The port is a coaling station of the British navy and is connected by telegraphic cables with Zanzibar and Mauritius. There is no inland telegraph system. All the islands are well provided with metalled roads. Regular monthly communication with Marseilles is maintained by the Messageries Maritimes steamers. German and British lines serve the South African and Indian ports. The government employ steam vessels for passenger and mail services between the islands, and there are large numbers of sailing craft belonging to the islanders.

Government, Revenue, &c.—Seychelles is a crown colony administered by a governor, assisted by nominated executive and legislative councils. Revenue is derived chiefly from customs, licences, court fees and the post office, while among the principal heads of expenditure figure telegraph and steamer subsidies and the education, medical, legal and police departments. For the ten years 1899–1908 the average yearly revenue was £28,726; the average yearly expenditure £27,304. A public debt of £20,000, repayable in thirty annual instalments, was contracted in 1899. The law in force is based on the Code Napoléon, considerably modified, however, by local ordinances. The simplification and codification of the laws was carried out during 1899–1904 (see the Colonial Office annual reports, especially that for 1903, § 37). Education is under the control, of a government board and, besides primary schools, there are institutions for higher education and a Carnegie Library. Grants are made to schools of all denominations. The creole patois is unsuited to be a medium of instruction, and English is used as far as possible, though its acquisition by the peasantry is that of a foreign language. The same difficulty, to an almost equal degree, would apply to the use of French as a medium.

History.—The Seychelles are marked on Portuguese charts dated 1502. The first recorded visit to the islands was made in 1609 by an English ship; then for 133 years there is no documentary evidence of any further visit. The second recorded visit, in 1742, was made by Captain Lazare Picault, who, returning two years later, formally annexed the islands to France. Though then uninhabited there is a strong tradition, probably well founded, that the Seychelles had been from Arab times a rendezvous of the pirates and corsairs who infested the high seas between South Africa and India. Picault, who acted as agent of the celebrated Mahé de la Bourdonnais, governor of the Île de France (Mauritius), named the principal island Mahé and the group Îles de la Bourdonnais, a style changed in 1756, when the islands were renamed after Moreau de Séchelles, at that time contrôleur des finances under Louis XV. The first permanent settlement was made about 1768, when the town of Mahé was founded. Soon afterwards Pierre Poivre, intendant of Île de France, seeing the freedom of the Seychelles archipelago from hurricanes, caused spice plantations to be made there, with the object of wresting from the Dutch the monopoly they then enjoyed of the spice trade. The existence of these plantations was kept secret, and it was with that object that they were destroyed by fire by the French on the appearance in the harbour in 1778 of a vessel flying the British flag. The ship, however, proved to be a French slaver which had hoisted the Union Jack fearing to find the British in possession. Mahé proved very useful to French ships during the wars of the Revolution, and this led to its capture by the British in 1794, but no troops were left to garrison the place, and the administration went on as before. In 1806 the island capitulated to the captain of another British ship, but again no garrison was left, and it was not until after the capture of Mauritius in 1810 that the Seychelles were

occupied by the British, to whom they were ceded by the treaty of Paris in 1814. Throughout this period Mons. J. B. Quéau de Quincy (1748–1827) administered the islands. This remarkable man, a Parisian by birth, became governor of the Seychelles in 1789 under the monarchy, continued to serve under the First Republic, and Napoleon I.,—acknowledging the British authority when ships of that nationality entered the harbour,—and when the Seychelles were made a dependency of Mauritius was appointed by the British agent-civil. In all he governed the islands thirty-eight years, dying in 1827. His tomb is in Government House garden. Under de Quincey's administration the islands prospered; the cultivation of cotton and coffee was then begun, much of the land being deforested for this purpose—a deforestation practically completed when vanilla was introduced. In 1834 the abolition of slavery led to a decline in the prosperity of the islands, but as many of the slaves captured by British cruisers off the east coast of Africa were landed at Seychelles economic conditions were gradually ameliorated. There was also a slight immigration of coolies from India. From 1810 until 1872 the administration was dependent upon Mauritius; from that date onward greater powers were given to the local authorities, until in 1903 Seychelles was erected into a separate colony with its own governor. The over-dependence placed on one product caused waves of depression to alternate with waves of prosperity, and the depression following the fall in the price of vanilla was aggravated by periods of drought, "agricultural sloth and careless extravagance."[1] But during 1905–1910 successful efforts were made to broaden the economic resources of the colony. A natural field for the energies of the surplus population was also found in colonization work in British East Africa. The islands were chosen in 1897 as the place of deportation of Prempeh, ex-king of Ashanti, and in 1901 Mwanga, ex-king of Uganda, and Kabarega, ex-king of Unyoro were also deported thither. Mwanga died at the Seychelles in May 1903.

Dependencies.—The outlying islands forming part of the colony of Seychelles consist of several widely scattered groups and have a total population of about 900. The Amirante archipelago is situated on a submarine bank west and south-west of the Seychelles, the nearest island being about 120 m. from Mahé. The archipelago consists of a number of coral islets and atolls comprising the African Islands (4), the St Joseph group (8), the Poivre Islands (9) and the Alphonso group (3). Farther south and within 170 m. of Madagascar is the Providence group (3) formed by the piling up of sand on a surface reef of crescent shape. The Cosmoledo Islands, 12 in number, lie some 210 m. west of Providence Island, while 70 m. further west are the Aldabra Islands (*q.v.*). The chief island in the Cosmoledo group is 9 m. long by 6 broad. Coetivy (transferred from Mauritius to the Seychelles in 1908) lies about 100 m. S.S.E. of Platte. The majority of the outlying islands are extremely fertile, coco-nut trees and maize growing luxuriantly. Several of the islands contain valuable deposits of guano and phosphate of lime, and their waters are frequented by edible and shell turtle. Like the Amirantes all the other islands named are of coral formation.

See *Unpublished Documents on the History of the Seychelles Islands Anterior to 1810*, with a cartography and a bibliography compiled by A. A. Fauvel (Mahé, 1909); *Ancient Maps of Seychelles Archipelago*, a portfolio containing 28 maps (Mahé, 1909); J. Stanley Gardiner, "The Seychelles Archipelago" (with bibliographical notes), in *Geo. Jnl.* vol. 29 (1907) and "The Indian Ocean," *Geo. Jnl.* vol. 28 (1906). See also the annual reports on the Seychelles issued by the Colonial Office; those from 1901 onward contain valuable botanical reports. For the dependencies see R. Dupont, *Report on a Visit of Investigation to St Pierre, Astove, Cosmoledo, Assumption and the Aldabra Group of the Seychelles Islands* (Seychelles, 1907).

SEYDLITZ, FRIEDRICH WILHELM, FREIHERR VON (1721–1773), Prussian soldier, one of the greatest cavalry generals of history, was born on the 3rd of February 1721 at Calcar in Cleve duchy, where his father, a major of Prussian cavalry, was stationed. After his father's death in 1728 he was brought up in straitened circumstances by his mother, but at the age of thirteen he went as a page to the court of the margrave of Schwedt, who had been his father's colonel. Here he acquired a superb mastery of horsemanship, and many stories are told of his feats, the best known of which was his riding between the sails of a wind-mill in full swing. In 1740 he was commissioned a cornet in the margrave's regiment of Prussian cuirassiers. Serving as a subaltern in the first Silesian War, he was taken prisoner in May 1742 after so gallant a defence that King Frederick offered to exchange an Austrian captain for him. In 1743 the king made him a captain in the 4th Hussars, and he brought his squadron to a state of conspicuous efficiency. He served through the second war, and after Hohenfriedberg was promoted major at the age of twenty-four. At the close of the war he had an opportunity of successfully handling 15 squadrons in front of the enemy, and this, with other displays of his capacity of leading cavalry in the searching tests of Frederick's "reviews," secured his promotion in 1752 to the rank of lieutenant-colonel and in 1753 to the command of the 8th cuirassiers. Under his hands this regiment soon became a pattern to the rest of the army. In 1755 he was made colonel. Next year the Seven Years' War, that was to make his name immortal, broke out. In 1757, regardless of the custom of keeping back the heavy cavalry in reserve, he took his regiment to join the advanced guard, at Prague he nearly lost his life in attempting to ride through a marshy pool, and at Kolin, at the head of a cavalry brigade, he distinguished himself in checking the Austrian pursuit by a brilliant charge. Two days later the king made him major-general and gave him the order *pour le mérite*, which promotion he felt to be no more than his deserts, for to Zieten's congratulations he responded: "It was high time, Excellency, if they wanted more work out of me. I am already thirty-six." Four times in the dismal weeks that followed the disaster of Kolin, Seydlitz asserted his energy and spirit in cavalry encounters, and on the morning of Rossbach Frederick, superseding two senior generals, placed Seydlitz in command of the whole of his cavalry. The result of the battle was the complete rout and disorganization of the enemy, and in achieving that result only seven battalions of Frederick's army had fired a shot. The rest was the work of Seydlitz and his 38 squadrons. The same night the king gave him the order of the Black Eagle, and promoted him lieutenant-general. But he had received a wound in the mêlée, and for some months he was away from the army. He rejoined the king in 1758, and at the battle of Zorndorf Seydlitz's cavalry again saved the day and won the victory. At Hochkirch with 108 squadrons he covered the Prussian retreat, and in the great disaster of Kunersdorf he was severely wounded in a hopeless attempt to storm a hill held by the Russians. During his convalescence he married Countess Albertine Hacke. He rejoined the army in May 1760, but his health was so impaired that Frederick sent him home again. It was not until 1761 that he reappeared at the front. He now commanded a wing of Prince Henry's army, composed of troops of all arms, and many doubts were expressed as to his fitness for this command, as his service had hitherto been with the cavalry exclusively. But he answered his critics by his conduct at the battle of Freyburg (October 29, 1762), in which, leading his infantry and his cavalry in turn, he decided the day. After the peace of Hubertusberg he was made inspector-general of the cavalry in Silesia, where eleven regiments were permanently stationed and whither Frederick sent all his most promising officers to be trained by him. In 1767 he was made a general of cavalry. But his later years were clouded by domestic unhappiness. His wife was unfaithful to him, and his two daughters, each several times married, were both divorced, the elder once and the younger twice. His formerly close friendship with the king was brought to an end by some misunderstanding, and it was only in his last illness, and a few weeks before his death, that they met again. Seydlitz died of paralysis at Ohlau on the 27th of August 1773.

See Varnhagen von Ense, *Das Leben des Generals von Seydlitz* (Berlin, 1834); and Bismarck, *Die kgl. preussische Reiterei unter Friedrich dem Grossen* (Karlsruhe, 1837).

SEYMOUR, or ST MAUR, the name of an English family in which several titles of nobility have from time to time been created, and of which the duke of Somerset is the head. The family was settled in Monmouthshire in the 13th century. The original form of the name, which has been resumed by the dukes of Somerset since 1863, seems to have been St Maur, of which Camden says that Seymour was a later corruption. It appears

[1] *Colonial Reports . . . Seychelles* (1907).

that about the year 1240 Gilbert Marshal, earl of Pembroke, assisted William St Maur to wrest a place called Woundy, near Caldecot in Monmouthshire, from the Welsh. Woundy and Penhow, at the latter of which he made his residence, were the property of Sir Richard St Maur at the end of the 13th century, but they passed away from the family through the marriage of Sir Richard's great-great-granddaughter, the only child of John St Maur, who died in 1359. John St Maur's younger brother Roger married Cecily, one of the daughters and co-heiresses of John Beauchamp of Hache, Baron Beauchamp de Somerset (d. 1361), who brought to her husband the greater part of her father's extensive estates in Somersetshire, Devonshire, Buckinghamshire and Suffolk. The eldest son of this marriage was Sir William St Maur, or Seymour (for the later form of the name appears to have come into use about this date), who was an attendant on the Black Prince, and who died in his mother's lifetime, leaving a son Roger, who inherited the estates and added to them by his marriage with Maud, daughter of Sir William Esturmi of Wolf Hall, Wiltshire. During the next three or four generations the wealth and importance of the Seymours in the western counties increased, until in the reigns of Henry VII. and Henry VIII. Sir John Seymour of Wolf Hall became a personage of note in public affairs. He took an active part in suppressing the Cornish rebellion in 1497; and afterwards attended Henry at the Field of the Cloth of Gold, and on the occasion of the emperor Charles V.'s visit to England in 1522. The eldest of his ten children was Edward Seymour, 1st duke of Somerset (*q.v.*), the famous Protector in the reign of Edward VI.; his third son was Thomas Seymour, Baron Seymour of Sudeley (*q.v.*); and his eldest daughter Jane was third wife of King Henry VIII., and mother of Edward VI. The Protector was twice married; and, probably owing to the adultery of his first wife whom he repudiated about 1535, his titles and estates were entailed first on the issue of his second marriage with Anne, daughter of Sir Edward Stanhope. (See SOMERSET, EARLS AND DUKES OF.)

The Protector's eldest surviving son by his first marriage, Sir Edward Seymour (d. 1593), knight, of Berry Pomeroy, Devon, was father of Sir Edward Seymour (d. 1613) who was created a baronet in 1611; and the baronetcy then descended for six generations from father to son, all of whom were named Edward, until in 1750, on the failure of heirs of the Protector by his second marriage, Sir Edward Seymour, 6th baronet of Berry Pomeroy, succeeded to the dukedom of Somerset. The 3rd baronet, in whose time the family seat at Berry Pomeroy was plundered and burnt by the Roundheads, had a younger brother Henry (1612–1686), who was a close personal attendant of Prince Charles during the Civil War, and bore the prince's last message to his father, Charles I., before the latter's execution. Henry Seymour continued his service to Charles II. in exile, and at the Restoration he received several valuable offices from the king. In 1669 he bought the estate of Langley in Buckinghamshire, where he lived till his death in 1686. In 1681 his son Henry, at the age of seven years, was created a baronet.

Sir Edward Seymour, 4th baronet (1633–1708), speaker of the House of Commons, was elected member of parliament for Gloucester in 1661, and his influence at Court together with his natural abilities procured for him a position of weight in the House of Commons. He was appointed to the lucrative post of treasurer of the navy; and in 1667 he moved the impeachment of Lord Clarendon, which he carried to the House of Lords. In 1672 he was elected speaker, an office which he filled with distinction until 1679, when, having been unanimously re-elected to the Chair, the king refused to confirm the choice of the Commons. On the accession of James II., Seymour courageously opposed the arbitrary measures of the Crown; and at the revolution he adhered to the Prince of Orange. In 1691 he became a lord of the treasury, but losing his place three years later he took an active part in the tory opposition to William's whig ministers; and in later years he was not less hostile to those of Queen Anne, but owing to the ascendancy of Marlborough he lost all influence for some time before his death, which took place in 1708. Seymour was not less arrogant than his relative "the Proud Duke" of Somerset; but he was described by Burnet as "the ablest man of his party, the first speaker of the House of Commons that was not bred to the law; a graceful man, bold and quick, and of high birth." Sir Edward Seymour was twice married. By his first wife he had two sons, Edward, 5th baronet, whose son Edward became the 8th duke of Somerset, and William, who became a lieutenant-general; by his second wife, a daughter of Alexander Popham of Littlecote, he had six sons, the eldest of whom, Popham, on succeeding to the estates of his mother's cousin, Edward, earl of Conway, assumed the name of Conway in addition to that of Seymour. Popham was killed in a duel with Colonel Kirk in 1669, and his estates devolved on his next brother, Francis, who likewise assumed the name of Conway, and having been created Baron Conway in 1703 was the father of Francis Seymour Conway (1719–1794), created marquess of Hertford in 1793, and of field-marshal Henry Seymour Conway (*q.v.*). (See HERTFORD, EARLS AND MARQUESSES OF.)

The eldest son of the Protector's second marriage, Edward Seymour (1537–1621), was relieved by act of parliament in the reign of Queen Mary from the attainder passed on his father in 1551, and was created Baron Beauchamp and earl of Hertford in 1559. In 1560 he secretly married Lady Catherine Grey, second daughter of Henry Grey, duke of Suffolk, and sister of Lady Jane Grey, claimant of the crown as great-granddaughter of Henry VII., on whose death Catherine stood next in succession to the throne after Queen Elizabeth under the will of Henry VIII. On this account both parties to the marriage incurred the displeasure of Queen Elizabeth; they were imprisoned in the Tower of London, and the fact of their marriage, together with the legitimacy of their two sons, was denied. The eldest of these sons was Edward Seymour (1561–1612), styled Lord Beauchamp notwithstanding the question as to his legitimacy, who in 1608 obtained a patent declaring that after his father's death he should become earl of Hertford. He, however, died before his father, leaving three sons, one of whom, William, became 2nd duke of Somerset; and another, Francis, was created Baron Seymour of Trowbridge in 1641. The latter had at first taken an active part in the opposition in the House of Commons to the government of Charles I., having been elected member for Wiltshire in 1620. He represented the same constituency in both the Short and the Long Parliaments; and he refused to pay ship money in 1639. When, however, the popular party proceeded to more extreme measures, Francis Seymour refused his support, and was rewarded by being raised to the peerage; he voted in the House of Lords against the attainder of Strafford, and in 1642 he joined Charles at York and fought on the royalist side throughout the Great Rebellion. He died in 1664. His grandson Francis, 3rd baron, succeeded to the dukedom of Somerset in 1675; and on the death of his nephew Algernon, 7th duke of Somerset, in 1750, the male line of the Protector by his second marriage became extinct, and the dukedom reverted to the elder line, the 6th baronet of Berry Pomeroy becoming 8th duke of Somerset.

Henry Seymour (1729–1805), a son of the 8th duke of Somerset's brother Francis, was elected to the House of Commons in 1763; in 1778 he went to France, and fixing his residence at Prunay, near Versailles, he became the lover of Madame du Barry, many of whose letters to him are preserved in Paris. He was twice married, and in addition to children by both wives he left an illegitimate daughter, Henriette Felicité, who married Sir James Doughty-Tichborne, by whom she was the mother of Sir Roger Tichborne, impersonated in 1871 by the famous impostor Arthur Orton.

Lord Hugh Seymour (1759–1801), a younger son of Francis Seymour-Conway, marquess of Hertford, was a distinguished naval officer who saw much active service especially under Lord Howe, in whose famous action on the 1st of June 1794 he took a conspicuous part. His son Sir George Francis Seymour (1787–1870), admiral of the fleet, began his naval career by serving under Nelson; in 1818 he became Sergeant-at-arms in the House of Lords, a post which he retained till 1841, when he was promoted to the rank of rear-admiral and appointed a lord of the admiralty; his eldest son, Francis George Hugh Seymour (1812–1884), succeeded his cousin Richard Seymour-Conway as 5th marquess of Hertford in 1870. Lord Hugh Seymour's younger son, Sir Horace Beauchamp Seymour, was the father of Frederick Beauchamp Paget Seymour, Baron Alcester (*q.v.*).

A younger branch of the great house of Seymour is said to have

settled in Ireland in the reign of Elizabeth, from which Sir Michael Seymour (1768–1834) claimed descent. Sir Michael, like so many of his name, was an officer in the navy, in which he rendered much distinguished service in the last decade of the 18th century. He lost an arm in Howe's action on the 1st of June 1794; and between 1796 and 1810 as commander of the "Spitfire," and afterwards of the "Amethyst," he captured a great number of prizes from the French in the Channel. Seymour became a rear-admiral in 1832, and died two years later while in chief command on the South American station. His son, Sir Michael Seymour (1802–1887), entered the navy in 1813, and attained the rank of rear-admiral in 1854, in which year he served under Sir Charles Napier in the Baltic during the war with Russia. In 1856 he was in command of the China station, and conducted the operations arising out of the affair of the lorcha "Arrow"; he destroyed the Chinese fleet in June 1857, took Canton in December, and in 1858 he captured the forts on the Pei-ho, compelling the Chinese government to consent to the treaty of Tientsing. In 1864 he was promoted to the rank of admiral.

AUTHORITIES.—*The Wiltshire Archaeological Magazine*, vol. xv.; William Camden, *Britannia*, English translation, edited by Richard Gough (4 vols., London, 1806); Arthur Collins, *Peerage of England* (8 vols., London, 1779); G. E. C., *Complete Peerage*, *sub.* "Somerset," "Seymour of Trowbridge," and "Hertford" (London, 1896); Burke's *Peerage*, *sub.* "Somerset," *Dictionary of National Biography*, *sub.* "Seymour," vol. li. (London, 1897).

SEYMOUR, HORATIO (1810–1886), American statesman, was born at Pompey, Onondaga county, New York, on the 31st of May 1810. His ancestor, Richard Seymour, a Protestant Episcopal clergyman, was an early settler of Hartford, Connecticut, and his father, Henry Seymour, who removed from Connecticut to New York, was prominent in the Democratic party in the state, being a member of the "Albany Regency" and serving as state senator in 1816–1819 and in 1822, and as canal commissioner in 1819–1831. The son was brought up in Utica, studied in 1824–1825 at Geneva Academy (afterwards Hobart College), and then at a military school in Middletown, Conn., and was admitted to the bar in 1832. He was military secretary to Governor W. L. Marcy in 1833–1839, was a member of the New York Assembly in 1842, in 1844 and in 1845, being speaker in 1845; mayor of Utica in 1843, and in 1852 was elected governor of the state over Washington Hunt (1811–1867), the Whig candidate, who had defeated him in 1850. He vetoed in 1854 a bill prohibiting the sale of intoxicating liquors (which was declared unconstitutional almost immediately after its re-enactment in 1855), and in consequence he was defeated in 1854 for re-election as governor by Myron Holley Clark (1806–1892), the Whig and temperance candidate. Seymour was a conservative on national issues and supported the administrations of Pierce and Buchanan; he advocated compromise to avoid secession in 1860–1861; but when war broke out he supported the maintenance of the Union. In 1863–1865 he was again governor of New York state. His opposition to President Lincoln's policy was mainly in respect to emancipation, military arrests and conscription. The president tried to win him over early in 1863, but Seymour disapproved of the arrest of C. S. Vallandigham in May, and, although he responded immediately to the call for militia in June, he thought the Conscription Act unnecessary and unconstitutional and urged the president to postpone the draft until its legality could be tested. During the draft riots in July he proclaimed the city and county of New York in a state of insurrection, but in a speech to the rioters adopted a tone of conciliation—a political error which injured his career. He was defeated as Democratic candidate for governor in 1864. In 1868 he was nominated presidential candidate by the National Democratic Convention, Francis P. Blair, Jr., being nominated for the vice-presidency; but Seymour and Blair carried only eight states (including New York, New Jersey and Oregon), and received only 80 electoral votes to 214 for Grant and Colfax. Seymour did not re-enter political life, refusing to be considered for the United States senatorship from New York in 1876. He died on the 12th of February 1886 in Utica, at the home of his sister, who was the wife of Roscoe Conkling.

The Public Record of Horatio Seymour (New York, 1868) includes his speeches and official papers between 1856 and 1868.

SEYMOUR, THOMAS DAY (1848–1907), American educationist, was born in Hudson, Ohio, on the 1st of April 1848. He graduated in 1870 at Western Reserve College, where his father, Nathan Perkins Seymour, was long professor of Greek and Latin. Here, after studying in Berlin and Leipzig, the son was professor of Greek in 1872–1880; and he became professor of Greek at Yale University in 1880, holding his position until his death in New Haven on the 31st of December 1907. He was from 1887 to 1901 chairman of the managing committee of the American School of Classical Studies at Athens, and was president of the Archaeological Institute of America from 1903. Except for his *Selected Odes of Pindar* (1882), his published work was practically confined to the study of the Homeric poems: *An Introduction to the Language and Verse of Homer* (1885); Homer's *Iliad*, i.-iv. (1887–1890); *Homeric Vocabulary* (1889); *Introduction and Vocabulary to School Odyssey* (1897); and *Life in the Homeric Age* (1907). He edited, with Lewis R. Packard and John W. White, the "College Series of Greek Authors."

SEYMOUR, a city of Jackson county, Indiana, U.S.A., about 59 m. S. by E. of Indianapolis. Pop. (1890) 5337; (1900) 6445, of whom 321 were foreign-born. It is served by the Baltimore & Ohio, South-Western (which has repair shops here), the Pittsburg, Cincinnati, Chicago & St Louis, and the Southern Indiana railways, and by the Indianapolis, Columbus & Southern and the Indianapolis & Louisville interurban electric lines. The city has a considerable trade in produce, and has various manufactures, including woollen-goods, furniture, carriages and automobiles. Seymour was settled in 1854, incorporated as a town in 1864, and chartered as a city in 1867.

SEYMOUR OF SUDELEY, THOMAS SEYMOUR, BARON (*c.* 1508–1549), lord high admiral of England, was fourth son of Sir John Seymour of Wolf Hall, Wiltshire, and younger brother of the Protector Edward Seymour, 1st duke of Somerset. His sister Jane Seymour became the third wife of Henry VIII. in 1536, and another sister, Elizabeth, married Thomas Cromwell's son. Seymour's connexions thus ensured his promotion, and he quickly won the favour of the king, who gave him many grants of land and employed him in the royal household and on diplomatic missions abroad. From 1540 to 1542 he was at Vienna, and in 1543 in the Netherlands, where he served with distinction in the war against France, holding for a short time the supreme command of the English army. In 1544 he was rewarded with the post of master of the ordnance for life, becoming admiral of the fleet a few months later, in which capacity he was charged with guarding the Channel against French invasion. Henry VIII. left Seymour a legacy by his will, and is said to have directed that he should be raised to the peerage. In February 1547 he was accordingly created Baron Seymour of Sudeley and appointed lord high admiral. From this time forward he was mainly occupied in intrigue against his brother the Protector, of whose power he was jealous; and he aimed at procuring for himself the position of guardian of the young king, Edward VI. Several matrimonial projects entered into Seymour's schemes for gratifying his ambitions. No sooner was Henry VIII. dead than the lord high admiral tried to secure the princess (afterwards queen) Elizabeth in marriage; and when this project was frustrated he secretly married the late king's widow, Catherine Parr, whose hand he had vainly sought as early as 1543. He also took steps to ingratiate himself with Edward, and proposed a marriage between the king and the Lady Jane Grey. He entered into relations with pirates on the western coasts, whom it was his duty as lord high admiral to suppress, with a view to securing their support; and when the Protector invaded Scotland in the summer of 1547 Seymour fomented opposition to his authority in his absence. On the death of his wife in September of the same year he made renewed attempts to marry the princess Elizabeth. Somerset strove ineffectually to save his brother from ruin, and in January 1549 Seymour was arrested and sent to the Tower; he was convicted of treason, and executed on the 20th of March 1549.

See Sir John Maclean, *Life of Sir Thomas Seymour* (London, 1869); *Chronicle of Henry VIII.*, translated from the Spanish, with notes by M. A. S. Hume (London, 1889); *Literary Remains of Edward VI.*, with notes and memoir by J. G. Nichols (2 vols., London,

1857); Mary A. E. Green, *Letters of Royal and Illustrious Ladies of Great Britain to the Close of the Reign of Mary* (3 vols., London, 1846). See also SOMERSET, EDWARD SEYMOUR, 1st DUKE OF and the authorities there cited.

SEYNE SUR MER, or LA SEYNE, an industrial suburb of Toulon, S.W. of that port, and connected with it by rail and steamer. Pop. (1901) 21,002. It owes its importance to the shipbuilding trade, the *Société des Forges et Chantiers de la Méditerranée* having here one of the finest shipbuilding yards in Europe (it is a branch of the greater establishment at Marseilles), which gives employment to about 3000 workmen.

SFAX (Arabic *Asfākis* or *Safākus*, the cucumbers), a city of Tunisia, second in importance only to the capital, 78 m. due S. of Susa, on the Gulf of Gabes (Syrtis Minor) opposite the Kerkenna Islands, in 34° 43′ N., 10° 46′ E. Sfax occupies the site of the ancient Taphrura, of which few vestiges remain. The town consists of a European quarter, with streets regularly laid out and fine houses, and the Arab town, with its kasbah or citadel, and tower-flanked walls pierced by three gates. Many of the private houses, mosques and *zawias* are good specimens of native art of the 17th and 18th centuries. North-east of the native town is a camp for the European garrison. Sfax was formerly the starting-point of a caravan route to Central Africa, but its inland trade now extends only to the phosphate region beyond Gafsa, reached by a railway which, after skirting the coast southwards from Sfax to Mahares, runs inland past Gafsa. With Susa there is regular communication by steamer and motor car. Olive oil is manufactured, and the fisheries are important, notably those of sponges and of octopuses (exported to Greece). The prosperity of the town is largely due to the export trade in phosphates, esparto grass, oil, almonds, pistachio nuts, sponges, wool, &c. There is in the Gulf of Gabes a rise and fall of 5 ft. at spring tides, which is rare in the Mediterranean. Formerly the only anchorage at Sfax was 2 m. from shore; but a harbour, completed in 1900 and entered by a channel 1¼ m. long and 21½ ft. deep, now renders vessels independent of the tide. There are separate basins for fishing boats and a dock for torpedo-boat flotilla. Round the town for 5 or 6 m. to the north and west stretch orchards, gardens and country houses. Dates, almonds, grapes, figs, peaches, apricots, olives, and in rainy years melons and cucumbers grow there without irrigation. Two enormous cisterns, maintained by public charitable trusts, supply the town with water in dry seasons.

Sfax is on the site of a Roman settlement. Many of its Arab inhabitants claim descent from Mahomet. The Sicilians under Roger the Norman took it in the 12th century, and in the 16th the Spaniards occupied it for a brief period. The bombardment of the town in 1881 was one of the principal events of the French conquest of Tunisia; it was pillaged by the soldiers on the 16th of July, and the inhabitants had afterwards to pay a war indemnity of £250,000. The population, about 15,000 at the time of the French occupation, had increased to 50,000 in 1906.

SFORZA, the name of a famous Italian family. They were descended from a peasant condottiere, Giacomo or Muzio (sometimes abbreviated into Giacomuzzo) Attendolo, who was born at Cotignola in the Romagna on the 10th of June 1369, gained command of a band of adventurers by whom he had been kidnapped, took the name of Sforza in the field, became constable of Naples under Joanna II., fought bravely against the Spaniards, served Pope Martin V., by whom he was created a Roman count, and was drowned on the 4th of January 1424 in the Pescara near Aquila while engaged in a military expedition. His natural son FRANCESCO (1401–1466) succeeded in command of the condottieri, and showed military genius and political acumen. He served the Visconti against the Venetians and then the Venetians against the Visconti; he attacked the pope, deprived him of the Romagna, and later defended him; he married in 1441 Bianca, the only daughter of Filippo Maria Visconti, duke of Milan, and received Pontremoli and Cremona as dowry and the promise of succession to the duchy of Milan. The short-lived Ambrosian republic, which was established by the Milanese on the death of Visconti (1447), was overthrown by Francesco, who made his triumphal entry as duke of Milan on the 25th of March 1450. He suppressed a revolt at Piacenza, formed close alliances with Cosmo de' Medici and with Louis XI. of France, and exercised authority over Lombardy, several districts south of the Po and even Genoa. He rebuilt the fortress of Porta Giovio and constructed the Great Hospital and the canal of the Martesana, which connects Milan with the Adda; and his court, filled with Italian scholars and Greek exiles, speedily became one of the most splendid in Italy. His daughter Ippolita was renowned for her Latin discourses.

Francesco left several sons, among whom were Galeazzo Maria, Lodovico, surnamed the Moor, and Ascagnio, who became a cardinal.

GALEAZZO MARIA, who succeeded to the duchy, was born in 1444, and was a lover of art, eloquent in speech, but dissolute and cruel. He was assassinated at the porch of the cathedral on the 26th of December 1476 by three young Milanese noblemen desirous of imitating Brutus and Cassius. His daughter Caterina is separately noticed. GIAN GALEAZZO (1469–1494), son of Galeazzo, succeeded to the duchy under the regency of his mother, Bona of Savoy, who was supplanted in her power (1481) by the boy's uncle, Lodovico the Moor. Gian Galeazzo married Isabella of Aragon, granddaughter of the king of Naples, and his sudden death was attributed by some to poison administered by the regent. His daughter, BONA SFORZA (1493–1557), married King Sigismund of Poland in 1518. She displayed remarkable ability in government, built castles, schools and hospitals, but increased corruption and intrigue at the Polish court. She was accused of having killed her daughter-in-law, the wife of Sigismund Augustus. On the death of her husband she returned to Italy and was poisoned (1557) by her paramour Pappacoda.

LODOVICO THE MOOR [Lodovico il Moro] (1451–1508), who is famed as patron of Leonardo da Vinci and other artists, had summoned Charles VIII. of France to his aid (1494) and received the ducal crown from the Milanese nobles on the 22nd of October in the same year, but finding his own position endangered by the French policy, he joined the league against Charles VIII., giving his niece Bianca in marriage to Maximilian I. and receiving in return imperial investiture of the duchy. Lodovico was driven from Milan by Louis XII. in 1499, and although reinstated for a short time by the Swiss he was eventually delivered over by them to the French (April 1500) and died a prisoner in the castle of Loches. FRANCESCO, the son of Gian Galeazzo, was also taken to France by Louis XII., became abbot of Marmoutiers, and died in 1511.

The two sons of Lodovico, MASSIMILIANO and FRANCESCO MARIA, took refuge in Germany; the former was restored to the duchy of Milan by the Swiss in 1512, but after the overwhelming defeat of his allies at Marignano (1515) he abandoned his rights to Francis I. for a pension of 30,000 ducats, and died at Paris in 1530; the latter was put in possession of Milan after the defeat of the French at La Bicocca in 1522, subsequently entered the Italian League against the emperor Charles V., was unpopular on account of oppressive taxation, and his death (24th of October 1535) marked the extinction of the direct male line of the Sforza. The duchy went to Charles V.

The dukes of Sforza-Cesarini and the counts of Santa Fiora are descended from collateral branches of the Sforza family.

See J. Burckhardt, *The Civilization of the Renaissance in Italy*, trans. by S. G. C. Middlemore (London, 1898); J. A. Symonds, *Age of the Despots* (New York, 1888); W. P. Urquhart, *Life and Times of Francesco Sforza* (2 vols., Edinburgh, 1852); Mrs Julia Ady, *Beatrice d'Este, duchess of Milan, 1475–1497* (London, 1905); F. Calvi, *Bianca Maria Sforza-Visconti e gli ambasciatori di Lodovico il Moro* (Milan, 1888); A. Segre, "Lodovico Sforza, duca di Milano," in *R. Accad. d. Sci. Atti*, vol. 36 (Turin, 1901). There is a critical bibliography by Otto von Schleinitz in *Zeitschrift für Bücherfreunde*, vol. v. (Bielefeld, 1901). (C. H. HA.)

SFORZA, CATERINA (1463–1509), countess of Forlì, was an illegitimate daughter of Galeazzo Maria Sforza (see above). In 1473 she was betrothed to Girolamo Riario, a son of Pope Sixtus IV., who was thus able to regain possession of Imola, that city being made a fief of the Riario family. After a triumphal

entry into Imola in 1477 Caterina Sforza went to Rome with her husband, who, with the help of the pope, wrested the lordship of Forlì from the Ordelaffi. Riario, by means of many crimes, for which his wife seems to have blamed him, succeeded in accumulating great wealth, and on the death of Sixtus in August 1484, he sent Caterina to Rome to occupy the castle of St Angelo, which she defended gallantly until, on the 25th of October, she surrendered it by his order to the Sacred College. They then returned to their fiefs of Imola and Forlì, where they tried to win the favour of the people by erecting magnificent public buildings and churches and by abolishing taxes; but want of money obliged them to levy the taxes once more, which caused dissatisfaction. Riario's enemies conspired against him with a view to making Franceschetto Cybò, nephew of Pope Innocent VIII., lord of Imola and Forlì in his stead. Riario thereupon instituted a system of persecution, in which Caterina was implicated, against all whom he suspected of treachery. In 1488 he was murdered by three conspirators, his palace was sacked, and his wife and children were taken prisoners. The castle of Forlì, however, held out in Caterina's interest, and every inducement and threat to make her order its surrender proved useless; having managed to escape from her captors she penetrated into the castle, whence she threatened to bombard the city, refusing to come to terms even when the besiegers threatened to murder her children. With the assistance of Lodovico il Moro she was able to defeat her enemies and to regain possession of all her dominions; she wreaked vengeance on those who had opposed her and re-established her power. Being now a widow she had several lovers, and by one of them, Giacomo Feo, whom she afterwards married, she had a son. Feo, who made himself hated for his cruelty and insolence, was murdered before the eyes of his wife in August 1495; Caterina had all the conspirators and their families, including the women and children, massacred. She established friendly relations with the new pope, Alexander VI., and with the Florentines, whose ambassador, Giovanni de' Medici, she secretly married in 1496. Giovanni died in 1498, but Caterina managed with the aid of Lodovico il Moro and of the Florentines to save her dominions from the attacks of the Venetians. Alexander VI., however, angered at her refusal to agree to a union between his daughter Lucrezia Borgia and her son Ottaviano, and coveting her territories as well as the rest of Romagna for his son Cesare, issued a bull on the 9th of March 1499, declaring that the house of Riario had forfeited the lordship of Imola and Forlì and conferring those fiefs on Cesare Borgia. The latter began his campaign of conquest with Caterina Sforza's dominions and attacked her with his whole army, reinforced by 14,000 French troops and by Louis XII. Caterina placed her children in safety and took strenuous measures for defence. The castle of Imola was held by her henchman Dionigi Naldi of Brisighella, until resistance being no longer possible he surrendered (December 1499) with the honours of war. Caterina absolved the citizens of Forlì from their oath of fealty, and defended herself in the citadel. She repeatedly beat back the Borgia's onslaughts and refused all his offers of peace. Finally when the situation had become untenable and having in vain given orders for the magazine to be blown up, she surrendered, after a battle in which large numbers were killed on both sides, to Antoine Bissey, *bailli* of Dijon, entrusting herself to the honour of France (January 12, 1500). Thus her life was spared, but she was not saved from the outrages of the treacherous Cesare; she was afterwards taken to Rome and held a prisoner for a year in the castle of St Angelo, whence she was liberated by the same *bailli* of Dijon to whom she had surrendered at Forlì. She took refuge in Florence to escape from persecution from the Borgias, and the power of that sinister family having collapsed on the death of Alexander VI. in 1503, she attempted to regain possession of her dominions. In this she failed owing to the hostility of her brothers-in-law, Pierfrancesco and Lorenzo de' Medici, and as they wished to get her son Giovanni de' Medici (afterwards Giovanni dalle Bande Nere) into their hands, she took refuge with him in the convent of Annalena, where she died on the 20th of May 1509.

See Buriel, *Vita di Caterina Sforza-Riario* (Bologna, 1785); F. Oliva, *Vita di C. Sforza, signora di Forlì* (Forlì, 1821); Pietro Desiderio Pesolini Dall' Onda, *Caterina Sforza* (Rome, 1893); English translation by P. Sylvester (1898). This is the best and most complete work on the subject; E. M. de Vogüé, *Histoire et poésie* (Paris, 1898); and Ernesto Masi, "C. Sforza," in the *Nuova Antologia* for May 1 and May 15, 1893.

SGAMBATI, GIOVANNI (1843–), Italian composer, was born in Rome on the 28th of May 1843, of an Italian father and an English mother. His early education took place at Trevi, in Umbria, and there he wrote some church music, and obtained experience as a singer and conductor. In 1860 he settled in Rome, and definitely took up the work of winning acceptance for the best German music, which was at that time neglected in Italy. The influence and support of Liszt, who was in Rome from 1861, was naturally of the greatest advantage to him, and concerts were given in which Sgambati conducted as well as played the piano. His compositions of this period (1864–1865) included a quartet, two piano quintets, an octet, and an overture. He conducted Liszt's *Dante* symphony in 1866, and made the acquaintance of Wagner's music for the first time at Munich, whither he travelled in Liszt's company. His first album of songs appeared in 1870, and his first symphony was played at the Quirinal in 1881; this, as well as a piano concerto, was performed in the course of his first visit to England in 1882; and at his second visit, in 1891, his *Sinfonia epitalamio* was given at the Philharmonic. His most extensive work, a Requiem Mass, was performed in Rome 1901. His many pianoforte works have won permanent success; but his influence on Italian musical taste has been perhaps greater than the merits of his compositions, which, though often poetical and generally effective, are often slight in style.

SHABATS (also written *Shabatz* and *Šabac*), a town in Servia, capital of the Drina department, on the right bank of the river Save. Pop. (1900) 12,072. It has a medieval castle, built in 1470 by Sultan Mahommed II., to facilitate the incursion of the Turks into Slavonia, which lies on the left bank of the river. It is the principal commercial town of north-western Servia, exporting cereals, prunes, cattle and pigs to Hungary. It is well known for the excellent white honey which comes from its neighbourhood. The district is rich in lime-trees. Shabats is the seat of a bishop, of the district prefecture, and of a tribunal. It has a college and a library, and a garrison occupies the old fort. The people of Shabats have the reputation of being the wittiest in Servia.

SHAD, the name given to certain migratory species of herrings (*Clupea*), which are distinguished from the herrings proper by the total absence of teeth in the jaws. Two species occur in Europe, much resembling each other—one commonly called allis shad (*Clupea alosa* or *Alosa vulgaris*), and the other known as twaite shad (*Clupea finta* or *Alosa finta*). Both, like the majority of herrings, are greenish on the back and silvery on the sides, but they are distinguished from the other European species *Clupea* by the presence of a large blackish blotch behind the gill-opening, which is succeeded by a series of several other similar spots along the middle of the side of the body. So closely allied are these two fishes that their distinctness can be proved only by an examination of the gill-apparatus, the allis shad having from sixty to eighty very fine and long gill-rakers along the concave edge of the first branchial arch, whilst the twaite shad possesses from twenty-one to twenty-seven stout and stiff gill-rakers only. In their habits and geographical distribution also the two shads are similar. They inhabit the coasts of temperate Europe, the twaite shad being more numerous in the Mediterranean. While they are in salt water they live singly or in very small companies, but during May (the twaite shad some weeks later) they congregate, and in great numbers ascend large rivers, such as the Severn (and formerly the Thames), the Seine, the Rhine, the Nile, &c., in order to deposit their spawn. A few weeks after they drop down the river, lean and exhausted, numbers floating dead on the surface, so that only a small proportion seem to regain the sea. At Elbeuf on the Seine above Rouen there was formerly a hatchery for the artificial

propagation of shad. The eggs are spawned in May and June, and are similar in the two species; they are heavier than the fresh water in which they develop, but unlike the herring's eggs they are not adhesive. They remain free and separate at the bottom of the river, carried down by the current or up by the tide. In the Elbe the twaite shad spawns below Hamburg, the allis shad above Dresden. In November the fry have reached 3 to 5 in. in length, but very few specimens in their second year have been found in rivers. The majority seem to descend to the sea before their first winter, to return when mature. On rivers in which these fishes make their periodical appearance they have become the object of a regular fishery. They are much esteemed on the middle Rhine, where they are generally known as "Maifisch." The allis shad is caught at a size from 15 to 24 in., and is better flavoured than the twaite shad, which is generally smaller.

Other, but closely allied species, occur on the Atlantic coasts of North America, all surpassing the European species in importance as food-fishes and economic value, viz., the American shad (*Clupea sapidissima*), the gaspereau or ale-wife (*C. mattowocca* or *vernalis*), and the menhaden (*C. menhaden*).

SHADDOCK (*Citrus decumana*), a tree allied to the orange and the lemon, presumably native to the Malay and Polynesian islands, but generally cultivated throughout the tropics. The leaves are like those of the orange, but downy on the under surface, as are also the young shoots. The flowers are large and white, and are succeeded by very large globose fruits like oranges, but paler in colour, and with a more pungent flavour. The name Shaddock is asserted to be that of a captain who introduced the tree to the West Indies. The fruit is also known under the name of grape-fruit, pommeloes, and "forbidden fruit." Varieties occur with yellow and reddish pulp; and there are also pear-shaped varieties.

SHADOOF (Arab. *shādūf*), an apparatus for drawing water, used in the East generally, and particularly on the Nile for the purpose of irrigation. It consists of an upright frame on which is suspended a long pole at a distance of about one-fifth of its length from one end; to the other end is attached a bucket or skin bag, while at the short end a weight is suspended serving as the counterpoise of a lever. The vessel containing the water is then swung round and emptied into the runnel, which conveys the water in the direction required.

SHADOW (O. Eng. *Schadewe*, *sceadu*; a form of "shade"; connected with Gr. σκότος, darkness). When an opaque body is placed between a screen and a luminous source, it casts a "shadow" on the screen. If the source be a point, such as the image formed by a lens of small focus or by a fine hole in a plate held close to a bright flame, the outline of the shadow is to be found by drawing straight lines from the luminous point so as to envelop the opaque body. These lines form a cone. The points of contact form a line on the opaque body separating the illuminated from the non-illuminated portion of its surface. Similarly, when these lines are produced to meet the screen, their points of intersection with it form a line which separates the illuminated from the non-illuminated parts of the screen. This line is called the boundary of the *geometrical shadow*, and its construction is based on the assumption that light travels in straight lines (in homogeneous media) and suffers no deviation on meeting an obstacle. But a deviation, termed *diffraction*, does occur, and consequently the complete theory of shadows involves considerations based on the nature of the rays themselves; this aspect is treated in DIFFRACTION OF LIGHT. An instance of the geometrical shadow is seen when a very small gas-jet is burning in a ground-glass shade near a wall. In this case the cone, above mentioned, is usually a right cone with its axis vertical. Thus the boundary of the geometric shadow is a portion of a circle on the roof, but a portion of an hyperbola on the vertical wall. If the roof be not horizontal, we may obtain in this way any form of conic section. Hints in projection may be obtained by observing the shadows of bodies of various forms cast in this way by rays which virtually diverge from one point: *e.g.* how to place a plane quadrilateral of given form so that its geometric shadow may be a square; how to place an elliptic disk, with a small hole in it, so that the shadow may be circular with a bright spot at its centre, &c.

When there are more luminous points than one, we have only to draw separately the geometrical shadows due to each of the sources, and then superpose them. A new consideration now comes in. There will be, in general, portions of all the separate geometrical shadows which overlap one another in some particular regions of the screen. In such regions we still have full shadow; but around them there will be other regions, some illuminated by one of the sources alone, some by two, &c., until finally we come to the parts of the screen which are illuminated directly by all the sources. There will evidently be still a definite boundary of the parts wholly unilluminated, *i.e.* the true shadow or *umbra*, and also a definite boundary of the parts wholly illuminated. The region between these boundaries—*i.e.* the partially illumined portion—is called the *penumbra*.

Fig. 1 represents the shadow of a circular disk cast by four equal luminous points arranged as the corners of a square—

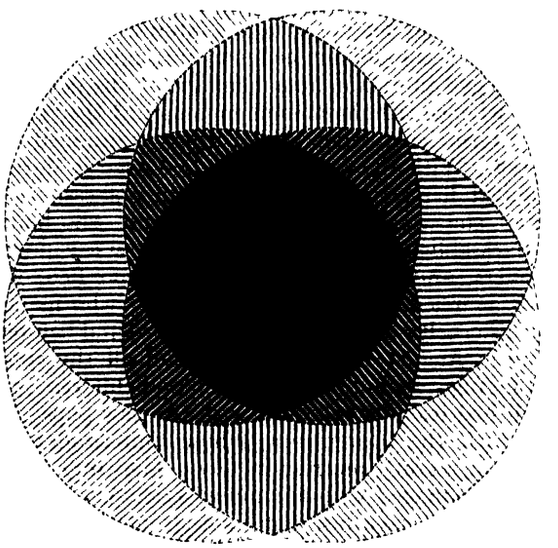


FIG. 1.

the disk being large enough to admit of a free overlapping of the separate shadows. The amount of want of illumination in each portion of the penumbra is roughly indicated by the shading. The separate shadows are circular, if the disk is parallel to the screen. If we suppose the number of sources to increase indefinitely, so as finally to give the appearance of a luminous surface as the source of light, it is obvious that the degrees of darkness at different portions of the penumbra will also increase indefinitely; *i.e.* there will be a gradual increase of brightness in the penumbra from total darkness at the edge next the geometrical shadow to full illumination at the outer edge.

Thus we see at once why the shadows cast by the sun or moon are in general so much less sharp than those cast by the electric arc. For, practically, at moderate distances the arc appears as a mere luminous point. But if we place a body at a distance of a foot or two only from the arc, the shadow cast will have as much of penumbra as if the sun had been the source. The breadth of the penumbra when the source and screen are nearly equidistant from the opaque body is equal to the diameter of the luminous source. The notions of the penumbra and umbra are important in considering eclipses (*q.v.*). When the eclipse is total, there is a real geometrical shadow—very small compared with the penumbra (for the apparent diameters of the sun and moon are nearly equal, but their distances are as 370 : 1); when the eclipse is annular, the shadow is all penumbra. In a lunar eclipse, on the other hand, the earth is the shadow-casting body, and the moon is the screen, and we observe things according to our first point of view.

Suppose, next, that the body which casts the shadow is a large one, such as a wall, with a hole in it. If we were to plug the hole, the whole screen would be in geometrical shadow. Hence the illumination of the screen by the light passing through

the hole is precisely what would be cut off by a disk which fits the hole, and the complement of fig. 1, in which the light and shade are interchanged, would give therefore the effect of four equal sources of light shining on a wall through a circular hole. The umbra in the former case becomes the fully illuminated portion, and vice versa. The penumbra remains the penumbra, but it is now darkest where before it was brightest, and vice versa.

Thus we see how, when a small hole is cut in the window-shutter of a dark room, a picture of the sun, and bright clouds about it, is formed on the opposite wall. This picture is obviously inverted, and also perverted, for not only are objects depicted lower the higher they are, but also objects seen to the right are depicted to the left, &c. But it will be seen unperverted (though still inverted) if it be received on a sheet of ground glass and looked at from behind. The smaller the hole (so far at least as geometrical optics is concerned) the less confused will the picture be. As the hole is made larger the illuminated portions from different sources gradually overlap; and when the hole becomes a window we have no indications of such a picture except from a body (like the sun) much brighter than the other external objects. Here the picture has ceased to be one of the sun, it is now a picture of the window. But if the wall could be placed 100 m. off, the picture would be one of the sun. To prevent this overlapping of images, and yet to admit a good deal of light, is one main object of the lens which usually forms part of the camera obscura (*q.v.*).

The formation of pictures of the sun in this way is well seen on a calm sunny day under trees, where the sunlight penetrating through small chinks forms elliptic spots on the ground. When detached clouds are drifting rapidly across the sun, we often see the shadows of the bars of the window on the walls or floor suddenly shifted by an inch or two, and for a moment very much more sharply defined. They are, in fact, shadows cast by a small portion of the sun's limb, from opposite sides alternately. Another beautiful illustration is easily obtained by cutting with a sharp knife a very small T aperture in a piece of note paper. Place this close to the eye, and an inch or so behind it place another piece of paper with a fine needle-hole in it. The light of the sky passing through the needle-hole forms a bright picture of the T on the retina. The eye perceives this picture, which gives the impression of the T much magnified, but turned upside down.

Another curious phenomenon may fitly be referred to in this connexion, viz. the phantoms which are seen when we look at two parallel sets of palisades or railings, one behind the other, or look through two parallel sides of a meat-safe formed of perforated zinc. The appearance presented is that of a magnified set of bars or apertures which appear to move rapidly as we slowly walk past. Their origin is the fact that where the bars appear nearly to coincide the apparent gaps bear the greatest ratio to the dark spaces; *i.e.* these parts of the field are the most highly illuminated. The exact determination of the appearances in any given case is a mere problem of convergents to a continued fraction. But the fact that the apparent rapidity of motion of this phantom may exceed in any ratio that of the spectator is of importance—enabling us to see how velocities, apparently of impossible magnitude, may be accounted for by the mere running along of the condition of visibility among a group of objects no one of which is moving at an extravagant rate.

SHADWELL, THOMAS (*c.* 1642–1692), English playwright and miscellaneous writer, was born about 1642, at Santon Hall, Norfolk, according to his son's account. He was educated at Bury St Edmund's School, and at Caius College, Cambridge, where he was entered in 1656. He left the university without a degree, and joined the Middle Temple. In 1668 he produced a prose comedy, *The Sullen Lovers, or the Impertinents*, based on *Les Fâcheux* of Molière, and written in avowed imitation of Ben Jonson. His best plays are *Epsom Wells* (1672), for which Sir Charles Sedley wrote a prologue, and the *Squire of Alsatia* (1688). Alsatia was the cant name for Whitefriars, then a kind of sanctuary for persons liable to arrest, and the play represents, in dialogue full of the argot of the place, the adventures of a young heir who falls into the hand of the sharpers there. For fourteen years from the production of his first comedy to his memorable encounter with Dryden, Shadwell produced a play nearly every year. These productions display a genuine hatred of shams, and a rough but honest moral purpose. They are disfigured by indecencies, but present a vivid picture of contemporary manners.

Shadwell is chiefly remembered as the unfortunate Mac Flecknoe of Dryden's satire, the "last great prophet of tautology," and the literary son and heir of Richard Flecknoe:—

> "The rest to some faint meaning make pretence,
> But Shadwell never deviates into sense."

Dryden had furnished Shadwell with a prologue to his *True Widow* (1679), and in spite of momentary differences, the two had been apparently on friendly terms. But when Dryden joined the court party, and produced *Absalom and Achitophel* and *The Medal*, Shadwell became the champion of the true-blue Protestants, and made a scurrilous attack on the poet in *The Medal of John Bayes: a Satire against Folly and Knavery* (1682). Dryden immediately retorted in *Mac Flecknoe, or a Satire on the True Blue Protestant Poet, T.S.* (1682), in which Shadwell's personalities were returned with interest. A month later he contributed to Nahum Tate's continuation of *Absalom and Achitophel* satirical portraits of Elkanah Settle as Doeg and of Shadwell as Og. In 1687 Shadwell attempted to answer these attacks in a version of the tenth satire of Juvenal. At the Whig triumph in 1688 he superseded his enemy as poet laureate and historiographer royal. He died at Chelsea on the 19th of November 1692.

His son, CHARLES SHADWELL, was the author of *The Fair Quaker of Deal* and other plays, collected and published in 1720.

A complete edition of Shadwell's works were published by his son Sir John Shadwell in 1720. His other dramatic works are—*The Royal Shepherdess* (1669), an adaptation of John Fountain's *Rewards of Virtue*; *The Humorist* (1671); *The Miser* (1672), adapted from Molière; *Psyche* (1675); *The Libertine* (1676); *The Virtuoso* (1676), *The history of Timon of Athens the Man-hater* (1678) (on this Shakespearian adaptation see O. Beber, *Shadwell's Bearbeitung des . . . Timon of Athens* (Rostock, 1897); *A True Widow* (1679), *The Woman Captain* (1680), revived in 1744 as *The Prodigal*; *The Lancashire Witches and Teague O'Divelly, the Irish Priest* (1682); *Bury Fair* (1689); *The Amorous Bigot, with the second part of Teague O'Divelly* (1690); *The Scowerers* (1691); and *The Volunteers, or Stockjobbers*, published posthumously (1693).

SHĀFI'Ī [Mahommed ibn Idrīs ash-Shāfi'ī] (767–820), the founder of the Shāfi 'ite school of canon law, was born in A.H. 150 (A.D. 767) of a Koreishite (Quraishite) family at Gaza or Ascalon, and was brought up by his mother in poor circumstances at Mecca. There, and especially in intercourse with the desert tribe of Hudhail, he gained a knowledge of classical Arabic and old Arabian poetry for which he was afterwards famous. About 170 he went to Medina and studied canon law (*fiqh*) under Malik ibn Anas. After the death of Malik in 179 legend takes him to Yemen, where he is involved in an 'Alid conspiracy, carried prisoner to Bagdad, but pardoned by Hārūn al-Rashīd. He was certainly pursuing his studies, and he seems to have come to Bagdad in some such way as this and then to have studied under Ḥanifite teachers. He had not yet formulated his own system. After a journey to Egypt, however, we find him in Bagdad again, as a teacher, between 195 and 198. There he had great success and turned the tide against the Ḥanifite school. His method was to restore the sources of canon law which Abū Ḥanīfa had destroyed by inclining too much to speculative deduction. Instead, he laid equal emphasis upon the four—Koran, tradition, analogy, and agreement. See further, under MAHOMMEDAN LAW. In 198 he went to Egypt in the train of a new governor, and this time was received as the leading orthodox authority in law of his time. There he developed and somewhat changed the details of his system, and died in 204 (A.D. 820). He was buried to the south-east of what is now Cairo, and a great dome (erected *c.* A.D. 1240) is conspicuous over his tomb.

See F. Wüstenfeld, *Schāfi'iten*, 31 ff.; M. J. de Goeje in *ZDMG*, xlvii. 106 ff.; C. Brockelmann, *Geschichte*, i. 178 ff.; M'G. de Slane's transl. of Ibn Khallikān, ii. 569 ff., *Fihrist*, 209, Nawawi's *Biogr. Dict.* 56 ff.

(D. B. MA.)

SHAFIROV, PETER PAVLOVICH, BARON (1670–1739), Russian statesman, one of the ablest coadjutors of Peter the Great, was of obscure, and in all probability of Jewish, extraction. He first made himself useful by his extraordinary knowledge of foreign languages. He was the chief translator in the Russian Foreign Office for many years, subsequently accompanying Peter on his travels. Made a baron and raised to the rank of vice-chancellor, he displayed diplomatic talents of the highest order. During the unlucky campaign of 1711, he succeeded against all expectations in concluding the peace of the Pruth (see TURKEY : *History*). Peter left him in the hands of the Turks as a hostage, and on the rupture of the peace he was imprisoned in the Seven Towers. Finally, however, with the aid of the British and Dutch ambassadors, he defeated the diplomacy of Charles XII. of Sweden and his agents, and confirmed the good relations between Russia and Turkey by the treaty of Adrianople (June 5th, 1713). On the institution of the colleges or departments of state in 1718, Shafirov was appointed vice-president of the department of Foreign Affairs, and a senator. In 1723, however, he was deprived of all his offices and sentenced to death. The capital sentence was commuted on the scaffold to banishment, first to Siberia and then to Novgorod. Peculations and disorderly conduct in the senate were the offences charged against Shafirov, and with some justice. On the death of Peter, Shafirov was released from prison and commissioned to write the life of his late master. He had previously (1717), in an historical tract on the war with Charles XII., in which Peter himself collaborated, epitomized, in a high panegyric style, some of the greatest exploits of the tsar-regenerator. The successful rivalry of his supplanter, Andrei Osterman, prevented Shafirov from holding any high office during the last fourteen years of his life.

See B. M. Solovev, *History of Russia*, vols. xiii.-xvi. (Rus.) (Petersburg, 1895). (R. N. B.)

SHAFT (O. Eng. *sceaft*, from *scafan*, to shave ; the word is common to Teutonic languages), any slender, smoothed rod or stick, and so first used of the body of an arrow or spear to which the head is attached ; hence the word is applied to the handle of a tool, and to the pair of bars between which a horse is harnessed to a vehicle, and in machinery to connecting bars or rods conveying power from one part of a machine to another. It is also applied to an opening sunk in the ground for mining or other purposes (see SHAFT-SINKING). This use is probably due to the use of Ger. *Schacht*, a variant of *schaft*. In architecture the term "shaft" is applied to the body of a column between the capital and the base. In Romanesque work shafts are occasionally octagonal, and are sometimes ornamented with the zigzag or chevron, or fluted vertically or in spirals; the most beautiful examples of the latter being found in the cloisters of St John Lateran and at St Paul's outside the walls at Rome, where they are enriched with mosaics. Perhaps the earliest ornamented shafts are those of the Parthian Palace, now the mosque, at Diarbekr in Mesopotamia.

SHAFTESBURY, ANTHONY ASHLEY COOPER, 1ST EARL OF (1621–1683), son of Sir John Cooper of Rockbourne in Hampshire, and of Anne, the only child of Sir Anthony Ashley, Bart., and was born at Wimborne St Giles, Dorset, on the 22nd of July 1621. His parents died before he was ten years of age, and he inherited extensive estates in Hampshire, Wiltshire, Dorsetshire and Somersetshire, much reduced, however, by litigation in Chancery. He lived for some time with Sir Daniel Norton, one of his trustees, at Southwick, and upon his death in 1635 with Mr Tooker, an uncle by marriage, at Salisbury. In 1637 he went as a gentleman-commoner to Exeter College, Oxford, where he remained about a year. No record of his studies is to be found, but he has left an amusing account of his part in the wilder doings of the university life of that day, in which, in spite of his small stature, he was recognized by his fellows as their leader. At the age of eighteen, on the 25th of February 1639, he married Margaret, daughter of Lord Coventry, with whom he and his wife lived at Durham House in the Strand, and at Canonbury House in Islington. In March 1640, though still a minor, he was elected for Tewkesbury, and sat in the parliament which met on the 13th of April, but appears to have taken no active part in its proceedings. In 1640 Lord Coventry died, and Cooper then lived with his brother-in-law at Dorchester House in Covent Garden. For the Long Parliament, which met on the 3rd of November 1640, he was elected for Downton in Wiltshire, but the return was disputed, and he did not take his seat—his election not being declared valid until the last days of the Rump. He was present as a spectator at the setting up of the king's standard at Nottingham on the 25th of August 1642 ; and in 1643 he appeared openly on Charles's side in Dorsetshire, where he raised at his own expense a regiment of foot and a troop of horse, of both of which he took the command. He was also appointed governor of Weymouth, sheriff of Dorsetshire for the king and president of the king's council of war in the county. In the beginning of January 1644, however, for reasons which are variously reported by himself and Clarendon, he resigned his governorship and commissions and went over to the parliament. He appeared on the 6th of March before the standing committee of the two Houses to explain his conduct, when he stated that he had come over because he saw danger to the Protestant religion in the king's service, and expressed his willingness to take the Covenant. In July 1644 he went to Dorsetshire on military service, and on the 3rd of August received a commission as field-marshal general. He assisted at the taking of Wareham, and shortly afterwards compounded for his estates by a fine of £500 from which, however, he was afterwards relieved by Cromwell. On the 25th of October he was made commander-in-chief in Dorsetshire, and in November he took by storm Abbotsbury, the house of Sir John Strangways —an affair in which he appears to have shown considerable personal gallantry. In December he relieved Taunton. His military service terminated at the time of the Self-denying Ordinance in 1645 ; he had associated himself with the Presbyterian faction, and naturally enough was not included in the New Model. For the next seven or eight years he lived in comparative privacy. He was high sheriff of Wiltshire during 1647, and displayed much vigour in this office. Upon the execution of Charles, Cooper took the Engagement, and was a commissioner to administer it in Dorsetshire. On the 25th of April 1650, he married Lady Frances Cecil, sister of the earl of Essex, his first wife having died in the previous year leaving no family. In 1651 a son was born to him, who died in childhood, and on the 16th of January 1652, another son, named after himself, who was his heir. On the 17th of January he was named on the commission for law reform, of which Hale was the chief ; and on the 17th of March 1653, he was pardoned of all delinquency and thus at last made capable of sitting in parliament. He sat for Wiltshire in the Barebones parliament, of which he was a leading member, and where he supported Cromwell's views against the extreme section. He was at once appointed on the council of thirty. On the resignation of this parliament he became a member of the council of state named in the "Instrument." In the first parliament elected under this "Instrument" he sat for Wiltshire, having been elected also for Poole and Tewkesbury, and was one of the commissioners for the ejection of unworthy ministers. After the 28th of December 1654, he left the privy council, and henceforward is found with the Presbyterians and Republicans in opposition to Cromwell. His second wife had died during this year ; in 1656 he married a third, who survived him, Margaret, daughter of Lord Spencer, niece of the earl of Southampton, and sister of the earl of Sunderland, who died at Newbury. By his three marriages he was thus connected with many of the leading politicians of Charles II.'s reign.

Cooper was again elected for Wiltshire for the parliament of 1656, but Cromwell refused to allow him, with many others of his opponents, to sit. He signed a letter of complaint, with sixty-five excluded members, to the speaker, as also a "Remonstrance" addressed to the people. In the parliament which met on the 20th of January 1658, he took his seat, and was active in opposition to the new constitution of the two Houses. He was also a leader of the opposition in Richard Cromwell's

parliament, especially on the matter of the limitation of the power of the protector, and against the House of Lords. He was throughout these debates celebrated for the "nervous and subtle oratory" which made him so formidable in after days.

Upon the replacing of the Rump by the army, after the breaking up of Richard's parliament, Cooper endeavoured unsuccessfully to take his seat on the ground of his former disputed election for Downton. He was, however, elected on the council of state, and was the only Presbyterian in it; he was at once accused by Scot, along with Whitelocke, of corresponding with Hyde. This he solemnly denied. After the rising in Cheshire Cooper was arrested in Dorsetshire on a charge of correspondence with its leader Booth, but on the matter being investigated by the council he was unanimously acquitted. In the disputes between Lambert at the head of the military party and the Rump in union with the council of state, he supported the latter, and upon the temporary supremacy of Lambert's party worked indefatigably to restore the Rump. With Monk's commissioners he, with Haselrig, had a fruitless conference, but he assured Monk of his co-operation, and joined with eight others of the overthrown council of state in naming him commander-in-chief of the forces of England and Scotland. He was instrumental in securing the Tower for the parliament, and in obtaining the adhesion of Admiral Lawson and the fleet. Upon the restoration of the parliament on the 26th of December Cooper was one of the commissioners to command the army, and on the 2nd of January was made one of the new council of state. On the 7th of January he took his seat on his election for Downton in 1640, and was made colonel of Fleetwood's regiment of horse. He speedily secured the admission of the secluded members, having meanwhile been in continual communication with Monk, was again one of the fresh council of state, consisting entirely of friends of the Restoration, and accepted from Monk a commission to be governor of the Isle of Wight and captain of a company of foot. He now steadily pursued the design of the Restoration, but without holding any private correspondence with the king, and only on terms similar to those proposed in 1648 to Charles I. at the Isle of Wight. In the Convention parliament he sat for Wiltshire. Monk cut short these deliberations and forced on the Restoration without condition. Cooper was one of the twelve commissioners who went to Charles at Breda to invite him to return. On his journey he was upset from his carriage, and the accident caused an internal abscess which was never cured.

Cooper was at once placed on the privy council, receiving also a formal pardon for former delinquencies. His first duty was to examine the Anabaptist prisoners in the Tower. In the prolonged discussions regarding the Bill of Indemnity he was instrumental in saving the life of Haselrig, and opposed the clause compelling all officers who had served under Cromwell to refund their salaries, he himself never having had any. He showed indeed none of the avaricious temper so common among the politicians of the time. He was one of the commissioners for conducting the trials of the regicides, but was himself vehemently "fallen upon" by Prynne for having acted with Cromwell. He was named on the council of plantations and on that of trade. In the debate abolishing the court of wards he spoke, like most landed proprietors, in favour of laying the burden on the excise instead of on the land, and on the question of the restoration of the bishops carried in the interests of the court an adjournment of the debate for three months. At the coronation in April 1661 Cooper had been made a peer, as Baron Ashley of Wimborne St Giles, in express recognition of his services at the Restoration; and on the meeting of the new parliament in May he was appointed chancellor of the exchequer and under-treasurer, aided no doubt by his connexion with Southampton. He vehemently opposed the persecuting acts now passed—the Corporation Act, the Uniformity Bill, against which he is said to have spoken three hundred times, and the Militia Act. He is stated also to have influenced the king in issuing his dispensing declaration of the 26th of December 1662, and he zealously supported a bill introduced for the purpose of confirming the declaration, rising thereby in favour and influence with Charles. He was himself the author of a treatise on tolerance. He was now recognized as one of the chief opponents of Clarendon and the High Anglican policy. On the breaking out of the Dutch War in 1664 he was made treasurer of the prizes, being accountable to the king alone for all sums received or spent. He was also one of the grantees of the province of Carolina and took a leading part in its management; it was at his request that Locke in 1669 drew up a constitution for the new colony. In September 1665 the king unexpectedly paid him a visit at Wimborne. He opposed unsuccessfully the appropriation proviso introduced into the supply bill as hindering the due administration of finance, and this opposition seems to have brought about a reconciliation with Clarendon. In 1668, however, he supported a bill to appoint commissioners to examine the accounts of the Dutch War, though in the previous year he had opposed it. In accordance with his former action on all questions of religious toleration he opposed the shameful Five Mile Act of 1665. In 1667 he supported the bill for prohibiting the importation of Irish cattle, on the ground that it would lead to a great fall of rents in England. Ashley was himself a large landowner, and, moreover, was opposed to Ormonde, who would have benefited by the importation. In all other questions of this kind he shows himself far in advance of the economic fallacies of the day. His action led to an altercation with Ossory, the son of Ormonde, in which Ossory used language for which he was compelled to apologize. On the death of Southampton, Ashley was placed on the commission of the treasury, Clifford and William Coventry being his principal colleagues. He appears to have taken no part in the attempt to impeach Clarendon on a general charge of treason.

The new administration was headed by Buckingham, in whose toleration and comprehension principles Ashley shared to the full. An able paper written by him to the king in support of these principles, on the ground especially of their advantage to trade, has been preserved. He excepts, however, from toleration Roman Catholics and Fifth Monarchy men. His attention to all trade questions was close and constant; he was a member of the council of trade and plantations appointed in 1670, and was its president from 1672 to 1676. The difficulty of the succession also occupied him, and he co-operated thus early in the design of legitimizing Monmouth as a rival to James. In the intrigues which led to the infamous treaty of Dover he had no part. That treaty contained a clause by which Charles was bound to declare himself a Catholic, and with the knowledge of this Ashley, as a stanch Protestant, could not be trusted. In order to blind him and the other Protestant members of the Cabal a sham treaty was arranged in which this clause did not appear, and it was not until a considerable while afterwards that he found out that he had been duped. Under this misunderstanding he signed the sham Dover treaty on the 31st of December 1670. This treaty, however, was kept from public knowledge, and Ashley helped Charles to hoodwink parliament by signing a similar treaty on the 2nd of February 1672, which was laid before them as the only one in existence. His approval of the attempt of the Lords to alter a money bill led to the loss of the supply to Charles and to the consequent displeasure of the king. His support of the Lord Roos Act, ascribed generally to his desire to ingratiate himself with Charles, was no doubt due in part to the fact that his son had married Lord Roos's sister. So far from advising the "Stop of the Exchequer," he opposed this bad measure; the reasons which he left with the king for his opposition are extant. The responsibility rests with Clifford alone. In the other great measure of the Cabal ministry, Charles's Declaration of Indulgence, he concurred. He was now rewarded by being made earl of Shaftesbury and Baron Cooper of Pawlett by a patent dated the 23rd of April 1672. It is stated too that he was offered, but refused, the lord treasurership. On the 17th of November 1672, however, he became lord chancellor, Bridgman having been compelled to resign the seat. As chancellor he issued writs for the election of thirty-six new members to fill vacancies caused during the long recess; this, though grounded upon precedent, was open to suspicion as an attempt to fortify Charles, and was attacked by an angry House of Commons

which met on the 4th of February 1673. The writs were cancelled, and the principle was established that the issuing of writs rested with the House itself. It was at the opening of parliament that Shaftesbury made his celebrated "delenda est Carthago" speech against Holland, in which he urged the Second Dutch War, on the ground of the necessity of destroying so formidable a commercial rival to England, excused the Stop of the Exchequer which he had opposed, and vindicated the Declaration of Indulgence. On the 8th of March he announced to parliament that the declaration had been cancelled, though he did his best to induce Charles to remain firm. For affixing the great seal to this declaration he was threatened with impeachment by the Commons. The Test Act was now brought forward, and Shaftesbury, who appears to have heard how he had been duped in 1670, supported it, with the object probably of thereby getting rid of Clifford. He now began to be regarded as the chief upholder of Protestantism in the ministry; he lost favour with Charles, and on Sunday, the 9th of September 1673, was dismissed from the chancellorship. Among the reasons for this dismissal is probably the fact that he opposed grants to the king's mistresses. He has been accused of vanity and ostentation in his office, but his reputation for ability and integrity as a judge was high even with his enemies.

Charles soon regretted the loss of Shaftesbury, and endeavoured, as did also Louis, to induce him to return, but in vain. He preferred now to become the great popular leader against all the measures of the court, and may be regarded as the intellectual chief of the opposition. At the meeting of parliament on the 8th of January 1674, he carried a motion for a proclamation banishing Catholics to a distance of 10 m. from London. During the whole session he organized and directed the opposition in their attacks on the king's ministers. On the 19th of May he was dismissed the privy council and ordered to leave London. He retired to Wimborne and urged upon his parliamentary followers the necessity of securing a new parliament. He was in the House of Lords, however, in 1675, when Danby brought forward his famous Non-resisting Test Bill, and headed the opposition which was carried on for seventeen days, distinguishing himself, says Burnet, more in this session than ever before. The bill was shelved, a prorogation having taken place in consequence of a quarrel between the two Houses, supposed to have been purposely got up by Shaftesbury, in which he supported the right of the Lords to hear appeal cases, even where the defendant was a member of the Lower House. Parliament was prorogued for fifteen months until the 15th of February 1677, and it was determined by the opposition to attack its existence on the ground that a prorogation for more than a year was illegal. In this matter the opposition were in the wrong, and by attacking the parliament discredited themselves. The result was that Shaftesbury, Buckingham, Wharton and Salisbury were sent to the Tower. In June Shaftesbury applied for a writ of *habeas corpus*, but could get no release until the 26th of February 1678, after his letter and three petitions to the king. Being brought before the bar of the House of Lords he made submission as to his conduct in declaring parliament dissolved by the prorogation, and in violating the Lords' privileges by bringing a *habeas corpus* in the King's Bench.

The breaking out of the Popish Terror in 1678 marks the worst part of Shaftesbury's career. That so clear-headed a man could have credited the lies of Oates and the other perjurers is beyond belief; and the manner in which he excited baseless alarms, and encouraged fanatic cruelty, for nothing but party advantage, is without excuse. On the 2nd of November he opened the great attack by proposing an address declaring the necessity for the king's dismissing James from his council. Under his advice the opposition now made an alliance with Louis whereby the French king promised to help them to ruin Danby on condition that they would compel Charles, by stopping the supplies, to make peace with France, doing thus a grave injury to Protestantism abroad for the sake of a temporary party advantage at home. Upon the refusal in November of the Lords to concur in the address of the Commons requesting the removal of the queen from court, he joined in a protest against the refusal, and was foremost in all the violent acts of the session. He urged on the bill by which Catholics were prohibited from sitting in either House of Parliament, and was bitter in his expressions of disappointment when the Commons passed a proviso excepting James, against whom the bill was especially aimed, from its operation. A new parliament met on the 6th of March 1679. Shaftesbury had meanwhile ineffectually warned the king that unless he followed his advice there would be no peace with the people. On the 25th of March he made a striking speech upon the state of the nation, especially upon the dangers to Protestantism and the misgovernment of Scotland and Ireland. He was suspected, too, of doing all in his power to bring about a revolt in Scotland. By the advice of Temple, Charles now tried the experiment of forming a new privy council in which the chief members of the opposition were included, and Shaftesbury was made president, with a salary of £4000, being also a member of the committee for foreign affairs. He did not, however, in any way change either his opinions or his action. He opposed the compelling of Protestant Nonconformists to take the oath required of Roman Catholics. That indeed, as Ranke says, which makes him memorable in English history is that he opposed the establishment of an Anglican and Royalist organization with success. The question of the succession was now again prominent, and Shaftesbury, in opposition to Halifax, committed the error, which really brought about his fall, of putting forward Monmouth as his nominee, thus alienating a large number of his supporters; he encouraged, too, the belief that this was agreeable to the king. He pressed on the Exclusion Bill with all his power, and, when that and the inquiry into the payments for secret service and the trial of the five peers, for which too he had been eager, were brought to an end by a sudden prorogation, he is reported to have declared aloud that he would have the heads of those who were the king's advisers to this course. Before the prorogation, however, he saw the invaluable Act of Habeas Corpus, which he had carried through parliament, receive the royal assent. In pursuance of his patronage of Monmouth, Shaftesbury now secured for him the command of the army sent to suppress the insurrection in Scotland, which he is supposed to have fomented. In October 1679, the circumstances which led Charles to desire to conciliate the opposition having ceased, Shaftesbury was dismissed from his presidency and from the privy council; when applied to by Sunderland to return to office he made as conditions the divorce of the queen and the exclusion of James. With nine other peers he presented a petition to the king in November, praying for the meeting of parliament, of which Charles took no notice. In April, upon the king's declaration that he was resolved to send for James from Scotland, Shaftesbury advised the popular leaders at once to leave the council, and they followed his advice. In March we find him unscrupulously eager in the prosecution of the alleged Irish Catholic plot. Upon the king's illness in May he held frequent meetings of Monmouth's friends at his house to consider how best to act for the security of the Protestant religion. On the 26th of June, accompanied by fourteen others, he presented to the grand jury of Westminster an indictment of the duke of York as a Popish recusant. In the middle of September he was seriously ill. On the 15th of November the Exclusion Bill, having passed the Commons, was brought up to the Lords, and an historic debate took place, in which Halifax and Shaftesbury were the leaders on opposite sides. The bill was thrown out, and Shaftesbury signed the protest against its rejection. The next day he urged upon the House the divorce of the queen. On the 7th of December, to his lasting dishonour, he voted for the condemnation of Lord Stafford. On the 23rd he again spoke vehemently for exclusion, and his speech was immediately printed. All opposition was, however, checked by the dissolution on the 18th of January. A new parliament was called to meet at Oxford, to avoid the influences of the city of London, where Shaftesbury had taken the greatest pains to make himself popular. Shaftesbury, with fifteen other peers, petitioned the king that it might as usual be held in the capital. He prepared instructions to be handed by constituencies to their

members upon election, in which exclusion, disbanding, the limitation of the prerogative in proroguing and dissolving parliament, and security against popery and arbitrary power were insisted on. At this parliament, which lasted but a few days, he again made a personal appeal to Charles, which was curtly rejected, to permit the legitimizing of Monmouth. The king's advisers now urged him to arrest Shaftesbury; he was seized on the 2nd of July 1681, and committed to the Tower, the judges refusing his petition to be tried or admitted to bail. This refusal was twice repeated in September and October, the court hoping to obtain evidence sufficient to ensure his ruin. In October he wrote offering to retire to Carolina if he were released. On the 24th of November he was indicted for high treason at the Old Bailey, the chief ground being a paper of association for the defence of the Protestant religion, which, though among his papers, was not in his handwriting; but the grand jury ignored the bill. He was released on bail on the 1st of December. In 1682, however, Charles secured the appointment of Tory sheriffs for London; and, as the juries were chosen by the sheriffs, Shaftesbury felt that he was no longer safe from the vengeance of the court. Failing health and the disappointment of his political plans led him into violent courses. He appears to have entered into consultation of a treasonable kind with Monmouth and others; he himself had, he declared, ten thousand brisk boys in London ready to rise at his bidding. For some weeks he was concealed in the city and in Wapping; but, finding the schemes for a rising hang fire, he went to Harwich, disguised as a Presbyterian minister, and after a week's delay, during which he was in imminent risk of discovery, if indeed, as is probable, his escape was not winked at by the government, he sailed to Holland on the 28th of November 1682, and reached Amsterdam in the beginning of December. Here he was welcomed with the jest, referring to his famous speech against the Dutch, "nondum deleta Carthago." He was made a citizen of Amsterdam, but died there of gout in the stomach on the 21st of January 1683. His body was sent in February to Poole, in Dorset, and was buried at Wimborne St Giles.

Few politicians have been the mark of such abuse as Shaftesbury. Dryden, while compelled to honour him as an upright judge, overwhelmed his memory with scathing, if venal, satire; and Dryden's satire has been accepted as truth by later historians. Macaulay in especial exerted all his art, though in contradiction of probability and fact, to deepen still further the shade which rests upon his reputation. Christie, on the other hand, in possession of later sources of information, and with more honest purpose, did much to rehabilitate him. Occasionally, however, he appears to hold a brief for the defence, and, though the picture is comparatively true, this *Life* (1871) should be read with caution. Finally, in his monograph (1886) in the series of "English Worthies," H. D. Traill professes to hold the scales equally. He makes an interesting addition to our conception of Shaftesbury's place in English politics, by insisting on his position as the first great party leader in the modern sense, and as the founder of modern parliamentary oratory. In other respects his book is derived almost entirely from Christie. See also the present writer's article in the *Dict. Nat. Biog.* Much of Shaftesbury's career, increasingly so as it came near its close, is incapable of defence; but it has escaped most of his critics that his life up to the Restoration, apparently full of inconsistencies, was evidently guided by one leading principle, the determination to uphold the supremacy of parliament, a principle which, however obscured by self-interest, appears also to have underlain his whole political career. He was, too, ever the friend of religious freedom and of an enlightened policy in all trade questions. And, above all, it should not be forgotten, in justice to Shaftesbury's memory, that "during his long political career, in an age of general corruption, he was ever incorrupt, and never grasped either money or land." (O. A.)

SHAFTESBURY, ANTHONY ASHLEY COOPER, 3RD EARL OF (1671–1713), was born at Exeter House in London on the 26th of February 1670/1. He was grandson of the first and son of the second earl. His mother was Lady Dorothy Manners, daughter of John, earl of Rutland. According to a curious story, told by the third earl himself, the marriage between his father and mother was negotiated by John Locke, who was a trusted friend of the first earl. The second Lord Shaftesbury appears to have been a poor creature, both physically and mentally. At the age of three his son was made over to the formal guardianship of his grandfather. Locke, who in his capacity of medical attendant to the Ashley household had already assisted in bringing the boy into the world, though not his instructor, was entrusted with the superintendence of his education. This was conducted according to the principles enunciated in Locke's *Thoughts concerning Education*, and the method of teaching Latin and Greek conversationally was pursued with such success by his instructress, Mrs Elizabeth Birch, that at the age of eleven, it is said, Ashley could read both languages with ease. In November 1683, some months after the death of the first earl, his father entered him at Winchester as a warden's boarder. Being shy and constantly taunted with the opinions and fate of his grandfather, he appears to have been rendered miserable by his schoolfellows, and to have left Winchester in 1686 for a course of foreign travel. He was brought thus into contact with those artistic and classical associations which exercised so marked an influence on his character and opinions. On his travels he did not, we are told by the fourth earl, "greatly seek the conversation of other English young gentlemen on their travels," but rather that of their tutors, with whom he could converse on congenial topics.

In 1689, the year after the Revolution, Lord Ashley returned to England, and for nearly five years he appears to have led a quiet and studious life. There can be no doubt that the greater part of his attention was directed to the perusal of classical authors, and to the attempt to realize the true spirit of classical antiquity. He had no intention, however, of becoming a recluse, or of permanently holding himself aloof from public life. Accordingly he became a candidate for the borough of Poole, and was returned the 21st of May 1695. He soon distinguished himself by a speech in support of the Bill for Regulating Trials in Cases of Treason, one provision of which was that a person indicated for treason or misprision of treason should be allowed the assistance of counsel. But, though a Whig, alike by descent, by education and by conviction, Ashley could by no means be depended on to give a party vote; he was always ready to support any propositions, from whatever quarter they came, that appeared to him to promote the liberty of the subject and the independence of parliament. Unfortunately, his health was so treacherous that, on the dissolution of July 1698, he was obliged to retire from parliamentary life. He suffered much from asthma, a complaint which was aggravated by the London smoke.

Lord Ashley now retired into Holland, where he became acquainted with Le Clerc, Bayle, Benjamin Furly, the English Quaker merchant, at whose house Locke had resided during his stay at Rotterdam, and probably Limborch and the rest of the literary circle of which Locke had been a cherished and honoured member nine or ten years before. To Lord Ashley this society was probably far more congenial than his surroundings in England. Unrestrained conversation on the topics which most interested him—philosophy, politics, morals, religion—was at this time to be had in Holland with less danger and in greater abundance than in any other country in the world. To the period of this sojourn in Holland must probably be referred the surreptitious impression or publication of an imperfect edition of the *Inquiry concerning Virtue*, from a rough draught, sketched when he was only twenty years of age. This liberty was taken, during his absence, by Toland.

After an absence of over a twelvemonth, Ashley returned to England, and soon succeeded his father as earl of Shaftesbury. He took an active part, on the Whig side, in the general election of 1700–1701, and again, with more success, in that of the autumn of 1701. It is said that William III. showed his appreciation of Shaftesbury's services on this latter occasion by offering him a secretaryship of state, which, however, his declining health compelled him to decline. Had the king's life continued, Shaftesbury's influence at court would probably have been considerable. After the first few weeks of Anne's reign, Shaftesbury, who had been deprived of the vice-admiralty of Dorset, returned to his retired life, but his letters to Furly show that he retained a keen interest in politics. In August 1703 he again settled in Holland, in the air of which he seems, like Locke, to have had great faith. At Rotterdam he lived, he says in a letter to

his steward Wheelock, at the rate of less than £200 a year, and yet had much "to dispose of and spend beyond convenient living." He returned to England, much improved in health, in August 1704. But, though he had received immediate benefit from his stay abroad, symptoms of consumption were constantly alarming him, and he gradually became a confirmed invalid. His occupations were now almost exclusively literary, and from this time forward he was probably engaged in writing, completing or revising the treatises which were afterwards included in the *Characteristics*. He continued, however, to take a warm interest in politics, both home and foreign, and especially in the war against France, of which he was an enthusiastic supporter.

Shaftesbury was nearly forty before he married, and even then he appears to have taken this step at the urgent instigation of his friends, mainly to supply a successor to the title. The object of his choice (or rather of his second choice, for an earlier project of marriage had shortly before fallen through) was a Miss Jane Ewer, the daughter of a gentleman in Hertfordshire. The marriage took place in the autumn of 1709, and on February 9, 1710/1, was born at his house at Reigate, in Surrey, his only child and heir, the fourth earl, to whose manuscript accounts we are in great part indebted for the details of his father's life. The match appears to have been happy, though Shaftesbury had little sentiment on the subject of married life.

With the exception of a *Preface to the Sermons of Dr Whichcote*, one of the Cambridge Platonists or latitudinarians, published in 1698, Shaftesbury appears to have printed nothing himself till 1708. About this time the French prophets, Camisards (*q.v.*), as they were called, attracted much attention by their extravagances and follies. Various repressive remedies were proposed, but Shaftesbury maintained that fanaticism was best encountered by "raillery" and "good-humour." In support of this view he wrote a letter *Concerning Enthusiasm* to Lord Somers, dated September 1707, which was published anonymously in the following year, and provoked several replies. In May 1709 he returned to the subject, and printed another letter, entitled *Sensus Communis, an Essay on the Freedom of Wit and Humour*. In the same year he also published *The Moralists, a Philosophical Rhapsody*, and in the following year *Soliloquy, or Advice to an Author*. None of these pieces seems to have been printed either with his name or his initials. In 1711 appeared the *Characteristics of Men, Manners, Opinions, Times*, in three volumes, also without any name or initials on the title-page, and without even the name of a printer. These volumes contain in addition to the four treatises already mentioned, *Miscellaneous Reflections*, now first printed, and the *Inquiry concerning Virtue or Merit*, described as "formerly printed from an imperfect copy, now corrected and published intire," and as "printed first in the year 1699."

The declining state of Shaftesbury's health rendered it necessary for him to seek a warmer climate, and in July 1711 he set out for Italy. He settled at Naples in November, and lived there considerably over a year. His principal occupation at this time must have consisted in preparing for the press a second edition of the *Characteristics*, which appeared in 1713, soon after his death. The copy, carefully corrected in his own handwriting, is preserved in the British Museum. He was also engaged, during his stay at Naples, in writing the little treatise (afterwards included in the *Characteristics*) entitled *A Notion of the Historical Draught or Tablature of the Judgment of Hercules*, and the letter concerning *Design*. A little before his death he had also formed a scheme of writing a Discourse on the Arts of Painting, Sculpture, Etching, &c., but when he died he had made but little progress with it. "Medals, and pictures, and antiquities," he writes to Furly, "are our chief entertainments here." His conversation was with men of art and science, "the virtuosi of this place."

The events preceding the peace of Utrecht, which he regarded as preparing the way for a base desertion of our allies, greatly troubled the last months of Shaftesbury's life. He did not, however, live to see the actual conclusion of the treaty (March 31, 1713), as he died the month before, February 4, 1712/3. He had not completed his forty-second year. His body was brought back by sea to England and buried at St Giles's, the family seat in Dorsetshire. His only son, Anthony Ashley, succeeded him as 4th earl, and his great-grandson was the famous philanthropist, the 7th earl.

Shaftesbury's amiability of character seems to have been one of his principal characteristics. Like Locke he had a peculiar pleasure in bringing forward young men. Among these may be especially mentioned Michael Ainsworth, a native of Wimborne St Giles, the young man who was the recipient of the *Letters* addressed to a student at the university, and was maintained by Shaftesbury at University College, Oxford. The interest which Shaftesbury took in his studies, and the desire that he should be specially fitted for the profession which he had selected, that of a clergyman of the Church of England, are marked features of the letters. Other protegés were Crell, a young Pole, the two young Furlys and Harry Wilkinson, a boy who was sent into Furly's office at Rotterdam, and to whom several of the letters still extant in the Record Office are addressed.

In the popular mind, Shaftesbury is generally regarded as a writer hostile to religion. But, however short his orthodoxy might fall if tried by the standards of any particular church, his temperament was pre-eminently religious. This fact is shown in his letters. The belief in a God, all-wise, all-just and all-merciful, governing the world providentially for the best, pervades all his works, his correspondence and his life. Nor had he any wish to undermine established beliefs, except where he conceived that they conflicted with a truer religion and a purer morality.

To the public ordinances of the church he scrupulously conformed. But, unfortunately, there were many things both in the teaching and the practice of the ecclesiastics of that day which were calculated to repel men of sober judgment and high principle. These evil tendencies in the popular presentation of Christianity undoubtedly begot in Shaftesbury's mind a certain amount of repugnance and contempt to some of the doctrines of Christianity itself; and, cultivating, almost of set purpose, his sense of the ridiculous, he was too apt to assume towards such doctrines and their teachers a tone of raillery.

But, whatever might be Shaftesbury's speculative opinions or his mode of expressing them, all witnesses bear testimony to the elevation and purity of his life and aims. As an earnest student, an ardent lover of liberty, an enthusiast in the cause of virtue, and a man of unblemished life and untiring beneficence, Shaftesbury probably had no superior in his generation. His character and pursuits are the more remarkable, considering the rank of life in which he was born and the circumstances under which he was brought up. In many respects he reminds us of the imperial philosopher Marcus Aurelius, whose works he studied with avidity, and whose influence is stamped upon his own productions.

Most of Shaftesbury's writings have been already mentioned. In addition to these there have been published fourteen letters from Shaftesbury to Molesworth, edited by Toland in 1721; some letters to Benjamin Furly, his sons, and his clerk Harry Wilkinson, included in a volume entitled *Original Letters of Locke, Sidney and Shaftesbury*, which was published by Mr T. Forster in 1830, and again in an enlarged form in 1847; three letters, written respectively to Stringer, Lord Oxford and Lord Godolphin, which appeared, for the first time, in the *General Dictionary*; and lastly a letter to Le Clerc, in his recollections of Locke, first published in *Notes and Queries*, Feb. 8, 1851. The *Letters to a Young Man at the University* (Michael Ainsworth), already mentioned, were first published in 1716. The Letter on Design was first published in the edition of the *Characteristics* issued in 1732. Besides the published writings, there are several memoranda, letters, rough drafts, &c., in the Shaftesbury papers in the Record Office.

Shaftesbury took great pains in the elaboration of his style, and he succeeded so far as to make his meaning transparent. The thought is always clear. But, on the other hand, he did not equally succeed in attaining elegance, an object at which he seems equally to have aimed. There is a curious affectation about his style—a falsetto note—which, notwithstanding all his efforts to please, is often irritating to the reader. Its main characteristic is perhaps best hit off by Charles Lamb when he calls it "genteel." He poses too much as a fine gentleman, and is so anxious not to be taken for a pedant of the vulgar scholastic kind that he falls into the hardly more attractive

pedantry of the aesthete and *virtuoso*. But he is easily read and understood. Hence, probably, the wide popularity which his works enjoyed in the 18th century; and hence the agreeable feeling with which, notwithstanding all their false taste and their tiresome digressions, they impress the modern reader.

Shaftesbury's philosophical importance (see ETHICS) is due mainly to his ethical speculations, in which his motive was primarily the refutation of Hobbes's egoistic doctrine. By the method of empirical psychology, he examined man first as a unit in himself and secondly in his wider relations to the larger units of society and the universe of mankind. His great principle was that of Harmony or Balance, and he based it on the general ground of good taste or feeling as opposed to the method of reason. (1) In the first place man as an individual is a complex of appetites, passions, affections, more or less perfectly controlled by the central reason. In the moral man these factors are duly balanced. "Whoever," he says, "is in the least versed in this moral kind of architecture will find the inward fabric so adjusted, . . . that the barely extending of a single passion too far or the continuance . . . of it too long, is able to bring irrecoverable ruin and misery" (*Inquiry concerning Virtue or Merit*, Bk. II. ii. 1). (2) As a social being, man is part of a greater harmony, and, in order that he may contribute to the happiness of the whole, he must order his extra-regarding activities so that they shall not clash with his environs. Only when he has regulated his internal and his social relations by this ideal can he be regarded as truly moral. The egoist and the altruist are both imperfect. In the ripe perfection of humanity, the two impulses will be perfectly adjusted. Thus, by the criterion of harmony, Shaftesbury refutes Hobbes, and deduces the virtue of benevolence as indispensable to morality. So also he has drawn a close parallel between the moral and the aesthetic criteria. Just as there is a faculty which apprehends beauty in the sphere of art, so there is in the sphere of ethics a faculty which determines the value of actions. This faculty he described (for the first time in English thought) as the Moral Sense (see HUTCHESON) or Conscience (cf. BUTLER). In its essence, it is primarily emotional and non-reflective; in process of development it becomes rationalized by education and use. The emotional and the rational elements in the "moral sense" Shaftesbury did not fully analyse (see HUME).

From this principle, it follows (1) that the distinction between right and wrong is part of the constitution of human nature; (2) that morality stands apart from theology, and the moral qualities of actions are determined apart from the arbitrary will of God; (3) that the ultimate test of an action is its tendency to promote the general harmony or welfare; (4) that appetite and reason concur in the determination of action; and (5) that the moralist is not concerned to solve the problem of freewill and determinism. From these results we see that Shaftesbury, opposed to Hobbes and Locke, is in close agreement with Hutcheson (*q.v.*), and that he is ultimately a deeply religious thinker, inasmuch as he discards the moral sanction of public opinion, the terrors of future punishment, the authority of the civil authority, as the main incentives to goodness, and substitutes the voice of conscience and the love of God. These two alone move men to aim at perfect harmony for its own sake in the man and in the universe.

Shaftesbury's philosophical activity was confined to ethics, aesthetics and religion. For metaphysics, properly so called, and even psychology, except so far as it afforded a basis for ethics, he evidently had no taste. Logic he probably despised as merely an instrument of pedants—a judgment for which, in his day, and especially at the universities, there was only too much ground.

The main object of the *Moralists* is to propound a system of natural theology, and to vindicate, so far as natural religion is concerned, the ways of God to man. The articles of Shaftesbury's religious creed were few and simple, but these he entertained with a conviction amounting to enthusiasm. They may briefly be summed up as a belief in one God whose most characteristic attribute is universal benevolence, in the moral government of the universe, and in a future state of man making up for the imperfections and repairing the inequalities of the present life. Shaftesbury is emphatically an optimist, but there is a passage in the *Moralists* (pt. ii. sect. 4) which would lead us to suppose that he regarded matter as an indifferent principle, co-existent and co-eternal with God, limiting His operations, and the cause of the evil and imperfection which, notwithstanding the benevolence of the Creator, is still to be found in His work. If this view of his optimism be correct, Shaftesbury, as Mill says of Leibnitz, must be regarded as maintaining, not that this is the best of all imaginable but only of all possible worlds. This brief notice of Shaftesbury's scheme of natural religion would be conspicuously imperfect unless it were added that it is popularized in Pope's *Essay on Man*, several lines of which, especially of the first epistle, are simply statements from the *Moralists* done into verse. Whether, however, these were taken immediately by Pope from Shaftesbury, or whether they came to him through the papers which Bolingbroke had prepared for his use, we have no means of determining.

The influence of Shaftesbury's writings was considerable both at home and abroad. His ethical system was reproduced, though in a more precise and philosophical form, by Hutcheson, and from him descended, with certain variations, to Hume and Adam Smith. Nor was it without its effect even on the speculations of Butler. Of the so-called deists Shaftesbury was probably the most important, as he was certainly the most plausible and the most respectable. No sooner had the *Characteristics* appeared than they were welcomed, in terms of warm commendation, by Le Clerc and Leibnitz. In 1745 Diderot adapted or reproduced the *Inquiry concerning Virtue* in what was afterwards known as his *Essai sur le Mérite et la Vertu*. In 1769 a French translation of the whole of Shaftesbury's works, including the *Letters*, was published at Geneva. Translations of separate treatises into German began to be made in 1738, and in 1776–1779 there appeared a complete German translation of the *Characteristics*. Hermann Hettner says that not only Leibnitz, Voltaire and Diderot, but Lessing, Mendelssohn, Wieland and Herder, drew the most stimulating nutriment from Shaftesbury. "His charms," he adds, "are ever fresh. A new-born Hellenism, or divine cultus of beauty presented itself before his inspired soul." Herder is especially eulogistic. In the *Adrastea* he pronounces the *Moralists* to be a composition in form well-nigh worthy of Grecian antiquity, and in its contents almost superior to it. The interest felt by German literary men in Shaftesbury was revived by the publication of two excellent monographs, one dealing with him mainly from the theological side by Dr Gideon Spicker (Freiburg in Baden, 1872), the other dealing with him mainly from the philosophical side by Dr Georg von Gizycki (Leipzig, 1876). (T. F.; J. M. M.)

AUTHORITIES.—In Dr Thomas Fowler's monograph on Shaftesbury and Hutcheson in the series of "English philosophers" (1882) he was able largely to supplement the printed materials for the Life by extracts from the Shaftesbury papers in the Record Office. These include, besides many letters and memoranda, two Lives of him, composed by his son, the fourth earl, one of which is evidently the original, though it is by no means always closely followed, of the Life contributed by Dr Birch to the *General Dictionary*. For a description and criticism of Shaftesbury's philosophy reference may also be made to James Mackintosh's *Progress of Ethical Philosophy*, W. Whewell's *History of Moral Philosophy in England*, Jouffroy's *Introduction to Ethics* (Channing's translation), Sir Leslie Stephen's *English Thought in the Eighteenth Century*, Martineau's *Types of Ethical Theory*, Windelband's *History of Philosophy* (Eng. trans., 1893); W. M. Hatch's unfinished edition with appendices of the *Characteristics* (1870); J. M. Robertson's edition of the *Characteristics* (1900); B. Rand's *Life* (1900). For his relation to the religious and theological controversies of his day, see, in addition to some of the above works, J. Leland, *View of the Principal Deistical Writers*, V. Lechler, *Geschichte des Englischen Deismus*, J. Hunt, *Religious Thought in England*, C. J. Abbey and J. H. Overton, *English Church in the Eighteenth Century* and A. S. Farrar's *Bampton Lectures*; G. Zart, *Einfluss der englischen Philosophen seit Bacon auf die deutsche Philosophie des 18ten Jahrhunderts* (Berlin, 1881).

SHAFTESBURY, ANTHONY ASHLEY COOPER, 7TH EARL OF (1801–1885), son of Cropley, 6th earl (a younger brother of the 5th earl; succeeded 1811), and Anne, daughter of the 3rd duke of Marlborough, was born on the 28th of April 1801. He was educated at Harrow and Christ Church, Oxford, where he obtained a first class in classics in 1822, and graduated M.A. in 1832. In 1841 he received from his university the degree of D.C.L. He entered parliament as member for the pocket borough of Woodstock in 1826; in 1830 he was returned for Dorchester; from 1831 till February 1846 he represented the county of Dorset; and he was member for Bath from 1847 till (having previously borne the courtesy title Lord Ashley) he succeeded his father as earl in 1851. Although giving a general support to the Conservatives, his parliamentary conduct was greatly modified by his intense interest in the improvement of the social condition of the working classes, his efforts in behalf of whom have made his name a household word. He opposed the Reform Bill of 1832, but was a supporter of Catholic emancipation, and his objection to the continuance of resistance to the abolition of the Corn Laws led him to resign his seat for Dorset in 1846. In parliament his name, more than any other, is associated with the new factory legislation. He was a lord of the admiralty under Sir Robert Peel (1834–1835), but on being invited to join Peel's administration in 1841 refused, having been unable to obtain Peel's support for the Ten Hours' Bill. Chiefly by his persistent efforts a Ten Hours' Bill was carried in 1847, but its operation was impeded by legal difficulties, which were only removed by successive Acts, instigated chiefly by him, until legislation reached a final stage in the Factory Act of 1874. The part which he took in the legislation bearing on coal mines was equally prominent. His efforts in behalf of the welfare of the working classes were guided by personal knowledge. Thus in 1846, after the resignation of his seat for Dorset, he explored the slums of the metropolis, and not only gave a new

impulse to the movement for the establishment of ragged schools, but was able to make it more widely beneficial. For forty years he was president of the Ragged School Union. He was also one of the principal founders of reformatory and refuge unions, young men's Christian associations and working men's institutes. He took an active interest in foreign missions, and was president of several of the most important philanthropic and religious societies of London. He died on the 1st of October 1885. By his marriage (1830) to Lady Emily (d. 1872), daughter of the 5th earl Cowper, he left a large family, and was succeeded by his eldest son Anthony, who committed suicide in 1886, his son (b. 1869) becoming 9th earl.

See also Hodder's *Life* (1886).

SHAFTESBURY, a market town and municipal borough in the northern parliamentary division of Dorsetshire, England, 103 m. W.S.W. from London by the London & South-Western railway (Semley station). Pop. (1901) 2027. It lies high on a hill above a rich agricultural district. The church of St Peter is Perpendicular; those of Holy Trinity and St James are in the main modern reconstructions. The borough is under a mayor, 4 aldermen and 12 councillors. Area 157 acres.

Although there are traces of both British and Roman occupation in the immediate neighbourhood, the site of Shaftesbury (Cær Palladur, Cær Septon, Seaftonia, Sceafstesbyrig, Shafton) was probably first occupied in Saxon times. Matthew Paris speaks of its foundation by the mythical king Rudhudibras, while Asser ascribes it to Alfred, who made his daughter Ethelgeofu the first abbess. It is probable that a small religious house had existed here before the time of Alfred, and that it and the town were destroyed by the Danes, being both rebuilt about 888. In 980 Dunstan brought St Edward's body here from Wareham for burial, and here Canute died in 1035. Shaftesbury was a borough containing 104 houses in the king's demesne during the reign of Edward the Confessor; in 1086, 38 houses had been destroyed, but it was still the seat of a mint with three mint-masters. In the manor of the abbess of Shaftesbury were 111 houses and 151 burgesses; here 42 houses had been totally destroyed since St Edward's reign. In 1280 the abbess obtained the royal manor at an annual fee-farm rent of £12 and remained the sole mistress of the borough until it passed at the dissolution of the monasteries to Sir Thomas Arundel, after whose execution it was granted about 1552 to William Herbert, earl of Pembroke. In 1252 the burgesses received their first charter from Henry III. This granted that in all eyres the justices itinerant should come to Shaftesbury and that the burgesses should not answer for aught without the town and might choose for themselves two coroners annually. The reeve of the borough is mentioned in 1313–1317. The office of mayor was created between the years 1350-1352, and an inquisition of 1392 records that the mayor held a court of pie-powder and governed the town in the absence of the steward. The seal of the commonalty is extant for 1350, and that of the mayoralty first occurs in 1428. By 1471 a general assembly of burgesses had acquired power to take part in elections. There is no evidence that Elizabeth granted Shaftesbury a charter, as has been asserted, but she confiscated the common lands in 1585, the town only recovering them by purchase. This probably led to a charter of incorporation being obtained from James I. in 1604. A new charter was granted to the town in 1684, but without the surrender of the old charter confirmed by Charles II. in 1665. Shaftesbury returned two members to parliament from 1294 to 1832, when the representation was reduced to one, and it was lost in 1885. Leland speaks of Shaftesbury as a great market town, and it possessed a market in the time of Edward I. The Martinmas fair was granted in 1604. In the 17th century worsted, buttons and leather were manufactured, but these industries have disappeared.

See Charles Hubert Mayo, *The Municipal Records of the Borough of Shaftesbury* (Sherborne, 1889).

SHAFT-SINKING, an important operation in mining for reaching and working mineral deposits situated at a depth below the surface, whenever the topography does not admit of driving adits or tunnels. Shafts are often sunk also in connexion with certain civil engineering works, *e.g.* at intervals along the line of a railway tunnel, for starting intermediate headings, thus securing more points of attack than if the entire work were carried on from the end headings only. Sundry modifications of shaft-sinking are adopted in excavating for deep foundations of heavy buildings, bridge piers and other engineering structures.

If in solid rock, carrying but little water, shaft-sinking is a comparatively simple operation. But when much water is encountered or the formation penetrated comprises unstable, watery strata, special forms of lining become necessary and the work is slow and expensive. Mine shafts are often very deep; notably in the Witwatersrand, South Africa; the Michigan copper district; at Bendigo, Australia; and in certain parts of Europe. Many vertical shafts exceed 4000 ft. in depth, and at least two—the Whiting shaft, of the Calumet and Hecla mine and shaft No. 3 of the Tamarack mine (both in Michigan)—are over 5000 ft. deep. The last named at the beginning of 1907 was about 5200 ft., and was then the deepest in the world. Several inclined shafts, in the same district, approximate 6000 ft. in length.

Shape of Shafts.—In Europe shafts are generally cylindrical, sometimes of elliptical cross-section, and are lined with masonry, concrete, cast iron or steel; in the United States and elsewhere throughout the mining regions of the world, rectangular cross-sections are the rule for sinking in rock, the shaft walls being supported by timbering, occasionally by steel lining. For sinking in loose, water-bearing soils, the cross-section is almost invariably cylindrical, as this form best resists pressure tending to cause crushing or caving of the shaft walls. The European practice of sinking cylindrical shafts even in rock is based mainly on four considerations:—(1) custom; (2) high cost of timber; (3) apart from questions of first cost, a cylindrical shaft, lined with masonry or iron, is strong and permanent, and its cost of maintenance low; (4) more shafts in difficult formations have been sunk in Europe than elsewhere. The cheaper timber-lined, rectangular shaft, however, is generally appropriate under normal conditions in rocky strata, in view of the temporary character of mining operations. Vertical shafts may be either rectangular or cylindrical; when inclined they are always rectangular.

The primary purpose of mine shafts is to act as hoisting- and travelling-ways; incidentally they serve for ventilation, for pumping and for transmitting power underground by steam, compressed air or other means. Rectangular shafts are usually divided longitudinally into compartments. One or more of these are for the cages or skips, which run in guides bolted to the shaft timbering (see MINING). Another is generally provided for a ladder- and pipe-way and for ventilation. When much water is encountered a separate pump compartment is desirable. Cylindrical shafts may be similarly divided by subsidiary timbering, though in many timbering is omitted and the hoisting cages are guided by wire ropes stretched from top to bottom.

Dimensions.—The cross-sectional area of shafts depends mainly on the size of the cages or skips—*i.e.* on the hoisting loads. Small rectangular shafts of one or two compartments measure inside of timbers, say 4 by 6 ft. up to 7 by 12 ft.; larger shafts of three compartments, from 5 by 12 ft. up to 8 or 10 ft. by 20 ft. For four- or five-compartment shafts, sometimes required for large scale work, as in the deep-level mines of the Witwatersrand, the inside dimensions range from 6 by 20 ft. to 6 or 8 by 30 ft., and for some of the Pennsylvania colliery shafts, up to 13 by 52 ft. Cylindrical shafts rarely have more than two hoisting compartments and are commonly from 10 to 16 ft., sometimes 20 or 21 ft. diameter, the segmental areas surrounding the hoisting-ways being utilized for ventilation, piping, &c.

Sinking in Rock.—If the rock be overlaid by loose soil carrying little water, excavation is begun by pick and shovel, and after the rock is reached it is continued by drilling and blasting (see BLASTING). The sinking plant, usually temporary, comprises a small hoist and boiler, several buckets or sometimes a skip, one or more sinking pumps, according to the quantity of water,

occasionally a small ventilating fan, and a timber derrick or head-frame over the shaft mouth, with appliances for dumping the buckets, handling the rock and safe-guarding the men in the shaft against falling objects. In some circumstances a portion of the permanent mine plant is erected for sinking. The choice between hand and machine drilling depends chiefly on the kind of rock and the size and depth of shaft. For very hard rock or when rapid work is desired, machine drilling is advisable, a compressor and additional boiler capacity being then required. Remarkable speeds, however, have been made by hand-sinking in some of the deep vertical shafts on the Rand, the world's record being that of the Howard shaft, sunk by hand labour 203 ft. in one month. But such speeds are attainable only in dry, or nearly dry, ground, at a high cost per foot and by crowding as many men into the shaft as possible, both for drilling and loading away the blasted rock. The conditions being the same, inclined shafts closely approaching the vertical can be put down about as fast as vertical shafts; but for inclinations between say 75° and 30° to the horizontal, inclines are generally slower on account of the greater inconvenience of carrying on the work, both of excavation and timbering. Very flat shafts, on the other hand, can be sunk at speeds little less than for driving tunnels, unless there is much water. The highest speed on record for a very flat incline (10°) is 267 ft. in one month.

As a rule, the speed attained in sinking depends less on the drilling time per round of holes than on the time required to handle and hoist out the rock; hence the speed generally diminishes with increase of depth. Furthermore, omitting shafts of small area, the cost per foot of depth does not increase greatly with the cross-sectional dimensions. For the same rock the rate of advance in wet formations is always much slower than in dry and the cost greater.

The work of sinking in rock is carried on as follows. A round of holes is drilled, usually from 3 to 4 ft. deep if by hand, or from 5 to 8 or 9 ft. if by machine drilling (see BLASTING). A common mode of arranging machine drill holes is shown in plan and section in fig. 1. The holes are charged with dynamite and fired by fuze or electricity—in deep shafts preferably by electricity, as the men may have to be hoisted a long distance to reach a place of safety. After the smoke has cleared away (which may be hastened by sprays or by turning on the compressed air if machine drills are used), the work of hoisting out the broken rock is begun and drilling resumed as soon as possible. For shafts not over 6 or 8 ft. wide, machine drills are usually mounted on horizontal bars stretching across from wall to wall, or, in wider or cylindrical shafts, on tripods or special sinking-frames. In shafts of small area, or deep shafts which are timbered during sinking, the hoisting buckets must be guided to prevent them from striking against the sides. Small quantities of water are bailed into the buckets; when the inflow is too great to be so disposed of, a sinking pump is employed (see MINING).

Shaft Timbering.—In sinking rectangular vertical shafts under normal conditions the excavation through the surface soil is commonly lined with cribbing, inside of which a concrete curb is sometimes built to dam out the surface water. After reaching rock the lining is generally composed of horizontal sets of 8 by 8 in. to 12 by 12 in. squared timber wedged against the walls, with smaller pieces, or planking, called "lagging," placed behind them, to prevent portions of the walls from falling away. In firm rock lagging may be omitted. Each set consists of (fig. 2) two long timbers (wall-plates) W,W, two shorter pieces (end plates) E,E, and usually one or more cross pieces (dividers or buntons) D,D, to form the compartments, strengthen the sets and support the cage guides, G,G. The sets are from 4 to 6 ft. apart, with vertical posts (studdles) S,S, between them. At intervals of say 80 to 120 ft., longer timbers ("bearers") are notched into the walls, under a set, to prevent displacement of the lining as a whole. A series of shaft sets, with their posts, are either built up from a bearing-set, or suspended from the latter by hanger-bolts. When the rock is firm, a considerable depth of shaft may be sunk and then timbered; generally, however, it is safer to put in a few sets at a time as sinking advances, the lowermost set being always far enough from the bottom to prevent it from being injured by the blasting. Inclined shafts in solid ground are often timbered as described above, though sometimes merely by setting longitudinal rows of posts, for supporting the roof and dividing the shaft into compartments.

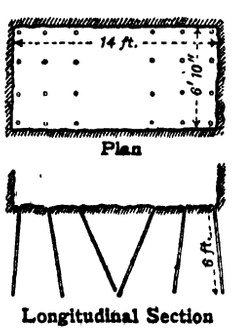


FIG. 1

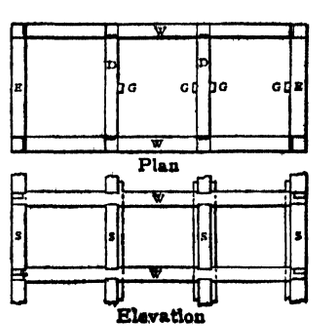


FIG. 2.

Lining for Cylindrical Shafts in Rock.—Wooden linings are occasionally put in small shafts, or for temporary support, before the permanent lining is built, but a cylindrical shaft of any importance is lined with masonry or iron. Masonry linings are generally built in sections, as the sinking advances, each section being based on a walling-crib AB, CD, (fig. 3). Specially moulded tapered bricks are convenient, shaped to conform with the radius of the shaft. Concrete may be similarly moulded into large blocks, often weighing 1200 to 1600 lb each. The thickness of the walling depends on the depth of shaft and pressure anticipated; it is usually from 13 in. to 2 ft., laid in cement mortar. Such linings, while not entirely water-tight, will shut out much of the water present in the surrounding rock.

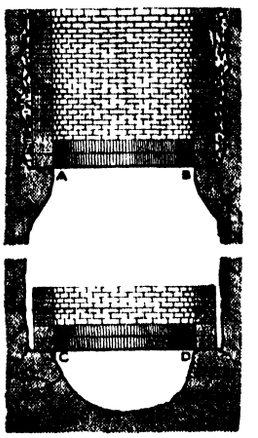


FIG. 3.

Iron lining, or "tubbing," is employed when the inflow of water is rather large. It is usually composed of cast iron flanged rings, each cast in a single piece for shafts of small diameter, or in segments bolted together for large diameters. To permit the rings to adjust themselves to the pressure, the horizontal joints are rarely bolted; they are packed with sheet-lead or thin strips of dry pine, any leaks appearing subsequently being stopped with wedges. Though preferably of cast iron, tubbing is occasionally built of steel plate rings, stiffened by angles or channels riveted to them. The irregular annular space between the tubbing and rock-walls is afterwards filled with concrete or cement grouting. The lowermost tubbing ring is based upon a "wedging-crib." This is a heavy cast iron ring, composed of segments bolted together, and set on a projecting shelf of rock, carefully dressed down. The space behind the crib is driven full of wooden wedges, which expand on becoming water-soaked and thus make a tight joint at the bottom of the tubbing with the rock just above the mineral deposit. By this means most of the water may be permanently shut out of the shaft, and the cost of pumping materially reduced.

Kind-Chaudron System of Sinking.—This ingenious method, introduced in 1852, has thus far been confined to Europe. Up to 1904, 79 shafts had been sunk by its use, some of them to depths of 1000 ft. or more, without a single instance of failure. It is applicable only to firm rock and was devised to deal with cases where the quantity of water is too great to be pumped out while excavation is in progress; that is, for inflows greater than 1000 or 1200 gallons per minute. In its after results the system is most successful when the water-bearing rocks rest on an impervious stratum, overlying the mineral deposit. The entire excavation is carried on under water; then a lining of special design is lowered into place and the shaft unwatered. The shaft is sunk by boring on an immense scale, by apparatus resembling the rod and drop-drill (see BORING). Instead of ordinary drills, massive tools called "trepans" are employed, consisting of a heavy iron frame, in the lower edge of which are set a number of separate cutters (fig. 4). Shafts not exceeding 8 ft. diameter are bored in one operation; for larger diameters an advance bore is usually made with a small trepan and afterwards enlarged to full size. The advance bore may be completed to the required depth of shaft before beginning enlargement, or the small and large trepans used alternately, the advance being kept 30 to 60 ft. ahead of the enlargement. An 8 ft. trepan weighs about 12 tons, those of 14 or 15 ft. 25 to 30 tons. The trepan is attached to a heavy rod, suspended from a walking-beam operated by an engine on the surface, as in ordinary boring. A derrick is erected over the

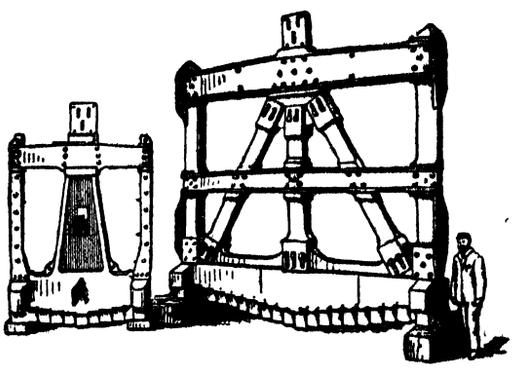


FIG. 4.—Large and Small Trepans for shaft sinking, Haniel & Lueg, Düsseldorf, makers.

shaft, with a hoisting engine for raising and lowering the tools. Average rock is bored at a speed of about 1½ ft. per 24 hours. The advance bore is cleaned of débris at intervals by a bailer similar to that used for bore-holes. The enlarging trepan is so shaped that the bottom of the enlargement slopes to the centre, whereby the cuttings, assisted by the agitation of the water, run into the advance bore and are bailed out. Owing to the difficulty of this latter procedure the advance bore is sometimes omitted even for large shafts, the débris being removed by a special dredger (*Coll. Guard.*, Dec. 22, 1899, p. 1181). For rather loose rock another somewhat similar system of drilling, the Pattberg, has been satisfactorily employed.

When the shaft has passed through the watery strata the lining is installed. This is composed of cast iron rings, like tubbing (*cc*, *dd*), bolted together at the shaft mouth and gradually lowered through the water (fig. 5). The first two rings, called the "moss-box" (*aa*, *bb*) are designed to telescope together and have a quantity of dry moss packed between their outer flanges. When the lowermost ring reaches the bottom, the weight of the lining compresses the moss and forces it against the surrounding rock, making a tight joint. The lining is suspended from the surface by threaded rods, and to regulate and reduce its weight while it is being lowered the bottom is closed by a diaphragm (*ff*), from the centre of which rises an open pipe (*g*). This pipe is provided with cocks for admitting inside the lining from time to time enough water to overcome buoyancy. Finally, concrete is filled in behind the lining, the diaphragm removed and the completed shaft pumped out. In some formations the moss-box is omitted, the concreting being relied on to make the lining water-tight. The cost of this method of sinking and lining (generally £35 to £60 per foot), as well as the speed, compare favourably with results obtainable under the same conditions by other means; in many cases it is the only practicable method.

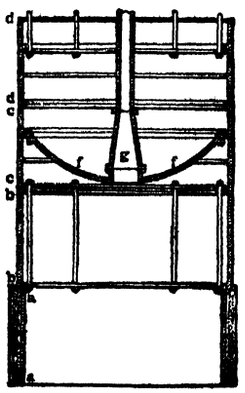


FIG. 5.

Sinking in unstable, watery soils, which often cause serious engineering difficulties, is accomplished by: (1) spiling, vertical or inclined; (2) drop-shafts; (3) caisson and compressed air; (4) the freezing process.

Vertical spiling consists in driving one or more series of spiles around the sides of the excavation, supported by horizontal timber cribs. When the first spiles have been driven, and the enclosed soil removed, a second set follows inside, and so on. As a result of the successive reductions in cross-section of the shaft, vertical spiling is inapplicable to depths much greater than say 75 ft.

Inclined spiling is also limited to small depths. Cribs are put in every few feet and around them, driven ahead of the excavation, are short, heavy planks, sharpened to a chisel edge. The spiles incline outward, being driven inside of one crib and outside of that next below (fig. 6). The shaft bottom also is usually sheathed with planking, braced against the lowest crib and advanced to new positions as sinking progresses.

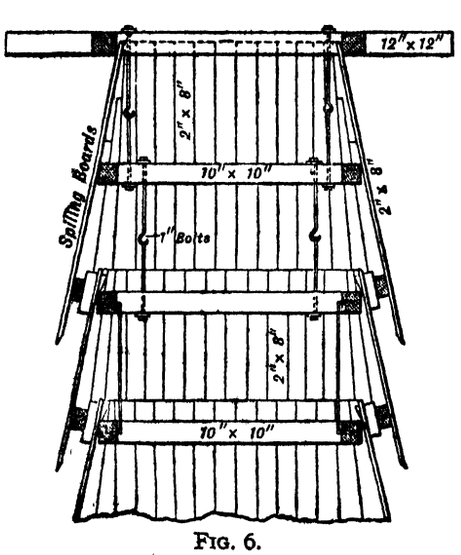


FIG. 6.

Drop-Shafts.—This important method has been used for depths of nearly 500 ft. A heavy timber, iron or masonry lining (usually cylindrical), is sunk through the soil, new sections being successively added at the surface, while the excavation goes on inside. In quite soft soil the lining or drop-shaft sinks with its own weight; when necessary, additional weights of pig-iron, rails, &c., are applied at the top. If, from excessive friction or other cause, the first lining refuses to sink farther, a second is lowered telescopically inside, followed by others if required. The drop-shaft, which must be strongly built to resist collapse, distortion or rupture, is based on a massive wooden or iron shoe, generally of triangular cross-section, which cuts into the soil as the weight of the structure increases and the excavation proceeds. When built of masonry the great weight of the drop-shaft may become unmanageable in very soft soil, either sinking too fast or settling irregularly and spasmodically, accompanied by inrushes of sand or mud at the bottom. It is then suspended by iron rods, fastened to the shoe and threaded for passing through large nuts supported by a framework on the surface. The rods are lengthened as required for lowering the lining. For deep shafts the lining must be of iron or steel, as wood is too weak and masonry too heavy. When the inflow of water can be met by a reasonable amount of pumping, the material is excavated by hand; otherwise, the water is allowed to stand at its natural level and the excavation carried on by dredging. This saves the cost of pumping during sinking, and the pressure of the unstable soil is largely counteracted by the weight of the column of water within the shaft. After the lining has come to rest on the solid sub-stratum, the shaft is pumped out, inflow underneath the shoe stopped as far as possible and sinking resumed by ordinary means. The dredging appliance commonly employed is the "sackborer." This consists of an iron or wooden rod, suspended vertically in the shaft, at the lower end of which on each side is attached a heavy hoop-like wing. The wings carry two large sacks of canvas and leather, opening in opposite directions. By rotating the rod by machinery at the surface, the sacks are swept round horizontally like the cutting edges of an auger, and partly filling after a few revolutions are then raised and emptied. The leakage under the shoe may be stopped in several ways, *e.g.* by concreting the shaft bottom, then pumping out the water and sinking through the concrete by drilling and blasting; by unwatering the shaft and calking below the shoe; or by inserting a wedging crib. There are various modifications of the drop-shaft which cannot here be detailed.

Sinking with caisson and compressed air is rarely adopted except in civil engineering operations, for deep foundations of bridge piers, &c. (see CAISSON).

Freezing Process.—This useful process was introduced in Germany in 1883, by F. H. Poetsch. The soil in which the shaft is to be sunk is artificially frozen and then excavated like solid rock. A number of drive-pipes are put down (see BORING), usually 4 to 6 in. diameter and about 3 ft. apart, in a circle whose radius is, say, 3 ft. greater than that of the shaft, and reaching to bed-rock or other firm formation. Each pipe is plugged at the lower end and within it is placed an open pipe, 1½ in. in diameter, extending nearly to the bottom. Or, preferably, after the drive-pipes are down, a slightly smaller pipe, closed at its lower end, is inserted in each drive-pipe, the latter being afterwards pulled out. The inner 1½ in. open pipes are then put in place. At the surface, the outer and inner pipes are connected respectively to two horizontal distributing rings, which in turn are connected with a pump and ice-machine. A circulatory system is thus established. The freezing fluid, a nearly saturated solution of calcium or magnesium chloride (freezing point about −29° F.), is pumped through the ice-machine, where it is cooled to at least 0° F., and goes thence to the freezing pipes. It passes down the inner pipes, up through the outer pipes, and returns to the ice-machine. The cold solution rising in the large pipes absorbs the heat from the surrounding watery soil, which freezes concentrically round each pipe. As the process goes on the frozen masses finally join (in from 3 to 4 weeks), forming an unbroken wall. The enclosed soft soil may then be excavated by dredging; or the freezing may be continued (total time usually from 5 to 10 weeks according to the depth), until the solidification reaches the centre and to some distance beyond the circle of pipes, after which the ground is drilled and blasted. This process has been successfully employed to depths of over 700 ft., and is applicable not only to the most unstable soils but also to heavily water-bearing rocks. It is questionable whether it will prove to be practicable for great depths, largely because of the difficulty of maintaining verticality of the bore-holes for the freezing pipes. Even a slight angular divergence would leave breaks in the wall of frozen soil and cause danger. In a modification of the Poetsch process, introduced by A. Gobert in 1891, the calcium chloride solution is replaced by anhydrous liquid ammonia, which on vaporizing in the freezing pipes produces a temperature of −25° to −30° F. Sixty-four shafts had been sunk by the freezing process up to 1904.

Another method proposed for dealing with quicksand or similar watery ground is to inject through pipes a mixture of cement and water. The entire mass of soil would be solidified by the setting of the cement, and the shaft sunk by drilling and blasting, with no trouble from water.

BIBLIOGRAPHY.—The following partial list of references may be useful:—

Sinking in Rock: *Engineering* (London, 2nd Feb. 1894); *Coll. Guardian* (7th April 1898) p. 631, (20th April 1906, and 20th May 1898); *Coll. Engineer* (Oct. 1898) p. 135, (Dec. 1895) p. 100, and (Jan. 1896) p. 103; *Mines and Minerals* (June 1900) p. 481, (Dec. 1905) p. 225, and (Feb. 1906), p. 311; *Eng. and Min. Journ*, (13th April 1901) p. 461, and (16th Sep. 1905) p. 483; *Min. and Sci. Press* (3rd April 1904) p. 299; *Australian Min. Standard* (1st Feb. 1900); *Trans. Instn. Min. and Met.* xv. 333; *Jour. South African Assoc. Engs.* (3rd Feb. 1906); *Rev. univ. des mines* (Oct. 1899); *Glückauf* (8th Oct. 1904 and 4th March 1905).

Kind-Chaudron System: *Engineer* (London, Aug. 1904); *Coll. Guardian* (23rd March 1900), p. 541; *North of Eng. Inst., M.E.* xx. 187; *Proc. Instn. C.E.* lxxi. 178; *Rev. Univ. des Mines* (Oct. 1902).

Sinking in Soft Ground:—*Das Schachtabteufen in schwierigen Fällen*, J. Riemer (1905), translated into English in 1907 by C. R. Corning and Robert Peele; *Coll. Guard.* (6th April 1894, 14th Nov. 1902, 3rd Jan. 1903 and 29th Dec. 1905); *Mines and Minerals*

(Nov. 1904), p. 188; *Trans. Amer. Inst. M.E.*, xx. 188; *Glückauf* (14th June 1902); *School of Mines Quart.* iii. 277; *Rev. univ. des mines* (July 1902); *Bull. Soc. de l'Ind. Min.* (1903), No 1; *Ann. des mines de Belgique*, x. pt. 1; *Mining Jour.* (21st April 1906).

Freezing Process: *Glückauf* (12th May 1906, 2nd June 1906); *Östrr. Zeitschr. f. Berg- u. Hüttenwesen* (14th, 21st and 28th July 1906, 14th, 21st and 28th April, and 5th May, 1900); *Ann. des mines*, xviii. 379; *Génie civil* (18th and 25th Jan. and 1st Feb. 1902); *Mines and Minerals* (July 1898), p. 565; *Trans. Fed. Inst. M.E.* xi. 297; *Coll. Guard.* (1st Dec. 1893) p. 960, and (12th June 1896) p. 1108; *Eng. and Min. Jour.* (12th and 26th Oct. 1907). (R. P.*)

SHAGÏA (SHAIGIA, SHAIKĪYEH), a tribe of Africans of Semitic origin living on both banks of the Nile from Korti to the Third Cataract, and in portions of the Bayuda Desert. The Shagïa are partly a nomad, partly an agricultural people. They claim descent from one Shayig Ibn Hamaidan of the Beni Abbas, and declare that they came from Arabia at the time of the conquest of Egypt in the 7th century. They must have dispossessed and largely intermarried with a people of Nuba origin. They appear (from a statement by James Bruce) to have been settled originally south of their present country and to have moved northward since 1772. Formerly subject to the Funj kings of Sennar, they became independent on the decline of that state in the 18th century. They were overcome *c.* 1811 at Dongola by the Mamelukes, but continued to dominate a considerable part of Nubia. To the Egyptians in 1820 they offered a stout resistance, but finally submitted and served in the Egyptian ranks during the suppression of the Jā'alin revolt (1822). For their services they obtained lands of these latter between Shendi and Khartum. At that time they were far more civilized than the neighbouring tribes. Freedom-loving, brave, enlightened and hospitable, they had schools in which all Moslem science was taught, and were rich in corn and cattle. Their fighting men, mounted on horses of the famous Dongola breed, were feared throughout the eastern Sudan. Their chiefs wore coats of mail and carried shields of hippopotamus or crocodile skin. Their arms were lance, sword or javelin. The Shagïa are divided into twelve clans. Their country is the most fertile along the Nile between Egypt and Khartum. Many of their villages are well built; some of the houses are fortified. They speak Arabic and generally preserve the Semitic type, though they are obviously of very mixed blood. The typical Shagïa has a sloping forehead, aquiline nose and receding chin. They have adopted the African custom of gashing the chests of their children. In the wars of 1884–85 General Gordon's first fight was to rescue a few Shagïa besieged in a fort at Halfaya. In April 1884 Saleh Bey (Saleh Wad el Mek), head of the tribe, and 1400 men surrendered to the mahdi's forces. Numbers of Shagïa continued in the service of General Gordon and this led to the outlawry of the tribe by the mahdi. When Khartum fell Saleh's sons were sought out and executed by the dervishes. On the reconquest of the Sudan by the Anglo-Egyptian army (1896–98) it was found that the Shagïa were reduced to a few hundred families.

See *Anglo-Egyptian Sudan*, edited by Count Gleichen (London, 1905); A. H. Keane, *Ethnology of the Egyptian Sudan* (London, 1884).

SHAGREEN, a species of untanned leather with a roughened, granular surface. The word is the English form; cf. Ger. *Schagrin*, of Fr. *chagrin*, Ital. *zagrin, zigrino*; these are usually referred to Turkish and Persian *saghri*, lit. the back of a horse, and so applied to leather made from this part. The skin of the wild ass was especially used. The method of preparing the skins to secure the rough, granular surface is as follows. The seeds of a plant, usually some species of *Chinopodium*, are embedded in the skin while soft, the surface is then shaved down and soaked in water, when the edges of the indentations swell up. The leather is then dyed, green being a favourite colour. Shagreen is now commonly made of the skins of sharks and rays; the placoid scales of the shark skin giving the necessary roughened surface. Shagreen is used as an ornamental leather for making pocket-books, small cases and the like, and for the handles of swords, daggers, &c.

The figurative use in French of "chagrin," for anxiety, annoyance, was adopted in English in the 17th century. This application of the word is due to the rasping surface of the leather.

SHAH, the title of the kings of Persia, the full title being *padshah, i.e.* "lord king," Pers. *pati*, lord, and *shah*, king (see PADISHAH, the Turkish form of the word). The word *shah* is a much shortened form of the O. Pers. *khsayathiya*, probably formed from *khsayathi*, might, power, *khsi*, to rule. The Sanskrit *kshatram*, dominion, is allied, cf. also "satrap." From the Pers. *shāh māt*, the king is dead, is ultimately derived, through the Arab. pronunciation *shāg*, "check-mate," then "check," "chess," "exchequer," &c.

SHAHABAD, a district of British India, in the Patna division of Bengal, with an area of 4373 sq. m. About three-fourths of the area to the north is an alluvial flat, planted with mangoes, bamboos and other trees; while the southern portion is occupied by the Kaimur hills, a branch of the great Vindhyan range, and is a densely wooded tract. The chief rivers are the Ganges and the Sone, which unite in the north-eastern corner of Shahabad. In the southern portion large game abounds. The annual rainfall averages 43 in. In 1901 the population was 1,962,696, showing a decrease of 4·7 % in the decade. The chief crops are rice, millets, wheat, pulses, oilseeds, poppy and sugarcane. Shahabad is protected against drought by a system of canals from the Sone, some of which are navigable. The district is traversed by the East Indian railway near the Ganges, and by a branch from Mogul Serai to Gaya, which crosses the Sone at Dehri-on-Sone, where are the workshops of the canal. The administrative headquarters are at Arrah. Among other historic sites, it includes the hill-fort of Rohtas, the tomb of Shere Shah at Sasseram and the battlefield of Buxar.

See *Shahabad District Gazetteer* (Calcutta, 1906).

SHAH ALAM (1728–1806), Mogul emperor of Delhi, son of Alamgir II., was born on the 15th of June 1728, and was originally known as the Shahzada Ali Gohar. Being proclaimed a rebel by his father, he fled to Shuja-ud-Dowlah, wazir of Oudh, and on the death of his father in 1759 assumed the name of Shah Alam. He joined Shuja-ud-Dowlah against the British, but after his defeat at the battle of Buxar, he sought British protection. In 1765 he granted the *diwani* (superintendence of the revenue) of Bengal to Lord Clive for the East India Company in return for a payment of 26 lakhs a year. In 1771 he fell into the power of the Mahrattas, was installed emperor of Delhi, and lost the British subsidy. In 1788 the Rohilla chief Ghulam Kadir seized Delhi and put out Shah Alam's eyes. Sindhia restored him to the throne, and after the Mahratta war of 1803 he was again taken under British protection. He died on the 10th of November 1806.

See W. Francklin, *History of the Reign of Shah Alam* (Calcutta, 1798).

SHAH JAHAN (fl. 1627–1658), Mogul emperor of Delhi, the fifth of the dynasty. After revolting against his father Jahangir, as the latter had revolted against Akbar, he succeeded to the throne on his father's death in 1627. It was during his reign that the Mogul power attained its greatest prosperity. The chief events of his reign were the destruction of the kingdom of Ahmadnagar (1636), the loss of Kandahar to the Persians (1653), and a second war against the Deccan princes (1655). In 1658 he fell ill, and was confined by his son Aurangzeb in the citadel of Agra until his death in 1666. The period of his reign was the golden age of Indian architecture. Shah Jahan erected many splendid monuments, the most famous of which is the Taj Mahal at Agra, built as a tomb for his wife Mumtaz Mahal; while the Pearl Mosque at Agra and the palace and great mosque at Delhi also commemorate him. The celebrated "Peacock Throne," said to have been worth £6,000,000, also dates from his reign; and he was the founder of the modern city of Delhi, the native name of which is Shahjahanabad.

SHAHJAHANPUR, a city and district of British India, in the Bareilly division of the United Provinces. The city is on the left bank of the river Deoha or Garra, 507 ft. above the sea-level, with a station on the Oudh and Rohilkhand railway, 768 m. N.W. of Calcutta, and a military cantonment. Pop.

(1901) 75,128. It was founded in 1647 during the reign of Shah Jahan, whose name it bears, by Nawab Bahadur Khan, a Pathan. His mosque is the only building of antiquarian interest. There is a manufacture of sugar, but no great trade.

The DISTRICT OF SHAHJAHANPUR has an area of 1727 sq. m. It consists of a long and narrow tract running up from the Ganges towards the Himalayas, and is for the most part level and without any hills. The principal rivers are the Gumti, Khanaut, Garai and Ramganga. To the north-east the country resembles the *tarai* in the preponderance of waste and forest over cultivated land, in the sparseness of population and in general unhealthiness. Between the Gumti and the Khanaut the country varies from a rather wild and unhealthy northern region to a densely inhabited tract in the south, with a productive soil cultivated with sugar-cane and other remunerative crops. The section between the Deoha and Garai comprises much marshy land; but south of the Garai, and between it and the Ramganga, the soil is mostly of a sandy nature. From the Ramganga to the Ganges in the south is a continuous low country of marshy patches, alternating with a hard clayey soil that requires much irrigation in parts. Shahjahanpur contains a number of *jhils* or lakes, which afford irrigation for the spring crops. The climate is very similar to that of most parts of Oudh and Rohilkhand, but moister than that of the Doab. The annual rainfall averages about 37 in. In 1901 the population was 921,535. The principal crops are wheat, rice, pulse, millets, sugar-cane and poppy. The district suffered very severely from the famine of 1877–1879. It is traversed by the Lucknow-Bareilly section of the Oudh and Rohilkhand railway, with a branch northwards from Shahjahanpur city. At Rosa is a large sugar refinery and rum distillery.

Shahjahanpur was ceded to the English by the nawab of Oudh in 1801. During the Mutiny of 1857 it became the scene of open rebellion. The Europeans were attacked when in church; three were shot down, but the remainder, aided by a hundred faithful sepoys, escaped. The force under Lord Clyde put a stop to the anarchy in April 1858, and shortly afterwards peace and authority were restored.

SHAHPUR, a town and district of British India, in Rawalpindi division of the Punjab. The town is near the left bank of the river Jhelum. Pop. (1901) 9386. The district of Shahpur has an area of 4840 sq. m. Its most important physical subdivisions are the Salt range in the north, the valleys of the Chenab and Jhelum, and the plains between those rivers and between the Jhelum and the Salt range. The characteristics of these two plains are widely different: the desert portion of the southern plain is termed the *bar*; the corresponding tract north of the Jhelum is known as the *thal*. The climate of the plains is hot and dry, but in the Salt range it is much cooler; the annual rainfall averages about 15 in. Tigers, leopards and wolves are found in the Salt range, while small game and antelope abound among the thick jungle of the *bar*. In 1901 the population was 524,259, showing an increase of 6% in the decade. The principal crops are wheat, millets, pulses and cotton. Irrigation is effected from government canals, and also from wells. The largest town and chief commercial centre is Bhera. The district is traversed by two branches of the North-Western railway.

Shahpur passed into the hands of the English along with the rest of the Punjab in 1849. During the Mutiny of 1857 the district remained tranquil, and though the villages of the *bar* gave cause for alarm no outbreak of sepoys occurred. Since annexation the limits and constitution of the district have undergone many changes.

SHAHRASTĀNĪ [Abū'l-Fatḥ Maḥommed ibn 'Abdalkarīm ush-Shahrastānī] (1076 or 1086–1153), Arabian theologian and jurist, was born at Shahrastān in Khorasan and studied at Jurjānīyah and Nīshāpūr, devoting his attention chiefly to Ash'arite theology. He made the pilgrimage in 1116, on his way back stayed at Bagdad for three years, then returned to his native place. His chief work is the *Kitāb ul Milal wan-Niḥal*, an account of religious sects and philosophical schools, published by W. Cureton (2 vols., London, 1846) and translated into German by T. Haarbrücker (2 vols., Halle, 1850–1851). After a preface of five chapters dealing with the divisions of the human race, an enumeration of the sects of Islam, the objections of Satan against God and against Mahomet and the principles on which the sects may be classified, he deals with (1) the sects of Islam in detail, (2) the possessors of a written revelation (Jews and Christians) or something resembling it (the Magi), (3) the men who follow their own reason, *i.e.* the philosophers of Greece and their followers among the Moslems; the pre-Islamic Arabs, the Indians and the heathen. Among Shahrastānī's other works still in manuscript only are a history of philosophers, a dogmatic text-book and a treatment of seven metaphysical questions.

A brief account of him is given on the authority of his pupil, the historian Sam'ānī, in Ibn Khallikān, vol. ii., pp. 675 ff. (G. W. T.)

SHAHRUD, the capital of the Shahrud-Bostam province of Persia, situated about 258 m. E. of Teheran, on the highroad thence to Meshed, at an altitude of 4460 ft., in 36° 25′ N., 54° 59′ E. It has a population of about 10,000, post and telegraph offices, and a transit trade between western Khorasan and Astarabad. Although capital of the province, it is not the residence of the governor, who prefers the more healthy Bostam, a small city with fine gardens and a mosque of the 14th century, lying 3 m. to the north-east.

SHAH SHUJA (1780?–1842), king of Afghanistan, was the son of Timur Shah, and grandson of Ahmad Shah, founder of the Durani dynasty. After conspiracies that caused the dethronement of two brothers, Taman Shah and Mahmud Shah, he became king in 1803. He was, however, in his turn driven out of Afghanistan in 1809 by Mahmud Shah, and found refuge and a pension in British territory. Distrusting the attitude of the Amir Dost Mahommed towards Russia, Lord Auckland in 1839 attempted to restore Shah Shuja to the throne against the wishes of the Afghan people. This policy led to the disastrous first Afghan War. After the retreat of the British troops from Kabul, Shah Shuja shut himself up in the Bala Hissar. He left this retreat on the 5th of April 1842, and was immediately killed by the adherents of Dost Mahommed and his son Akbar Khan.

SHAIRP, JOHN CAMPBELL (1819–1885), Scottish critic and man of letters, was born at Houstoun House, Linlithgowshire, on the 30th of July 1819. He was the third son of Major Norman Shairp of Houstoun, and was educated at Edinburgh Academy and Glasgow University. He gained the Snell exhibition, and entered at Balliol College, Oxford, in 1840. In 1842 he gained the Newdigate prize for a poem on Charles XII., and took his degree in 1844. During these years the "Oxford movement" was at its height. Shairp was stirred by Newman's sermons, and he had a great admiration for the poetry of Keble, on whose character and work he wrote an enthusiastic essay; but he remained faithful to his Presbyterian upbringing. After leaving Oxford he took a mastership at Rugby under Tait. In 1857 he became assistant to the professor of humanity in the university of St Andrews, and in 1861 he was appointed to that chair. In 1864 he published *Kilmahoe, a Highland Pastoral*, and in 1868 he republished some articles under the name of *Studies in Poetry and Philosophy*. In 1868 he was presented to the principalship of the United College, St Andrews, and lectured from time to time on literary and ethical subjects. A course of the lectures was published in 1870 as *Culture and Religion*. In 1873 Principal Shairp helped to edit the life of his predecessor J. D. Forbes, and in 1874 he edited Dorothy Wordsworth's charming *Recollections of a Tour in Scotland*. In 1877 he was elected professor of poetry at Oxford in succession to Sir F. H. Doyle. Of his lectures from this chair the best were published in 1881 as *Aspects of Poetry*. In 1877 he had published *The Poetic Interpretation of Nature*, in which he enters fully into the "old quarrel," as Plato called it, between science and poetry, and traces with great clearness the ideas of nature in all the chief Hebrew, classical and English poets. In 1879 he contributed a life of Robert Burns to the "English Men of Letters" series. He was re-elected to the chair of

poetry in 1882, and discharged his duties there and at St Andrews till the end of 1884. He died at Ormsary, Argyllshire, on the 18th of September 1885. In 1888 appeared *Glen Desseray, and other Poems*, edited by F. T. Palgrave.

See W. A. Knight's *Principal Shairp and his Friends* (1888).

SHAKERS, an American celibate and communistic sect, officially called "The United Society of Believers in Christ's Second Appearing" or "The Millennial Church."[1] The early Quakers were sometimes called Shakers, and the name, or its variant, Shaking Quakers, was applied in the early 18th century to a Manchester offshoot of the English Quakers, who, led by James and Ann Wardley, accepted the peculiar doctrines of the French Prophets, or Camisards, of Vivarais and Dauphine.[2] The Wardleys were succeeded by the real founder of Shakerism, Ann Lee (1736–1784), the daughter of a Manchester blacksmith. Although a believer in celibacy, she had at her parents' urging married one Abraham Stanley (Standley, or Standerin); had borne him four children, who died in infancy; had joined the Wardleys in 1758; and had influenced their followers to preach more publicly the imminent second coming and to attack sin more boldly and unconventionally. She was frequently imprisoned for breaking the Sabbath by dancing and shouting, and for blasphemy; had many "miraculous" escapes from death; and once, according to her story, being examined by four clergymen of the Established Church, spoke to them for four hours in seventy-two tongues. While in prison in Manchester for fourteen days, she said she had a revelation that "a complete cross against the lusts of generation, added to a full and explicit confession, before witnesses, of all the sins committed under its influence, was the only possible remedy and means of salvation." After this, probably in 1770, she was chosen by the society as "Mother in spiritual things" and called herself "Ann, the Word." In 1774 a revelation bade her take a select band to America. Accompanied by her husband, who soon afterward deserted her; her brother, William Lee (1740-1784); Nancy Lee, her niece; James Whittaker (1751-1787), who had been brought up by Mother Ann and was probably related to her; John Hocknell (1723–1799), who provided the funds for the trip; his son, Richard; and James Shepherd and Mary Partington, Mother Ann arrived on the 6th of August 1774 in New York City. Here they stayed for nearly two years. In 1776 Hocknell bought land at Niskayuna, in the township of Watervliet, near Albany, and the Shakers settled there. A spiritualistic revival in the neighbouring town of New Lebanon sent many penitents to Watervliet, who accepted Mother Ann's teachings and organized in 1787 (before any formal organization in Watervliet) the New Lebanon Society, the first Shaker Society, at New Lebanon (since 1861 called Mt. Lebanon), Columbia county, New York. The Society at Watervliet, organized immediately afterwards, and the New Lebanon Society formed a bishopric. The Watervliet members, as non-resistants and non-jurors, had got into trouble during the War of Independence; in 1780 the Board of Elders were imprisoned, but all except Mother Ann were speedily set free, and she was released in 1781.

In 1781–1783 the Mother with chosen elders visited her followers in New York, Massachusetts and Connecticut. She died in Watervliet on the 8th of September 1784. James Whittaker was head of the Believers for three years. On his death he was succeeded by Joseph Meacham (1742–1796), who had been a Baptist minister in Enfield, Connecticut, and had, second only to Mother Ann, the spiritual gift of revelation. Under his rule and that of Lucy Wright (1760–1821), who shared the headship with him during his lifetime and then for twenty-five years ruled alone, the organization of the Shakers and, particularly, a rigid communism, began. By 1793 property had been made a "consecrated whole" in the different communities, but a "non-communal order" also had been established, in which sympathizers with the principles of the Believers lived in families. The Shakers never forbade marriage, but refused to recognize it as a Christian institution since the second coming in the person of Mother Ann, and considered it less perfect than the celibate state. Shaker communities in this period were established in 1790 at Hancock, West Pittsfield, Mass.; in 1791 at Harvard, Mass.; in 1792 at East Canterbury (or Shaker Village), New Hampshire; and in 1793 at Shirley, Mass.; at Enfield (or Shaker Station), Connecticut; at Tyringham, Mass., where the Society was afterwards abandoned, its members joining the communities in Hancock and Enfield; at Gloucester (since 1890, Sabbath-day Lake), Maine; and at Alfred, Maine, where, more than anywhere else among the Shakers, spiritualistic healing of the sick was practised. In Kentucky and Ohio Shakerism entered after the Kentucky revival of 1800-1801,[3] and in 1805–1807 Shaker societies were founded at South Union, Logan county, and Pleasant Hill, Mercer county, Kentucky. In 1811 a community settled at Busro on the Wabash in Indiana; but it was soon abandoned and its members went to Ohio and to Kentucky. In Ohio later communities were formed at Watervliet, Hamilton county, and at Whitewater, Dayton county. In 1828 the communal property at Sodus Bay, New York, was sold and the community removed to Groveland, or Sonyea; their land here was sold to the state and the few remaining members went to Watervliet. A short-lived community at Canaan, N.Y., was merged in the Mount Lebanon (New York) and Enfield (Connecticut) communities. The numerical strength of the sect decreased rapidly, probably from 4000 to 1000 in 1887–1908; and there has been little effort made to plant new communities. The Mt. Lebanon Society in 1894 established a colony at Narcoossee, Florida; the attempt of the Union Village Society in 1898 to plant a settlement at White Oak, Camden county, Georgia, was unsuccessful. In 1910 the Union Village Society went into the hands of a receiver.

The period of spiritual manifestations among the Believers lasted from 1837 to 1847; first, children told of visits to cities in the spirit realm and gave messages from Mother Ann; in 1838 the gift of tongues was manifested and sacred places were set aside in each community, with names like Holy Mount; but in 1847 the spirits, after warning, left the Believers. The theology of the denomination is based on the idea of the dualism of God: the creation of male and female "in our image" showing the bi-sexuality of the Creator; in Jesus, born of a woman, the son of a Jewish carpenter, were the male manifestation of Christ and the first Christian Church; and in Mother Ann, daughter of an English blacksmith, were the female manifestation of Christ and the second Christian Church—she was the Bride ready for the Bridegroom, and in her the promises of the Second Coming were fulfilled. Adam's sin was in sexual impurity; marriage is done away with in the body of the Believers in the Second Appearance, who must pattern after the Kingdom in which there is no marriage or giving in marriage. The four virtues are virgin purity; Christian communism; confession of sin, without which none can become Believers; and separation from the world. The Shakers do not believe in the divinity or deity of Jesus, or in the resurrection of the body. Their insistence on the bi-sexuality of God and their reverence for Mother Ann have made them advocates of sex equality. Their spiritual directors are elders and "eldresses," and their temporal guides are deacons and deaconesses in equal numbers. The prescribed uniform costume with woman's neckerchief and cap, and the custom of men wearing their hair long on the neck and cut in a straight bang on the forehead, still persist; but the women wear different colours. The communism of the Believers was an economic success, and their cleanliness, honesty and frugality received the highest praise. They made leather in New York for several years, but in selling herbs and garden seeds, in making "apple-sauce" (at

[1] Some of its leaders prefer the name "Alethians," as they consider themselves children of the truth; but they do not repudiate the commonly applied name Shakers.

[2] The Wardleys' followers, when "wrestling in soul to be freed from the power of sin and a worldly life," writhed and trembled so that they won the name Shakers; their trances and visions, their jumping and dancing, were like those of many other sects, such as the Low Countries dancers of the 14th and 15th centuries, the French Convulsionnaires of 1720–1770, or the Welsh Methodist Jumpers.

[3] A prominent part in this revival had been taken by Richard McNemar, a Presbyterian, who had broken with his Church because of his Arminian tendencies and had established the quasi-independent Turtle Creek Church. McNemar was won by Shaker missionaries in 1805, and many of his parishioners joined him to form the Union Village Community on the site of the old Turtle Creek, 4 m. W. of Lebanon, Warren county, Ohio. McNemar was a favourite of Lucy Wright, who gave him the spiritual name Eleazer Right, which he changed to Eleazer Wright; he wrote *The Kentucky Revival* (Cincinnati, 1807), probably the earliest defence of Shakerism, and a poem, entitled *A Concise Answer to the General Inquiry Who or What are the Shakers* (1808).

Shirley), in weaving linen (at Altred), and in knitting underwear they did better work.

See John P. MacLean, *A Bibliography of Shaker Literature, with an Introductory Study of the Writings and Publications Pertaining to Ohio Believers* (Columbus, Ohio, 1905), and his *Sketch of the Life and the Labors of Richard McNemar* (Franklin, Ohio, 1905); Charles Edson Robinson, *A Concise History of the United Society of Believers, called Shakers* (East Canterbury, N.H., 1893); Anna White and Leila S. Taylor, *Shakerism, Its Meaning and Message* (Columbus, Ohio, 1905); Frederick W. Evans, *Shakers: Compendium of the Origin, History, Principles, Rules and Regulations, Governments and Doctrines of the United Society of Believers in Christ's Second Appearing* (Albany, 1858; and often elsewhere under other titles); M. Catherine Allen, *A Century of Communism* (Pittsfield, 1902); and the works of Nordhoff, Noyes, Hinds, &c., on American communism.

SHAKESPEARE, WILLIAM (1564–1616), English poet, player and playwright, was baptized in the parish church of Stratford-upon-Avon in Warwickshire on the 26th of April 1564. The exact date of his birth is not known. Two 18th-century antiquaries, William Oldys and Joseph Greene, gave it as April 23, but without quoting authority for their statements, and the fact that April 23 was the day of Shakespeare's death in 1616 suggests a possible source of error. In any case his birthday cannot have been later than April 23, since the inscription upon his monument is evidence that on April 23, 1616, he had already begun his fifty-third year. His father, John Shakespeare, was a burgess of the recently constituted corporation of Stratford, and had already filled certain minor municipal offices. From 1561 to 1563 he had been one of the two chamberlains to whom the finance of the town was entrusted. By occupation he was a glover, but he also appears to have dealt from time to time in various kinds of agricultural produce, such as barley, timber and wool. Aubrey (*Lives*, 1680) spoke of him as a butcher, and it is quite possible that he bred and even killed the calves whose skins he manipulated. He is sometimes described in formal documents as a yeoman, and it is highly probable that he combined a certain amount of farming with the practice of his trade. He was living in Stratford as early as 1552, in which year he was fined for having a dunghill in Henley Street, but he does not appear to have been a native of the town, in whose records the name is not found before his time; and he may reasonably be identified with the John Shakespeare of Snitterfield, who administered the goods of his father, Richard Shakespeare, in 1561. Snitterfield is a village in the immediate neighbourhood of Stratford, and here Richard Shakespeare had been settled as a farmer since 1529. It is possible that John Shakespeare carried on the farm for some time after his father's death, and that by 1570 he had also acquired a small holding called Ingon in Hampton Lucy, the next village to Snitterfield. But both of these seem to have passed subsequently to his brother Henry, who was buried at Snitterfield in 1596. There were also at Snitterfield a Thomas Shakespeare and an Anthony Shakespeare, who afterwards moved to Hampton Corley; and these may have been of the same family. A John Shakespeare, who dwelt at Clifford Chambers, another village close to Stratford, is clearly distinct. Strenuous efforts have been made to trace Shakespeare's genealogy beyond Richard of Snitterfield, but so far without success. Certain drafts of heraldic exemplifications of the Shakespeare arms speak, in one case of John Shakespeare's grandfather, in another of his great-grandfather, as having been rewarded with lands and tenements in Warwickshire for service to Henry VII. No such grants, however, have been traced, and even in the 16th-century statements as to "antiquity and service" in heraldic preambles were looked upon with suspicion.

Birth and parentage.

The name Shakespeare is extremely widespread, and is spelt in an astonishing variety of ways. That of John Shakespeare occurs 166 times in the Council Book of the Stratford corporation, and appears to take 16 different forms. The verdict, not altogether unanimous, of competent palaeographers is to the effect that Shakespeare himself, in the extant examples of his signature, always wrote "Shakspere." In the printed signatures to the dedications of his poems, on the title-pages of nearly all the contemporary editions of his plays that bear his name, and in many formal documents it appears as Shakespeare. This may be in part due to the martial derivation which the poet's literary contemporaries were fond of assigning to his name, and which is acknowledged in the arms that he bore. The forms in use at Stratford, however, such as Shaxpeare, by far the commonest, suggest a short pronunciation of the first syllable, and thus tend to support Dr Henry Bradley's derivation from the Anglo-Saxon personal name, Seaxberht. It is interesting, and even amusing, to record that in 1487 Hugh Shakspere of Merton College, Oxford, changed his name to Sawndare, because his former name *vile reputatum est*. The earliest record of a Shakespeare that has yet been traced is in 1248 at Clapton in Gloucestershire, about seven miles from Stratford. The name also occurs during the 13th century in Kent, Essex and Surrey, and during the 14th in Cumberland, Yorkshire, Nottinghamshire, Essex, Warwickshire and as far away as Youghal in Ireland. Thereafter it is found in London and most of the English counties, particularly those of the midlands; and nowhere more freely than in Warwickshire. There were Shakespeares in Warwick and in Coventry, as well as around Stratford; and the clan appears to have been very numerous in a group of villages about twelve miles north of Stratford, which includes Baddesley Clinton, Wroxall, Rowington, Haseley, Hatton, Lapworth, Packwood, Balsall and Knowle. William was in common use as a personal name, and Williams from more than one other family have from time to time been confounded with the dramatist. Many Shakespeares are upon the register of the gild of St Anne at Knowle from about 1457 to about 1526. Amongst these were Isabella Shakespeare, prioress of the Benedictine convent of Wroxall, and Jane Shakespeare, a nun of the same convent. Shakespeares are also found as tenants on the manors belonging to the convent, and at the time of the Dissolution in 1534 one Richard Shakespeare was its bailiff and collector of rents. Conjectural attempts have been made on the one hand to connect the ancestors of this Richard Shakespeare with a family of the same name who held land by military tenure at Baddesley Clinton in the 14th and 15th centuries, and on the other to identify him with the poet's grandfather, Richard Shakespeare of Snitterfield. But Shakespeares are to be traced at Wroxall nearly as far back as at Baddesley Clinton, and there is no reason to suppose that Richard the bailiff, who was certainly still a tenant of Wroxall in 1556, had also since 1529 been farming land ten miles off at Snitterfield.

With the breaking of this link, the hope of giving Shakespeare anything more than a grandfather on the father's side must be laid aside for the present. On the mother's side he was connected with a family of some distinction. Part at least of Richard Shakespeare's land at Snitterfield was held from Robert Arden of Wilmcote in the adjoining parish of Aston Cantlow, a cadet of the Ardens of Parkhall, who counted amongst the leading gentry of Warwickshire. Robert Arden married his second wife, Agnes Hill, formerly Webbe, in 1548, and had then no less than eight daughters by his first wife. To the youngest of these, Mary Arden, he left in 1556 a freehold in Aston Cantlow consisting of a farm of about fifty or sixty acres in extent, known as Asbies. At some date later than November 1556, and probably before the end of 1557, Mary Arden became the wife of John Shakespeare. In October 1556 John Shakespeare had bought two freehold houses, one in Greenhill Street, the other in Henley Street. The latter, known as the wool shop, was the easternmost of the two tenements now combined in the so-called Shakespeare's birthplace. The western tenement, the birthplace proper, was probably already in John Shakespeare's hands, as he seems to have been living in Henley Street in 1552. It has sometimes been thought to have been one of two houses which formed a later purchase in 1575, but there is no evidence that these were in Henley Street at all.

William Shakespeare was not the first child. A Joan was baptized in 1558 and a Margaret in 1562. The latter was buried in 1563 and the former must also have died young, although her burial is not recorded, as a second Joan was baptized in 1569. A Gilbert was baptized in 1566, an Anne in 1571, a Richard in 1574 and an Edmund in 1580. Anne died in 1579; Edmund,

who like his brother became an actor, in 1607; Richard in 1613. Tradition has it that one of Shakespeare's brothers used to visit London in the 17th century as quite an old man. If so, this can only have been Gilbert.

During the years that followed his marriage, John Shakespeare became prominent in Stratford life. In 1565 he was chosen as an alderman, and in 1568 he held the chief municipal office, that of high bailiff. This carried with it the dignity of justice of the peace. John Shakespeare seems to have assumed arms, and thenceforward was always entered in corporation documents as "Mr" Shakespeare, whereby he may be distinguished from another John Shakespeare, a "corviser" or shoemaker, who dwelt in Stratford about 1584-1592. In 1571 as an ex-bailiff he began another year of office as chief alderman.

One may think, therefore, of Shakespeare in his boyhood as the son of one of the leading citizens of a not unimportant provincial market-town, with a vigorous life of its own, which in spite of the dunghills was probably not much unlike the life of a similar town to-day, and with constant reminders of its past in the shape of the stately buildings formerly belonging to its college and its gild, both of which had been suppressed at the Reformation. Stratford stands on the Avon, in the midst of an agricultural country, throughout which in those days enclosed orchards and meadows alternated with open fields for tillage, and not far from the wilder and wooded district known as the Forest of Arden. The middle ages had left it an heritage in the shape of a free grammar-school, and here it is natural to suppose that William Shakespeare obtained a sound enough education,[1] with a working knowledge of "Mantuan"[2] and Ovid in the original, even though to such a thorough scholar as Ben Jonson it might seem no more than "small Latin and less Greek." In 1577, when Shakespeare was about thirteen, his father's fortunes began to take a turn for the worse. He became irregular in his contributions to town levies, and had to give a mortgage on his wife's property of Asbies as security for a loan from her brother-in-law, Edmund Lambert. Money was raised to pay this off, partly by the sale of a small interest in land at Snitterfield which had come to Mary Shakespeare from her sisters, partly perhaps by that of the Greenhill Street house and other property in Stratford outside Henley Street, none of which seems to have ever come into William Shakespeare's hands. Lambert, however, refused to surrender the mortgage on the plea of older debts, and an attempt to recover Asbies by litigation proved ineffectual. John Shakespeare's difficulties increased. An action for debt was sustained against him in the local court, but no personal property could be found on which to distrain. He had long ceased to attend the meetings of the corporation, and as a consequence he was removed in 1586 from the list of aldermen. In this state of domestic affairs it is not likely that Shakespeare's school life was unduly prolonged. The chances are that he was apprenticed to some local trade. Aubrey says that he killed calves for his father, and "would do it in a high style, and make a speech."

Youth.

Whatever his circumstances, they did not deter him at the early age of eighteen from the adventure of marriage. Rowe recorded the name of Shakespeare's wife as Hathaway, and Joseph Greene succeeded in tracing her to a family of that name dwelling in Shottery, one of the hamlets of Stratford. Her monument gives her first name as Anne, and her age as sixty-seven in 1623. She must, therefore, have been about eight years older than Shakespeare. Various small trains of evidence point to her identification with the daughter Agnes mentioned in the will of a Richard Hathaway of Shottery, who died in 1581, being then in possession of the farm-house now known as "Anne Hathaway's Cottage." Agnes was legally a distinct name from Anne, but there can be no doubt that ordinary custom treated them as identical. The principal record of the marriage is a bond dated on November 28, 1582, and executed by Fulk Sandells and John Richardson, two yeomen of Stratford who also figure in Richard Hathaway's will, as a security to the bishop for the issue of a licence for the marriage of William Shakespeare and "Anne Hathwey of Stratford," upon the consent of her friends, with one asking of the banns. There is no reason to suppose, as has been suggested, that the procedure adopted was due to dislike of the marriage on the part of John Shakespeare, since, the bridegroom being a minor, it would not have been in accordance with the practice of the bishop's officials to issue the licence without evidence of the father's consent. The explanation probably lies in the fact that Anne was already with child, and in the near neighbourhood of Advent within which marriages were prohibited, so that the ordinary procedure by banns would have entailed a delay until after Christmas. A kindly sentiment has suggested that some form of civil marriage, or at least contract of espousals, had already taken place, so that a canonical marriage was really only required in order to enable Anne to secure the legacy left her by her father "at the day of her marriage." But such a theory is not rigidly required by the facts. It is singular that, upon the day before that on which the bond was executed, an entry was made in the bishop's register of the issue of a licence for a marriage between William Shakespeare and "Annam Whateley de Temple Grafton." Of this it can only be said that the bond, as an original document, is infinitely the better authority, and that a scribal error of "Whateley" for "Hathaway" is quite a possible solution. Temple Grafton may have been the nominal place of marriage indicated in the licence, which was not always the actual place of residence of either bride or bridegroom. There are no contemporary registers for Temple Grafton, and there is no entry of the marriage in those for Stratford-upon-Avon. There is a tradition that such a record was seen during the 19th century in the registers for Luddington, a chapelry within the parish, which are now destroyed. Shakespeare's first child, Susanna, was baptized on the 26th of May 1583, and was followed on the 2nd of February 1585 by twins, Hamnet and Judith.

Marriage.

In or after 1584 Shakespeare's career in Stratford seems to have come to a tempestuous close. An 18th-century story of a drinking-bout in a neighbouring village is of no importance, except as indicating a local impression that a distinguished citizen had had a wildish youth. But there is a tradition which comes from a double source and which there is no reason to reject in substance, to the effect that Shakespeare got into trouble through poaching on the estates of a considerable Warwickshire magnate, Sir Thomas Lucy, and found it necessary to leave Stratford in order to escape the results of his misdemeanour. It is added that he afterwards took his revenge on Lucy by satirizing him as the Justice Shallow, with the dozen white louses in his old coat, of *The Merry Wives of Windsor*. From this event until he emerges as an actor and rising playwright in 1592 his history is a blank, and it is impossible to say what experience may not have helped to fill it. Much might indeed be done in eight years of crowded Elizabethan life. Conjecture has not been idle, and has assigned him in turns during this or some other period to the occupations of a scrivener, an apothecary, a dyer, a printer, a soldier, and the like. The suggestion that he saw military service rests largely on a confusion with another William Shakespeare of Rowington. Aubrey had heard that "he had been in his younger years a schoolmaster in the country." The mention in *Henry IV.* of certain obscure yeomen families, Visor of Woncote and Perkes of Stinchcombe Hill, near Dursley in Gloucestershire, has been thought to suggest a sojourn in that district, where indeed Shakespeares were to be found from an early date. Ultimately, of course, he drifted to London and the theatre, where, according to the stage tradition, he found employment in a menial capacity, perhaps even as a holder of horses at the doors, before he was admitted into a company as an actor and so found his way to his true vocation as a writer of plays. Malone thought that he might have left

Obscure years, 1584-1592.

[1] It is worth noting that Walter Roche, who in 1558 became fellow of Corpus Christi College, Oxford, was master of the school in 1570–1572, so that its standard must have been good.

[2] Baptista Mantuanus (1448-1516), whose Latin Eclogues were translated by Turberville in 1567.

Stratford with one of the travelling companies of players which from time to time visited the town. Later biographers have fixed upon Leicester's men, who were at Stratford in 1587, and have held that Shakespeare remained to the end in the same company, passing with it on Leicester's death in 1588 under the patronage of Ferdinando, Lord Strange and afterwards earl of Derby, and on Derby's death in 1594 under that of the lord chamberlain, Henry Carey, Lord Hunsdon. This theory perhaps hardly takes sufficient account of the shifting combinations and recombinations of actors, especially during the disastrous plague years of 1592 to 1594. The continuity of Strange's company with Leicester's is very disputable, and while the names of many members of Strange's company in and about 1593 are on record, Shakespeare's is not amongst them. It is at least possible, as will be seen later, that he had about this time relations with the earl of Pembroke's men, or with the earl of Sussex's men, or with both of these organizations.

What is clear is that by the summer of 1592, when he was twenty-eight, he had begun to emerge as a playwright, and had evoked the jealousy of one at least of the group of scholar poets who in recent years had claimed a monopoly of the stage. This was Robert Greene, who, in an invective on behalf of the play-makers against the play-actors which forms part of his *Groats-worth of Wit*, speaks of "an upstart Crow, beautified with our feathers, that with his *Tygers heart wrapt in a Players hide*, supposes he is as well able to bumbast out a blanke verse as the best of you: and being an absolute *Johannes fac totum*, is in his owne conceit the onely Shake-scene in a countrie." The play upon Shakespeare's name and the parody of a line from *Henry VI.* make the reference unmistakable.[1] The London theatres were closed, first through riots and then through plague, from June 1592 to April 1594, with the exception of about a month at each Christmas during that period; and the companies were dissolved or driven to the provinces. Even if Shakespeare had been connected with Strange's men during their London seasons of 1592 and 1593, it does not seem that he travelled with them. Other activities may have been sufficient to occupy the interval. The most important of these was probably an attempt to win a reputation in the world of non-dramatic poetry. *Venus and Adonis* was published about April 1593, and *Lucrece* about May 1594. The poems were printed by Richard Field, in whom Shakespeare would have found an old Stratford acquaintance; and each has a dedication to Henry Wriothesley, earl of Southampton, a brilliant and accomplished favourite of the court, still in his nonage. A possibly super-subtle criticism discerns an increased warmth in the tone of the later dedication, which is supposed to argue a marked growth of intimacy. The fact of this intimacy is vouched for by the story handed down from Sir William Davenant to Rowe (who published in 1709 the first regular biography of Shakespeare) that Southampton gave Shakespeare a thousand pounds "to enable him to go through with a purchase which he heard he had a mind to." The date of this generosity is not specified, and there is no known purchase by Shakespeare which can have cost anything like the sum named. The mention of Southampton leads naturally to the most difficult problem which a biographer has to handle, that of the *Sonnets*. But this will be more conveniently taken up at a later point, and it is only necessary here to put on record the probability that the earliest of the sonnets belong to the period now under discussion. There is a surmise, which is not in itself other than plausible, and which has certainly been supported with a good deal of ingenious argument, that Shakespeare's enforced leisure enabled him to make of 1593 a *Wanderjahr*, and in particular that the traces of a visit to northern Italy may clearly be seen in the local colouring of *Lucrece* as compared with *Venus and Adonis*, and in that of the group of plays which may be dated in or about 1594 and 1595 as compared with those that preceded. It must, however, be borne in mind that, while Shakespeare may perfectly well, at this or at some earlier time, have voyaged to Italy, and possibly Denmark and even Germany as well, there is no direct evidence to rely upon, and that inference from internal evidence is a dangerous guide when a writer of so assimilative a temperament as that of Shakespeare is concerned.

Play-wright and poet.

From the reopening of the theatres in the summer of 1594 onwards Shakespeare's status is in many ways clearer. He had certainly become a leading member of the Chamberlain's company by the following winter, when his name appears for the first and only time in the treasurer of the chamber's accounts as one of the recipients of payment for their performances at court; and there is every reason to suppose that he continued to act with and write for the same associates to the close of his career. The history of the company may be briefly told. At the death of the lord chamberlain on the 22nd of July 1596, it passed under the protection of his successor, George, 2nd Lord Hunsdon, and once more became "the Lord Chamberlain's men" when he was appointed to that office on the 17th of March 1597. James I. on his accession took this company under his patronage as grooms of the chamber, and during the remainder of Shakespeare's connexion with the stage they were "the King's men." The records of performances at court show that they were by far the most favoured of the companies, their nearest rivals being the company known during the reign of Elizabeth as "the Admiral's," and afterwards as "Prince Henry's men." From the summer of 1594 to March 1603 they appear to have played almost continuously in London, as the only provincial performances by them which are upon record were during the autumn of 1597, when the London theatres were for a short time closed owing to the interference of some of the players in politics. They travelled again during 1603 when the plague was in London, and during at any rate portions of the summers or autumns of most years thereafter. In 1594 they were playing at Newington Butts, and probably also at the Rose on Bankside, and at the Cross Keys in the city. It is natural to suppose that in later years they used the Theatre in Shoreditch, since this was the property of James Burbage, the father of their principal actor, Richard Burbage. The Theatre was pulled down in 1598, and, after a short interval during which the company may have played at the Curtain, also in Shoreditch, Richard Burbage and his brother Cuthbert rehoused them in the Globe on Bankside, built in part out of the materials of the Theatre. Here the profits of the enterprise were divided between the members of the company as such and the owners of the building as "housekeepers," and shares in the "house" were held in joint tenancy by Shakespeare and some of his leading "fellows." About 1608 another playhouse became available for the company in the "private" or winter house of the Black Friars. This was also the property of the Burbages, but had previously been leased to a company of boy players. A somewhat similar arrangement as to profits was made.

Connexion with the Chamberlain's company of actors.

Shakespeare is reported by Aubrey to have been a good actor, but Adam in *As You Like It*, and the Ghost in *Hamlet* indicate the type of part which he played. As a dramatist, however, he was the mainstay of the company for at least some fifteen years, during which Ben Johson, Dekker, Beaumont and Fletcher, and Tourneur also contributed to their repertory. On an average he must have written for them about two plays a year, although his rapidity of production seems to have been greatest during the opening years of the period. There was also no doubt a good deal of rewriting of his own earlier work, and also perhaps, at the beginning, of that of others. Occasionally he may have entered into collaboration, as, for example, at the end of his career, with Fletcher.

In a worldly sense he clearly flourished, and about 1596, if not earlier, he was able to resume relations as a moneyed man with Stratford-on-Avon. There is no evidence to show whether he had visited the town in the interval, or whether he had brought his wife and family to London. His son Hamnet died and was buried at Stratford in 1596. During the last ten years John Shakespeare's affairs had remained unprosperous. He incurred fresh debt, partly through becoming surety for

[1] It is most improbable, however, that the apologetic reference in Chettle's *Kind-hart's Dream* (December 1592) refers to Shakespeare.

his brother Henry; and in 1592 his name was included in a list of recusants dwelling at or near Stratford-on-Avon, with a note by the commissioners that in his case the cause was believed to be the fear of process for debt. There is no reason to doubt this explanation, or to seek a religious motive in John Shakespeare's abstinence from church. William Shakespeare's purse must have made a considerable difference. The prosecutions for debt ceased, and in 1597 a fresh action was brought in Chancery for the recovery of Asbies from the Lamberts. Like the last, it seems to have been without result. Another step was taken to secure the dignity of the family by an application in the course of 1596 to the heralds for the confirmation of a coat of arms said to have been granted to John Shakespeare while he was bailiff of Stratford. The bearings were *or* on a bend *sable* a spear *or* steeled *argent*, the crest a falcon his wings displayed *argent* supporting a spear *or* steeled *argent*, and the motto *Non sanz droict*. The grant was duly made, and in 1599 there was a further application for leave to impale the arms of Arden, in right of Shakespeare's mother. No use, however, of the Arden arms by the Shakespeares can be traced. In 1597 Shakespeare made an important purchase for £60 of the house and gardens of New Place in Chapel Street. This was one of the largest houses in Stratford, and its acquisition an obvious triumph for the ex-poacher. Presumably John Shakespeare ended his days in peace. A visitor to his shop remembered him as "a merry-cheekt old man" always ready to crack a jest with his son. He died in 1601, and his wife in 1608, and the Henley Street houses passed to Shakespeare. Aubrey records that he paid annual visits to Stratford, and there is evidence that he kept in touch with the life of the place. The correspondence of his neighbours, the Quineys, in 1598 contains an application to him for a loan to Richard Quiney upon a visit to London, and a discussion of possible investments for him in the neighbourhood of Stratford. In 1602 he took, at a rent of 2s. 6d. a year, a copyhold cottage in Chapel Lane, perhaps for the use of his gardener. In the same year he invested £320 in the purchase of an estate consisting of 107 acres in the open fields of Old Stratford, together with a farm-house, garden and orchard, 20 acres of pasture and common rights; and in 1605 he spent another £440 in the outstanding term of a lease of certain great tithes in Stratford parish, which brought in an income of about £60 a year.

Stratford affairs.

Meanwhile London remained his headquarters. Here Malone thought that he had evidence, now lost, of his residence in Southwark as early as 1596, and as late as 1608. It is known that payments of subsidy were due from him for 1597 and 1598 in the parish of St Helen's, Bishopsgate, and that an arrear was ultimately collected in the liberty of the Clink. He had no doubt migrated from Bishopsgate when the Globe upon Bankside was opened by the Chamberlain's men. There is evidence that in 1604 he "lay," temporarily or permanently, in the house of Christopher Mountjoy, a tire-maker of French extraction, at the corner of Silver Street and Monkwell Street in Cripplegate. A recently recovered note by Aubrey, if it really refers to Shakespeare (which is not quite certain), is of value as throwing light not only upon his abode, but upon his personality. Aubrey seems to have derived it from William Beeston the actor, and through him from John Lacy, an actor of the king's company, It is as follows: "The more to be admired q[uod] he was not a company-keeper, lived in Shoreditch, would not be debauched, & if invited to court, he was in paine." Against this testimony to the correctness of Shakespeare's morals are to be placed an anecdote of a green-room amour picked up by a Middle Temple student in 1602 and a Restoration scandal which made him the father by the hostess of the Crown Inn at Oxford, where he baited on his visits to Stratford, of Sir William Davenant, who was born in February 1606. His credit at court is implied by Ben Jonson's references to his flights "that so did take Eliza and our James," and by stories of the courtesies which passed between him and Elizabeth while he was playing a kingly part in her presence, of the origin of *The Merry Wives of Windsor* in her desire to see Falstaff in love, and of an autograph letter written to honour him by King James. It was noticed with some surprise by Henry Chettle that his "honied muse" dropped no "sable tear" to celebrate the death of the queen. Southampton's patronage may have introduced him to the brilliant circle that gathered round the earl of Essex, but there is no reason to suppose that he or his company were held personally responsible for the performance of *Richard II.* at the command of some of the followers of Essex as a prelude to the disastrous rising of February 1601. The editors of the First Folio speak also of favours received by the author in his lifetime from William Herbert, earl of Pembroke, and his brother Philip Herbert, earl of Montgomery.

London associations.

He appears to have been on cordial terms with his fellows of the stage. One of them, Augustine Phillips, left him a small legacy in 1605, and in his own will he paid a similar compliment to Richard Burbage, and to John Heminge and Henry Condell, who afterwards edited his plays. His relations with Ben Jonson, whom he is said by Rowe to have introduced to the world as a playwright, have been much canvassed. Jests are preserved which, even if apocryphal, indicate considerable intimacy between the two. This is not inconsistent with occasional passages of arms. The anonymous author of *The Return from Parnassus* (2nd part; 1602), for example, makes Kempe, the actor, allude to a "purge" which Shakespeare gave Jonson, in return for his attack on some of his rivals in *The Poetaster*.[1] It has been conjectured that this purge was the description of Ajax and his humours in *Troilus and Cressida*. Jonson, on the other hand, who was criticism incarnate, did not spare Shakespeare either in his prologues or in his private conversation. He told Drummond of Hawthornden that "Shakspeer wanted arte." But the verses which he contributed to the First Folio are generous enough to make all amends, and in his *Discoveries* (pub. 1641; written c. 1624 and later), while regretting Shakespeare's excessive facility and the fact that he often "fell into those things, could not escape laughter," he declares him to have been "honest and of an open and free nature," and says that, for his own part, "I lov'd the man and do honour his memory (on this side idolatry) as much as any." According to the memoranda-book (1661–1663) of the Rev. John Ward (who became vicar of Stratford in 1662), Jonson and Michael Drayton, himself a Warwickshire poet, had been drinking with Shakespeare when he caught the fever of which he died; and Thomas Fuller (1608–1661), whose *Worthies* was published in 1662, gives an imaginative description of the wit combats, of which many took place between the two mighty contemporaries.

Friends.

Of Shakespeare's literary reputation during his lifetime there is ample evidence. He is probably neither the "Willy" of Spenser's *Tears of the Muses*, nor the "Action" of his *Colin Clout's Come Home Again*. But from the time of the publication of *Venus and Adonis* and *Lucrece* honorific allusions to his work both as poet and dramatist, and often to himself by name, come thick and fast from writers of every kind and degree. Perhaps the most interesting of these from the biographical point of view are those contained in the *Palladis Tamia*, a kind of literary handbook published by Francis Meres in 1598; for Meres not only extols him as "the most excellent in both kinds [*i.e.* comedy and tragedy] for the stage," and one of "the most passionate among us to bewaile and bemoane the perplexities of Love," but also takes the trouble to give a list of twelve plays already written, which serves as a starting-point for all modern attempts at a chronological arrangement of his work. It is moreover from Meres that we first hear of "his sugred Sonnets among his private friends." Two of these sonnets were printed in 1599

Contemporary reputation.

[1] Kempe (speaking to Burbage), "Few of the university pen plays well. They smell too much of that writer Ovid and that writer (*sic*) Metamorphosis, and talk too much of Proserpina and Jupiter. Why here's our fellow Shakespeare puts them all down; aye, and Ben Jonson too. O that Ben Jonson is a pestilent fellow. He brought up Horace giving the Poets a pill, but our fellow Shakespeare hath given him a purge that made him beray his credit."

in a volume of miscellaneous verse called *The Passionate Pilgrim*. This was ascribed upon the title-page to Shakespeare, but probably, so far as most of its contents were concerned, without justification. The bulk of Shakespeare's sonnets remained unpublished until 1609.

About 1610 Shakespeare seems to have left London, and entered upon the definite occupation of his house at New Place, Stratford. Here he lived the life of a retired gentleman, on friendly if satirical terms with the richest of his neighbours, the Combes, and interested in local affairs, such as a bill for the improvement of the highways in 1611, or a proposed enclosure of the open fields at Welcombe in 1614, which might affect his income or his comfort. He had his garden with its mulberry-tree, and his farm in the immediate neighbourhood. His brothers Gilbert and Richard were still alive; the latter died in 1613. His sister Joan had married William Hart, a hatter, and in 1616 was dwelling in one of his houses in Henley Street. Of his daughters, the eldest, Susanna, had married in 1607 John Hall (d. 1635), a physician of some reputation. They dwelt in Stratford, and had one child, Elizabeth, afterwards Lady Barnard (1608–1670). The younger, Judith, married Thomas Quiney, a vintner, also of Stratford, two months before her father's death. At Stratford the last few of the plays may have been written, but it is reasonable to suppose that Shakespeare's connexion with the King's company ended when the Globe was burnt down during a performance of *Henry VIII.* on the 29th of June 1613. Certainly his retirement did not imply an absolute break with London life. In 1613 he devised an *impresa*, or emblem, to be painted by Richard Burbage, and worn in the tilt on Accession day by the earl of Rutland, who had been one of the old circle of Southampton and Essex. In the same year he purchased for £140 a freehold house in the Blackfriars, near the Wardrobe. This was conveyed to trustees, apparently in order to bar the right which his widow would otherwise have had to dower. In 1615 this purchase involved Shakespeare in a lawsuit for the surrender of the title-deeds. Richard Davies, a Gloucestershire clergyman of the end of the 17th century, reports that the poet "died a papist," and the statement deserves more attention than it has received from biographers. There is indeed little to corroborate it; for an alleged "spiritual testament" of John Shakespeare is of suspected origin, and Davies's own words suggest a late conversion rather than an hereditary faith. On the other hand, there is little to refute it beyond an entry in the accounts of Stratford corporation for drink given in 1614 to "a preacher at the Newe Place."

Last years.

Shakespeare made his will on the 25th of March 1616, apparently in some haste, as the executed deed is a draft with many erasures and interlineations. There were legacies to his daughter Judith Quiney and his sister Joan Hart, and remembrances to friends both in Warwickshire and in London; but the real estate was left to his sister Susanna Hall under a strict entail which points to a desire on the part of the testator to found a family. Shakespeare's wife, for whom other provision must have been made, is only mentioned in an interlineation, by which the "second best bed with the furniture" was bequeathed to her. Much nonsense has been written about this, but it seems quite natural. The best bed was an important chattel, which would go with the house. The estate was after all not a large one. Aubrey's estimate of its annual value as £200 or £300 a year sounds reasonable enough, and John Ward's statement that Shakespeare spent £1000 a year must surely be an exaggeration. The sum-total of his known investments amounts to £960. Mr Sidney Lee calculates that his theatrical income must have reached £600 a year; but it may be doubted whether this also is not a considerable overestimate. It must be remembered that the purchasing value of money in the 17th century is generally regarded as having been about eight times its present value. Shakespeare's interest in the "houses" of the Globe and Blackfriars probably determined on his death.

Will.

A month after his will was signed, on the 23rd of April 1616, Shakespeare died, and as a tithe-owner was buried in the chancel of the parish church. Some doggerel upon the stone that covers the grave has been assigned by local tradition to his own pen. A more elaborate monument, with a bust by the sculptor Gerard Johnson, was in due course set up on the chancel wall. Anne Shakespeare followed her husband on the 6th of August 1623. The family was never founded. Shakespeare's grand-daughter, Elizabeth Hall, made two childless marriages, the first with Thomas Nash of Stratford, the second with John, afterwards Sir John, Barnard of Abington Manor, Northants. His daughter Judith Quiney had three sons, all of whom had died unmarried by 1639. There were, therefore, no direct descendants of Shakespeare in existence after Lady Barnard's death in 1670. Those of his sister, Joan Hart, could however still be traced in 1864. On Lady Barnard's death the Henley Street houses passed to the Harts, in whose family they remained until 1806. They were then sold, and in 1846 were bought for the public. They are now held with Anne Hathaway's Cottage at Shottery as the Birthplace Trust. Lady Barnard had disposed of the Blackfriars house. The rest of the property was sold under the terms of her will, and New Place passed, first to the Cloptons who rebuilt it, and then to the Rev. Francis Gastrell, who pulled it down in 1759. The site now forms a public recreation-ground, and hard by is a memorial building with a theatre in which performances of Shakespeare's plays are given annually in April. Both the Memorial and the Birthplace contain museums, in which books, documents and portraits of Shakespearian interest, together with relics of greater or less authenticity, are stored.

Death.

No letter or other writing in Shakespeare's hand can be proved to exist, with the exception of three signatures upon his will, one upon a deposition (May 11, 1612) in a lawsuit with which he was remotely concerned, and two upon deeds (March 10 and 11, 1613) in connexion with the purchase of his Blackfriars house. A copy of Florio's translation of Montaigne (1603) in the British Museum, a copy of the Aldine edition of Ovid's *Metamorphoses* (1502) in the Bodleian, and a copy of the 1612 edition of Sir Thomas North's translation of Plutarch's *Lives of the Noble Grecians and Romaines* in the Greenock Library, have all been put forward with some plausibility as bearing his autograph name or initials, and, in the third case, a marginal note by him. A passage in the manuscript of the play of *Sir Thomas More* has been ascribed to him (*vide infra*), and, if the play is his, might be in his handwriting. Aubrey records that he was "a handsome, well-shap't man," and the lameness attributed to him by some writers has its origin only in a too literal interpretation of certain references to spiritual disabilities in the *Sonnets*.

A collection of *Mr William Shakespeare's Comedies, Histories and Tragedies* was printed at the press of William and Isaac Jaggard, and issued by a group of booksellers in 1623. This volume is known as the First Folio. It has dedications to the earls of Pembroke and Montgomery, and to "the great Variety of Readers," both of which are signed by two of Shakespeare's "fellows" at the Globe, John Heminge and Henry Condell, and commendatory verses by Ben Jonson, Hugh Holland, Leonard Digges and an unidentified I. M. The Droeshout engraving forms part of the title-page. The contents include, with the exception of *Pericles*, all of the thirty-seven plays now ordinarily printed in editions of Shakespeare's works. Of these eighteen were here published for the first time. The other eighteen had already appeared in one or more separate editions, known as the Quartos.

Dramas.

The following list gives the date of the First Quarto of each such play, and also that of any later Quarto which differs materially from the First.

The Quarto Editions.

Titus Andronicus (1594).
2 Henry VI. (1594).
3 Henry VI. (1595).
Richard II. (1597, 1608).
Richard III. (1597).
Romeo and Juliet (1597, 1599).
Love's Labour's Lost (1598).
1 Henry IV. (1598).
2 Henry IV. (1600).
Henry V. (1600).
A Midsummer Night's Dream (1600).
The Merchant of Venice (1600).
Much Ado About Nothing (1600).
The Merry Wives of Windsor (1602).
Hamlet (1603, 1604).
King Lear (1608).
Troilus and Cressida (1609).
Othello (1622).

Entries in the *Register* of copyrights kept by the Company of Stationers indicate that editions of *As You Like It* and *Anthony and Cleopatra* were contemplated but not published in 1600 and 1608 respectively.

The Quartos differ very much in character. Some of them contain texts which are practically identical with those of the First Folio; others show variations so material as to suggest that some revision, either by rewriting or by shortening for stage purposes, took place. Amongst the latter are *2, 3 Henry VI.*, *Richard III.*, *Romeo and Juliet*, *The Merry Wives of Windsor*, *Hamlet* and *King Lear*. Many scholars doubt whether the Quarto versions of *2, 3 Henry VI.*, which appeared under the titles of *The First Part of the Contention betwixt the two famous Houses of York and Lancaster* and *The True Tragedy of Richard Duke of York*, are Shakespeare's work at all. It seems clear that the Quartos of *The Troublesome Reign of John King of England* (1591) and *The Taming of A Shrew* (1594), although treated for copyright purposes as identical with the plays of *King John* and *The Taming of the Shrew*, which he founded upon them, are not his. The First Quartos of *Romeo and Juliet*, *Henry V.*, *The Merry Wives of Windsor*, and *Hamlet* seem to be mainly based, not upon written texts of the plays, but upon versions largely made up out of shorthand notes taken at the theatre by the agents of a piratical bookseller. A similar desire to exploit the commercial value of Shakespeare's reputation probably led to the appearance of his name or initials upon the title-pages of *Locrine* (1595), *Sir John Oldcastle* (1600), *Thomas Lord Cromwell* (1602), *The London Prodigal* (1605), *The Puritan* (1607), *A Yorkshire Tragedy* (1608), and *Pericles* (1609). It is not likely that, with the exception of the last three acts of *Pericles*, he wrote any part of these plays, some of which were not even produced by his company. They were not included in the First Folio of 1623, nor in a reprint of it in 1632, known as the Second Folio; but all seven were appended to the second issue (1664) of the Third Folio (1663), and to the Fourth Folio of 1685. Shakespeare is named as joint author with John Fletcher on the title-page of *The Two Noble Kinsmen* (1634), and with William Rowley on that of *The Birth of Merlin* (1662); there is no reason for rejecting the former ascription or for accepting the latter. Late entries in the Stationers' *Register* assign to him *Cardenio* (with Fletcher), *Henry I.* and *Henry II.* (both with Robert Davenport), *King Stephen*, *Duke Humphrey*, and *Iphis and Ianthe*; but none of these plays is now extant. Modern conjecture has attempted to trace his hand in other plays, of which *Arden of Feversham* (1592), *Edward III.* (1596), *Mucedorus* (1598), and *The Merry Devil of Edmonton* (1608) are the most important; it is quite possible that he may have had a share in *Edward III.* A play on *Sir Thomas More*, which has been handed down in manuscript, contains a number of passages, interpolated in various handwritings, to meet requirements of the censor; and there are those who assign one of these (ii. 4, 1-172) to Shakespeare.

Unfortunately the First Folio does not give the dates at which the plays contained in it were written or produced; and the endeavour to supply this deficiency has been one of the main preoccupations of more than a century of Shakespearian scholarship, since the pioneer essay of Edmund Malone in his *An Attempt to Ascertain the Order in which the Plays of Shakespeare were Written* (1778). The investigation is not a mere piece of barren antiquarianism, for on it depends the possibility of appreciating the work of the world's greatest poet, not as if it were an articulated whole like a philosophical system, but in its true aspect as the reflex of a vital and constantly developing personality. A starting-point is afforded by the dates of the Quartos and the entries in the Stationers' *Register* which refer to them, and by the list of plays already in existence in 1598 which is inserted by Francis Meres in his *Palladis Tamia* of that year, and which, while not necessarily exhaustive of Shakespeare's pre-1598 writing, includes *The Two Gentlemen of Verona*, *The Comedy of Errors*, *Love's Labour's Lost*, *A Midsummer Night's Dream*, *The Merchant of Venice*, *Richard II.*, *Richard III.*, *Henry IV.*, *King John*, *Titus Andronicus* and *Romeo and Juliet*, as well as a mysterious *Love's Labour's Won*, which has been conjecturally identified with several plays, but most plausibly with *The Taming of the Shrew*. There is a mass of supplementary evidence, drawn partly from definite notices in other writings or in diaries, letters, account-books, and similar records, partly from allusions to contemporary persons and events in the plays themselves, partly from parallels of thought and expression between each play and those near to it in point of time, and partly from considerations of style, including the so-called metrical tests, which depend upon an analysis of Shakespeare's varying feeling for rhythm at different stages of his career. The total result is certainly not a demonstration, but in the logical sense an hypothesis which serves to colligate the facts and is consistent with itself and with the known events of Shakespeare's external life.

Dates.

The following table, which is an attempt to arrange the original dates of production of the plays without regard to possible revisions, may be taken as fairly representing the common results of recent scholarship. It is framed on the assumption that, as indeed John Ward tells us was the case, Shakespeare ordinarily wrote two plays a year; but it will be understood that neither the order in which the plays are given nor the distribution of them over the years lays claim to more than approximate accuracy.

Chronology of the Plays.

1591.
(1, 2) *The Contention of York and Lancaster* (2, 3 *Henry VI.*).

1592.
(3) *1 Henry VI.*
(The theatres were closed for riot and plague from June to the end of December.)

1593.
(4) *Richard III.*
(5) *Edward III.* (part only).
(6) *The Comedy of Errors.*
(The theatres were closed for plague from the beginning of February to the end of December.)

1594.
(7) *Titus Andronicus.*
(The theatres were closed for plague during February and March.)
(8) *Taming of the Shrew.*
(9) *Love's Labour's Lost.*
(10) *Romeo and Juliet*

1595.
(11) *A Midsummer Night's Dream.*
(12) *The Two Gentlemen of Verona.*
(13) *King John.*

1596.
(14) *Richard II.*
(15) *The Merchant of Venice.*

1597.
(The theatres were closed for misdemeanour from the end of July to October.)
(16) *1 Henry IV.*

1598.
(17) *2 Henry IV.*
(18) *Much Ado About Nothing.*

1599.
(19) *Henry V.*
(20) *Julius Caesar.*

1600.
(21) *The Merry Wives of Windsor.*
(22) *As You Like It.*

1601.
(23) *Hamlet.*
(24) *Twelfth Night.*

1602.
(25) *Troilus and Cressida.*
(26) *All's Well that Ends Well.*

1603.
(The theatres were closed on Elizabeth's death in March, and remained closed for plague throughout the year.)

1604.
(27) *Measure for Measure.*
(28) *Othello.*

1605.
(29) *Macbeth.*
(30) *King Lear.*

1606.
(31) *Anthony and Cleopatra.*
(32) *Coriolanus.*

1607.
(33) *Timon of Athens* (unfinished).

1608.
(34) *Pericles* (part only).

1609.
(35) *Cymbeline.*

1610.
(36) *The Winter's Tale.*

1611.
(37) *The Tempest.*

1612.
..

1613.
(38) *The Two Noble Kinsmen* (part only).
(39) *Henry VIII.* (part only).

A more detailed account of the individual plays may now be attempted. The figures here prefixed correspond to those in the table above.

Composition.

1, 2. The relation of *The Contention of York and Lancaster* to *2, 3 Henry VI.* and the extent of Shakespeare's responsibility for either or both works have long been subjects of controversy. The extremes of critical opinion are to be found in a theory which regards Shakespeare as the sole author of *2, 3 Henry VI.* and *The Contention* as a shortened and piratical version of the original plays, and in a theory which regards *The Contention* as written in collaboration by Marlowe, Greene and possibly Peele, and *2, 3 Henry VI.* as a revision of

The Contention written, also in collaboration, by Marlowe and Shakespeare. A comparison of the two texts leaves it hardly possible to doubt that the differences between them are to be explained by revision rather than by piracy; but the question of authorship is more difficult. Greene's parody, in the "Shake-scene" passage of his *Groats-worth of Wit* (1592), of a line which occurs both in *The Contention* and in 3 *Henry VI.*, while it clearly suggests Shakespeare's connexion with the plays, is evidence neither for nor against the participation of other men, and no sufficient criterion exists for distinguishing between Shakespeare's earliest writing and that of possible collaborators on grounds of style. But there is nothing inconsistent between the reviser's work in 2, 3 *Henry VI.* and on the one hand *Richard III.* or on the other the original matter of *The Contention*, which the reviser follows and elaborates scene by scene. It is difficult to assign to any one except Shakespeare the humour of the Jack Cade scenes, the whole substance of which is in *The Contention* as well as in *Henry VI.* Views which exclude Shakespeare altogether may be left out of account. *Henry VI.* is not in Meres's list of his plays, but its inclusion in the First Folio is an almost certain ground for assigning to him some share, if only as reviser, in the completed work.

3. A very similar problem is afforded by 1 *Henry VI.*, and here also it is natural, in the absence of tangible evidence to the contrary, to hold by Shakespeare's substantial responsibility for the play as it stands. It is quite possible that it also may be a revised version, although in this case no earlier version exists; and if so the Talbot scenes (iv. 2-7) and perhaps also the Temple Gardens scene (ii. 4), which are distinguished by certain qualities of style from the rest of the play, may date from the period of revision. Thomas Nash refers to the representation of Talbot on the stage in his *Pierce Penilesse, his Supplication to the Divell* (1592), and it is probable that 1 *Henry VI.* is to be identified with the "Harey the vj." recorded in Henslowe's *Diary* to have been acted as a new play by Lord Strange's men, probably at the Rose, on the 3rd of March 1592. If so, it is a reasonable conjecture that the two parts of *The Contention* were originally written at some date before the beginning of Henslowe's record in the previous February, and were revised so as to fall into a series with 1 *Henry VI.* in the latter end of 1592.

4. The series as revised can only be intended to lead directly up to *Richard III.*, and this relationship, together with its style as compared with that of the plays belonging to the autumn of 1594, suggest the short winter season of 1592–1593 as the most likely time for the production of *Richard III.* There is a difficulty in that it is not included in Henslowe's list of the plays acted by Lord Strange's men during that season. But it may quite well have been produced by the only other company which appeared at court during the Christmas festivities, Lord Pembroke's. The mere fact that Shakespeare wrote a play, or more than one play, for Lord Strange's men during 1592–1594 does not prove that he never wrote for any other company during the same period; and indeed there is plenty of room for guess-work as to the relations between Strange's and Pembroke's men. The latter are not known to have existed before 1592, and many difficulties would be solved by the assumption that they originated out of a division of Strange's, whose numbers, since their amalgamation with the Admiral's, may have been too much inflated to enable them to undertake as a whole the summer tour of that year. If so, Pembroke's probably took over the *Henry VI.* series of plays, since *The Contention*, or at least the *True Tragedy*, was published as performed by them, and completed it with *Richard III.* on their return to London at Christmas. It will be necessary to return to this theory in connexion with the discussion of *Titus Andronicus* and *The Taming of the Shrew*. The principal historical source for *Henry VI.* was Edward Hall's *The Union of the Noble and Illustre Families of Lancaster and York* (1542), and for *Richard III.*, as for all Shakespeare's later historical plays, the second edition (1587) of Raphael Holinshed's *Chronicles of England, Scotland and Ireland* (1577). An earlier play, *The True Tragedy of Richard the Third* (1594), seems to have contributed little if anything to *Richard III.*

5. Many scholars think that at any rate the greater part of the first two acts of *Edward III.*, containing the story of Edward's wooing of the countess of Salisbury, are by Shakespeare; and, if so, it is to about the time of *Richard III.* that the style of his contribution seems to belong. The play was entered in the Stationers' *Register* on December 1, 1595. The Shakespearian scenes are based on the 46th Novel in William Paynter's *Palace of Pleasure* (1566). The line, "Lilies that fester smell far worse than weeds" (ii. 1. 451), is repeated verbatim in the 94th sonnet.

6. To the winter season of 1592–1593 may also be assigned with fair probability Shakespeare's first experimental comedy, *The Comedy of Errors*, and if his writing at one and the same time for Pembroke's and for another company is not regarded as beyond the bounds of conjecture, it becomes tempting to identify this with "the gelyous comodey" produced, probably by Strange's men, for Henslowe as a new play on January 5, 1593. The play contains a reference to the wars of succession in France which would fit any date from 1589 to 1594. The plot is taken from the *Menaechmi*, and to a smaller extent from the *Amphitruo* of Plautus. William Warner's translation of the *Menaechmi* was entered in the Stationers' *Register* on June 10, 1594. A performance of *The Comedy of Errors* by "a company of base and common fellows" (including Shakespeare?) is recorded in the *Gesta Grayorum* as taking place in Gray's Inn hall on December 28, 1594.

7. *Titus Andronicus* is another play in which many scholars have refused to see the hand of Shakespeare, but the double testimony of its inclusion in Meres's list and in the First Folio makes it unreasonable to deny him some part in it. This may, however, only have been the part of a reviser, working, like the reviser of *The Contention*, upon the dialogue rather than the structure of a crude tragedy of the school of Kyd. In fact a stage tradition is reported by Edward Ravenscroft, a late 17th-century adapter of the play, to the effect that Shakespeare did no more than give a few "master-touches" to the work of a "private author." The play was entered in the Stationers' *Register* on February 6, 1594, and was published in the same year with a title-page setting out that it had been acted by the companies of Lords Derby (*i.e.* Strange, who had succeeded to his father's title on September 25, 1593), Pembroke and Sussex. It is natural to take this list as indicating the order in which the three companies named had to do with it, but it is probable that only Sussex's had played Shakespeare's version. Henslowe records the production by this company of *Titus and Andronicus* as a new play on January 23, 1594, only a few days before the theatres were closed by plague. For the purposes of Henslowe's financial arrangements with the company a rewritten play may have been classed as new. Two years earlier he had appended the same description to a play of *Tittus and Vespacia*, produced by Strange's men on April 11, 1592. At first sight the title suggests a piece founded on the lives of the emperor Titus and Vespasian, but the identification of the play with an early version of *Titus Andronicus* is justified by the existence of a rough German adaptation, which follows the general outlines of Shakespeare's play, but in which one of the sons of Titus is named Vespasian instead of Lucius. The ultimate source of the plot is unknown. It cannot be traced in any of the Byzantine chroniclers. Strange's men seem to have been still playing *Titus* in January 1593, and it was probably not transferred to Pembroke's until the companies were driven from London by the plague of that year. Pembroke's are known from a letter of Henslowe's to have been ruined by August, and it is to be suspected that Sussex's, who appeared in London for the first time at the Christmas of 1593, acquired their stock of plays and transferred these to the Chamberlain's men, when the companies were again reconstituted in the summer of 1594. The revision of *Titus and Vespasian* into *Titus Andronicus* by Shakespeare may have been accomplished in the interval between these two transactions. The Chamberlain's men were apparently playing *Andronicus* in June. The stock of Pembroke's men probably included, as well as *Titus and Vespasian*, both *Henry VI.* and *Richard III.*, which also thus passed to the Chamberlain's company.

8. In the same way was probably also acquired an old play of *The Taming of A Shrew*. This, which can be traced back as far as 1589, was published as acted by Pembroke's men in 1594. In June of that year it was being acted by the Chamberlain's, but more probably in the revised version by Shakespeare, which bears the slightly altered title of *The Taming of The Shrew*. This is a much more free adaptation of its original than had been attempted in the case of *Henry VI.*, and the Warwickshire allusions in the Induction are noteworthy. Some critics have doubted whether Shakespeare was the sole author of *The Shrew*, and others have assigned him a share in *A Shrew*, but neither theory has any very substantial foundation. The origins of the play, which is to be classed as a farce rather than a comedy, are to be found ultimately in widely distributed folk-tales, and more immediately in Ariosto's *I Suppositi* (1509) as translated in George Gascoigne's *The Supposes* (1566). It may have been Shakespeare's first task for the newly established Chamberlain's company of 1594 to furbish up the old farce. Thenceforward there is no reason to think that he ever wrote for any other company.

9. *Love's Labour's Lost* has often been regarded as the first of Shakespeare's plays, and has sometimes been placed as early as 1589. There is, however, no proof that Shakespeare was writing before 1592 or thereabouts. The characters of *Love's Labour's Lost* are evidently suggested by Henry of Navarre, his followers Biron and Longaville, and the Catholic League leader, the duc de Maine. These personages would have been familiar at any time from 1585 onwards. The absence of the play from the lists in Henslowe's *Diary* does not leave it impossible that it should have preceded the formation of the Chamberlain's company, but certainly renders this less likely; and its lyric character perhaps justifies its being grouped with the series of plays that began in the autumn of 1594. No entry of the play is found in the Stationers' *Register*, and it is quite possible that the present First Quarto of 1598 was not really the first edition. The title-page professes to give the play as it was "corrected and augmented" for the Christmas either of 1597 or of 1598. It was again revived for that of 1604. No literary source is known for its incidents.

10. *Romeo and Juliet*, which was published in 1597 as played by Lord Hunsdon's men, was probably produced somewhat before *A Midsummer Night's Dream*, as its incidents seem to have suggested the parody of the Pyramus and Thisbe interlude. An attempt to date it in 1591 is hardly justified by the Nurse's references to an earthquake eleven years before and the fact that there was a real earthquake in London in 1580. The text seems to have been partly revised before the issue of the Second Quarto in 1599. There had been an earlier play on the subject, but the immediate source used by Shakespeare was Arthur Brooke's narrative poem *Romeus and Juliet* (1562).

11. *A Midsummer Night's Dream*, with its masque-like scenes of fairydom and the epithalamium at its close, has all the air of having been written less for the public stage than for some courtly wedding; and the compliment paid by Oberon to the "fair vestal throned by the west" makes it probable that it was a wedding at which Elizabeth was present. Two fairly plausible occasions have been suggested. The wedding of Mary countess of Southampton with Sir Thomas Heneage on the 2nd of May 1594 would fit the May-day setting of the plot; but a widowed countess hardly answers to the "little western flower" of the allegory, and there are allusions to events later in 1594 and in particular to the rainy weather of June and July, which indicate a somewhat later date. The wedding of William Stanley, earl of Derby, brother of the lord Strange for whose players Shakespeare had written, and Elizabeth Vere, daughter of the earl of Oxford, which took place at Greenwich on the 26th of January 1595, perhaps fits the conditions best. It has been fancied that Shakespeare was present when "certain stars shot madly from their spheres" in the Kenilworth fireworks of 1575, but if he had any such entertainment in mind it is more likely to have been the more recent one given to Elizabeth by the earl of Hertford at Elvetham in 1591. There appears to be no special source for the play beyond Chaucer's *Knight's Tale* and the widespread fairy lore of western Europe.

12. No very definite evidence exists for the date of *The Two Gentlemen of Verona*, other than the mention of it in *Palladis Tamia*. It is evidently a more rudimentary essay in the genre of romantic comedy than *The Merchant of Venice*, with which it has other affinities in its Italian colouring and its use of the inter-relations of love and friendship as a theme; and it may therefore be roughly assigned to the neighbourhood of 1595. The plot is drawn from various examples of contemporary fiction, especially from the story of the shepherdess Filismena in Jorge de Montemayor's *Diana* (1559). A play of *Felix and Philiomena* had already been given at court in 1585.

13. *King John* is another play for which 1595 seems a likely date, partly on account of its style, and partly from the improbability of a play on an independent subject drawn from English history being interpolated into the middle either of the Yorkist or of the Lancastrian series. It would seem that Shakespeare had before him an old play of the Queen's men, called *The Troublesome Reign of King John*. This was published in 1591, and again, with "W. Sh." on the title-page, in 1611. For copyright purposes *King John* appears to have been regarded as a revision of *The Troublesome Reign*, and in fact the succession of incidents in the two plays is much the same. Shakespeare's dialogue, however, owes little or nothing to that of his predecessor.

14. *Richard II.* can be dated with some accuracy by a comparison of the two editions of Samuel Daniel's narrative poem on *The Civil Wars Between the Two Houses of Lancaster and York*, both of which bear the date of 1595 and were therefore issued between March 25, 1595 and March 24, 1596 of the modern reckoning. The second of these editions, but not the first, contains some close parallels to the play. From the first two quartos of *Richard II.*, published in 1597 and 1598, the deposition scene was omitted, although it was clearly part of the original structure of the play, and its removal leaves an obvious mutilation in the text. There is some reason to suppose that this was due to a popular tendency to draw seditious parallels between Richard and Elizabeth; and it became one of the charges against the earl of Essex and his fellow-conspirators in the abortive *émeute* of February 1601, that they had procured a performance of a play on Richard's fate in order to stimulate their followers. As the actors were the Lord Chamberlain's men, this play can hardly have been any other than Shakespeare's. The deposition scene was not printed until after Elizabeth's death, in the Third Quarto of 1608.

15. *The Merchant of Venice*, certainly earlier than July 22, 1598, on which date it was entered in the Stationers' *Register*, and possibly inspired by the machinations of the Jew poisoner Roderigo Lopez, who was executed in June 1594, shows a considerable advance in comic and melodramatic power over any of the earlier plays, and is assigned by a majority of scholars to about 1596. The various stories of which its plot is compounded are based upon common themes of folk-tales and Italian *novelle*. It is possible that Shakespeare may have had before him a play called *The Jew*, of which there are traces as early as 1579, and in which motives illustrating "the greedinesse of worldly chusers" and the "bloody mindes of usurers" appear to have been already combined. Something may also be owing to Marlowe's play of *The Jew of Malta*.

16, 17. The existence of *Richard II.* is assumed throughout in *Henry IV.*, which probably therefore followed it after no long interval. The first part was published in 1598, the second not until 1600, but both parts must have been in existence before the entry of the first part in the Stationers' *Register* on February 25th 1598, since Falstaff is named in this entry, and a slip in a speech-prefix of the second part, which was not entered in the *Register* until August 23rd 1600, betrays that it was written when the character still bore the name of Sir John Oldcastle. Richard James, in his dedication to *The Legend of Sir John Oldcastle* about 1625, and Rowe in 1709 both bear witness to the substitution of the one personage for the other, which Rowe

ascribes to the intervention of Elizabeth, and James to that of some descendants of Oldcastle, one of whom was probably Lord Cobham. There is an allusion to the incident and an acknowledgment of the wrong done to the famous Lollard martyr in the epilogue to 2 *Henry IV.* itself. Probably Shakespeare found Oldcastle, with very little else that was of service to him, in an old play called *The Famous Victories of Henrythe Fifth*, which had been acted by Tarlton and the Queen's men at least as far back as 1588, and of which an edition was printed in 1598. Falstaff himself is a somewhat libellous presentment of the 15th century leader, Sir John Fastolf, who had already figured in *Henry VI.*; but presumably Fastolf had no titled descendants alive in 1598.

18. An entry in the Stationers' *Register* during 1600 shows that *Much Ado About Nothing* was in existence, although its publication was then directed to be "stayed." It may plausibly be regarded as the earliest play not included in Meres's list. In 1613 it was revived before James I. under the alternative title of *Benedick and Beatrice*. Dogberry is said by Aubrey to have been taken from a constable at Grendon in Buckinghamshire. There is no very definite literary source for the play, although some of its incidents are to be found in Ariosto's *Orlando Furioso* and Bandello's *novelle*, and attempts have been made to establish relationships betwen it and two early German plays, Jacob Ayrer's *Die Schöne Phaenicia* and the *Vincentius Ladislaus* of Duke Henry Julius of Brunswick.

19. The completion of the Lancastrian series of histories by *Henry V.* can be safely placed in or about 1599, since there is an allusion in one of the choruses to the military operations in Ireland of the earl of Essex, who crossed on March 27 and returned on September 28, 1599. The First Quarto, which was first "stayed" with *Much Ado About Nothing* and then published in 1600, is a piratical text, and does not include the choruses. A genuine and perhaps slightly revised version was first published in the First Folio.

20. That *Julius Caesar* also belongs to 1599 is shown, not only by its links with *Henry V.* but also by an allusion to it in John Weever's *Mirror of Martyrs*, a work written two years before its publication in 1601, and by a notice of a performance on September 21st, 1599 by Thomas Platter of Basel in an account of a visit to London. This was the first of Shakespeare's Roman plays, and, like those that followed, was based upon Plutarch's *Lives* as translated from the French of Jacques Amyot and published by Sir Thomas North in 1580. It was also Shakespeare's first tragedy since *Romeo and Juliet*.

21. It is reported by John Dennis, in the preface to *The Comical Gallant* (1702), that *The Merry Wives of Windsor* was written at the express desire of Elizabeth, who wished to see Falstaff in love, and was finished by Shakespeare in the space of a fortnight. A date at the end of 1599 or the beginning of 1600, shortly after the completion of the historical Falstaff plays, would be the most natural one for this enterprise, and with such a date the evidence of style agrees. The play was entered in the Stationers' *Register* on January 18th, 1602. The First Quarto of the same year appears to contain an earlier version of the text than that of the First Folio. Among the passages omitted in the revision was an allusion to the adventures of the duke of Württemberg and count of Mompelgard, whose attempts to secure the Garter had brought him into notice. The Windsor setting makes it possible that *The Merry Wives* was produced at a Garter feast, and perhaps with the assistance of the children of Windsor Chapel in the fairy parts. The plot has its analogies to various incidents in Italian *novelle* and in English adaptations of these.

22. *As You Like It* was one of the plays "stayed" from publication in 1600, and cannot therefore be later than that year. Some trifling bits of evidence suggest that it is not earlier than 1599. The plot is based upon Thomas Lodge's romance of *Rosalynde* (1590), and this in part upon the pseudo-Chaucerian *Tale of Gamelyn*.

23. A play of *Hamlet* was performed, probably by the Chamberlain's men, for Henslowe at Newington Butts on the 9th of June 1594. There are other references to it as a revenge-play, and it seems to have been in existence in some shape as early as 1589. It was doubtless on the basis of this that Shakespeare constructed his tragedy. Some features of the so-called *Ur-Hamlet* may perhaps be traceable in the German play of *Der bestrafte Brudermord*. There is an allusion in *Hamlet* to the rivalry between the ordinary stages and the private plays given by boy actors, which points to a date during the vogue of the children of the Chapel, whose performances began late in 1600, and another to an inhibition of plays on account of a "late innovation," by which the Essex rising of February 1601 may be meant. The play was entered in the Stationers' *Register* on July 26, 1602. The First Quarto was printed in 1603 and the Second Quarto in 1604. These editions contain texts whose differences from each other and from that of the First Folio are so considerable as to suggest, even when allowance has been made for the fact that the First Quarto is probably a piratical venture, that the play underwent an exceptional amount of rewriting at Shakespeare's hands. The title-page of the First Quarto indicates that the earliest version was acted in the universities of Oxford and Cambridge and elsewhere, as well as in London. The ultimate source of the plot is to be found in Scandinavian legends preserved in the *Historia Danica* of Saxo Grammaticus, and transmitted to Shakespeare or his predecessor through the *Histoires tragiques* (1570) of François de Belleforest (see HAMLET).

24. *Twelfth Night* may be fairly placed in 1601–1602, since it quotes part of a song included in Robert Jones's *First Book of Songs and Airs* (1600), and is recorded by John Manningham to have been seen by him at a feast in the Middle Temple hall on February 2nd, 1602. The principal source of the plot was Barnabe Riche's "History of Apolonius and Silla" in his *Farewell to Military Profession* (1581).

25. Few of the plays present so many difficulties as *Troilus and Cressida*, and it cannot be said that its literary history has as yet been thoroughly worked out. A play of the name, "as yt is acted by my Lord Chamberlens men" was entered in the Stationers' *Register* on February 7th, 1603, with a note that "sufficient authority" must be got by the publisher, James Roberts, before he printed it. This can hardly be any other than Shakespeare's play; but it must have been "stayed," for the First Quarto did not appear until 1609, and on the 28th of January of that year a fresh entry had been made in the *Register* by another publisher. The text of the Quarto differs in certain respects from that of the Folio, but not to a greater extent than the use of different copies of the original manuscript might explain. Two alternative title-pages are found in copies of the Quarto. On one, probably the earliest, is a statement that the play was printed "as it was acted by the Kings Maiesties seruants at the Globe"; from the other these words are omitted, and a preface is appended which hints that the "grand possessors" of the play had made difficulties about its publication, and describes it as "never staled with the stage." Attempts have been made, mainly on grounds of style, to find another hand than Shakespeare's in the closing scenes and in the prologue, and even to assign widely different dates to various parts of what is ascribed to Shakespeare. But the evidence does not really bear out these theories, and the style of the whole must be regarded as quite consistent with a date in 1601 or 1602. The more probable year is 1602, if, as seems not unlikely, the description of Ajax and his humours in the second scene of the first act is Shakespeare's "purge" to Jonson in reply to the *Poetaster* (1601), alluded to, as already mentioned, in the *Return from Parnassus*, a Cambridge play acted probably at the Christmas of 1602–1603 (rather than, as is usually asserted, 1601–1602). It is tempting to conjecture that *Troilus and Cressida* may have been played, like *Hamlet*, by the Chamberlain's men at Cambridge, but may never have been taken to London, and in this sense "never staled with the stage." The only difficulty of a date in 1602 is that a parody of a play on Troilus and Cressida is introduced into *Histriomastix* (*c.* 1599), and that in this Troilus "shakes his furious speare." But Henslowe had produced another play on the subject, by Dekker and Chettle, in 1599, and probably, therefore,

no allusion to Shakespeare is really intended. The material for *Troilus and Cressida* was taken by Shakespeare from Chaucer's *Troilus and Criseyde*, Caxton's *Recuyell of the Historyes of Troye*, and Chapman's Homer.

26. It is almost wholly on grounds of style that *All's Well that Ends Well* is placed by most critics in or about 1602, and, as in the case of *Troilus and Cressida*, it has been argued, though with little justification, that parts of the play are of considerably earlier date, and perhaps represent the *Love's Labour's Won* referred to by Meres. The story is derived from Boccaccio's *Decameron* through the medium of William Paynter's *Palace of Pleasure* (1566).

27. *Measure for Measure* is believed to have been played at court on the 26th of December 1604. The evidence for this is to be found, partly in an extract made for Malone from official records now lost, and partly in a forged document, which may, however, rest upon genuine information, placed amongst the account-books of the Office of the Revels. If this is correct the play was probably produced when the theatres were reopened after the plague in 1604. The plot is taken from a story already used by George Whetstone, both in his play of *Promos and Cassandra* (1578) and in his prose *Heptameron of Civil Discourses* (1582), and borrowed by him from Giraldi Cinthio's *Hecatommithi* (1566).

28. A performance at court of *Othello* on November 1, 1604, is noted in the same records as those quoted with regard to *Measure for Measure*, and the play may be reasonably assigned to the same year. An alleged performance at Harefield in 1602 certainly rests upon a forgery. The play was revived in 1610 and seen by Prince Louis of Württemberg at the Globe on April 30 of that year. It was entered in the Stationers' *Register* on October 6, 1621, and a First Quarto was published in 1622. The text of this is less satisfactory than that of the First Folio, and omits a good many lines found therein and almost certainly belonging to the play as first written. It also contains some profane expressions which have been modified in the Folio, and thereby points to a date for the original production earlier than the Act to Restrain Abuses of Players passed in the spring of 1606. The plot, like that of *Measure for Measure*, comes from the *Hecatommithi* (1566) of Giraldi Cinthio.

29. *Macbeth* cannot, in view of its obvious allusions to James I., be of earlier date than 1603. The style and some trifling allusions point to about 1605 or 1606, and a hint for the theme may have been given by Matthew Gwynne's entertainment of the *Tres Sibyllae*, with which James was welcomed to Oxford on August 27, 1605. The play was revived in 1610 and Simon Forman saw it at the Globe on April 20. The only extant text, that of the First Folio, bears traces of shortening, and has been interpolated with additional rhymed dialogues for the witches by a second hand, probably that of Thomas Middleton. But the extent of Middleton's contribution has been exaggerated; it is probably confined to act iii. sc. 5, and a few lines in act iv. sc. 1. A ballad of *Macdobeth* was entered in the Stationers' *Register* on August 27, 1596, but is not known. It is not likely that Shakespeare had consulted any Scottish history other than that included in Raphael Holinshed's *Chronicle*; he may have gathered witchlore from Reginald Scot's *Discoverie of Witchcraft* (1584) or King James's own *Demonologie* (1599).

30. The entry of *King Lear* in the Stationers' *Register* on November 26, 1607, records the performance of the play at court on December 26, 1606. This suggests 1605 or 1606 as the date of production, and this is confirmed by the publication in 1605 of the older play, *The True Chronicle History of King Leir*, which Shakespeare used as his source. Two Quartos of *King Lear* were published in 1608, and contain a text rather longer, but in other respects less accurate, than that of the First Folio. The material of the play consists of fragments of Celtic myth, which found their way into history through Geoffrey of Monmouth. It was accessible to Shakespeare in Holinshed and in Spenser's *Faerie Queene*, as well as in the old play.

31. It is not quite clear whether *Antony and Cleopatra* was the play of that name entered in the Stationers' *Register* on May 20, 1608, for no Quarto is extant, and a fresh entry was made in the *Register* before the issue of the First Folio. Apart from this entry, there is little external evidence to fix the date of the play, but it is in Shakespeare's later, although not his last manner, and may very well belong to 1606.

32. In the case of *Coriolanus* the external evidence available is even scantier, and all that can be said is that its closest affinities are to *Antony and Cleopatra*, which in all probability it directly followed or preceded in order of composition. Both plays, like *Julius Caesar*, are based upon the *Lives* of Plutarch, as Englished by Sir Thomas North.

33. There is no external evidence as to the date of *Timon of Athens*, but it may safely be grouped on the strength of its internal characteristics with the plays just named, and there is a clear gulf between it and those that follow. It may be placed provisionally in 1607. The critical problems which it presents have never been thoroughly worked out. The extraordinary incoherencies of its action and inequalities of its style have prevented modern scholars from accepting it as a finished production of Shakespeare, but there agreement ceases. It is sometimes regarded as an incomplete draft for an intended play; sometimes as a Shakespearian fragment worked over by a second hand either for the stage or for printing in the First Folio; sometimes, but not very plausibly, as an old play by an inferior writer which Shakespeare had partly remodelled. It does not seem to have had any relations to an extant academic play of *Timon* which remained in manuscript until 1842. The sources are to be found, partly in Plutarch's *Life of Marcus Antonius*, partly in Lucian's dialogue of *Timon or Misanthropos*, and partly in William Paynter's *Palace of Pleasure* (1566).

34. Similar difficulties, equally unsolved, cling about *Pericles*. It was entered in the Stationers' *Register* on May 20, 1608, and published in 1609 as "the late and much admired play" acted by the King's men at the Globe. The title-page bears Shakespeare's name, but the play was not included in the First Folio, and was only added to Shakespeare's collected works in the Third Folio, in company with others which, although they also had been printed under his name or initials in quarto form, are certainly not his. In 1608 was published a prose story, *The Painful Adventures of Pericles Prince of Tyre*. This claims to be the history of the play as it was presented by the King's players, and is described in a dedication by George Wilkins as "a poore infant of my braine." The production of the play is therefore to be put in 1608 or a little earlier. It can hardly be doubted on internal evidence that Shakespeare is the author of the verse-scenes in the last three acts, with the exception of the doggerel choruses. It is probable, although it has been doubted, that he was also the author of the prose-scenes in those acts. To the first two acts he can at most only have contributed a touch or two. It seems reasonable to suppose that the non-Shakespearian part of the play is by Wilkins, by whom other dramatic work was produced about 1607. The prose story quotes a line or two from Shakespeare's contribution, and it follows that this must have been made by 1608. The close resemblances of the style to that of Shakespeare's latest plays make it impossible to place it much earlier. But whether Shakespeare and Wilkins collaborated in the play, or Shakespeare partially rewrote Wilkins, or Wilkins completed Shakespeare, must be regarded as yet undetermined. Unless there was an earlier Shakespearian version now lost, Dryden's statement that "Shakespeare's own Muse her Pericles first bore" must be held to be an error. The story is an ancient one which exists in many versions. In all of these except the play, the name of the hero is Apollonius of Tyre. The play is directly based upon a version in Gower's *Confessio Amantis*, and the use of Gower as a "presenter" is thereby explained. But another version in Laurence Twine's *Patterne of Painefull Adventures* (*c.* 1576), of which a new edition appeared in 1607, may also have been consulted.

35. *Cymbeline* shows a further development than *Pericles* in the direction of Shakespeare's final style, and can hardly have come earlier. A description of it is in a note-book of Simon Forman, who died in September 1611, and describes in the same book other plays seen by him in 1610 and 1611. But these were not necessarily new plays, and *Cymbeline* may perhaps be assigned

conjecturally to 1609. The mask-like dream in act v. sc. 4 must be an interpolation by another hand. This play also is based upon a wide-spread story, probably known to Shakespeare in Boccaccio's *Decameron* (day 2, novel 9), and possibly also in an English book of tales called *Westward for Smelts*. The historical part is, as usual, from Holinshed.

36. *The Winter's Tale* was seen by Forman on May 15, 1611, and as it clearly belongs to the latest group of plays it may well enough have been produced in the preceding year. A document amongst the Revels Accounts, which is forged, but may rest on some authentic basis, gives November 5, 1611 as the date of a performance at court. The play is recorded to have been licensed by Sir George Buck, who began to license plays in 1607. The plot is from Robert Greene's *Pandosto, the Triumph of Time, or Dorastus and Fawnia* (1588).

37. The wedding-mask in act iv. of *The Tempest* has suggested the possibility that it may have been composed to celebrate the marriage of the princess Elizabeth and Frederick V., the elector palatine, on February 14, 1613. But Malone appears to have had evidence, now lost, that the play was performed at court as early as 1611, and the forged document amongst the Revels Accounts gives the precise date of November 1, 1611. Sylvester Jourdan's *A Discovery of the Bermudas*, containing an account of the shipwreck of Sir George Somers in 1609, was published about October 1610, and this or some other contemporary narrative of Virginian colonization probably furnished the hint of the plot.

38. The tale of Shakespeare's independent dramas is now complete, but an analysis of the *Two Noble Kinsmen* leaves no reason to doubt the accuracy of its ascription on the title-page of the First Quarto of 1634 to Shakespeare and John Fletcher. This appears to have been a case of ordinary collaboration. There is sufficient resemblance between the styles of the two writers to render the division of the play between them a matter of some difficulty; but the parts that may probably be assigned to Shakespeare are acts i. scc. 1-4; ii. 1; iii. 1, 2; v. 1, 3, 4. Fletcher's morris-dance in act iii. sc. 5 is borrowed from that in Beaumont's *Mask of the Inner Temple and Gray's Inn*, given on February 20, 1613, and the play may perhaps be dated in 1613. It is based on Chaucer's *Knight's Tale*.

39. It may now be accepted as a settled result of scholarship that *Henry VIII.* is also the result of collaboration, and that one of the collaborators was Fletcher. There is no good reason to doubt that the other was Shakespeare, although attempts have been made to substitute Philip Massinger. The inclusion, however, of the play in the First Folio must be regarded as conclusive against this theory. There is some ground for suspicion that the collaborators may have had an earlier work of Shakespeare before them, and this would explain the reversion to the "history" type of play which Shakespeare had long abandoned. His share appears to consist of act i. scc. 1, 2; act ii. scc. 3, 4; act iii. sc. 2, ll. 1-203; act v. sc. 1. The play was probably produced in 1613, and originally bore the alternative title of *All is True*. It was being performed in the Globe on June 29, 1613, when the thatch caught fire and the theatre was burnt. The principal source was Holinshed, but Hall's *Union of Lancaster and York*, Foxe's *Acts and Monuments of the Church*, and perhaps Samuel Rowley's play of *When You See Me, You Know Me* (1605), appear also to have contributed.

Shakespeare's non-dramatic writings are not numerous. The narrative poem of *Venus and Adonis* was entered in the Stationers' *Register* on April 18, 1593, and thirteen editions, dating from 1593 to 1636, are known. The *Rape of Lucrece* was entered in the *Register* on May 9, 1594, and the six extant editions range from 1594 to 1624. Each poem is prefaced by a dedicatory epistle from the author to Henry Wriothesley, earl of Southampton. The subjects, taken respectively from the *Metamorphoses* and the *Fasti* of Ovid, were frequent in Renaissance literature. It was once supposed that Shakespeare came from Stratford-on-Avon with *Venus and Adonis* in his pocket; but it is more likely that both poems owe their origin to the comparative leisure afforded to playwrights and actors by the plague-period of 1592–1594. In 1599 the stationer William Jaggard published a volume of miscellaneous verse which he called *The Passionate Pilgrim*, and placed Shakespeare's name on the title-page. Only two of the pieces included herein are certainly Shakespeare's, and although others may quite possibly be his, the authority of the volume is destroyed by the fact that some of its contents are without doubt the work of Marlowe, Sir Walter Raleigh, Richard Barnfield and Bartholomew Griffin. In 1601 Shakespeare contributed *The Phoenix and the Turtle*, an elegy on an unknown pair of wedded lovers, to a volume called *Love's Martyr, or Rosalin's Complaint*, which was collected and mainly written by Robert Chester.

Poems.

The interest of all these poems sinks into insignificance beside that of one remaining volume. The *Sonnets* were entered in the *Register* on May 20, 1609, by the stationer Thomas Thorpe, and published by him under the title *Shakespeares Sonnets, never before Imprinted*, in the same year. In addition to a hundred and fifty-four sonnets, the volume contains the elegiac poem, probably dating from the *Venus and Adonis* period, of *A Lover's Complaint*. In 1640 the *Sonnets*, together with other poems from *The Passionate Pilgrim* and elsewhere, many of them not Shakespeare's, were republished by John Benson in *Poems Written by Wil. Shakespeare, Gent.* Here the sonnets are arranged in an altogether different order from that of 1609 and are declared by the publisher to "appeare of the same purity, the Authour himselfe then living avouched." No Shakespearian controversy has received so much attention, especially during recent years, as that which concerns itself with the date, character, and literary history of the *Sonnets*. This is intelligible enough, since upon the issues raised depends the question whether these poems do or do not give a glimpse into the intimate depths of a personality which otherwise is at the most only imperfectly revealed through the plays. On the whole, the balance of authority is now in favour of regarding them as in a very considerable measure autobiographical. This view has undergone the fires of much destructive argument. The authenticity of the order in which the sonnets were printed in 1609 has been doubted; and their subject-matter has been variously explained as being of the nature of a philosophical allegory, of an effort of the dramatic imagination, or of a heartless exercise in the forms of the Petrarchan convention. This last theory has been recently and strenuously maintained, and may be regarded as the only one which now holds the field in opposition to the autobiographical interpretation. But it rests upon the false psychological assumption, which is disproved by the whole history of poetry and in particular of Petrarchan poetry, that the use of conventions is inconsistent with the expression of unfeigned emotions; and it is hardly to be set against the direct conviction which the sonnets carry to the most finely critical minds of the strength and sincerity of the spiritual experience out of which they were wrought. This conviction makes due allowance for the inevitable heightening of emotion itself in the act of poetic composition; and it certainly does not carry with it a belief that all the external events which underlie the emotional development are capable at this distance of time of inferential reconstruction. But it does accept the sonnets as an actual record of a part of Shakespeare's life during the years in which they were written, and as revealing at least the outlines of a drama which played itself out for once, not in his imagination but in his actual conduct in the world of men and women.

Problems of the Sonnets.

There is no advantage to be gained by rearranging the order of the 1609 volume, even if there were any basis other than that of individual whim on which to do so. Many of the sonnets are obviously linked to those which follow or precede them; and although a few may conceivably be misplaced, the order as a whole does not jar against the sense of emotional continuity, which is the only possible test that can be applied. The last two sonnets, however, are merely alternative versions of a Greek epigram, and the rest fall into two series, which are more probably parallel than successive. The shorter of these two series (cxxvii.-clii.) appears to be the record of the poet's relations with a mistress, a dark woman with raven brows and mourning eyes.

In the earlier sonnets he undertakes the half-playful defence of black beauty against the blonde Elizabethan ideal; but the greater number are in a more serious vein, and are filled with a deep consciousness of the bitterness of lustful passion and of the slavery of the soul to the body. The woman is a wanton. She has broken her bed-vow for Shakespeare, who on his side is forsworn in loving her; and she is doubly forsworn in proving faithless to him with other men. His reason condemns her, but his heart has not the power to throw off her tyranny. Her particular offence is that she, "a woman coloured ill," has cast her snares not only upon him, but upon his friend, "a man right fair," who is his "better angel," and that thus his loss is double, in love and friendship. The longer series (i.-cxxvi.) is written to a man, appears to extend over a considerable period of time, and covers a wide range of sentiment. The person addressed is younger than Shakespeare, and of higher rank. He is lovely, and the son of a lovely mother, and has hair like the auburn buds of marjoram. The series falls into a number of groups, which are rarely separated by any sharp lines of demarcation. Perhaps the first group (i.-xvii.) is the most distinct of all. These sonnets are a prolonged exhortation by Shakespeare to his friend to marry and beget children. The friend is now on the top of happy hours, and should make haste, before the rose of beauty dies, to secure himself in his descendants against devouring time. In the next group (xviii.-xxv.) a much more personal note is struck, and the writer assumes the attitudes, at once of the poet whose genius is to be devoted to eternizing the beauty and the honour of his patron, and of the friend whose absorbing affection is always on the point of assuming an emotional colour indistinguishable from that of love. The consciousness of advancing years and that of a fortune which bars the triumph of public honour alike find their consolation in this affection. A period of absence (xxvi.-xxxii.) follows, in which the thought of friendship comes to remedy the daily labour of travel and the sorrows of a life that is "in disgrace with fortune and men's eyes" and filled with melancholy broodings over the part. Then (xxxiii.-xlii.) comes an estrangement. The friend has committed a sensual fault, which is at the same time a sin against friendship. He has been wooed by a woman loved by the poet, who deeply resents the treachery, but in the end forgives it, and bids the friend take all his loves, since all are included in the love that has been freely given him. It is difficult to escape the suggestion that this episode of the conflict between love and friendship is the same as that which inspired some of the "dark woman" sonnets. Another journey (xliii.-lii) is again filled with thoughts of the friend, and its record is followed by a group of sonnets (liii.-lv.) in which the friend's beauty and the immortality which this will find in the poet's verse are especially dwelt upon. Once more there is a parting (lvi.-lxi.) and the poet waits as patiently as may be his friend's return to him. Again (lxii.-lxv.) he looks to his verse to give the friend immortality. He is tired of the world, but his friend redeems it (lxvi.-lxviii.). Then rumours of some scandal against his friend (lxix.-lxx.) reach him, and he falls (lxxi.-lxxiv.) into gloomy thoughts of coming death. The friend, however, is still (lxxv.-lxxvii.) his argument; and he is perturbed (lxxviii.-lxxxvi.) by the appearance of a rival poet, who claims to be taught by spirits to write "above a mortal pitch," and with "the proud full sail of his great verse" has already won the countenance of Shakespeare's patron. There is another estrangement (lxxxvii.-xc.), and the poet, already crossed with the spite of fortune, is ready not only to acquiesce in the loss of friendship, but to find the fault in himself. The friend returns to him, but the relation is still clouded by doubts of his fidelity (xci.-xciii.) and by public rumours of his wantonness (xciv.-xcvi.). For a third time the poet is absent (xcvii.-xcix.) in summer and spring. Then comes an apparent interval, after which a love already three years old is renewed (c.-civ.), with even richer praises (cv.-cviii). It is now the poet's turn to offer apologies (cix.-cxii.) for offences against friendship and for some brand upon his name apparently due to the conditions of his profession. He is again absent (cxiii.) and again renews his protestations of the imperishability of love (cxiv.-cxvi.) and of his own unworthiness (cxvii.-cxxi.), for which his only excuse is in the fact that the friend was once unkind. If the friend has suffered as Shakespeare suffered, he has "passed a hell of time." The series closes with a group (cxxii.-cxxv.) in which love is pitted against time; and an *envoi*, not in sonnet form, warns the "lovely boy" that in the end nature must render up her treasure.

Such an analysis can give no adequate idea of the qualities in these sonnets, whereby the appeal of universal poetry is built up on a basis of intimate self-revelation. The human document is so legible, and at the same time so incomplete, that it is easy to understand the strenuous efforts which have been made to throw further light upon it by tracing the identities of those other personalities, the man and the woman, through his relations to whom the poet was brought to so fiery an ordeal of soul, and even to the borders of self-abasement. It must be added that the search has, as a rule, been conducted with more ingenuity than judgment. It has generally started from the terms of a somewhat mysterious dedication prefixed by the publisher Thomas Thorpe to the volume of 1609. This runs as follows:—"To the onlie begetter of these insuing sonnets Mr W. H. all happinesse and that eternitie promised by our ever-living poet wisheth the well-wishing adventurer in setting forth T. T." The natural interpretation of this is that the inspirer or "begetter" of the sonnets bore the initials W. H.; and contemporary history has accordingly been ransacked to find a W. H. whose age and circumstances might conceivably fit the conditions of the problem which the sonnets present. It is perhaps a want of historical perspective which has led to the centring of controversy around two names belonging to the highest ranks of the Elizabethan nobility, those of Henry Wriothesley, earl of Southampton, and William Herbert, earl of Pembroke. There is some evidence to connect Shakespeare with both of these. To Southampton he dedicated *Venus and Adonis* in 1593 and *The Rape of Lucrece* in 1594, and the story that he received a gift of no less than £1000 from the earl is recorded by Rowe. His acquaintance with Pembroke can only be inferred from the statement of Heminge and Condell in their preface to the First Folio of the plays, that Pembroke and his brother Montgomery had "prosequuted both them and their Authour living, with so much favour." The personal beauty of the rival claimants and of their mothers, their amours and the attempts of their families to persuade them to marry, their relations to poets and actors, and all other points in their biographies which do or do not fit in with the indications of the sonnets, have been canvassed with great spirit and some erudition, but with no very conclusive result. It is in Pembroke's favour that his initials were in fact W. H., whereas Southampton's can only be turned into W. H. by a process of metathesis; and his champions have certainly been more successful than Southampton's in producing a dark woman, a certain Mary Fitton, who was a mistress of Pembroke's, and was in consequence dismissed in disgrace from her post of maid of honour to Elizabeth. Unfortunately, the balance of evidence is in favour of her having been blonde, and not "black." Moreover, a careful investigation of the sonnets, as regards their style and their relation to the plays, renders it almost impossible on chronological grounds that Pembroke can have been their subject. He was born on the 9th of April 1580, and was therefore much younger than Southampton, who was born on the 6th of October 1573. The earliest sonnets postulate a marriageable youth, certainly not younger than eighteen, an age which Southampton reached in the autumn of 1591 and Pembroke in the spring of 1598. The writing of the sonnets may have extended over several years, but it is impossible to doubt that as a whole it is to the years 1593–1598 rather than to the years 1598–1603 that they belong. There is not, indeed, much external evidence available. Francis Meres in his *Palladis Tamia* of 1598 mentions Shakespeare's "sugred sonnets among his private friends,"[1] but this allusion might come as well at

Mystery of "Mr W. H."

[1] "The sweet witty soul of Ovid lives in mellifluous and honey-tongued Shakespeare, witness his *Venus and Adonis*, his *Lucrece*, his sugred sonnets among his private friends."

the beginning as at the end of the series; and the fact that two, not of the latest, sonnets are in *The Passionate Pilgrim* of 1599 is equally inconclusive.

The only reference to an external event in the sonnets themselves, which might at first sight seem useful, is in the following lines (cvii.):—

> "The mortal moon hath her eclipse endured,
> And the sad augurs mock their own presage;
> Incertainties now crown themselves assured,
> And peace proclaims olives of endless age."

This has been variously interpreted as referring to the death of Elizabeth and accession of James in 1603, to the relief caused by the death of Philip II. of Spain in 1598, and to the illness of Elizabeth and threatened Spanish invasion in 1596. Obviously the "mortal moon" is Elizabeth, but although "eclipse" may well mean "death," it is not quite so clear that "endure an eclipse" can mean "die."

Nor do the allusions to the rival poet help much. "The proud full sail of his great verse" would fit, on critical grounds, with Spenser, Marlowe, Chapman, and possibly Peele, Daniel or Drayton; and the "affable familiar ghost," from whom the rival is said to obtain assistance by night, might conceivably be an echo of a passage in one of Chapman's dedications. Daniel inscribed a poem to Southampton in 1603, but with this exception none of the poets named are known to have written either for Southampton or for Pembroke, or for any other W. H. or H. W., during any year which can possibly be covered by the sonnets. Two very minor poets, Barnabe Barnes and Gervase Markham, addressed sonnets to Southampton in 1593 and 1595 respectively, and Thomas Nash composed improper verses for his delectation.

But even if external guidance fails, the internal evidence for 1593–1598 as approximately the sonnet period in Shakespeare's life is very strong indeed. It has been worked out in detail by two German scholars, Hermann Isaac (now Conrad) in the *Shakespeare-Jahrbuch* for 1884, and Gregor Sarrazin in *William Shakespeares Lehrjahre* (1897) and *Aus Shakespeares Meisterwerkstatt* (1906). Isaac's work, in particular, has hardly received enough attention even from recent English scholars, probably because he makes the mistakes of taking the sonnets in Bodenstedt's order instead of Shakespeare's, and of beginning his whole chronology several years too early in order to gratify a fantastic identification of W. H. with the earl of Essex. This, however, does not affect the main force of an argument by which the affinities of the great bulk of the sonnets are shown, on the ground of stylistic similarities, parallelisms of expression, and parallelisms of theme, to be far more close with the poems and with the range of plays from *Love's Labour's Lost* to *Henry IV.* than with any earlier or later section of Shakespeare's work. This dating has the further advantage of putting Shakespeare's sonnets in the full tide of Elizabethan sonnet-production, which began with the publication of Sidney's *Astrophel and Stella* in 1591 and Daniel's *Delia* and Constable's *Diana* in 1592, rather than during years for which this particular kind of poetry had already ceased to be modish. It is to the three volumes named that the influence upon Shakespeare of his predecessors can most clearly be traced; while he seems in his turn to have served as a model for Drayton, whose sonnets to Idea were published in a series of volumes in 1594, 1599, 1602, 1605 and 1619. It does not of course follow that because the sonnets belong to 1593–1598 W. H. is to be identified with Southampton. On general grounds he is likely, even if above Shakespeare's own rank, to have been somewhat nearer that rank than a great earl, some young gentleman, for example, of such a family as the Sidneys, or as the Walsinghams of Chislehurst.

It is possible that there is an allusion to Shakespeare's romance in a poem called "Willobie his Avisa," published in 1594 as from the pen of one Henry Willoughby, apparently of West Knoyle in Wiltshire. In this Willoughby is introduced as taking counsel when in love with "his familiar friend W. S. who not long before had tryed the curtesy of the like passion, and was now newly recovered of the like infection." But there is nothing outside the poem to connect Shakespeare with a family of Willoughbys or with the neighbourhood of West Knoyle. Various other identifications of W. H. have been suggested, which rarely rest upon anything except a similarity of initials. There is little plausibility in a theory broached by Mr Sidney Lee, that W. H. was not the friend of the sonnets at all, but a certain William Hall, who was himself a printer, and might, it is conjectured, have obtained the "copy" of the sonnets for Thorpe. It is, of course, just possible that the "begetter" of the title-page might mean, not the "inspirer," but the "procurer for the press" of the sonnets; but the interpretation is shipwrecked on the obvious identity of the person to whom Thorpe "wishes" eternity with the person to whom the poet "promised" that eternity. The external history of the *Sonnets* must still be regarded as an unsolved problem; the most that can be said is that their subject may just possibly be Southampton, and cannot possibly be Pembroke.

The man and the artist.

In order to obtain a glimmering of the man that was Shakespeare, it is necessary to consult all the records and to read the evidence of his life-work in the plays, alike in the light of the simple facts of his external career and in that of the sudden vision of his passionate and dissatisfied soul preserved in the sonnets. By exclusive attention to any one of these sources of information it is easy to build up a consistent and wholly false conception of a Shakespeare; of a Shakespeare struggling between his senses and his conscience in the artistic Bohemianism of the London taverns; of a sleek, bourgeois Shakespeare to whom his art was no more than a ready way to a position of respected and influential competence in his native town; of a great objective artist whose personal life was passed in detached contemplation of the puppets of his imagination. Any one of these pictures has the advantage of being more vivid, and the disadvantage of being less real, than the somewhat elusive and enigmatic Shakespeare who glances at us for a perplexing moment, now behind this, now behind that, of his diverse masks. It is necessary also to lay aside Shakespeareolatry, the spirit that could wish with Hallam that Shakespeare had never written the *Sonnets*, or can refuse to accept *Titus Andronicus* on the ground that "the play declares as plainly as play can speak, 'I am not Shakespeare's; my repulsive subject, my blood and horrors, are not, and never were his.'" The literary historian has no greater enemy than the sentimentalist. In Shakespeare we have to do with one who is neither beyond criticism as a man nor impeccable as an artist. He was for all time, no doubt; but also very much of an age, the age of the later Renaissance, with its instinct for impetuous life, and its vigorous rather than discriminating appetite for literature. When Ben Jonson said that Shakespeare lacked "art," and when Milton wrote of his "native wood-notes wild," they judged truly. The Shakespearian drama is magnificent and incoherent; it belongs to the adolescence of literature, to a period before the instrument had been sharpened and polished, and made unerring in its touch upon the sources of laughter and of tears. Obviously nobody has such power over our laughter and our tears as Shakespeare. But it is the power of temperament rather than of art; or rather it is the power of a capricious and unsystematic artist, with a perfect dramatic instinct for the exposition of the ideas, the characters, the situations, which for the moment command his interest, and a perfect disregard for the laws of dramatic psychology which require the patient pruning and subordination of all material that does not make for the main exposition. This want of finish, this imperfect fusing of the literary ore, is essentially characteristic of the Renaissance, as compared with ages in which the creative impulse is weaker and leaves room for a finer concentration of the means upon the end. There is nearly always unity of purpose in a Shakespearian play, but it often requires an intellectual effort to grasp it and does not result in a unity of effect. The issues are obscured by a careless generosity which would extend to art the boundless freedom of life itself. Hence the intrusive and jarring elements which stand in such curious incongruity with the utmost reaches of

which the dramatic spirit is capable; the conventional and melodramatic endings, the inconsistencies of action and even of character, the emotional confusions of tragicomedy, the complications of plot and subplot, the marring of the give-and-take of dialogue by superfluities of description and of argument, the jest and bombast lightly thrown in to suit the taste of the groundlings, all the flecks that to an instructed modern criticism are only too apparent upon the Shakespearian sun. It perhaps follows from this that the most fruitful way of approaching Shakespeare is by an analysis of his work rather as a process than as a completed whole. His outstanding positive quality is a vast comprehensiveness, a capacity for growth and assimilation, which leaves no aspect of life unexplored, and allows of no finality in the nature of his judgments upon life. It is the real and sufficient explanation and justification of the pains taken to determine the chronological order of his plays, that the secret of his genius lies in its power of development and that only by the study of its development can he be known. He was nearly thirty when, so far as we can tell, his career as a dramatist began; and already there lay behind him those six or seven unaccounted-for years since his marriage, passed no one knows where, and filled no one knows with what experience, but assuredly in that strenuous Elizabethan life with some experience kindling to his intellect and formative of his character. To the woodcraft and the familiarity with country sights and sounds which he brought with him from Stratford, and which mingle so oddly in his plays with a purely imaginary and euphuistic natural history, and to the book-learning of a provincial grammar-school boy, and perhaps, if Aubrey is right, also of a provincial schoolmaster, he had somehow added, as he continued to add throughout his life, that curious store of acquaintance with the details of the most diverse occupations which has so often perplexed and so often misled his commentators. It was the same faculty of acquisition that gave him his enormous vocabulary, so far exceeding in range and variety that of any other English writer.

His first group of plays is largely made up of adaptations and revisions of existing work, or at the best of essays in the conventions of stage-writing which had already achieved popularity. In the Yorkist trilogy he takes up the burden of the chronicle play, in *The Comedy of Errors* that of the classical school drama and of the page-humour of Lyly, in *Titus Andronicus* that of the crude revenge tragedy of Kyd, and in *Richard III.* that of the Nemesis motive and the exaltation of the Machiavellian superman which properly belong to Marlowe. But in *Richard III.* he begins to come to his own with the subtle study of the actor's temperament which betrays the working of a profound interest in the technique of his chosen profession. The style of the earliest plays is essentially rhetorical; the blank verse is stiff and little varied in rhythm; and the periods are built up of parallel and antithetic sentences, and punctuated with devices of iterations, plays upon words, and other methods of securing emphasis, that derive from the bad tradition of a popular stage, upon which the players are bound to rant and force the note in order to hold the attention of a dull-witted audience. During the plague-vacations of 1592 to 1594, Shakespeare tried his hand at the ornate descriptive poetry of *Venus and Adonis* and *Lucrece*; and the influence of this exercise, and possibly also of Italian travel, is apparent in the next group of plays, with their lyric notes, their tendency to warm southern colouring, their wealth of decorative imagery, and their elaborate and not rarely frigid conceits. Rhymed couplets make their appearance, side by side with blank verse, as a medium of dramatic dialogue. It is a period of experiment, in farce with *The Taming of the Shrew*, in satirical comedy with *Love's Labour's Lost*, in lyrical comedy with *A Midsummer Night's Dream*, in lyrical tragedy with *Romeo and Juliet*, in lyrical history with *Richard II.*, and finally in romantic tragicomedy with *The Two Gentlemen of Verona* and with the masterpiece of this singular genre, *The Merchant of Venice*. It is also the period of the sonnets, which have their echoes both in the phrasing and in the themes of the plays; in the black-browed Rosaline of *Love's Labour's Lost*, and in the issue between friendship and love which is variously set in *The Two Gentlemen of Verona* and in *The Merchant of Venice*. But in the latter play the sentiment is already one of retrospection; the tempest of spirit has given way to the tender melancholy of renunciation. The sonnets seem to bear witness, not only to the personal upheaval of passion, but also to some despondency at the spite of fate and the disgrace of the actor's calling. This mood too may have cleared away in the sunshine of growing popularity, of financial success, and of the possibly long-delayed return to Stratford. Certainly the series of plays written next after the travels of 1597 are light-hearted plays, less occupied with profound or vexatious searchings of spirit than with the delightful externalities of things. The histories from *King John* to *Henry V.* form a continuous study of the conditions of kingship, carrying on the political speculations begun in *Richard II.* and culminating in the brilliant picture of triumphant efficiency, the Henry of Agincourt. Meanwhile Shakespeare develops the astonishing faculty of humorous delineation of which he had given foretastes in Jack Cade, in Bottom the weaver, and in Juliet's nurse; sets the creation of Falstaff in front of his vivid pictures of contemporary England; and passes through the half-comedy, half-melodrama, of *Much Ado About Nothing* to the joyous farce of *The Merry Wives of Windsor*, and to his two perfectly sunny comedies, the sylvan comedy of *As You Like It* and the urban comedy of *Twelfth Night*.

Then there comes a change of mood, already heralded by *Julius Caesar*, which stands beside *Henry V.* as a reminder that efficiency has its seamy as well as its brilliant side. The tragedy of political idealism in Brutus is followed by the tragedy of intellectual idealism in *Hamlet*; and this in its turn by the three bitter and cynical pseudo-comedies, *All's Well That Ends Well*, in which the creator of Portia, Beatrice, Rosalind and Viola drags the honour of womanhood in the dust—*Troilus and Cressida*, in which the ideals of heroism and of romance are confounded in the portraits of a wanton and a poltroon– and *Measure for Measure*, in which the searchlight of irony is thrown upon the paths of Providence itself. Upon the causes of this new perturbation in the soul of Shakespeare it is perhaps idle to speculate. The evidence of his profound disillusion and discouragement of spirit is plain enough; and for some years the tide of his pessimistic thought advances, swelling through the pathetic tragedy of *Othello* to the cosmic tragedies of *Macbeth* and *King Lear*, with their Titan-like indictments not of man alone, but of the heavens by whom man was made. Meanwhile Shakespeare's style undergoes changes no less notable than those of his subject-matter. The ease and lucidity characteristic of the histories and comedies of his middle period give way to a more troubled beauty, and the phrasing and rhythm often tend to become elliptic and obscure, as if the thoughts were hurrying faster than speech can give them utterance. The period closes with *Antony and Cleopatra* and *Coriolanus*, in which the ideals of the love of woman and the honour of man are once more stripped bare to display the skeletons of lust and egoism, and in the latter of which signs of exhaustion are already perceptible; and with *Timon of Athens*, in which the dramatist whips himself to an almost incoherent expression of a general loathing and detestation of humanity. Then the stretched cord suddenly snaps. *Timon* is apparently unfinished, and the next play, *Pericles*, is in an entirely different vein, and is apparently finished but not begun. At this point only in the whole course of Shakespeare's development there is a complete breach of continuity. One can only conjecture the occurrence of some spiritual crisis, an illness perhaps, or some process akin to what in the language of religion is called conversion, which left him a new man, with the fever of pessimism behind him, and at peace once more with Heaven and the world.

The final group of plays, the Shakespearian part of *Pericles*, *Cymbeline*, *The Winter's Tale*, *The Tempest*, all belong to the class of what may be called idyllic romances. They are happy dreams, in which all troubles and sorrows are ultimately resolved into fortunate endings, and which stand therefore as so many symbols of an optimistic faith in the beneficent dispositions of an ordering

Providence. In harmony with this change of temper the style has likewise undergone another change, and the tense structure and marmoreal phrasing of *Antony and Cleopatra* have given way to relaxed cadences and easy and unaccentuated rhythms. It is possible that these plays, Shakespeare's last plays, with the unimportant exceptions of his contributions to Fletcher's *Henry VIII.* and *The Two Noble Kinsmen*, were written in retirement at Stratford. At any rate the call of the country is sounding through them; and it is with no regret that in the last pages of *The Tempest* the weary magician drowns his book, and buries his staff certain fathoms deep in the earth.

(E. K. C.)

The Shakespeare-Bacon Theory.

In view of the continued promulgation of the sensational theory that the plays, and presumably the poems also, so long associated with the name of Shakespeare, were not written by the man whose biography is sketched above, but by somebody else who used this pseudonym—and especially that the writer was Lord Chancellor Francis Bacon, Viscount St Albans (1561–1626)—it appears desirable to deal here briefly with this question. No such idea seems to have occurred to anybody till the middle of the 19th century (see *Bibliography* below), but having once been started it has been elaborated in certain quarters by a variety of appeals, both to internal evidence as disclosed by the knowledge displayed in Shakespeare's works and by their vocabulary and style, and to external evidence as represented by the problems connected with the facts of Shakespeare's known life and of the publication of the plays. To what may be called ingenious inferences from data of this sort have even been added attempts to show that a secret confession exists which may be detected in a cipher or cryptogram in the printing of the plays. It must suffice here to say that the contentions of the Americans, Mr Donnelly and Mrs Gallup, on this score are not only opposed to the opinion of authoritative bibliographers, who deny the existence of any such cipher, but have carried their supporters to lengths which are obviously absurd and impossible. Lord Penzance, a great lawyer whose support of the Baconian theory may be found in his "judicial summing-up," published in 1902, expressly admits that "the attempts to establish a cipher totally failed; there was not indeed the semblance of a cipher." Sir Edwin Durning-Lawrence, in his *Bacon is Shakespeare* (1910), goes still farther in an attempt to prove the point by cryptographic evidence. According to him the classical "long word" cited in *Love's Labour's Lost*, "honorificabilitudinitatibus," is an anagram for "hi ludi F. Baconis nati tuiti orbi" (these plays F. Bacon's offspring preserved for the world); and he juggles very curiously with the numbers of the words and lines in the page of the First Folio containing this alleged anagram. He also cites the evidence of (more or less) contemporary illustrations to books, which he explains as cryptographic, in confirmation. These interpretations are in the highest degree speculative. But perhaps his argument is exposed in its full depth of incredibility when he counts up the letters in Ben Jonson's verses "To the Reader," describing the Droeshout portrait in the First Folio, and, finding them to be 287 (taking each "w" as two "v's"), concludes (by adding 287 to 1623, *i.e.* the date of the First Folio) that Bacon intended to reveal himself as the author in the year 1910! This sort of argument makes the plain man's head reel. On similar principles anything might prove anything. What may be considered the more reasonable way of approaching the question is shown in Mr G. Greenwood's *Shakespeare Problem Restated* (1908), in which the alleged difficulties of the Shakespearian authorship are competently presented without recourse to any such extravagances.

The plausibility of many of the arguments used by Mr Greenwood and those whom he follows depends a good deal upon the real obscurity which, for lack of positive evidence, shrouds the biography of Shakespeare and our knowledge of the precise facts as to the publication of the works associated with his name; and it has been assisted by the dogmatism of some modern biographers, or the differences of opinion between them, when they attempt to interpret the known facts of Shakespeare's life so as to account for his authorship. But it must be remembered that, if Shakespeare (or Shakspere) wrote Shakespeare's works, it is only possible to reconcile our view of his biography with our knowledge of the works by giving *some* interpretation to the known facts or accepting *some* explanation of what may have occurred in the obscure parts of his life which will be consistent with such an identification. That different hypotheses are favoured by different orthodox critics is therefore no real objection, nor that some may appear exceedingly speculative, for the very reason that positive evidence is irrecoverable and that speculation—consistent with what is possible—is the only resource. In so far as evidence is to be twisted and strained at all, it is right, in view of the long tradition and the prima facie presumptive evidence, to strain it in any possible direction which can reasonably make the Shakespearian authorship intelligible. As a matter of fact the evidence is strained alike by one side and the other; but as between the two it has to be remembered that the onus lies on the opponent of the Shakespearian authorship to show, first that there is no possible explanation which would justify the tradition, and secondly that there is positive evidence which can upset it and which will saddle the authorship of Shakespeare's works on Bacon or some one else. The contempt indiscriminately thrown on supporters of the Baconian theory by orthodox critics is apt to be expressed in terms which are occasionally unwarranted. But even if we leave out of account the lunatics and fabricators who have been so prominently connected with it, the adventurous amateur—however eminent as a lawyer or however acute as a critic of everyday affairs—may easily be too ingenious in his endeavours to solve a literary problem in which judgment largely depends on a highly trained and subtle sense of literary style and a special knowledge of the conditions of Elizabethan England and of the early drama. In such an exposition of what may be called the "anti-Shaksperian" case as Mr Greenwood's, many points appear to make for his conclusion which are really not more than doubtful interpretations of evidence; and though these interpretations may be derived from orthodox Shakespearians - orthodox, that is to say, so far at all events as their view of Shakespearian authorship is concerned—there have been a good many such interpreters whose zeal has outrun their knowledge. The fact remains that the most competent special students of Shakespeare, however they may differ as to details, and also the most authoritative special students of Bacon, are unanimous in upholding the traditional view. The Baconian theory simply stands as a curious illustration of the dangers which, even in the hands of fair judges of ordinary evidence, attend certain methods of literary investigation.

There is one simple reason for this: in order to establish even a prima facie case against the identification of the man Shakespeare (however the name be spelt) with the author of Shakespeare's works, the Baconian must clearly account for the positive contemporary evidence in its favour, and this cannot well be done; it is highly significant that it was not attempted or thought of for centuries. It is comparatively easy to point to certain difficulties, which are due to the gaps in our knowledge. As already explained, the orthodox biographer, armed with the results of accurate scholarship and prolonged historical research, attempts to reconstruct the life of the period so as to offer possible or probable explanations of these difficulties. But he does so backed by the unshaken tradition and the positive contemporary evidence that the Stratford boy and man, the London actor, the author of *Venus and Adonis* and *Lucrece*, and the dramatist (so far at least as criticism upholds the canon of the plays ascribed to Shakespeare), were one and the same.

It may be useful here to add to what has been written in the preceding article some of the positive contemporary allusions to Shakespeare which establish this presumption. The evidence of Francis Meres in *Palladis Tamia* (1598) has already been referred to. It is incredible that Ben Jonson, who knew both Shakespeare and Bacon intimately, who himself dubbed Shakespeare the "swan of Avon," and who survived Bacon for eleven years, could have died without revealing the alleged secret, at a time when there was no reason for concealing it. Much has been made of Jonson's varying references to Shakespeare, and of certain inconsistencies in his references to both Shakespeare and Bacon; but these can be twisted in more than one direction and their explanation is purely speculative. His positive allusions to Shakespeare are inexplicable except as the most authoritative evidence of his identification of the man and his works. Richard Barnfield (1598) speaks of Shakespeare as "honey-flowing," and says that his *Venus* and *Lucrece* have placed his name "in Fame's immortal book." John Weever (1599) speaks of "honey-tongued Shakespeare," admired for "rose-cheeked Adonis," and "Romeo, Richard, more whose names I know not." John Davies of Hereford (1610) calls him "our English Terence, Mr Will Shakespeare." Thomas Freeman (1614) writes "to Master W. Shakespeare:"—"Who loves chaste life, there's Lucrece for a teacher | Who list read lust there's Venus and Adonis | . . . | Besides in plays thy wit winds like Meander." Other contemporary allusions, all treating Shakespeare as a great poet and tragedian, are also on record.

Finally, it may be remarked that although many problems in connexion with Shakespeare's authorship can only be solved by the answer that he was a "genius," the Baconian view that "genius" by itself could not confer on Shakespeare, the supposed Stratford "rustic," the positive knowledge of law, &c., which is revealed in his works, depends on a theory of his upbringing and career which strains the evidence quite as much as anything put forward by orthodox biographers, if not more. As shown in the preceding article, it is by no means improbable that the Stratford "rustic" was quite well educated, and that his rusticity is a gross exaggeration. We know very little about his early years, and, in so far as we are ignorant, it is legitimate to draw inferences in favour of what makes the remainder of his career and achievements intelligible. The Baconian theory entirely depends on straining every assumption in favour of Shakespeare's *not* having had any opportunity to acquire knowledge which in any case it would require "genius" to absorb and utilize; and this method of argument is directly opposed to the legitimate procedure in approaching the undoubted difficulties. Isolated phrases, such as Ben Jonson's *dictum* as to his small knowledge of Latin and Greek, which may well be purely comparative, the contemptuous expression of a university scholar for one who had no academic training, can easily be made too much of. The extreme

inferences as to his illiteracy, drawn from his handwriting, depend on the most meagre data. The preface to the First Folio says that "what he thought he uttered with that easiness that we have scarce received from him a blot in his papers"; whereas Ben Jonson, in his *Discoveries*, says, "I remember the players often mentioned it as an honour to Shakespeare that in his writing, whatsoever he penned, he never blotted a line. My answer had been, would he had blotted a thousand!—which they thought a malevolent speech." Reams have been written about these two sayings, but we do not know the real circumstances which prompted either, and the non-existence of any of the Shakespeare manuscripts leaves us open, unfortunately, to the wildest conjectures. That there were such manuscripts (unless Ben Jonson and the editors of the First Folio were liars) is certain; but there is nothing peculiar in their not having survived, though persons unacquainted with the history of the manuscripts of printed works of the period sometimes seem to think so.

We know so little of the composition of Shakespeare's works, and the stages they went through, or the influence of other persons on him, that, so far as technical knowledge is concerned (especially the legal knowledge, which has given so much colour to the Baconian theory), various speculations are possible concerning the means which a dramatic genius may have had to inform his mind or acquire his vocabulary. The theatrical and social *milieu* of those days was small and close; the influence of culture was immediate and mainly oral. We have no positive knowledge indeed of any relations between Shakespeare and Bacon; but, after all, Bacon was a great contemporary, personally interested in the drama, and one would expect the contents of his mind and the same sort of literary expression that we find in his writings to be reflected in the mirror of the stage; the same phenomenon would be detected in the drama of to-day were any critic to take the trouble to inquire. Assuming the genius of Shakespeare, such a poet and playwright would naturally be full of just the sort of matter that would represent the culture of the day and the interests of his patrons. In the purlieus of the Temple and in literary circles so closely connected with the lawyers and the court, it is just the dramatic "genius" who would be familiar with anything that could be turned to account, and whose works, especially plays, the vocabulary of which was open to embody countless sources, in the different stages of composition, rehearsal, production and revision, would show the imagination of a poet working upon ideas culled from the brains of others. Resemblances between phrases used by Shakespeare and by Bacon, therefore, carry one no farther than the fact that they were contemporaries. We cannot even say which, if either, originated the echo. So far as vocabulary is concerned, in every age it is the *writer* whose record remains and who by degrees becomes its representative; the truth as to the extent to which the intellectual *milieu* contributed to the education of the writer, or his genius was assisted by association with others, is hard to recover in after years, and only possible in proportion to our knowledge of the period and of the individual factors in operation.

(H. Ch.)

The Portraits of Shakespeare

The mystery that surrounds much in the life and work of Shakespeare extends also to his portraiture. The fact that the only two likenesses of the poet that can be regarded as carrying the authority of his co-workers, his friends, and relations—yet neither of them a life-portrait—differ in certain essential points, has opened the door to controversy and encouraged the advance and acceptance of numerous wholly different types. The result has been a swarm of portraits which may be classed as follows: (1) the genuine portraits of persons not Shakespeare but not unlike the various conceptions of him; (2) memorial portraits often based on one or other of accepted originals, whether those originals are worthy of acceptance or not; (3) portraits of persons known or unknown, which have been fraudulently "faked" into a resemblance of Shakespeare; and (4) spurious fabrications especially manufactured for imposition upon the public, whether with or without mercenary motive. It is curious that some of the crudest and most easily demonstrable frauds have been among those which have from time to time been, and still are, most eagerly accepted and most ardently championed. There are few subjects which have so imposed upon the credulous, especially those whose intelligence might be supposed proof against the chicanery practised upon them. Thus, in the past, a president of the Royal Academy in England, and many of the leading artists and Shakespearian students of the time, were found to support the genuineness, as a contemporary portrait of the poet, of a picture which, in its faked Shakespeare state, a few months before was not even in existence. This, at least, proves the intense interest taken by the world in the personality of Shakespeare, and the almost passionate desire to know his features. It is desirable, therefore, to describe those portraits which have chief claim to recollection by reason either of their inherent interest or of the notoriety which they have at some time enjoyed: it is to be remarked that such notoriety once achieved never entirely dies away, if only because the art of the engraver, which has usually perpetuated them either as large plates, or as illustrations to reputable editions of the works, or to commentaries or biographies, sustains their undeserved credit as likenesses more or less authentic.

Exhaustive study of the subject, extended over a series of years, has brought the present writer to the conclusion—identical with that entertained by leading Shakespearian authorities—that two portraits only can be accepted without question as authentic likenesses: the bust (really a half-length statue) with its structural wall-monument in the choir of Holy Trinity Church, Stratford-on-Avon, and the copper-plate engraved by Martin Droeshout as frontispiece to the First Folio of Shakespeare's works (and used for three subsequent issues) published in 1623, although first printed in the previous year.

The Stratford bust and monument must have been erected on the N. wall of the chancel or choir within six years after Shakespeare's death in 1616, as it is mentioned in the prefatory memorial lines by Leonard Digges in the First Folio. The design in its general aspect was one often adopted by the "tombe-makers" of the period, though not originated by them, and according to Dugdale was executed by a Fleming resident in London since 1567, Garratt Johnson (Gerard Janssen), a denizen, who was occasionally a collaborator with Nicholas Stone. The bust is believed to have been commissioned by the poet's son-in-law, Dr John Hall, and, like the Droeshout print, must have been seen by and likely enough had the approval of Mrs Shakespeare, who did not die until August 1623. It is thought to have been modelled from either a life or death mask, and inartistic as it is has the marks of facial individuality; that is to say, it is a portrait and not a generalization such as was common in funereal sculpture. According to the practice of the day, especially at the hands of Flemish sculptors of memorial figures, the bust was coloured; this is sufficient to account for the technical summariness of the modelling and of the forms. Thus the eyebrows are scarcely more than indicated by the chisel, and a solid surface represents the teeth of the open mouth; the brush was evoked to supply effect and detail. To the colour, as reapplied after the removal of the white paint with which Malone had the bust covered in 1793, must be attributed a good deal of the wooden appearance which is now a shock to many. The bust is of soft stone (not alabaster, as incorrectly stated by "the accurate Dugdale"), but a careful examination of the work reveals no sign of the alleged breakage and restoration or reparation to which some writers have attributed the apparently inordinate length of the upper lip. As a matter of fact the lip is not long; it is less than seven-eighths of an inch: the appearance is to a great extent an optical illusion, the result partly of the smallness of the nose and, especially, of the thinness of the moustache that shows the flesh above and below. Some repair was made to the monument in 1649, and again in 1748, but there is no mention in the church records of any meddling with the bust itself. Owing, however, to the characteristic inaccuracy of the print by one of Hollars' assistants in the illustration of Dugdale's *Antiquities of Warwickshire* (p. 688), the first edition of which was published in 1656, certain writers have been misled into the belief that the whole monument and bust were not merely restored but replaced by those which we see to-day. As other prints in the volume depart grossly from the objects represented, and as Dugdale, like Vertue (whose punctilious accuracy has also been baselessly extolled by Walpole), was at times demonstrably loose in his descriptions and presentments, there is no reason to believe that the bust and the figures above it are other than those originally placed in position. Other engravers, following the Dugdale print, have further stultified the original, but as they (Vertue, Grignion, Foudrinier, and others) differ among themselves, little importance need be attached to the circumstance. A

warning should be uttered against many of the so-called "casts" of the busts. George Bullock took a cast in 1814 and Signor A. Michele another about forty years after, but those attributed to W. R. Kite, W. Scoular, and others, are really copies, departing from the original in important details as well as in general effect. It is from these that many persons derive incorrect impressions of the bust itself.

Mention should here be made of the "Kesselstadt Death Mask," now at Darmstadt, as that has been claimed as the true death-mask of Shakespeare, and by it the authenticity of other portraits has been gauged. It is not in fact a death-mask at all, but a cast from one and probably not even a direct cast. In three places on the back of it is the inscription — + Aº Dm 1616: and this is the sole actual link with Shakespeare. Among the many rapturous adherents of the theory was William Page, the American painter, who made many measurements of the mask and found that nearly half of them agreed with those of the Stratford bust; the greater number which do not he conveniently attributed to error in the sculptor. The cast first came to light in 1849, having been searched for by Dr Ludwig Becker, the owner of a miniature in oil or parchment representing a corpse crowned with a wreath, lying in bed, while on the background, next to a burning candle, is the date—Aõ 1637. This little picture was by tradition asserted to be Shakespeare, although the likeness, the death-date, and the wreath all point unmistakably to the poet-laureate Ben Jonson. Dr Becker had purchased it at the death-sale at Mainz of Count Kesselstadt in 1847, in which also "a plaster of Paris cast" (with no suggestion of Shakespeare then attached to it) had appeared. This he found in a broker's rag-shop, assumed it to be the same, recognized in it a resemblance to the picture (which most persons cannot see) and so came to attribute to it the enormous historical value which it would, were his hypothesis correct, unquestionably possess. In searching for the link of evidence necessary to be established, through the Kesselstadt line to England and Shakespeare, a theory has been elaborated, but nothing has been proved or carried beyond the point of bare conjecture. The arguments against the authenticity of the cast are strong and cogent—the chief of which is the fact that the skull reproduced is fundamentally of a different form and type from that shown in the Droeshout print—the forehead is receding instead of upright. Other important divergencies occur. The handsome, refined, and pleasing aspect of the mask accounts for much of the favour in which it has been held. It was believed in by Sir Richard Owen and was long on view in the British Museum, and was shown at the Stratford Centenary Exhibition in 1864.

The "Droeshout print" derives its importance from its having been executed at the order of Heminge and Condell to represent, as a frontispiece to the *Plays*, and put forth as his portrait, the man and friend to whose memory they paid the homage of their risky enterprise. The volume was to be his real monument; and the work was regarded by them as a memorial erected in a spirit of love, piety, and veneration. Mrs Shakespeare must have seen the print; Ben Jonson extolled it. His dedicatory verses, however, must be regarded in the light of conventional approval as commonly expressed in that age of the performances of portrait-engravers and habitually inscribed beneath them. It is obvious, therefore, that in the circumstances an authentic portrait must necessarily have been the basis of the engraving; and Sir George Scharf, judging from the contradictory lights and shadows in the head, concluded that the original must have been a limning—more or less an outline drawing—which the youthful engraver was required to put into chiaroscuro, achieving his task with but very partial success. That this is the case is proved by the so-called "unique proof" discovered by Halliwell-Phillips, and now in America. Another copy of it, also an early proof but not in quite the same "state," is in the Bodleian Library. No other example is known. In this plate the head is far more human. The nose is here longer than in the bust, but the bony structure corresponds. In the proof, moreover, there is a thin, wiry moustache, much widened in the print as used; and in several other details there are important divergencies. In this engraving by Droeshout the head is far too large for the body, and the dress—the costume of well-to-do persons of the time—is absurdly out of perspective: an additional argument that the unpractised engraver had only a drawing of a head to work from, for while the head shows the individuality of portraiture the body is as clearly done *de chic*. The first proof is conclusive evidence against the contention that the "Flower Portrait" at the Shakespeare Memorial Museum, Stratford-on-Avon—the gift of Mrs Charles Flower (1895) and boldly entitled the "Droeshout original"—is the original painting from which the engraving was made, and is therefore the actual life-portrait for which Shakespeare sat. This view was entertained by many connoisseurs of repute until it was pointed out that had that been the case the first proof, if it had been engraved from it, would have resembled it in all particulars, for the engraver would have merely copied the picture before him. Instead of that, we find that several details in the proof—the incorrect illumination, the small moustache, the shape of the eyebrow and of the deformed ear, &c.—have been corrected in the painting, in which further improvements are also imported. The conclusion is therefore irresistible. At the same time the picture may possibly be the earliest painted portrait in existence of the poet, for so far as we can judge of it in its present condition —(it was to some extent injured by fire at the Alexandra Palace) —it was probably executed in the earlier half of the 17th century. The inscription—*Willm̃ Shakespeare*, 1609—is suspect on account of being written in cursive script, the only known example at the date to which it professes to belong. If it were authentic it might be taken as showing us Shakespeare's appearance seven years before his death, and fourteen years before the publication of the Droeshout print. The former attribution of it to Cornelis Janssen's brush has been abandoned—it is the work of a comparatively unskilful craftsman. The picture's pedigree cannot definitely be traced far back, but that is of little importance, as plausible pedigrees have often been manufactured to bolster up the most obvious impostures. The most interesting of the copies or adaptations of this portrait is perhaps that by William Blake now in the Manchester Corporation Art Gallery. One of the cleverest imitations, if such it be, of an old picture is the "Buttery" or "Ellis portrait," acquired by an American collector in 1902. This small picture, on panel, is very poor judged as a work of art, but it has all the appearance of age. In this case the perspective of the dress has been corrected, and Shakespeare's shield is shown on the background. The head is that of a middle-aged man; the moustache, contrary to the usual type, is drooping. It is curious that the "Thurston miniature" done from the Droeshout print gives the moustache of the "proof."

Two other portraits of the same character of head and arrangement are the "Ely Palace portrait" and the "Felton portrait," both of which in their time have had, and still have, convinced believers. The "Ely Palace portrait" was discovered in 1845 in a broker's shop, and was bought by Thomas Turton, bishop of Ely, who died in 1864, when it was bought by Henry Graves and by him was presented to the Birthplace. An unsatisfactory statement of its history, similar to that of many other portraits, was put forth; the picture must be judged on its merits. It bears the inscription "Æ 39 + 1603," and it shows a moustache and a right eyebrow identical with those in the Droeshout "proof." It was therefore hailed by many competent judges as the original of the print; by others it was dismissed as a "make-up"; at the same time it is very far from being a proved fraud. Supposing both it and the "Flower portrait" to be genuine, this picture, which came to light long before the latter, antedates it by six years. Judged by the test of the Droeshout "proof" it must have preceded and not followed it. The "Felton portrait," which made its first appearance in 1792, had the valiant championship of the astute and cynical Steevens, of Britton, Drake, and other authorities, as the original of the Droeshout print, while a few—those who believed in the "Chandos portrait"—denounced it as "a rank forgery." On the back of the panel was boldly traced in a florid hand "Gul. Shakespear 1597 R.B." (by others read "R.N."). If

PORTRAITS OF SHAKESPEARE

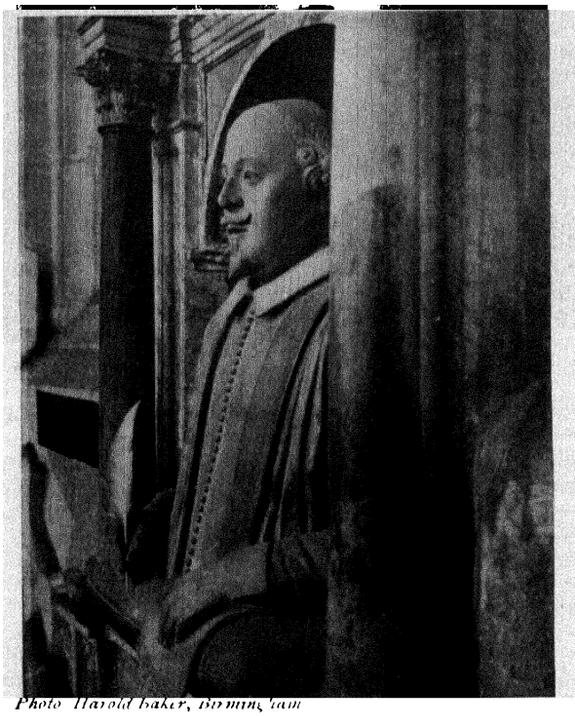
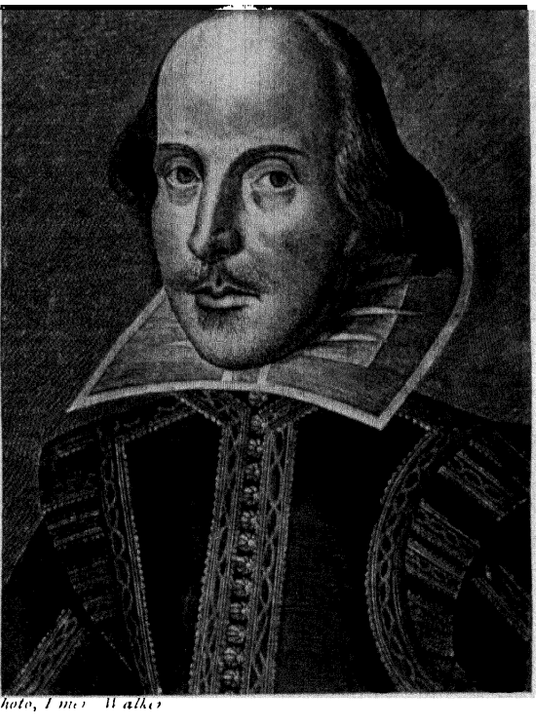


Photo Harold Baker, Birmingham

THE STRATFORD BUST AND MONUMENT IN HOLY TRINITY CHURCH STRATFORD-ON-AVON Erected before 1623.



Photo, Emery Walker

THE ENGRAVING BY MARTIN DROESHOUT.
In the First Folio Edition 1623

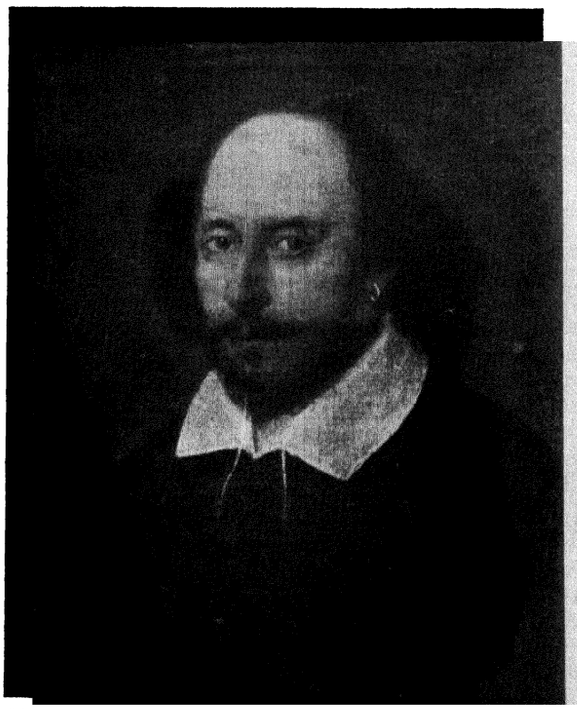
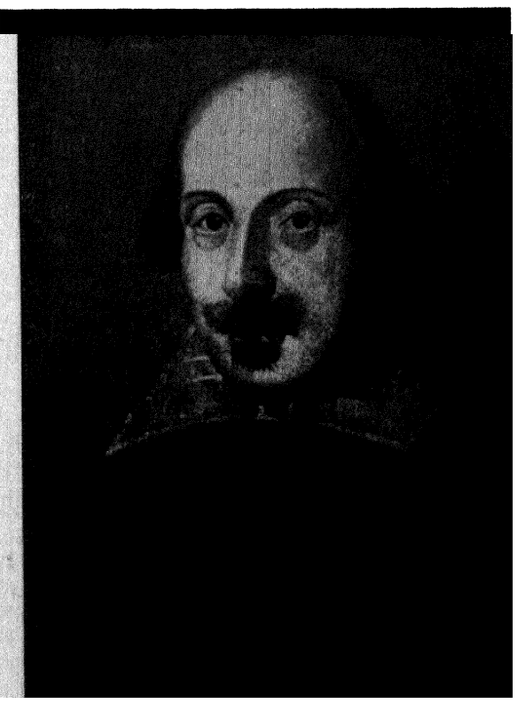


Photo Emery Walker

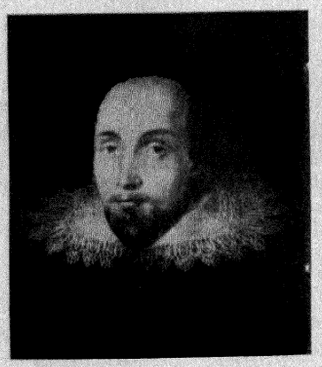
THE CHANDOS PORTRAIT
In the National Portrait Gallery



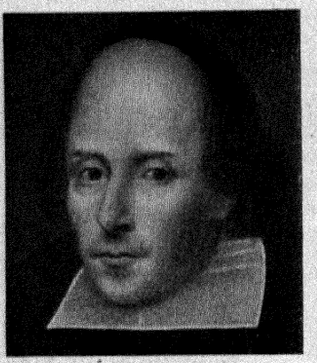
THE FLOWER PORTRAIT
(The Droeshout C
In the Shakespeare Memorial Gallery

SHAKESPEARE

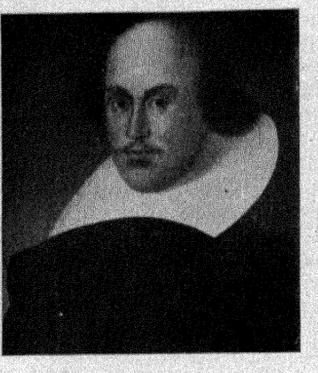
PORTRAITS OF SHAKESPEARE



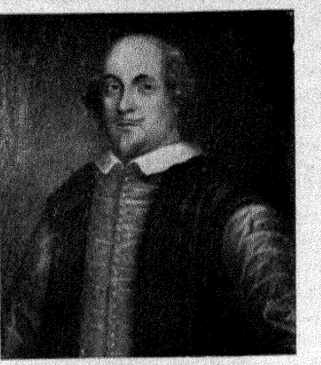
1. THE JANSSEN.



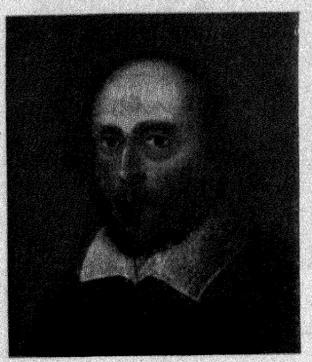
2. THE FELTON.



3. THE ELY PALACE.



4. THE HUNT OR STRATFORD.



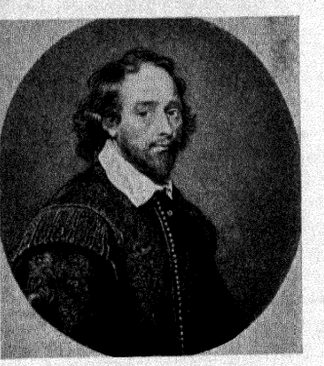
5. THE LUMLEY.



6. THE ASHBOURNE.



7. THE HAMPTON COURT.



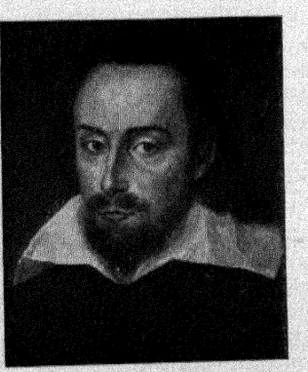
8. THE SOEST.



9. THE HILLIARD MINIATURE.



10. THE AURIOL MINIATURE.



Photo, W. A. Mansell.

11. THE DUNFORD.

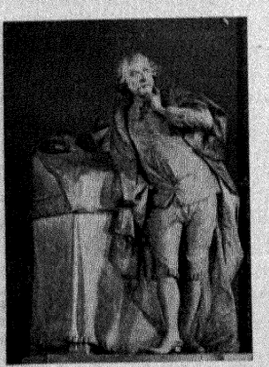


Photo, W. A. Mansell.

12. THE STACE.



13. THE DEATH-MASK.



14. THE ROUBILIAC STATUE.



15. THE SCHEEMAKERS STATUE.



16. THE DAVENANT BUST.

R.B. is correct, it is contended the initials indicate Richard Burbage, Shakespeare's fellow-actor. Traces of the writing may still be detected. Boaden's copy, made in 1792, repeating the inscription on the back, has "Guil. Shakspeare 1857 R.N." The spelling of Shakespeare's name—which in succeeding ages has been governed by contemporary fashion—has a distinct bearing on the authenticity of the panel. At the first appearance of the "Felton portrait" in a London sale-room it was bought by Samuel Felton of Drayton, Shropshire, for five pounds, along with a pedigree which carried its refutation along with it. Nevertheless, it bears evidence of being an honest painting done from life, and is probably not a make-up in the sense that most of the others are. It fell into the hands of Richardson the printseller, who issued fraudulent engravings of it by Trotter and others (by which it is best known), causing the characteristic lines of the shoulders to be altered, so that it is set upon a body attired in the Droeshout costume, which does not appear in the picture; and then, arguing from this falsely-introduced costume, the publisher maintained that the work was the original of the Droeshout print and therefore a life-portrait of Shakespeare. Thus foisted on the public it enjoyed for years a great reputation, and no one seems to have recognized that with its down-turned moustache it agrees with the inaccurate print after the Droeshout engraving which was published as frontispiece to Ayscough's edition of Shakespeare in 1790, *i.e.* two years before the discovery of the Felton portrait! The "Napier portrait," as the excellent copy by John Boaden is known, has recently been presented to the Shakespeare Memorial. Josiah Boydell also made a copy of the picture for George Steevens in 1797. Quite a number of capital miniatures from it are in existence. With these should be mentioned a picture of a similar type discovered by Mr M. H. Spielmann in 1905. Finding a wretched copy of the Chandos portrait executed on a panel about three hundred years old, he had the century-old paint cleaned off in order to ascertain the method of the forger. On the disappearance of the Chandos likeness under the action of the spirit another portrait of Shakespeare was found beneath, irretrievably damaged but obviously painted in the 17th century. At the time of the "fake" only portraits of the Chandos type were saleable, and this would account for the wanton destruction of an interesting work which was probably executed for a publisher—likely enough for Jacob Tonson—but not used. Early as it is in date it can make no claim to be a life-portrait.

The "Janssen" or "Somerset portrait" is in many respects the most interesting painted likeness of Shakespeare, and undoubtedly the finest of all the paintings in the series. It is certainly a genuine as well as a very beautiful picture of the period, and bears the inscription—$\frac{\text{Æt}^{\text{t}}\ 46}{1610}$—but doubt has been expressed whether the 6 of 46 has not been tampered with, and whether it was not originally an o and altered to fit Shakespeare's age. It was made known through Earlom's rare mezzotint of it, but the public knowledge of it has been mainly founded on Cooper's and Turner's beautiful but misleading mezzotint plates until a photograph of the original was published for the first time in 1909 (in *The Connoisseur*) by permission of the owner, the Lady Guendolen Ramsden, daughter of the duke of Somerset, the former owner of the picture. The resemblance to the main forms of the death-mask is undoubted; but that is of little consequence as confirmation unless the mask itself is supported by something beyond vague conjectures. Charles Jennens, the wealthy and eccentric amateur editor of the poor edition of *King Lear* issued in 1770, was the first known owner, but vouchsafed no information of its source and shrank from the challenge to produce the picture. Of the beauty, excellence, and originality of this portrait there is no question; it is more than likely that Janssen was the author of it; but that it was intended to represent Shakespeare is still to be proved. A number of good copies of it exist, all but one (which enjoys a longer pedigree) made in the 18th century: the "Croker Janssen" now lost, unless it be that of Lord Darnley's; the "Staunton Janssen," the "Buckston Janssen," the "Marsden Janssen," and the copy in the possession of the duke of Anhalt. These are all above the average merit of such work.

The portrait which has made the most popular appeal is that called the "Chandos," formerly known as the "d'Avenant," the "Stowe," and the "Ellesmere," according as it passed from hand to hand; it is now in the National Portrait Gallery. Tradition, tainted at the outset, attributes the authorship of it to Richard Burbage, although it is impossible that the painter of the head in the Dulwich Gallery could have produced a work so good in technique; and Burbage is alleged to have given it to his fellow-actor Joseph Taylor, who bequeathed it to Sir William d'Avenant, Shakespeare's godson. As a matter of fact, Taylor died intestate. Thenceforward, whether or not it belonged to d'Avenant, its history is clear. At the great Stowe sale of the effects of the duke of Buckingham and Chandos (who had inherited it) the earl of Ellesmere bought it and then presented it to the nation. Many serious inquirers have refused to accept this romantic, swarthy, Italian-looking head here depicted as a likeness of Shakespeare of the Midlands, if only because in every important physiognomical particular, and in face-measurement, it is contradicted by the Stratford bust and the Droeshout print. It is to be noted, however, that judged by the earlier copies of it—which agree in the main points—some of the swarthiness complained of may be due to the restorer. Oldys, indifferent to tradition, attributed it to Janssen, an unallowable ascription. This, except the "Lumley portrait," the "Burdett Coutts portrait," and the admitted fraud, the "Dunford portrait," is the only picture of Shakespeare executed before the end of the 18th century which represents the poet with earrings—the wearing of which, it should be noted, either simple gold circles or decorated with jewel-drops, was a fashion that extended over two centuries, in England mainly, if not entirely, affected by nobles and exquisites. Contrary to the general belief, the picture has not been subjected to very extensive repair. That it was not radically altered by the restorer is proved by the fine copy painted by Sir Godfrey Kneller, and by him presented to John Dryden. The poet acknowledged the gift in his celebrated Fourteenth Epistle, written after 1691 and published in 1694, and containing the passage beginning, "Shakespeare, thy gift, I place before my sight; With awe I ask his blessing ere I write." D'Avenant had died in 1668, and so could not, as tradition contends was the case, have been the donor. In Malone's time the picture was already in the possession of the earl Fitzwilliam. This at least proves the esteem in which the Chandos portrait was held so far back as the end of the 17th century, only three-quarters of a century after Shakespeare's death.

From among the innumerable copies and adaptations of the Chandos portrait a few emerge as having a certain importance of their own. That which Sir Joshua Reynolds is traditionally said to have made for the use of Roubiliac, then engaged in his statue of Shakespeare for David Garrick (now in the British Museum), and another alleged to have been done for Bishop Newton, are now lost. That by Ranelagh Barret was presented in 1779 to Trinity College Library, Cambridge, by the Shakespearian commentator Edward Capell. Dr Matthew Maty, principal librarian of the British Museum, presented his copy to the museum in 1760. There are also the smooth but rather original copy (with drapery added) belonging to the earl of Bath at Longleat; the Warwick Castle copy; the fair copy known as the Lord St Leonards portrait; the large copy in coloured crayons, formerly in the Jennens collection and now belonging to Lord Howe, by van der Gucht, which seems to be by the same hand as that which executed the pastel portrait of Chaucer in the Bodleian Library; the "Clopton miniature" attributed to John Michael Wright, which formed the basis of the drawing by Arlaud, by whose name the engravings of this modified type are usually known; the Shakespeare Hirst picture, based on Houbraken's engraving; the full-size chalk drawing by Ozias Humphry, R.A., at the Birthplace, which Malone guaranteed to be a perfect transcript, but which more resembles the late W. P. Frith, R.A., than Shakespeare. Humphry also,

adhering to his modified type, executed three beautiful but inaccurate miniatures from the picture, one of which is in the Garrick Club, and the others in private hands.

The "Lumley portrait" is in type a curious blend of the faces in the Chandos portrait and the Droeshout print, with a dash of the "Auriol miniature" (see later). It represents a heavy-jowled man with pursed-up lips, and with something of the expression but little of the vitality of the Chandos. Although it is thought to be indicated though not actually mentioned in the Lumley sale catalogues of 1785 and 1807, it was only when it came into the possession of George Rippon, presumably about the year 1848, that it was brought to the notice of the world, and additional attention was secured by the owner's contention that it was the original of the Chandos. It is claimed that the picture originally belonged to the portrait collector John, Lord Lumley, of Lumley castle, Durham, who died in 1609, and descended to Richard, the 4th earl of Scarborough, and George Augustus, the 5th earl, at whose respective sales at the dates mentioned it was put up to auction. On the first occasion it was bought in, and on the second it was acquired by George Walters. It is to be observed, however, that it does not appear by name in the early inventory, and it is unconvincingly claimed that it was mistakenly entered as Chaucer, a portrait of whom is mentioned. When in the possession of George Rippon the picture was so superbly chromo-lithographed by Vincent Brooks that copies of it, mounted on old panel or canvas, and varnished, have often changed hands as original paintings. It is clear that if the picture was indeed in possession of John, Lord Lumley, we have here a contemporary portrait of Shakespeare, and the fact that it is an amateur performance would in no way invalidate the claim. It is thinly painted and scarcely looks the age that is claimed for it; but it is an interesting work, which, in 1875, entered the collection of the late Baroness Burdett-Coutts.

To Frederigo Zuccaro are attributed three of the more important portraits now to be mentioned; upon him also have been foisted several of the more impudent fabrications herein named. The "Bath" or "Archer portrait"—it having been in the possession of the Bath Librarian, Archer, when attention was first drawn to it in 1859—is worthy of Zuccaro's brush. It is Italian in feeling, with an inscription ("W. Shakespear") in an Italian but apparently more modern hand. The type of head, too, is Italian, and it is curious that in certain respects it bears some resemblance not only to the Chandos, and to the Droeshout and Janssen portraits, but also to the "death-mask"; yet it differs in essentials from all. Certain writers have affirmed that Reynolds in one of his Discourses expressed his faith in the picture; but the alleged passage cannot be identified. This eloquent, refined, and well-bred head suggests an Italian noble, or, if an English poet, a man of the type of Edmund Spenser; a lady-love shoe-string, or "twist" (often used to tie on a jewel), threads the ear and a fine lace ruff frames the head. The whole picture is beautifully painted by a highly accomplished artist. If this portrait represents Shakspeare at about the age of 30, that is to say in 1594, the actor-dramatist had made astonishing progress in the world, and become well-to-do, and had adopted the attire of a dandy. But Zuccaro came to England in 1574, and as his biographers state "did not stay long," and returned to Florence to complete the work at the Duomo there begun by Vasari. The conclusion appears to be definite. The picture was acquired for the Baroness Burdett-Coutts by W. H. Wills.

Stronger objection applies to the "Boston Zuccaro" or "Joy portrait," now in Boston, U.S.A. A Mr Benjamin Joy, who emigrated from London to Boston, owned a picture with a doubtful pedigree—transparently a manufactured tradition. R. S. Greenough, the American sculptor, used it along with "other authentic portraits" to produce his bust. In parts it has been viciously restored, but it is in very fair condition and appears to be a good picture of the Flemish school. In the vague assertion that it was found in the Globe Tavern which was frequented by Shakespeare and his associates, no credence can be placed, if only because no such tavern is known to have existed.

The "Cosway Zuccaro portrait" is now in America; but the reproduction of it exists in England in the miniature of it by Cosway's pupil, Charlotte Jones, as well as in the rare mezzotint by Hanna Greene. The picture is alleged to have disappeared from the possession of Richard Cosway; it was sold in his sale, however, and passed through the hands of Lionel Booth and of Augustin Daly. No one would imagine that it is intended for a portrait of the poet. It is far more like Shelley (somewhat caricatured, especially as to the cat-like eyes and the Mephistophelian eyebrows) or Torquato Tasso. The attribution to Zuccaro is absurd, yet Cosway and Sir Charles Eastlake believed in it. The inscription on the back, "Guglielm: Shakespear," with its mixture of Italian and English, resembles in wording and spelling that adopted in the case of several admitted "fakes." No attempt at discovering the history of the picture was ever made, but there is no doubt that at the beginning of the 19th century it was widely credited; Wivell and others attributed it to Lucas Franchois. It is said to be well painted, but the copies show that it is ill drawn. The miniature by Charlotte Jones, a fashionable artist in her day, is pretty and weak, but well executed; it was painted in 1823.

Of the "Burdett-Coutts portrait" (the fourth interesting portrait of Shakespeare in the possession of Mr Burdett-Coutts) there is no history whatever to record. No name has been suggested for the artist, but the hands and accessories of dress strongly resemble those in the portrait of Elizabeth Hardwick, countess of Shrewsbury, in the National Portrait Gallery. The ruff, painted with extreme care, reveals a *pentimento*. The picture is admirably executed, but the face is weak and is the least satisfactory part of it; especially feeble is the ear with the ring. Shakespeare's shield, crest, with red mantling, which appear co-temporary with the rest, and the figures "37" beneath it, appear on the background, in the manner adopted in 17th-century portraits. From this picture the "Craven portrait" seems to have been "faked."

Equally striking is the "Ashbourne portrait," well known through G. F. Storm's engraving of it. It is sometimes called the "Kingston portrait" as the first known owner of it was the Rev. Clement U. Kingston, who issued the engraving in 1847. It is an important three-quarter length, representing a figure in black standing beside a table at the corner of which is a skull whereon the figure rests his right forearm. It is an acceptable likeness of Shakespeare, in the manner of Paul van Somer, apparently pure except in the ruff. The inscription "ÆTATIS SVAE. 47. A° 1611," and the decoration of cross spears on a book held by the right hand, are also raised from the ground, so that it would be injudicious to decide that these are not of a later date yet at the same time ancient additions. It is the only picture—if we disregard the inadmissible "Hampton Court portrait"—in which Shakespeare is shown wearing a sword-belt and a thumb-ring, and holding a gauntleted glove. The type is that of a refined, fresh-coloured, fair-haired English gentleman. There is no record of the picture before Mr Kingston bought it from a London dealer.

More famous, but less reputable, is the "Stratford" or "Hunt portrait," amusingly exhibited in an iron safe in the Birthplace at Stratford, to which it was presented by W. O. Hunt, town clerk, in 1867. It had been in the Hunt family for many years and represented a black-bearded man. Simon Collins, the picture cleaner and restorer who had cleansed the Stratford bust of Malone's white paint and restored its colours, declaring that another picture was beneath it, was engaged to exercise himself upon it. He removed the top figure from the dilapidated canvas with spirit and found beneath it the painted version of the Stratford bust. At that time Mr Rabone's copy, now at Birmingham, was made; it is valuable as evidence. Then Collins, always a suspect in this matter, proceeded with the restoration, and by treatment of the hair made the portrait more than ever like the bust; and the owner, and not a few others, proclaimed the picture to be the original from which the bust was made. No judge of painting, however, accepts the picture as dating further back than the latter half of the 18th

century—when it was probably executed, among a score of others, about the time of the bicentenary of Shakespeare's birth, an event which gave rise to much celebration. The ingenious but entirely unconvincing explanations offered to account for the state in which the picture was found need not be recounted here.

The "Duke of Leeds' portrait," now at Hornby castle, has been for many years in the family, but the circumstances of its provenance are unknown. It has been thought possible that this is the lost portrait of which John Evelyn speaks as having been in the collection of Lord Chancellor Clarendon, the companion picture to that of Chaucer; but no evidence has been adduced to support the conjecture. It represents a handsome, fair man, with auburn beard, with an expression recalling the Janssen portrait; the nose, however, is quite different. He wears a standing "wired band," as in the Droeshout print. It is a workmanlike piece of painting, but there is nothing in the picture to connect it with Shakespeare. The same may be said of the "Welcombe portrait," which was bought by Mark Philips of Welcombe and descended to Sir George Trevelyan. It is a fairly good picture, having some resemblance to the "Boston Zuccaro" with something of the Chandos. The figure, a half-length, wears a falling spiked collar edged with lace, and from the ear a love-lace, the traces of which only are left. Two other portraits at the Shakespeare Memorial should be named. The "Venice portrait," which was bought in Paris and is said to have come from Venice, bears an Italian undecipherable inscription on the back; it seems to have no obvious connexion with Shakespeare apart from its exaggeration of the general aspect of the Chandos portrait; it is a weak thing. The "Tonson portrait," inscribed on the frame "The Jacob Tonson Picture, 1735," a small oval, with the attributes of comedy and tragedy, is believed to have been executed for Tonson's 4th edition of Shakespeare, but not used.

The "Soest portrait" (often called Zoust or Zoest), formerly known as "the Douglas," the "Lister Kaye" or the "Clarges portrait," according to the owner of the moment, was for many years a public favourite, mainly through J. Simon's excellent mezzotint. The picture, a short half-length within an oval, is manifestly meant for Shakespeare, but the head as nearly resembles the head of Christ at Lille by Charles Delafosse (1636–1716) who also painted pictures in England. Gerard Soest was not born until 1637, and according to Granger the picture was painted in Charles II.'s reign. It is a pleasing but weak head, possibly based on the Chandos. The whereabouts of the picture is unknown, unless it is that in the possession of the earl of Craven. A number of copies exist, two of which are at the Shakespeare Memorial. Simon's print was the first announcement of the existence of the picture, which at that time belonged to an obscure painter, F. Wright of Covent Garden.

The "Charlecote portrait," which was exhibited publicly at Stratford in 1896, represents a burly, bull-necked man, whose chief resemblance to Shakespeare lies in his baldness and hair, and in the wired band he wears. The former possession of the picture by the Rev. John Lucy has lent it a sort of reputation; but that gentleman bought it as recently as 1853.

Similarly, the "Hampton Court portrait" derives such authority as it possesses from the dignity of its owner and its habitat. William IV. bought it as a portrait of Shakespeare, but without evidence, it is suggested, from the de Lisles. This gorgeously attired officer in an elaborate tunic of green and gold, with red bombasted trunks, with fine worked sword and dagger pendent from the embroidered belt, and with a falling ruff and laces from his ear, bears some distant resemblance to the Chandos portrait. Above is inscribed, "Ætat. suae. 34." It appears to be the likeness of a blue-eyed soldier; but it has been suggested that the portrait represents Shakespeare in stage dress—a frequent explanation for the strange attire of quaintly alleged portraits of the poet. A copy of this picture was made by H. Duke about 1860. Similarly unacceptable is the "H. Danby Seymour portrait" which has disappeared since it was lent to the National Portrait Exhibition of 1866. This is a fine three-quarter length in the Miervelt manner. The dignified bald-headed man has a light beard, brown hair, and blue eyes, and wears white lace-edged falling collars and cuffs over a doublet gold-embroidered with points; and in the left hand holds a black hat. The "Lytton portrait," a royal gift made to Lord Lytton from Windsor Castle, is mainly interesting as having been copied by Miller in his original profile engraving of Shakespeare. The "Rendlesham" and "Crooks" portraits also belong to the category of capital paintings representing some one other than Shakespeare; and the same may be hazarded of the "Grafton" or "Winston" portrait, the "Sanders portrait," the "Gilliland portrait" (an old man's head impudently advanced), the striking "Thorne Court portrait," the "Aston Cantlow portrait," the "Burn portrait," the "Gwennet portrait," the "Wilson portrait" and others of the class.

Miniature-painting has assumed a certain importance in relation to the subject. The "Welbeck Abbey" or "Harleian miniature," is that which Walpole caused to be engraved by Vertue for Pope's edition of Shakespeare (1723–1725), but which Oldys declared, incorrectly, to be a juvenile portrait of James I. According to Scharf, it belonged to Robert Harley, 1st earl of Oxford, but it is more likely that it was bought by his son Edward Harley in the father's lifetime. It already was in his collection in 1719, but whence it came is not known. It has been denounced as a piece of arrant sycophancy that Pope consented to adopt this very beautiful but entirely unauthenticated portrait, which bears little resemblance to any other accepted likeness (more, however, to the Chandos than to the rest) simply in order to please the aristocratic patron of his literary circle. It measures 2 in. high; Vertue's exquisite engraving, executed in 1721, enlarged it to 5¼, and became the "authority" for numerous copies, British and foreign. The "Somerville" or "Hilliard miniature," belonging to Lord and Lady Northcote, is claimed to have descended from Shakespeare's friend, Somerville of Edstone, grandfather of the poet William Somerville. It was first publicly spoken of in 1818 when it was in the possession of Sir James Bland Burges. It is certainly by Hilliard, but although Sir Thomas Lawrence and many distinguished painters and others agreed that it was an original life-portrait of the poet, few will be disposed to give adherence to the theory, in view of its complete departure from other portraits. It represents a pale man with flaxen hair and beady eyes; yet in it Burges found "a general resemblance to the best busts (*sic*) of Shakespeare," and an attempt was made to prove a relationship between the Ardens and the Somervilles—an untenable theory. The miniature has frequently been exhibited and has figured in important collections on its own merits. The well-known "Auriol miniature," now in America, is one of the least sympathetic and the least acceptable of the Shakespeare miniatures, excellent though it is in technique. It has the forehead and hair of the Chandos, but it is utterly devoid of the Shakespeare expression. In the background appears "Æt 33." The costume is that worn by the highest in the land. It first appeared in its present character in 1826, but it had been known for a few years before, as being in the collection of "Dog" Jennings, and ultimately it came into the hands of the collector, Charles Auriol. Its early history is unknown. The other principal miniatures of interest, but lacking authority, are the "Waring miniature," the "Tomkinson miniature" (which, like the "Hilliard" and the "Auriol," was formerly in the Lumsden Propert collection), the doubtful "Isaac Oliver miniature" (alleged to have been in the Jaffé collection at Hamburg), the "Mackey" and "Glen" miniatures, and those presented to the Shakespeare Memorial by Lord Ronald Sutherland Gower, T. Kite, and Henry Graves. These are all contemporary or early works. Miniature copies of recognized portraits are numerous and many of them of high excellence, but they do not call for special enumeration. That, however, by Mary Anne Nichols, "an imitative cameo after Roubiliac," exhibited in the Royal Academy, 1848, claims notice. In this category are a number of enamels by accomplished artists, the chief of them Henry Bone, R.A., H. P. Bone, and W. Essex.

Several recorded painted portraits have disappeared, other than those already mentioned; these include the "Earl of Oxford portrait" and the "Challis portrait." The "Countess of Zetland's portrait," which had its adherents, was destroyed by fire.

Not a few of the existent representations of Shakespeare, unauthoritative as they are, were honestly produced as memorial pictures. There is another class, the earnest attempts made to reconstitute the face and form of the poet, combining within them the best and most characteristic features of the earliest portraits. The most successful, perhaps, is that by Ford Madox Brown, in the Manchester Corporation Art Gallery. Those by J. F. Rigaud, R.A., and Henry Howard, R.A., take a lower rank. It is to be regretted that Gainsborough did not execute the portrait for Garrick, for which he made serious preparations. The "Booker portrait," which gained wide publicity in Stratford, might be included here; it has dignity, but the pigment forbids us to allow the age claimed for it. The portraits by P. Krämer and Rumpf are among the best recently executed in Germany. The remarkable pen-and-ink drawings by Minanesi and Philip H. Newman deserve to be remembered.

The " faked " portraits have been at times as ardently accepted as those with some solid claim to consideration. The " Shakespeare Marriage picture," with its rhyming confirmatory " tag " intended as an inscription, was discovered in 1872. It is a genuine Dutch picture of man and wife weighing out money in the foreground—a frequent subject—while through the open door Shakespeare and, presumably, Ann Hathaway are seen going through the ceremony of handfasting. The inscription and the Shakespeare head (probably the whole group) are fakes. The " Rawson portrait," inscribed with the poet's name, is faked; it is really a beautiful little portrait of Lord Keeper Coventry by Janssen. The " Matthias Alexander portrait " shows a modern head on an old body. The " Belmount Hall portrait " with its pseudo-Garrick MS. inscription on the back, is in the present writer's opinion not the genuine thing which it claims to be. It represents the poet looking up from his literary work. In the early part of the 19th century two clever " restorers," Holder and Zincke, made a fairly lucrative trade of fabricating spurious portraits of Shakespeare (as well as of Oliver Cromwell and Nell Gwynn) and the clumsiness of most of them did not impede a ready sale. The way in which they imposed upon scholars as well as on the public is marvellous. Many of these impudent impostures won wide acceptance, sometimes by the help of the fine engravings which were made of them. Such are the " Stace " and the " Dunford portraits "—so named after the unscrupulous dealers who put them forward and promulgated them. They have both disappeared, but of the latter a copy is still in existence known as the " Dr Clay portrait." The former is based upon the portrait of Robert Carr, earl of Somerset. There are the two " Winstanley portraits," the Bishop Newton," the " Cygnus Avoniæ," the " Norwich " or " Boardman," the " Bellows " or " Talma " portraits—most of them, as well as others, traceable to one or other or both of the enterprising fakers already named. At least a dozen are reinforced, as corroborative evidence, with verses supposed to issue from the pen of Ben Jonson. These are all to be attributed to one ready pseudo-Elizabethan writer whose identity is known. With these pictures, apparently, should be ranged the composition, now in America, purporting to represent Shakespeare and Ben Jonson playing chess.

The " fancy-portraits " are not less numerous. The 18th-century small full-length " Willett portrait " is at the Shakespeare Memorial. It is a charmingly touched-in little figure. There are many representations of the poet in his study in the act of composition—they include those by Benjamin Wilson (Stratford Town Hall), John Boaden, John Faed, R.A., Sir George Harvey, R.S.A., C. Bestland, B. J. N. Geiger, and the painter of the Warwick Castle picture, &c.; others have for subject Shakespeare reading, either to the Court or to his family, by John Wood, E. Ender, R. Westall, R.A., &c.; or the infancy and childhood of Shakespeare, by George Romney (three pictures), T. Stothard, R.A., John Wood, James Sant, R.A.; Shakespeare before Sir Thomas Lucy, by Sir G. Harvey, R.S.A., Thomas Brooks, A. Chisholme, &c. These, and kindred subjects such as " Shakespeare's Courtship," have provided infinite material for the industry and ingenuity of Shakespeare-loving painters.

The engraved portraits on copper, steel, and wood are so numerous —amounting to many hundreds—that it is impossible to deal with them here; but one or two must be referred to, as they have genuine importance and interest. Vertue and Walpole speak of an engraved portrait by John Payne (fl. 1620, the pupil of Simon Pass and one of the first English engravers who achieved distinction); but no such print has ever been found and its existence is doubted. Walpole probably confounded it with that by W. Marshall, a reversed and reduced version of the Droeshout, which was published as frontispiece to the spurious edition of Shakespeare's poems (1640). It is good but hard. An admirable engraving, to all but expert eyes unrecognizable as a copy, was made from it in 1815, and another later. William Faithorne (d. 1691) is credited with the frontispiece to Quarles's edition of " The Rape of Lucrece, by William Shakespeare, gent. " (1655). It was copied for Rodd by R. Sawyer and republished in 1819. It represents the tragic scene between Tarquin and Lucrece, and above is inset an oval medallion, being a rendering of the Droeshout portrait reversed. The earliest engravings from the Chandos portrait are of interest. The first by L. du Guernier (Arlaud type) and that by M. (father of G.) van der Gucht are introduced into a pleasing composition. The same elaborate design was adopted by L. van der Gucht. These, like Vertue's earlier prints, look to the left; subsequent versions are reversed. Perhaps the most celebrated, partly because it was the most important and technically the finest, up to that time, is the large engraving (to the right) by Houbraken, a Dutchman, done for Birch's " Heads of Illustrious Persons of Great Britain " published by T. and P. Knapton (1747–1752). This free rendering of the Chandos portrait is the parent of the numerous engravings of " the Houbraken type." Since that date many plates of a high order, from all the principal portraits, have been issued, many of them extremely inaccurate.

Numerous portraits in stained glass have been inserted in the windows of public institutions. Typical of them are the German Chandos windows by Franz Mayer (Mayer & Co.) at Stationers' Hall, and in St Helens, Bishopsgate (Professor Blaim); and that of the Droeshout type in the great hall of the City of London school. Ford Madox Brown's design is one of the best ever executed.

We now come to the sculptured memorials. After Gerrard Johnson's bust no statuary portrait was executed until 1740, when the statue in Poets' Corner, Westminster Abbey, was set up by public subscription, mainly through the enthusiastic activity of the earl of Burlington, Dr Richard Mead, and the poet Pope. It was designed or " invented " by William Kent and modelled and carried out by Peter Scheemakers; what is, as Walpole said, " preposterous " about it—mainly the pedestal with its incongruous heads—may be credited to the former, and what is excellent to the latter. It is good sculpture, and is interesting as being the first sculptured portrait of the poet based upon the Chandos picture. Lord Pembroke possesses a replica of it. A free repetition, reversed and with many changes of detail, is erected in a niche on the exterior wall of the town-hall of Stratford-on-Avon. A copy of it in lead by Scheemakers' pupil, Sir Henry Cheere, used to stand in Drury Lane theatre. Wedgwood copied this work, omitting the absurdities of the pedestal, with much spirit in black basalt. The marble copy, much simplified, in Leicester Square, is by Fontana, a gift to London by Baron Albert Grant. Busts were executed by Scheemakers, founded on the same portrait. One is still at Stowe in the " Temple of British Worthies," and in Lord Cobham's possession is that presented by Pope to Lord Lyttelton. Some very fine engravings of the monument have been produced, the most important that in Boydell's *Shakespeare* (larger edition). By L. F. Roubiliac, Cheere's protégé, is the statue which in 1758 David Garrick commissioned him to carve and which he bequeathed to the British Museum. It is also based upon the Chandos portrait. The terra-cotta model for the statue is in the Victoria and Albert Museum; and a marble reproduction of it is in private hands. To Roubiliac also must be credited the celebrated " D'Avenant Bust " of blackened terra-cotta in the possession of the Garrick Club This fine work of art derives its name from having been found bricked up in the old Duke's theatre in Portugal Row, Lincoln's Inn Fields, which 180 years before was d'Avenant's, but which afterwards passed through various vicissitudes. It was again adapted for theatrical purposes by Giffard, for whom this bust, together with one of Ben Jonson which was smashed at the moment of discovery, must have been modelled by the sculptor, who at the same time was engaged on Garrick's commission. The model for the British Museum statue is seen in the portrait of Roubiliac by Carpentiers, now in the National Portrait Gallery. Another portrait of Shakespeare is in Westminster Abbey—a medallion based on the Chandos picture, introduced into Webber's rather fantastic monument to David Garrick. An important alto-relievo representation of Shakespeare, by J. Banks, R.A., between the Geniuses of Painting and the Drama, is now in the garden of New Place, Stratford-on-Avon It was executed for Boydell's Shakespeare Gallery in Pall Mall, and was presented to the British Institution which afterwards occupied the premises; on the dissolution of that body it was given to Stratford by Mr Holte Bracebridge. It is a fine thing, but the likeness adheres to no clearly specified type. It has been excellently engraved in line by James Stow, B. Smith, and others, and was reproduced on the admirable medal by Küchler, presented by Boydell to every subscriber to his great illustrated edition of Shakespeare's works. It is remarkable that Banks's was the first British hand to model a portrait of the poet.

In more recent times numerous attempts have been made to reconstitute the figure of Shakespeare in sculpture. The most ambitious of these is the elaborate memorial group modelled and presented by Lord Ronald Sutherland Gower to Stratford and set up outside the Memorial Theatre in 1888. The large seated figure of Shakespeare is mounted on a great circular base around which are arranged the figures of Hamlet, Lady Macbeth, Prince Henry, and Falstaff. In 1864 J. E. Thomas modelled the colossal group of Shakespeare with attendant figures of Comedy and Tragedy that was erected in the grounds of the Crystal Palace, and in the same year Charles Bacon produced his colossal Centenary Bust, a reproduction of which forms the frontispiece to John H. Heraud's *Shakspere: His Inner Life* (1865). The chief statues, single or in a group, in London still to be mentioned are the following: that by H. H. Armstead, R.A., in marble, on the southern podium of the Albert Memorial; by Hamo Thornycroft, R.A. (1871), on the Poets' Fountain in Park Lane; by Messrs Daymond on the upper storey of the City of London School, on the Victoria Embankment; and by F. E. Schenck, a seated figure, on the façade of the Hammersmith Public Library. The Droeshout portrait is the basis of the head in the bronze memorial by Professor Lanteri set into the wall on the conjectural site of the Globe Theatre (1909) and of the excellent bust by Mr C. J. Allen in the churchyard of St Mary the Virgin, Aldermanbury, in memory of Heminge and Condell (1896). A recumbent statue, with head of the Chandos type, was in preparation in 1910 for erection in the south aisle of Southwark Cathedral. Among statues erected in the provinces are those by Mr H. Pegram, A.R.A., in the building of Birmingham University (1908) and by M. Guillemin for Messrs Farmer and Brindley for the Nottingham University buildings.

Several statues of importance have been erected in other countries. The bronze by M. Paul Fournier in Paris (presented by an English resident) marks the junction of the Boulevard Haussmann and the Avenue de Messine (1888). The seated marble statue by Professor O. Lessing was set up in Weimar by the German Shakespeare Society; the sculptor has also modelled a couple of busts of a very personal

and, it may be said, un-English type. A seated statue in stone roughly hewn with characteristic breadth by the Danish sculptor, Louis Hasselriis, has for some years been placed in the apartment of the Castle of Kronborg, in which, according to the Danish tradition, Shakespeare and his company acted for the king of Denmark. America possesses some well-known statues. That by J. Q. A. Ward is in Central Park, New York (1872). In 1886 William Ordway Partridge modelled and carved the seated marble figure for Lincoln Park, Chicago; and later, Frederick Macmonnies produced his very original statue for the Library of Congress, Washington, D.C. This is in some measure based on the Droeshout engraving. William R. O'Donovan also sculptured a portrait of Shakespeare in 1874. Great consideration is given by some to the bust made by William Page of New York in preparation for a picture of the poet he was about to paint. He founded it with pathetic faith and care and amazing punctiliousness on the so-called "Death Mask," which it little resembles; as he was no sculptor the bust is no more successful than the picture. The bust by R. S. Greenough, already mentioned as based in part on the "Boston Zuccaro" portrait, must be included here, as well as the romantic, dreamy, marble bust by Augusto Possaglio of Florence (presented to the Garrick Club by Salvini in 1876); the imaginative work by Altini (Duke of Northumberland, Alnwick Castle); and the busts by F. M. Miller, E. G. Zimmermann, Albert Toft, J. E. Carew (Mr Muspratt, Liverpool) and P. J. Chardigny of Paris. The last named was a study made in 1850, for a proposed statue, 100 ft. high, which the sculptor hoped to be commissioned to produce. A multitude of small bronze and silver busts and statuettes have also been produced. Some attention has been accorded for several years past to the great pottery bust attributed to John Dwight's Fulham Pottery (*c.* 1675) The present writer, however, has ascertained that it is by Lipscombe, in the latter portion of the 19th century.

The wood carvings are numerous. The most interesting among them is the medallion traditionally believed to have been carved by Hogarth, and inset in the back of the "Shakespeare chair" presented by the artist to David Garrick (in the possession of Mr W. Burdett-Coutts). The statuettes alleged to be carved from the wood of Shakespeare's mulberry-tree are numerous; among the most attractive are the archaic carvings by Salsbee (1761). One statuette of a primitive order of art was sold in 1909 in London for a fantastic sum; it was absurdly claimed to be the original of Scheemakers' statue, but without the slightest attempt at proof or justification.

The Medals and Coins of Shakespeare offer material for a separate numismatic study. Those of the Chandos type are by far the most numerous. The best of them are as follows: Jean Dassier (Swiss; in the "Series of Famous Men," *c.* 1730); J. J. Barre (French; in the "Series numismatica universalis," 1818); Westwood (Garrick Jubilee, 1769); J. G. Hancock—the young short-lived genius who engraved the die when only seven years old; J. Kirk (for the Hon. Order of Shakespeareians, 1777); W. Barnett (for the Stratford Commemoration, 1816); J. Moore (to celebrate the Birthplace, 1864); and L. C. Wyon (the gift of Mr C. Fox-Russell to Harrow School, 1870). The latest, and one of the most skilful, is the plaquette (no reverse) in the series of "Berühmter Männer" by Wilhelm Mayer and Franz Wilhelm of Stuttgart, the leading medal-partnership of Germany (1908). After the "Droeshout" engraving: Westwood (1821); T. A. Vaughton (1908–1909). After the "Stratford bust": W. F. Taylor (celebrating the Birthplace, 1842); and T. J. Minton; T. W. Ingram (for Shakespearean Club, Stratford, 1824); J. Moore, Birmingham; and, head only, Antoine Desbœufs (French, exhibited in the Salon, 1822 –obverse only); B. Wyon (for the City of London School, Beaufoy Shakespearean prize, 1851); J. S. and A. B. Wyon (for the M'Gill University, Montreal, 1864); John Bell and L. C. Wyon (for the Tercentenary Anniversary, 1864); Allen and Moore (with incorrect birthdate, "1574," 1864). From the "Janssen" type: Joseph Moore (a medal imitating a cast medal, 1908). There is an Italian medal, cast, of recent date; with the exception of this all the medals are struck.

The 18th-century tradesmen's Tokens, which passed current as money when the copper coinage was inadequate for the public needs, constitute another branch for collectors. About thirty-four of these, including variations, bear the head of Shakespeare. With one exception (a farthing, 1815, issued much later than the bulk of the tokens) all represented half-pence. They comprise the "local" and "not local." There are the "Warwickshire" series, the "London and Middlesex," and the "Stratford Promissory" series. Many are stamped round the edge with the names of the special places in which they are payable. In addition to these may be mentioned the 24 "imitation regal" tokens which bear Shakespeare's name, around (except in one or two cases) the effigy of the king. They belong to the last quarter of the 18th century.

Many of the more important kilns have produced portraits of Shakespeare in porcelain and pottery, in statuettes, busts, in "cameos" and in painted pieces. We have them in Chelsea; old Derby; Chelsea-Derby; old Staffordshire (salt-glaze), frequently reproducing, as often as not with fantastic archaism, Scheemakers' statue; and on flat surfaces by transfer of printed designs—both 18th- and 19th-century productions; also French-Dresden and Wedgwood. In the last-named ware is the fine bust, half-life size, in black basalt, as well as several "cameos" in various sizes, in blue and white jasper, or yellow ground, and in black basalt. The busts were also produced in different sizes. Worcester produced the well-known "Benjamin Webster" service, with the portrait, Chandos type, *en camaïeu*, as well as the mug in "jet enamel," which was the fifth of the set of thirteen. Several of the portraits have also been produced commercially in biscuit china.

Gems with intaglio portraits of Shakespeare have been copiously produced since the middle of the 19th century, nearly all of them based upon earlier works by men who were masters of their still-living craft. The principal of these latter are as follows: Edward Burch, A.R.A., exhibited in 1765; Nathaniel Marchant, R.A., exhibited 1773 (Garrick turning to a bust of Shakespeare); Thomas Pownall (*c.* 1750); William Barnett; J. Wicksted the Elder (Shakespeare and Garrick); W. B. Wray (a beautiful drawing for this is in the Print Room of the British Museum); and Yeo. In the same class may be reckoned the Cameos, variously sardonyx, chalcedony, and shell, some excellent examples of which have been executed, and the Ivories, both in the round and in relief. The Waxes form a class by themselves; in the latter portion of the 18th century a few small busts and reliefs were put forth, very good of their kind. These have been imitated within recent years and attempts made to pass them off as originals, but only the novice is deceived by them. Similarly the old Shakespeare brass pipe-stoppers have latterly been widely reproduced, and the familiar little brass bust is widely reproduced from the bronze original. So voracious is the public appetite for portraits of the poet that the old embroideries in hair and more recently in woven silk found a ready market; reliefs in silver, bronze, iron, and lead are eagerly snapped up, and postage stamps with Shakespeare's head have been issued with success. The acquisitiveness of the collector paralyses his powers of selection. The vast number of other objects for daily use bearing the portrait of Shakespeare call for no notice here. (M. H. S.)

BIBLIOGRAPHY

The following is an attempt to supply the want of a select classified bibliography of the literature connected with Shakespeare (here abbreviated **S.**). The titles are arranged chronologically under each heading in order to give the literary history of the special subject. Articles in periodicals not issued separately, and modern critical editions of single plays, are not included; and only those of the plays usually contained in the collective editions are noticed.

I. Principal Collective Editions

Date.	Plays or Works.	Editors, Publishers, &c.
1623	P.	1st folio, J. Heminge and H. Condell (Jaggard & Blount) [reprinted by J. Wright (1807, folio) and by L. Booth (1862–4, 3 vols. 4to); photo-lithographic facsimile by H. Staunton (1866, folio); reduced by J. O. Halliwell-Phillipps, 1876, 8vo; reprod. from Chatsworth copy, introd. by S. Lee, 1902, folio; Methuen, 1910, folio].
1632	P.	2d folio (Cotes) [fasc. 1909 (Methuen) folio].
1663, 64	P.	3d folio (Chetwinde) [fasc. 1905 (Methuen) folio].
1685	P.	4th folio [fasc. 1904 (Methuen) folio].
1709	W.	1st 8vo, Rowe (Tonson), 7 vols., plates.
1723–25	W.	A. Pope (Tonson), 7 vols. 4to.
1733	W.	L. Theobald (Tonson), 7 vols. 8vo, plates.
1743, 44	P.	Sir T. Hanmer (Oxford), 6 vols. 4to, plates.
1747	P.	Bp. Warburton, 8 vols. 8vo.
1765	P.	Dr S. Johnson (Tonson), 8 vols. 8vo.
1767	P.	E. Capell (Tonson), 10 vols. sm. 8vo.
1773	P.	Johnson and G. Steevens, 10 vols. 8vo.
1773–75	P.	"Stage ed." (Bell), 8 vols. 12mo, plates.
1790	W.	E. Malone (Baldwin), first "Variorum ed.," 10 vols. sm. 8vo.
1793	P.	Johnson and Steeveus's 4th ed., by I. Reed, 15 vols. 8vo.
1795–96	W.	1st American ed., S. Johnson (Philadelphia), 8 vols. 12mo.
1799–1801	W.	1st Continental ed. (Brunswick), 8 vols. 8vo; repr. of 1793 ed. at Basle, 1799–1802, 23 vols. 8vo.
1802	P.	Boydell's illus. ed. (Bulmer), 9 vols. fol., plates, and 2 additional vols.
1805	P.	A. Chalmers, 9 vols. 8vo, Fuseli's plates.
1807	P.	Heath's engravings, 6 vols. imp. 4to.
1818	P.	T. Bowdler's "Family ed.," complete, 10 vols. 18mo.
1821	W.	E. Malone, by J. Boswell, "Variorum ed.," 21 vols. 8vo.
1825	P.	Rev. W. Harness, 8 vols. 8vo.
1826	P.	S. W. Singer (Pickering), 10 vols. 18mo, woodcuts.
1829	P.	1st French ed. (Baudry), 8vo.
1830	W.	L. Tieck (Leipzig), roy. 8vo.
1832–34	W.	J. Valpy, "Cabinet Pictorial ed.," 15 vols. sm. 8vo.
1838–43	W.	C. Knight, "Pictorial ed.," 8 vols. imp. 8vo.
1839–43	W.	B. Cornwall, 3 vols. imp. 8vo, woodcuts by Kenny Meadows.
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1842–44	W.	C. Knight, "Library ed.," 12 vols. 8vo, woodcuts.
1844	P.	O. W. Peabody (Boston, U.S.), 7 vols. 8vo.
1847	P.	Dr G. C. Verplanck (N.Y.), 3 vols. roy. 8vo, woodcuts.
1851	W.	W. Hazlitt, 4 vols. 12mo.
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1852–57	W.	Rev. H. N. Hudson (Boston, U.S.), 11 vols. 12mo.
1853	P.	J. P. Collier (see *Payne Collier Controversy*, xix.), 8vo.
1853–65	W.	J. O. Halliwell, 16 vols. folio, plates.
1854–65	W.	N. Delius (Elberfeld), 8 vols. 8vo.

Date.	Plays or Works.	Editors, Publishers, &c.
1850	P.	Singer and W. W. Lloyd (Bell), 10 vols. 12mo.
1857	W.	Rev. A. Dyce (Moxon), 6 vols. 8vo, 2d ed., 1864-67.
1857-60	W.	R. G. White (Boston, U.S.), 12 vols. cr. 8vo.
1858-60	W.	H. Staunton, 3 vols. roy. 8vo, illustrated by Sir J. Gilbert.
1860	W.	Mrs Cowden Clarke (N.Y.), 2 vols. roy. 8vo.
1863-66	W.	W. G. Clark, J. Glover and W. A. Wright, "Cambridge ed.," 9 vols. 8vo.
1864	P.	J. B. Marsh, "Reference ed.," large 8vo.
1805-69	P.	C. and M. C. Clarke (Cassell), illustrated by H. C. Selous, 3 vols. la. 8vo.
1871 &c.	P.	H. H. Furness, "Variorum ed." (Phil.), vols. 1-16, 8vo., in progress.
1872-74	P.	C. Knight, "Imperial," 4 vols. imp. 4to, plates.
1874	W.	W. G. Clark and W. A. Wright, "Globe," sm. 8vo.
1875	W.	S. Neil, "Library Shakespeare" (Mackenzie), 3 vols. 4to, illus.
1876	W.	G. L. Duyckinck (Phil.), large 8vo, illus.
1877 &c.	P.	A. A. Paton, "Humnet ed.," 8vo, 1st folio text, spelling modernized.
1877	W.	N. Delius (F. J. Furnivall), "Leopold" Shakespeare, 4to.
1878	W.	J. S. Hart, "Avon ed." (Phil.), large 8vo, portraits.
1881	W.	Rev. H. N. Hudson, "Harvard ed." (Boston, U.S.), 20 vols. 12mo
1883	P.	C. Wordsworth, "Historical Plays," 3 vols. sm. 8vo
1883	W.	R. G. White, "Riverside ed." (Camb., Mass.), 3 vols. 8vo.
1884	W.	Rolfe's "Friendly ed.," 20 vols. 16mo (N.Y.).
1887-90	W.	Sir H. Irving and F. A. Marshall, "H. Irving ed.," 8 vols. 4to.
1888-92	P.	J. A. Morgan, "Bankside ed.," orig. players' text (N.Y. *S.* Soc.), 20 vols.
1889	W	"Bedford ed.," N.Y., 12 vols. 8vo.
1891-93	W.	W. A. Wright, "Cambridge ed.," 9 vols. 8vo; also 1893-95, 40 vols. sm. 8vo.
1894-96	W.	I. Gollancz, "Temple ed.," 40 vols. sm. 8vo.
1899 1903	W.	C. H. Herford, "Eversley ed.," 10 vols. 8vo.
1899 1902	W.	J. Dennis, "Chiswick ed.," ill. by Byam Shaw, 39 vols. sm. 8vo.
1899 &c.	P.	W. J. Craig, "Arden ed.," each play separate editor.
1901-4	W.	W. E. Henley (and W. Raleigh), "Edinburgh folio ed.," 10 vols.
1906-9	W.	S. Lee, "Univ. Press *S.* Renaissance ed.," 40 vols.
1907 &c.	W.	F. J. Furnivall, "Old Spelling *S.*" (I. Gollancz, *S.* Lib.).
1907 &c.	P.	J. A. Morgan, "Bankside-Restoration *S.*" (N.Y. *S.* Soc.).
		[G. Steevens, *Twenty of the Plays*, 1766, 4 vols. 8vo, contains reprints of the early editions 48 vols. of the quartos were facsimiled by E. W. Ashbee (1866-71), under the superintendence of Halliwell; photo-lithographic reproductions of early editions by Griggs and Praetorius, with introductions by Furnivall, &c., 1883-9, 43 vols. 4to.]

II. Selections and Readings

J. R. Pitman, *The School S.*, 1822, 8vo; B. H. Smart, *S. Readings*, 1839, 12mo; Howell, *Select Plays*, 1848, 12mo, Roman Catholic; C. Kean, *Selections, as at the Princess' Theatre*, 1860, 2 vols. sm. 8vo; T. and Rev. S. G. Bulfinch, *S. adapted for Reading Classes and the Family*, Boston, 1865, 12mo; W. A. Wright, *Select Plays*, 1869-86, 14 vols. sm. 8vo; J. W. S. Hows, *Historical S.ian Reader*, N.Y., 1870, 8vo; R. J. Lane (editor), *C. Kemble's S. Readings*, 1870, sm. 8vo; R. Baughan, *Plays, Abridged and Revised for Girls*, 1871, 8vo; H. N. Hudson, *Plays, Selected*, Boston, 1872, 3 vols. sm. 8vo; H. Cundell, *The Boudoir S.*, 1876-77, 3 vols. 8vo, eight plays for reading aloud; H. C. Bowen, *S. Reading Book*, 1881, 3 pts. 8vo, seventeen plays for schools and reading aloud; S. Brandrum, *Selected Plays, abridged for the Young*, 1882, sm. 8vo; C. M. Yonge, *S.'s Plays for Schools*, 1883-85, five plays abridged and annotated; M. A. Woods, *Scenes from S. for use in Schools*, 1898, &c., 8vo; *Lamb, S. for the Young* (I. Gollancz, *S. Lib.*) 1908, &c., based on *Lamb's Tales from S.*

III. Principal Translations of Works

German.—C. M. Wieland, 1762-66, 8 vols. 8vo; J. J. Eschenburg, 1775-82, 13 vols. 8vo; A. W. v. Schlegel, 1797-1810, 9 vols. 8vo; Schlegel-Eschenburg, 1810-12, 20 vols. 8vo; J. H. and H. and A. Voss, 1818-29, 9 vols. 8vo; J. W. O. Benda, 1825-26, 19 vols. 16mo; J. Meyer and H. Döring, 1824-34, 52 pts. 18mo; Schlegel-Tieck, 1825-33, 9 vols. 12mo; P. Kaufmann, 1830-36, 4 vols. 12mo; E. Ortlepp, 1838-30, 8 vols. 12mo; Schlegel-Tieck-Ulrici, 1867-71, 12 vols. 8vo; Dingelstedt, W. Jordan and others, 1865-70, 9 vols. 8vo; F. Bodenstedt and others, 1867-71, 5th ed. 1890, 9 vols. 8vo; Schlegel-Tieck-Bernays, 1871-73, 12 vols. sm. 8vo; Schlegel-Gundolf, 1908, &c. *French.*—Letourneur, 1776-82, 20 vols. 8vo; Letourneur-Guizot, 1821, 13 vols. 8vo; B. Laroche, 1838-39, 2 vols. roy. 8vo; Francisque-Michel, 1839-40, 3 vols. roy. 8vo; F. Victor Hugo fils, 1859-66, 18 vols. 8vo; Guizot, 1860-62, 8 vols. 8vo; E. Montégut, 1868-73, 10 vols. 12mo; G. Duval, 1908-9, 8 vols. 8vo; J. H. Rosny, 1909, &c. *Italian.*—M. Leoni, 1814-15, 8 vols. 8vo; C. Rusconi, 1838, 8vo; C. Pasqualigo, 1870, &c.; G. Carcano, 1875-82, 12 vols. 8vo. *Spanish.*—Marqués de Dos Hermanos, 1872-77, 3 vols. 8vo; J. Clark, 1870-74, 5 vols. (only 10 plays); G. Macpherson, 1885. *Dutch.*—B. Brunius, &c., 1778-82, 5 vols. 8vo; A. S. Kok, 1872-80, 7 vols. 8vo; L. A. J. Burgersdijk, 1886-88, 12 vols. 8vo. *Danish.*—Foersom and L. Lembcke, 1861-73, 18 vols. 8vo. *Swedish.*—C. A. Hagberg, 1847-51, 12 vols. 8vo. *Bohemian.*—J. Ceška, F. Doucha, &c., 1856-73, 9 vols. 8vo. *Hungarian.*—Dobrentei, 1824, 8vo; Lemouton, 1845, &c. *Polish.*—I. Kefalinski and J. v. Placyd, 1839-47, 3 vols. 8vo; S. Kozmiana, 1866, &c.; H. C. Selousa, 1875-77, 3 vols. *Russian.*—N. Ketschera, 1841-50, 5 vols. (18 plays); P. A. Kanshin, 1893, 12 vols. (complete works).

IV. Criticism, Illustration and Comment

A.—*General Works.*

T. Rymer, *The Tragedies of the Last Age*, 1678, 8vo, and *A Short View of Tragedy*, 1693, 8vo; C. Gildon, "Some Reflections on Mr Rymer" (in *Miscellaneous Lectures*, 1694, 8vo); J. Dennis, *The Impartial Critic*, 1692, 4to, and *Essay on the Genius and Writings of S.*, 1712, 8vo; Z. Grey, *Word or Two of Advice to W. Warburton*, 1746, 8vo, *Free and Familiar Letter to W. Warburton*, 1750, 8vo, *Remarks on [Warburton's] Edition*, 1751, 8vo, and *Critical, Historical, and Explanatory Notes*, 1754, 3rd ed. 1755, 2 vols. 8vo; S. Johnson, *Proposal for a New Edition* (1746), folio, 1765, 8vo; E. Capell, *Notes and Various Readings to S.*, 1759, 4to (1779-80), 3 vols. 4to; P. Nichols, *The Castrated Letter of Sir T. Hanmer*, 1763, 8vo; *Prefaces by Dr Johnson, Pope, Theobald, &c.*, 1765, 8vo; W. Kenrick, *Review of Dr Johnson's New Edition*, 1765, 8vo, and *Defence*, 1766; G. Steevens, *Proposals for Printing a New Edition*, 1766, 8vo; Mrs Eliz. Montagu, *Essay on Writings and Genius of S.*, 1769, 8vo, frequently reprinted; W. Kenrick, *Introduction to the School of S.*, 1773, 8vo; Mrs Eliz. Griffiths, *Morality of S.'s Drama*, 1775, 8vo; Voltaire, *Lettre à l'Académie*, 1776, 8vo, on Letourneur's translation; J. Baretti, *Discours sur S. et Voltaire*, 1777, 8vo; E. Malone, *Supplement to the Edition of 1778*, 1780, 2 vols. 8vo, *Second Appendix*, 1783, 8vo; J. Ritson, *Remarks on the Text and Notes of [Steevens's 1778] edition*, 1783, 8vo; T. Davies, *Dramatic Miscellanies*, 1783-84, 3 vols. 8vo; J. M. Mason, *Comments on the Last Edition*, 1785, 8vo; T. Whately, *Remarks on some of the Characters*, 1785, 8vo, new edition by Archbishop Whately, 1839, 12mo; J. J. Eschenburg, *Versuch ü. S.*, Leipzig, 1787, 8vo; J. Ritson, *The Quip Modest*, 1788, 8vo; S. Felton, *Imperfect Hints towards a New Edition of S.*, 1787-88, 2 pts. 4to; A. Eccles, *Illustrations and Variorum Comments on Lear, Cymbeline, and Merchant of Venice*, 1792-1805, 3 vols. 12mo; E. Malone, *Letter to R. Farmer*, 1792, 8vo; J. Ritson, *Cursory Criticism on Malone's Edition*, 1792, 8vo; E. Malone, *Prospectus of an Edition in 15 vols. roy. 8vo*, 1792, 4to; Bishop Percy, *Origin of the English Stage*, 1793, 8vo; E. Malone, *Proposals for an Intended Edition in 20 vols. roy. 8vo*, 1795, folio; W. Richardson, *Essays on some of S.'s Dramatic Characters*, 1797, 1812, 8vo, reprint of separate pieces, Lord Chedworth, *Notes on some Obscure Passages*, 1805, 8vo, privately printed; E. H. Seymour, *Remarks on the Plays of S.*, 1805, 2 vols. 8vo; F. Douce, *Illustrations of S. and Ancient Manners*, 1807, 2 vols. 8vo, new edition 1839, 8vo; H. J. Pye, *Comments on the Commentators*, 1807, 8vo; J. M. Mason, *Comments on the several Editions*, 1807, 8vo; C. (and M.) Lamb, *Tales from S.*, 1807, 2 vols. 12mo, plates, frequently translated and reprinted; A. Becket, *S. himself again*, 1815, 2 vols. 8vo; W. Hazlitt, *Characters of S.'s Plays*, 1817, 8vo, new edition 1873; N. Drake, *S. and his Times*, 1817, 2 vols. 4to, and *Memorials of S.*, 1828; Z. Jackson, *S.'s Genius Justified, Examples of 700 Errors in his Plays*, 1819, 8vo; [*Variorum*] *Annotations Illustrative of the Plays of S.*, 1819, 2 vols. 12mo, published with Scholey's edition; W. Hazlitt, *Lectures on the Dramatic Literature of the Age of Elizabeth*, 1820, 8vo; T. Bowdler, *Letter to Editor of British Critic*, 1823, 8vo, defends omissions; T. P. Courtenay, *Commentaries upon the Historical Plays of S.*, 1840, 2 vols. sm. 8vo; K. Sybrandi, *Verhandeling over Vondel en S.*, Haarlem, 1841, 4to; Rev. A. Dyce, *Remarks on Collier's and Knight's Editions*, 1844, 8vo; J. Hunter, *New Illustrations of S.*, 1845, 2 vols. 8vo; G. Fletcher, *Studies of S.*, 1847, 8vo; L. Tieck, *Dramaturgische Blätter*, 2d ed. 1848-52, 3 vols. 8vo; H. N. Hudson, *Lectures on S.*, N.Y., 1848, 2 vols. 8vo; C. Knight, *Studies of S.*, 1849, 8vo; S. T. Coleridge, *Notes and Lectures upon S.*, &c., 1849, 2 vols. sm. 8vo, and *Lectures and Notes on S.*, by T. Ashe, 1883, sm. 8vo; J. Britton, *Essay on the Merit and Characteristics of S.'s Writings*, 1849, roy. 8vo; K. Simrock, *Remarks on the Plots of S.'s Plays* (Shakespeare Society), 1850, 8vo; Rev. T. Grinfield, *Moral Influence of S.'s Plays*, 1850, 8vo; V. E. P. Chasles, *Études sur W. S., Marie Stuart, et l'Arétin*, 1851, 18mo; F. A. T. Kreyssig, *Vorlesungen ü. S.*, 1858-60, 3 vols., 3rd ed. 1876, 2 vols. 8vo, and *S. Fragen*, Leipzig, 1871, 8vo; [O'Connell], *New Exegesis of S.*, 1859, 8vo; S. Jervis, *Proposed Emendations of S.*, 2nd ed. 1861, 8vo; R. Cartwright, *The Footsteps of S.*, 1862, 8vo, *New Readings in S.*, 1866, 8vo, and *Papers on S.*, 1877, 8vo; G. G. Gervinus, *S. Commentaries translated*, 1863, 2 vols., new edition revised 1875, 8vo; S. Bailey, *The received Text of S.'s Dramatic Writings*, 1862-66, 2 vols. 8vo; C. C. Clarke, *S. Characters, chiefly those Subordinate*, 1863, 8vo; H. Marggraff, *W. S. als Lehrer der Menschheit*, Leipzig, 1864, 16mo; J. H. Hackett, *Notes and Comments*, N.Y., 1864, sm. 8vo; A. Mezières, *S. ses œuvres et ses critiques*, 1865, 8vo; H. Wellesley, *Stray Notes on the Text of S.*, 1865, 4to; A. M. L. de Lamartine, *S. et son œuvre*, 1865, 8vo; W. L. Rushton, *S. illustrated by old Authors*, 1867-68, 2 pts. 8vo; T. Keightley, *The S. Expositor*, 1867, sm. 8vo; B. Tschischwitz, *S. Forschungen*, 1868, 3 vols. 8vo; F. Jacox, *S. Diversions*, 1875-77, 2 vols. 8vo; H. v. Friesen, *Das Buch: S. v. Gervinus*, Leipzig, 1869, 8vo, *S. Studien*, Vienna, 1874-76, 2 vols. 8vo; H. T. Hall, *Shakespearian Fly Leaves*, 1874, 8vo; K. R. Proelss, *Erläuterungen*, Leipzig, 1874-78, pts. 1-6, sm. 8vo, including Hamlet, Julius Caesar, Merchant of Venice, Much Ado, &c., Richard II., Romeo and Juliet; C. W. H. G. v. Rümelin, *S. Studien*, 2nd ed., Stuttg., 1874, 8vo; R. A. C. Hebler, *Aufsätze üb. S.*, 2nd ed., Bern, 1874, 8vo; F. J. Furnivall, *The Succession of S.'s Works and the Uses of Metrical Tests*, 1874, 8vo; O. Ludwig, *S Studien*, 1874, 8vo; E. Dowden, *S.: a Critical Study of his Mind and Art*, 1875, 11th ed. 1897, 8vo; C. M. Ingleby, *S. Hermeneutics*, 1875, 4to, *S., the Man and the Book*, 1877-81, 2 pts. 4to, and *Occasional Papers on S.*, 1881, sq. 16mo; F. K. Elze, *Abhandlungen zu S.*, 1877, 8vo, and *Essays on S.*, translated, 1874, 8vo; E. Hermann, *Drei S. Studien*, Erlangen, 1877-79, 4 pts. sm. 8vo, *Weitere Beiträge*, ib., 1881, sm. 8vo; H. H. Vaughan, *New Readings and New Renderings of S.'s Tragedies*, 1878-86, 3 vols. 8vo; F. G. Fleay, *S. Manual*, 1878, sm. 8vo; J. O. Halliwell-Phillipps, *Notes and Memoranda* [on 4 Plays], 1868-80, 4 pts., 8vo, and *Memoranda* [on 12 Plays], 1879-80, 7 pts. 8vo; A. C. Swinburne, *A Study of S.*, 1880, 3rd ed. 1895, 8vo; D. J. Snider, *System of S.'s Dramas*, 1880, 8vo; F. A. Kemble, *Notes on some of S.'s Plays*, 1882, 8vo; H. Giles, *Human Life in S.*, Boston, 1882, 12mo; B. G. Kinnear, *Cruces Shakespearianae*, 1883, sm. 8vo; C. C. Hense, *S. Studien*, Halle, 1883, 8vo; F. Brincker, *Poetik S.'s in den Römerdramen*, 1884, 8vo; A. S. G. Canning, *Thoughts on S.'s Historical Plays*, 1884, 8vo; *New Study of S.*, 1884, 8vo; J. W. Hales, *Notes and Essays on S.*, 1884, sm. 8vo; J. Feis, *S. and Montaigne*, 1884, sm. 8vo; Sir P. Perring, *Hard Knots in S.*, 1885, 8vo; F. A. Leo, *S. Notes*, 1885, 8vo; R. G. Moulton, *S. as a Dramatic Artist*, 1885, 3rd ed. 1897, 8vo; R. G. White, *Studies in S.*, Boston, 1885, 8vo; J. Brown, *Répertoire de S.*, 1885, sm. 8vo; E. Rossi, *Studii drammatici*, Firenze, 1885, sm. 8vo; C. H. Hawkins (ed.), *Noctes S.ianae* (Winchester Coll. *S.* Soc.), 1887; E. Reichel, *S. Litteratur*, 1887, 8vo; G. Dawson, *S. and other Lectures*, 1888, 8vo; F. J. Furnivall, *Modern S.ean Criticism*, 1888, 8vo; W. T. Thom, *S. and Chaucer Examinations*, 1888, 8vo; R. Beyersdorff, *Giordano Bruno und S.*, 1889, 4to; C. Ransome, *Short Studies of S.'s Plots*, 1890, 8vo; H. v. Basedow, *Charaktere und Temperamente*, 1893, 8vo; T. Ten Brink, *S.: fünf Vorlesungen*, 1893, 8vo; transl. by J. Franklin, 1895, 8vo; H. Bulthaupt, *S. und d. Naturalismus*, Weimar, 1893, 8vo; E. Dowden, *Introd. to S.*, 1893, sm. 8vo; T. S. Baynes, *S. Studies*, 1894, 8vo; B. Wendell, *W. S., a Study in Elizabethan Literature*, 1894, 8vo; W. Winter, *S.'s England*, N.Y., 1894, new ed., 1910, 8vo; V. F. Janssen, *S. Studien*, 1897, 8vo; T. F. Ordish, *S.'s London*, 1897, sm. 8vo; J. M. Robertson, *Montaigne and S.*, 1897, 8vo; G. Brandes, *S.*, transl., 1898, 2 vols. 8vo; L. Kellner, *S.*, 1900, 8vo; A. H. Thorndike, *The Influence of Beaumont and Fletcher on S.*, Worc. (U.S.) 1901, 8vo; R. G. Moulton, *The Moral System of S.*, 1903, 8vo; M. J. Wolff, *W. S. Studien und Aufsätze*, 1903, 8vo; T. Seccombe and J. W. Allen, *The Age of S.*, 1903, 2 vols. 8vo; A. C. Bradley, *S.ean Tragedy*, 1904, 8vo; J. C. Collins, *Studies in S.*, 1904, sm. 8vo; S. A. Brooke, *On Ten Plays of S.*, 1905, 8vo; A. P. Wright, *Children of S.*, 1905, 8vo; H. J. Stephenson, *S.'s London*, 1905, sm. 8vo; F. W. Kilbourne, *Alterations and Adaptations of S.*, Boston (U.S.), 1906, sm. 8vo; T. R. Lounsbury, *The Text of S., its History*, 1906, 8vo; E. H. Griggs, *S.: a Handbook*, 1907, 8vo; W. Raleigh, *S.* (Engl. Men of Letters), 1907, sm. 8vo; Count L. N. Tolstoi, *S. and the Drama*, transl., 1907, 8vo; J. Kohler, *Verbrecher-Typen in S.'s Dramen*, Berlin [1907], 8vo; G. F. Boardman, *S.: Five Lectures*, 1908, 8vo; B. A. Goll, *Verbrecher bei S.*, 1908, 8vo; C. F. Johnson, *S. and his Critics*, 1909, 8vo; A. C. Swinburne, *Three Plays of S.*, 1909, sm. 8vo; and *S.* (written in 1905), 1909, sm. 8vo; Carlyle, Emerson, and Goethe *On S.* (De la More Booklets), 3 vols.; F. E. Schelling, *Engl. Lit. during Lifetime of S.*, 1910, 8vo.

B.—*Special Works on Separate Plays, &c., with Dates of Early Quartos.*

All's Well that Ends Well (1st ed. in F.1, 1623): H. v. Hagen, *Üb. die altfranzös. Vorstufe des Lustspieles*, Halle, 1879, 8vo. **Antony and Cleopatra** (1st ed. in F.1). **As You Like It** (1st ed. in F.1.): W. Whiter, *Specimen of a Commentary*, 1794, 8vo; A. O. Kellogg, *Jacques*, Utica, 1865, 8vo; C. Sheldon, *Notes*, 1877, 8vo; T. Stothard, *S.'s Seven Ages Illustrated*, 1799, folio; J. Evans, *S.'s Seven Ages*, 3d ed., 1834, 12mo; J. W. Jones, *Origin of the Division of Man's Life into Stages*, 1861, 4to; C. Semler, *S.'s Wie es euch gefällt*, 1899, 8vo. **Comedy of Errors** (1st ed. in F.1): F. Lang, *S.'s Comedy of Errors*, 1909, 8vo. **Coriolanus** (1st ed. in F.1): F. A. Leo, *Die Delius'sche Ausgabe kritisch beleuchtet*, Berlin, 1862, 8vo; F. von Westenholz, *Die Tragik in S.'s Coriolanus*, Stuttgart, 1895, 8vo. **Cymbeline** (1st ed. in F.1): K. Elze, *Letter to C. M. Ingleby*, 1885, 8vo; R. Ohle, *S.'s Cymbeline u. seine romanischen Vorläufer*, 1890, 8vo. **Hamlet** (Q.1, 1603; Q.2, 1604; Q.3, 1605; Q.4, 1611; Q.5, n.d.; Q.6, 1637): L. Theobald, *S. Restored*, 1726, 4to, devoted to Hamlet; Sir T. Hanmer, *Some Remarks on Hamlet*, 1736, 8vo, reprinted 1863, sm. 8vo; J. Plumptre, *Observations on Hamlet, and Appendix*, 1796-1797, 2 pts. 8vo; F. L. Schmidt, *Sammlung der*

besten Urtheile über Hamlet, Quedl., 1808, 8vo ; A. G. Barante, *Sur Hamlet*, 1824, 8vo ; P. Macdonnell, *Essay on Hamlet*, 1843, 8vo ; Sir E. Strachey, ***S.'s Hamlet***, 1848, 8vo ; H. K. S. Causton, *Essay on Mr Singer's Wormwood*, 1851, 8vo ; L. Noiré, *Hamlet, zwei Vorträge*, Mainz, 1856, 16mo ; M. W. Rooney, *Hamlet, First Edition* (1603), 1856, 8vo ; ***S.'s Hamlet, 1603 and 1604, with Bibliographical Preface***, by S. Timmins, 1860, 8vo ; A. Gerth, *Der Hamlet v. S.*, Leip., 1861, 8vo ; J. Conolly, *A Study of Hamlet*, 1863, sm. 8vo ; H. v. Friesen, *Briefe üb. S.'s Hamlet*, Leipzig, 1865, 8vo ; A. Flir, *Briefe üb. S.'s Hamlet*, Innsbruck, 1865, 8vo ; W. D. Wood, *Hamlet from a Psychological Point of View*, 1870, 8vo ; R. H. Horne (editor), *Was Hamlet Mad? a Series of Critiques*, 1871, 8vo ; G. F. Stedefeld, *Hamlet ein Tendenzdrama*, Berlin, 1871, 8vo ; A. Meadows, *Hamlet: an Essay*, 1871, 8vo ; R. G. Latham, *The Hamlet of Saxo Grammaticus and S.*, 1872, 8vo ; F. A. Marshall, *Study of Hamlet*, 1875, 8vo ; H. v. Struve, *Hamlet eine Charakterstudie*, Weimar, 1876, 8vo ; H. Baumgart, *Die Hamlet Tragödie u. ihre Kritik*, Königsb., 1877, 8vo ; A. Zinzow, *Die Hamlet Sage*, Halle, 1877, 8vo ; A. Büchner, *Hamlet le Danois*, 1878, 8vo ; M. Moltke, ***S.'s Hamlet Quellen***, 1881, 8vo ; E. P. Vining, *The Mystery of Hamlet*, Philad., 1881, sm. 8vo [Hamlet a woman] ; H. Besser, *Zur Hamlet Frage*, 1882, 8vo ; E. Stenger, *Der Hamlet Charakter*, 1883, 8vo ; A. Brereton, *Some Famous Hamlets*, 1884, 8vo ; N. R. d'Alfonso, *La Personalità di Amleto*, 1894, 8vo ; H. Conrad, ***S.'s Selbstbekenntnisse***, 1897, 8vo ; E. Heuse, *Zur Lösung des Hamlet-Problems*, 1897, 8vo ; G. S. Preston, *The Secret of Hamlet*, 1897, 8vo ; A. Doering, *Hamlet, ein neuer Versuch*, 1898, 8vo ; H. Traut, *Die Hamlet-Controverse*, 1898, 8vo ; F. Gregori, *Das Schaffen des Schauspielers*, 1899, 8vo ; C. W. Scott, *Some Notable Hamlets of the Present Day*, 1900, 8vo ; H. Ford, ***S.'s Hamlet***, 1900, 8vo ; M. E. Evans, *The Ghost in Hamlet*, 1902, 8vo ; A. H. Tolman, *The Views about Hamlet*, 1906, 8vo ; C. M. Lewis, *The Genesis of Hamlet*, 1907, 8vo ; R. Limberger, *Polonius*, 1908, 8vo ; A. Wurm, ***S.'s Hamlet***, 1908, 8vo ; W. Pfleiderer, *Hamlet u. Ophelia*, 1908, 8vo , A. V. Weilen, *Hamlet auf den deutschen Bühne*, 1908, 8vo ; S. M. Perlmann, *Eine neue Hamlet-Auffassung*, 1909, 8vo. **Henry IV.** (Pt. i. : Q.1, 1598 ; Q.2, 1599 ; Q.3, 1604 ; Q.4, 1608 ; Q.5, 1613 ; Q.6, 1622 ; Q.7, 1632 ; Q.8, 1639. Pt. ii. : Q.1 and Q.2, 1600) : E. A. Struve, *Studien zu S.'s Henry IV.*, Kiel, 1851, 4to. **Henry V.** (Q.1, 1600 ; Q.2, 1602 ; Q.3, 1608 [1619]) : G. A. Schmeding, *Essays on S.'s Henry V.*, 1874, 8vo ; P. Kabel, *Die Sage von Heinrich V.*, 1908, 8vo. **Henry VI.** (Pt. i. 1st ed. in F.1. Pt. ii. 1st ed. in F.1. *Contention*, &c : Q.1, 1594 ; Q.2, 1600 ; Q.3, [1619]. Pt. iii. 1st ed. in F.1. *Richard of Yorke* : Q.1, 1595 ; Q.2, 1600 ; Q.3 [1619]) : E. Malone, *Dissertation on Henry VI.*, 1792, 8vo ; G. L. Rives, *Authorship of Henry VI.*, 1874, 8vo ; C. Schmidt, *M. v. Anjou vor und bei S.*, 1906, 8vo. **Henry VIII.** (1st ed. in F.1) : T. E. Pemberton, *Henry VIII. on the Stage*, 1902, 8vo. **Julius Caesar** (1st ed. in F.1) : G. L. Craik, *The English of S. Illustrated*, 3rd ed. 1864, sm. 8vo ; H. Gomont, *Le César de S.*, 1874, 8vo ; M. G. Moberly, *Hints for S. Study exemplified in Julius Caesar*, 1881, 8vo ; P. Trabaud, *Etude sur le Jules César de S. et de Voltaire*, 1889, 8vo ; P. Kreutzberg, *Brutus in S.'s Julius Caesar*, 1894, 4to ; F. von Westenholz, *Idee u. Charaktere in S.'s Julius Caesar*, 1897, 8vo. **King John** (1st authentic ed. in F.1. *Troublesome Raigne*, spurious : Q.1, 1591 ; Q.2, 1611 ; Q.3, 1622). **King Lear** (Q.1, 1608 ; Q.2, 1608 [1619] ; Q.3, 1655) : [C. Jennens], *King Lear vindicated*, 1772, 8vo ; H. Neumann, *Über Lear u. Ophelia*, Breslau, 1866, 8vo ; J. R. Seeley, W. Young and E. A. Hart, *Three Essays on Lear*, 1851, 8vo, Beaufoy Prize Essays ; Dr Hirschfeld, *K. Lear im Lichte ärztlicher Wiss.*, 1882, 8vo ; F. G. F. Verdi, *Re Lear, lettere*, 1902, 8vo ; E. Bode, *Die Lear-Sage*, 1904, 8vo. **Love's Labour's Lost** (Q.1, 1598 ; Q.2, 1631). **Macbeth** (1st ed. in F.1) : [Dr S. Johnson] *Miscellaneous Observations on Macbeth*, 1745, 12mo ; J. P. Kemble, *Macbeth and Richard III.*, 1817, 8vo ; C. W. Opzoomer, *Aanteekeningen op Macbeth*, Amst., 1854, 8vo ; G. Sexton, *Psychology of Macbeth*, 1869, 8vo ; J. G. Ritter, *Beiträge zur Erkl. des Macbeth*, Leer, 1871, 2 pts. 4to ; V. Kaiser, *Macbeth und Lady Macbeth*, Basel, 1875, 8vo ; E. R. Russell, *The True Macbeth*, 1875, 8vo ; T. Hall Caine, *Richard III. and Macbeth*, 1877, 8vo ; A. Horst, *König Macbeth, eine schottische Sage*, Bremen, 1876, 16mo ; M. Zerbst, *Die dramat. Technik des Macbeth*, 1888, 8vo ; F. Kaim, ***S.'s Macbeth, eine Studie***, 1888, 8vo ; J. C. Carr, *Macbeth and Lady Macbeth*, 1889, 8vo ; G. Fletcher, *Character Studies in Macbeth*, 1889, 8vo ; E. Kroeger, *Die Sage von Macbeth*, 1904, 8vo. **Measure for Measure** (1st ed. in F.1) : J. O. Halliwell-Phillipps, *Memoranda on Measure for Measure*, 1880, 12mo ; A. E. Thiselton, *Some Textual Notes*, 1901, 8vo. **Merchant of Venice** (Q.1, 1600 ; Q.2, 1600 [1619] ; Q.3, 1637 ; Q.4, 1652) : G. Farren, *Essay on Shylock*, 1833, 8vo ; F. V. Hugo, *Commentary on the Merchant of Venice*, translated 1863, 8vo ; H. Graetz, *Shylock in d. Sage*, 1880, 8vo ; A. Pietscher, *Versuch einer Studie üb. S.'s Kaufmann v. V.*, 1881, 8vo ; C. H. C. Plath, ***S.'s Kaufmann v. V.***, 1882, 8vo ; H. Heinemann, *Shylock und Nathan*, 1886, 8vo ; A. Manzi, *L'Ebreo e la libbra di carne*, 1896, 8vo ; O. Burmeister, *Nachdichtungen*, 1902, 8vo. **Merry Wives of Windsor** (Q.1, 1602 ; Q.2, 1619 ; Q.3, 1630) : J. O. Halliwell-Phillipps, *Account of the only known MS. of S.'s Plays*, 1843, 8vo. **Midsummer Night's Dream** (Q.1, 1600 : Q.2, 1600 [1619]) : N. J. Halpin, *Oberon's Vision and Lylie's Endymion* (Shakespeare Society), 1843, 8vo ; J. O. Halliwell-Phillipps, *Introduction to S.'s Midsummer Night's Dream*, 1841, 8vo, and *Illustrations of the Fairy Mythology of Midsummer Night's Dream* (Shakesp Soc.), 1845, 8vo ; the same with J. Ritson, *Fairy Tales, Legends, and Romances*, ed. Hazlitt, 1875, 8vo ; E. Hermann, *Drei S. Studien*, Erlangen, 1877–9, 4 pts. sm. 8vo ; L. E. A. Proescholdt, *On the Sources of S.'s Midsummer Night's Dream*, 1878, 8vo ; A. E. Thiselton, *Some Textual Notes*, 1903, 8vo ; F. Sidgwick, *Sources and Analogues*, 1908, 8vo. **Much Ado About Nothing** (Q.1, 1600) : W. W. Lloyd, *Much Ado, &c.*, with essay, 1884, 8vo, to prove reputed prose to be metrical ; F. Holleck-Weithmann, *Zur Quellenfrage von Much ado, &c.*, 1902, 8vo. **Othello** (Q.1, 1622 ; Q.2, 1630 ; Q.3, 1655) : W. Parr, *The Story of the Moor of Venice*, 1795, 8vo ; R. G. Macgregor, *Othello's Character*, 1852, 8vo ; J. E. Taylor, *The Moor of Venice, Cinthio's Tale and S.'s Tragedy*, 1855, 8vo ; G. Piccini, *L' Otello di G. S.*, 1888, 8vo ; W. Given, *Further Study of Othello*, N.Y. 1899, 8vo ; W. R. Turnbull, *Othello*, 1892, 8vo ; S. Bobsin, ***S.'s Othello in englischer Bühnenbearbeitung***, 1904, 8vo. **Pericles** (Q.1, 2, 1609 ; Q.3, 1611 ; Q.4, 1619 ; Q.5, Q.6, 1630 ; Q.7, 1635) : R. Boyle, *On Wilkins's Share in Pericles*, 1882, 8vo ; A. H. Smyth, *Pericles and Apollonius of Tyre*, 1898, 8vo. **Richard II.** (Q.1, Q.2, 1597 ; Q.3, 1598 ; Q.4, Q.5. 1608 ; Q 6, 1615 ; Q.7, 1634) : Riechelmann, *Zu Richard II. S. u. Holinshed*, Plauen, 1860, 8vo ; B. Tschischwitz, ***S.'s Staat und Königthum***, 1866, 8vo ; T. D. Barnett, *Notes on Richard II.*, 1890, 8vo ; E. W. Sievers, ***S.'s zweiter mittelalterlicher Dramen-Cyklus***, 1896, 8vo. **Richard III.** (Q.1, 1597 ; Q.2, 1598 ; Q.3, 1602 ; Q.4, 1605 ; Q.5, 1612 ; Q.6, 1622 ; Q.7, 1629 ; Q.8, 1634) : M. Beale, *Lecture on the Times and Play of Richard III.*, 1844, 8vo ; I. F. Schoene, *Über den Charakter Richard III. bei S.*, 1856, 8vo ; L. Möser, *Observations on S.'s Richard III.*, Hertford, 1869, 8vo ; H. Mueller, *Grundlegung und Entwickelung des Charakters Richards III. bei S.*, 1889, 8vo ; G. B. Churchill, *Richard III. up to S.*, Berlin, 1900, 8vo ; J. Petersen, *Richard III., ein Vortrag*, 1901, 8vo ; A. Leschtsch, *Richard III., eine Charakterstudie*, 1908, 8vo. **Romeo and Juliet** (Q.1, 1597 ; Q.2, 1599 ; Q.3, 1609 ; Q.4, n.d. ; Q.5, 1637) : J. C. Walker, *Historical Memoir on Italian Tragedy*, 1799, 4to ; G. Pace Sanfelice, *The Original Story of Romeo and Juliet, by L. da Porto*, 1868, 8vo ; T. Straeter, *Die Komposition S.'s Romeo u. Julia*, Bonn, 1861, 8vo ; C. R. E. Hartmann, *Romeo u. Julia*, Leipzig, 1874, 8vo, a critical essay ; M. F. Guenther, *Defence of S. s Romeo and Juliet*, 1876, 8vo ; R. Gericke, *Romeo u. Julia nach S.'s MS.*, 1880, 8vo ; J. L. Fraenkel, *Stoff u. Quellenkunde von Romeo u. Juliet*, 1889, 8vo. **Taming of the Shrew** (1st ed. in F.1) : A. H. Tolman, ***S.'s part in the Taming of the Skrew*** (Modern Lang. Ass. of Am.), 1890, 8vo : H. Jacobson, ***W. S. und Käthchen Minola***, 1903, 8vo ; E. H. Schomberg, *Eine Studie* (Stud. zur engl. Phil.), 1904, 8vo. **Tempest** (1st ed. in F.1) : J. Holt, *Remarks on The Tempest*, 1750, 8vo ; E. Malone, *Incidents from which S.'s Tempest was derived*, 1808–9, 2 pts. 8vo ; G. Chalmers, *Another Account, &c.*, 1815, 8vo ; Rev. J. Hunter, *Disquisition on The Tempest*, 1839, 8vo ; P. Macdonnell, *Essay on the Tempest*, 1840, 8vo ; *Notes of Studies on The Taming of the Shrew*, S. Society of Philadelphia, 1866, 4to, with bibliography of The Tempest ; J. Meissner, *Untersuchungen üb. S.'s Sturm*, Dessau, 1872, 8vo ; D. Wilson, *Caliban, the Missing Link*, 1873, 8vo ; C. C. Hense, *Das Antike in S.'s Dramen : D. Sturm*, 1879, 8vo ; F. Boas, *Der Sturm und das Wintermärchen*, 1888, 8vo ; R. Boyle, ***S.'s Wintermärchen u. Sturm***, 1885, 8vo ; P. Rodin, ***S.'s Sturm***, 1893, 8vo. **Timon of Athens** (1st ed. in F.1) : A. Mueller, *Über die Quellen aus denen S. den Timon v. Athen entnommen hat*, Jena, 1873, 8vo ; A. E. Thiselton, *Two Passages*, 1904, 8vo. **Titus Andronicus** (Q.1, 1594 ; Q.2, 1600 ; Q.3, 1611) : M. M. A. Schroeder, *Über Titus Andronicus*, 1891, 8vo ; J. M. Robertson, *Did S. write T.A.?* 1905, 8vo. **Troilus and Cressida** (Q.1, Q.2, 1609) : *Annotations by S. Johnson, G. Steevens, &c., upon Troilus and Cressida*, 1787, 12mo ; L. Boening, *De S. fabula quae Troilus et Cressida inscribitur*, 1870, 8vo ; J. O. Halliwell-Phillipps, *Memoranda*, 1880, 12mo. **Twelfth Night, The Two Gentlemen of Verona**, and **The Winter's Tale** (all three first printed in F.1) : C. H. Coote, *On S.'s new map in Twelfth Night*, 1878, 8vo.

Sonnets (Q.1, 1609) : J. Boaden, *On the Sonnets of S.*, 1837, 8vo ; C. A. Brown, ***S.'s Autobiographical Poems***, 1838, 8vo ; I. Donnelly, *The Sonnets of S.*, 1859, 8vo ; Dr Barnstorff, *Key to S.'s Sonnets*, translated, 1862, 8vo ; B. Corney, *The Sonnets of S.*, 1862, 8vo ; [E. A. Hitchcock], *Remarks on the Sonnets of S.*, N.Y., 1865, 12mo ; R. Simpson, *Introduction to the Philosophy of S.'s Sonnets*, 1868, 8vo ; H. Brown, *The Sonnets of S. solved*, 1870, 8vo ; C. M. Ingleby, *The Soule arrayed, Sonnet cxlvi.*, 1872, 8vo ; G. Massey, *The Secret Drama of S.'s Sonnets unfolded*, 2nd ed. 1872, priv. pr. 1888, 8vo ; Baron E. von Dunckelmann, ***S. in seinen Sonetten***, 1897, 8vo ; F. J. Furnivall, ***S. and Mary Fitton***, 1897, 8vo ; S. Butler, ***S.'s Sonnets***, 1899, 8vo ; O. Wilde, *The Portrait of Mr. W. H.*, 1901, 8vo ; J. L. O'Flanagan, ***S.'s Self-Revelation***, 1902, 8vo ; E. A. Jackson, *Consideration of S.'s Sonnets*, 1904, 8vo ; A. B. MacMahan, ***S.'s Love Story***, 1909, 8vo. **Venus and Adonis** (Q.1, 1593 ; Q.2, 1594 ; sm. 8vo, 1596, 1599, 1600 (?), 1602, 1617, 1620, 1627, 1630, 1636 ; 8vo, 1675) : A. Morgan, *Venus and Adonis, Study in Warwickshire Dialect*, N.Y., 1885, 4th ed. 1900, 8vo. **Lucrece** (Q.1, 1594 ; sm. 8vo, 1598, 1600, 1607, 1616, 1624, 1632, 1655) : A. Wuerzner, *Die Orthographie der ersten Quarto-Ausgabe von Venus u. Adonis und Lucrece*, 1887, 8vo. **Passionate Pilgrim** (16mo, 1599 : 2nd ed. not known ; 3rd ed. 16mo, 1612) : A. Hoehnen, ***S.'s Passionate Pilgrim***, 1867, 8vo, dissertation.

Falstaff : C. Morris, *True Standard of Wit, with Character of Sir J. Falstaff*, 1744, 8vo ; W. Richardson, *Essays on Character of Sir J. Falstaff*, 1788, 8vo ; M. Morgan, *Essay on Sir J. Falstaff*, 1777, new edition 1825, 8vo, vindicates his courage ; J. H. Hackett, *Falstaff*, 1840, 8vo ; J. O. Halliwell-Phillipps, *On the Character of Falstaff in Henry IV.*, 1841, 8vo ; E. Schueller, *Don Quixote und Falstaff*, Berlin, 1858, 8vo ; G. W. Rusden, *Character of Falstaff*, Melbourne, 1870, 8vo ; G. Barone, *D'un antenato italiano di Falstaff*, 1895, 8vo ; C. E. Phelps, *Falstaff and Equity*, 1901, 8vo ; W. Baeske, *Oldcastle-Falstaff in der engl. Literatur bis zu S.*, 1905, 8vo. **Female Characters** : W. Richardson, *On S.'s Female Characters, &c.*, 1788, 8vo ; A. M. Jameson, *Characteristics of Women*, 1832, 2 vols., 12mo, illustrated ; ***S.'s Heroines***, 1879, sm. 8vo, same book ; C. Heath, *The Heroines of S.*, 1848, large 4to, illustrated, and *The S. Gallery, containing the Principal Female Characters*, 1836, large 8vo, plates reproduced in H. L. Palmer's *Stratford Gallery*, N.Y., 1859, large 8vo ; M. C. Clarke, *Girlhood of S.'s Heroines*, 1850–2, 3 vols. 8vo ; H. Heine, *Englische Fragmente und S.'s Mädchen und Frauen*, Hamburg, 1861, sm. 8vo, ***S.'s Maidens and Women***, transl. by C. G. Leland, 1891, 8vo ; F. A. Leo, ***S.'s Frauenideale***, Halle, 1868, 8vo ; F. M. von Bodenstedt, ***S.'s Frauencharaktere***, 2nd ed., Berlin, 1876, 8vo ; M. Summer, *Les Héroines de Kalidasa et les Héroines de S.*, 1879, sm. 8vo ; R. Genée, *Klassische Frauenbilder*, 1884, 8vo ; Lady Martin, *On Some of S.'s Female Characters*, 1885, 8vo ; Mrs M. L. Elliott, ***S.'s Garden of Girls***, 1885, 8vo ; L. Lewes, *The Women of S., &c.*, 1894, 8vo ; G. Cosentino, *Le donne di S.*, 1906, 8vo ; Baron A. von Gleichen-Russwurm, ***S.'s Frauengestalten***, 1909, 8vo. **Humour** : J. Weiss, *Wit, Humour and S.*, Boston, 1876, 10mo ; J. R. Ehrlich, *Der Humor S.'s*, Vienna, 1878, 8vo ; L. Wurth, *Das Wortspiel bei S.*, 1894, 8vo ; E. Dowden, ***S. as a Comic Dramatist***, 1903, 8vo.

V. Language, including Grammars and Glossaries

T. Edwards, *Supplement to Mr Warburton's Edition, being the Canons of Criticism and Glossary*, 1748, 8vo, 7th ed. 1765 ; R. Warner, *Letter on a Glossary to S.*, 1768, 8vo ; R. Nares, *Glossary*, 1822, 4to, by Halliwell and Wright, 1888, 8vo ; J. M. Jost, *Erkl. Wörterbuch*, Berlin, 1830, sm. 8vo ; C. L. W. Francke, *Bemerkungen über d. Sprachgebrauch des S.*, Berlin, 1837, 8vo ; J. O. Halliwell-Phillipps, *Dictionary of Archaic and Provincial Words*, 1846–47, 2 vols. 8vo, and *Hand-Book Index to the Works*, 1866, 8vo, phrases, manners, &c. ; J. L. Hilgers, *Sind nicht in S. noch manche Verse wiederherzustellen in Prosa?* Aix-la-Chapelle, 1852, 4to ; N. Delius, *S. Lexikon*, Bonn, 1852, 8vo ; W. S. Walker, *S.'s Versification*, 1854, 8vo, and *Examination of the Text of S., with Remarks on his Language*, 1860, 3 vols. 8vo ; C. Bathurst, *S.'s Versification at different Periods*, 1857, sm. 8vo ; S. Jervis, *Dictionary of the Language of S.*, 1868, 4to ; G. Helmes, *The English Adjective in S.*, Bremen, 1868, 8vo ; A. J. Ellis, *On Early English Pronunciation*, 1869–75, 4 vols. 8vo ; W. L. Rushton, *S.'s Euphuism*, 1871, 8vo ; D. Rohde, *Das Hülfszeitwort "To do" bei S.*, Göttingen, 1872, 8vo ; E. A. Abbott, *Shakespearian Grammar*, 1873, 1901, sm. 8vo ; A. Schmidt, *S. Lexikon*, 1874, third ed. by G. Sarrazin, Berlin, 1902, 2 vols., large 8vo, in English, includes all words, phrases and constructions ; K. Seitz, *Die Alliteration im Engl. vor u. bei S.*, 1875, 4to ; F. Pfeffer, *Die Anredepronomina bei S.*, 1877, 8vo ; P. A. Bronisch, *Das neutrale Possessivpronom bei S.*, 1878, 8vo ; O. W. F. Lohmann, *Die Auslassung des Relativpronomens, &c.*, 1879, 8vo ; A. Dyce, *Glossary*, revised by H. Littledale, 1902, 8vo ; C. Deutschbein, *S. Grammatik f. Deutsche*, 1882, 8vo ; A. Lummert, *Die Orthographie der ersten Folioausgabe*, 1883, 8vo ; C. Mackay, *Obscure Words and Phrases in S.*, 1884, 8vo ; G. H. Browne, *S.'s Versification*, Boston, 1884, 12mo, includes bibliography ; L. Kellner, *Zur Syntax des engl. Verbums*, Vienna, 1885, 8vo ; J. H. Siddons, *Shakespearian Referee*, Washington, 1886, 8vo, encyclopaedic glossary ; H. M. Selby, *The S. Classical Dict.*, 1888, 8vo ; S. F. Surtees, ***S.'s Provincialisms, Words used in Sussex***, 1889, sm. 8vo ; H. Conrad, *Metrische Untersuch. zur Feststellung der Abfassungszeit von S.'s Dramen*, Berlin, 1895, 8vo ; E. Hermann, *Urheberschaft u. Urquell v. S.'s Dichtungen*, 1886, 8vo ; G. Koenig, *Der Vers in S.'s Dramen*, 1888, 8vo ; J. Marx, *Der dichterische Entwickelungsgang S.*, 1895, 8vo ; W. Franz, ***S. Grammatik***, Halle, 1900, 2nd ed. 1909, 8vo ; B. A. P. van Dam, ***S. : Prosody and Text***, 1900, 8vo ; J. Phin, *S. Encyclopaedia*, 1902, sm. 8vo ; S. Lanier, ***S. and his Forerunners***, 1902, 2 vols. 8vo (Elizabethan poetry) ; W. Vietor, ***S.'s Pronunciation***, Marburg, 1906, 2 vols. sm. 8vo ; J. Foster, *A S. Word-book*, 1908, 8vo ; R. J. Cunliffe, *New S.ean Dict.* 1910, 8vo.

VI. Quotations

C. Gildon, *Shakespeariana*, in his *Complete Art of Poetry*, 1718, 12mo, the first of the class ; Dr W. Dodd, *The Beauties of S.*, 1752, 2 vols. 12mo, reprinted (in various forms) more frequently than any similar work ; *The Beauties of S.* (G. Kearsley), 1784, 12mo, not the same as Dodd's *Beauties* ; C. Lofft, *Aphorisms from S.*, 1812, 12mo ; T. Dolby, *The Shakespearian Dictionary*, 1832, 8vo, and *A Thousand Shakespearian Mottoes*, 1856, 32mo ; T. Price, *The Wisdom and Genius of S.*, 1838, 12mo ; Mrs M. C. Clarke, *S. Proverbs*, 1847, sm. 8vo, reprinted ; J. B. Marsh, *Familiar Proverbial, and Select Sayings from S.*, 1864, 8vo ; E. Routledge, *Quotations from S.*, 1867, 8vo ; C. W. Stearns, *The S. Treasury*, N.Y., 1869, 12mo ; Capt. A. F. P. Harcourt, *The S. Argosy*, 1874, sm. 8vo ; G. S. Bellamy, *New Shakespearian Dictionary*, 1877, 8vo ; A. A. Morgan, *The Mind of S.*, 1880, 8vo, quotations in alphabetical order ; C. Arnold, *Index to Shakespearian Thought*, 1880, 8vo.

VII. Concordances and Indexes

A. Becket, *Concordance*, 1787, 8vo, the earliest ; S. Ayscough, *Index*, 1790, large 8vo, 2nd ed. enlarged, 1827, useful ; F. Twiss, *Complete Verbal Index*, 1805, 2 vols. 8vo ; M. Cowden Clarke, *Complete Concordance*, 1844, new ed. 1889, 8vo, deals only with the

plays; Mrs H. H. Furness, *Concordance to Poems*, Philadelphia, 1874, 8vo, completing Mrs C. Clarke's; C. and M. C. Clarke, *The S. Key*, 1879, 8vo, companion to the *Concordance*; J. Bartlett, *The S. Phrase Book*, 1881, 8vo; W. H. D. Adams, *Concordance to Plays*, 1886, 8vo; E. M. O'Connor, *An Index to the Work of S.*, N.Y., 1887, 8vo; J. Bartlett, *New and Complete Concordance*, 1894, 4to, the best; M. Edwardes, *Pocket Lexicon and Concordance to Temple S.*, 1909, 12mo.

VIII. Probable Sources

Mrs C. Lennox, *S. Illustrated*, 1753–54, 3 vols. 12mo, dedication by Johnson, many of the observations also said to be by him; T. Hawkins, *The Origin of the English Drama*, 1773, 3 vols. 8vo; J. Nichols, *The Six Old Plays on which S. founded Measure for Measure, &c.*, 1779, 2 vols. 12mo; S. W. Singer, *S.'s Jest Book*, 1814–15, 2 pts. 8vo; F. Echtermeyer, L. Henschel, and K. Simrock, *Quellen des S.*, Berlin, 1831, 3 vols. 16mo; L. Tieck, *S.'s Vorschule*, Leipzig, 1823–29, 2 vols. 8vo; J. P. Collier, *S.'s Library* [1843], 2 vols. 8vo, 2nd ed. [by W. C. Hazlitt] 1875, 6 vols. 8vo; W. C. Hazlitt, *S.'s Jest Books*, 1864, 3 vols. 8vo; W. W. Skeat, *S.'s Plutarch*, 1875, 8vo; F. A. Leo, *Four Chapters of North's Plutarch*, 1878, folio; R. Simpson, *The School of S*, 1878, 2 vols. 8vo; P. Stapfer, *S. et l'antiquité*, 1879–1882, 2 pts. 8vo, transl. 1880; E. Viles and F. J. Furnivall, *The Rogues and Vagabonds of S.'s Youth*, 1880, 8vo; J. J. Jusserand, *Le Roman du temps de S.*, 1887, sm. 8vo, transl. 1890, 8vo; B. Graefe, *D. Commedia als Quellen f. S. u. Göthe*, 1896, 8vo; J. W. White, *Our English Homer*, 1892, 8vo; W. G. Boswell Stone, *S.'s Holinshed*, 1896, 4to; R. K. Root, *Classical Mythology in S.*, N.Y., 1903, 8vo; H. R. D. Anders, *S.'s Books, on S.'s Reading and Immediate Sources*, Berlin, 1904, 8vo; C. F. Tucker Brooke, *S.'s Plutarch*, 1909, 2 vols. sm. 8vo; W. Theobald, *Classical Element in S.'s Plays*, 1909, 8vo; W. M. MacCullum, *S.'s Roman Plays*, 1910, 8vo; *The S. Classics*, 1908, &c. and *S.'s England*, 1908, &c. (I. Gollancz, *S. Library*).

IX. Special Knowledge

Angling: H. N. Ellacombe, *S. as an Angler*, 1883, 8vo. **Bible**: T. R. Eaton, *S. and the Bible*, 1858, 8vo; J. Brown, *Bible Truths with Shakespearian Parallels*, 3rd ed. 1872, 8vo; J. Rees, *S. and the Bible*, Phil., 1876, sm. 8vo; Bp. C. Wordsworth, *S.'s Knowledge and Use of the Bible*, 1864, 8vo; C. Bullock, *S.'s Debt to the Bible*, 1879, 8vo; W. H. Malcolm, *S. and Holy Writ*, 1881, 8vo; G. Q. Colton, *S. and the Bible*, N.Y., 1888, 8vo; C. Ellis, *S. and the Bible*, 1897, sm. 8vo, 3rd ed. with title, *The Christ in S.*, 1902, sm. 8vo; W. Burgess, *The Bible in S.*, 1903, 8vo. **Botany**: J. E. Giraud, *Flowers of S.*, 1847, 4to, plates; S. Beisly, *S.'s Garden*, 1864, 8vo; H. N. Ellacombe, *Plant-lore and Garden-craft of S.*, 2d ed. 1884, sm. 8vo; J. H. Grindon, *S.'s Flora*, 1883, 4to; L. Holmesworth, *S.'s Garden*, 1903, 8vo; J. H. Bloom, *S.'s Garden*, 1903, 8vo. **Emblems**: H. Green, *S. and the Emblem Writers*, 1870, 4to. **Folk-lore and Use of Supernatural**: W. Bell, *S.'s Puck and his Folks-lore*, 1852–64, 3 vols. sm. 8vo; W. J. Thoms, "The Folk-lore of Shakespeare," in *Three Notelets*, 1865, 8vo, reprinted from *Athenaeum*, 1847; B. Tschischwitz, *Nachklänge Germanischer Mythe in S.*, Halle, 1868, 8vo; [W. C. Hazlitt, editor], *Fairy Tales, Legends, and Romances illustrating S., &c.*, 1875, 8vo; T. F. T. Dyer, *Folk-lore of S.*, 1884, 8vo; T. A. Spalding, *Elisabethan Demonology*, 1880, 8vo; A. Nutt, *Fairy Mythology of S.*, 1900, 8vo; J. P. S. R. Gibson, *S.'s Use of the Supernatural*, 1907, 8vo; M. Lucy, *S. and the Supernatural*, 1906, 8vo; H. H. Stewart, *The Supernatural in S.*, 1908, 8vo; J. E. Poritzky, *S.'s Hexen*, 1909, 8vo. **Learning**: P. Whalley, *Enquiry into the Learning of S.*, 1748, 8vo; R. Farmer, *Essay on the Learning of S.*, 1767, 8vo, reprinted in the variorum (1821) and other editions, criticized by W. Maginn, see *S. Papers, annotated by S. Mackenzie*, N.Y., 1856, sm. 8vo; [K. Prescot], *Essay on the Learning of S.*, 1774, 4to; E. Capell, *The School of S.*, 1780, 4to (vol. iii. of his *Notes and Various Readings to S.*, 1779–83, 3 vols. 4to); see also Probable Sources (above). **Legal**: W. L. Rushton, *S. a Lawyer*, 1858, 8vo, *S.'s Legal Maxims*, 1859, 8vo, new ed. 1907, *S.'s Testamentary Language*, 1869, 8vo, and *S. illustrated by the Lex Scripta*, 1870, 8vo; Lord Campbell, *S.'s Legal Acquirements*, 1859, 8vo; H. T., *Was S. a Lawyer?* 1871, 8vo; J. Kohler, *S. vor dem Forum der Jurisprudenz, und Nachwort*, 1883–84, 2 pts. 8vo; F. F. Heard, *S. as a Lawyer*, Boston, 1884, 16mo; C. K. Davis, *The Law in S.*, St Paul, U.S., 1884, 8vo; W. C. Devecmon, *In re S.'s Legal Acquirements*, N.Y., 1899, sm. 8vo. **Medicine**: G. Farren, *Essays on Mania exhibited in Hamlet, Ophelia, &c.*, 1833, 8vo; J. C. Bucknill, *The Medical Knowledge of S.*, 1860, 8vo, and *The Mad Folk of S.*, 1867, sm. 8vo; C. W. Stearns, *S.'s Medical Knowledge*, N.Y., 1865, sm. 8vo; G. Cless, *Medicinische Blumenlese aus S.*, Stuttgart, 1865, 8vo; A. O. Kellogg, *S.'s Delineations of Insanity, &c.*, N.Y., 1866, 16mo; H. R. Aubert, *S. als Mediciner*, Rostock, 1873, 8vo; J. P. Chesney, *S. as a Physician*, St Louis, 1884, 8vo; B. R. Field, *Medical Thoughts of S.*, 2nd ed., Easton, U.S., 1885, 8vo; J. Moyes, *Medicine and Kindred Arts in the Plays of S.*, 1896, 8vo; H. Lähr, *Die Darstellung krankhafter Geisteszustände in S.'s Dramen*, Stuttgart, 1898, 8vo. **Military**: W. J. Thoms, "Was S. ever a Soldier?" in his *Three Notelets*, 1865, 8vo. **Natural History**: R. Patterson, *Insects mentioned in S.'s Plays*, 1838, 8vo; J. H. Fennell, *S. Cyclopaedia*, 1862, 8vo, pt. i. Zoology, Man (all published); J. E. Harting, *Ornithology of S.*, 1871, 8vo; C. R. Smith, *The Rural Life of S.*, 1874, 8vo; J. Walter, *S.'s Home and Rural Life*, 1874, 4to, illustrated; B. Mayou, *Natural History of S.*, 1877, 8vo, quotations; E. Phipson, *Animal Lore of S.'s Time*, 1883, sm. 8vo; W. H. Seager, *Natural History in S.'s Time*, 1896, 8vo; E. O. von Lippmann, *Naturwiss. aus S.*, 1902, 8vo. **Philosophy**: W. J. Birch, *Philosophy and Religion of S.*, 1848, sm. 8vo; V. Knauer, *W. S., der Philosoph*, Innsbruck, 1879, 8vo. **Printing**: W. Blades, *S. and Typography*, 1872, 8vo. **Psychology**: J. C. Bucknill, *The Psychology of S.*, 1859, 8vo; E. Onimus, *La Psychologie dans les Drames de S.*, 1876, 8vo; Biauté, *Étude médico-psychologique sur S. et ses œuvres*, 1889, 8vo. **Sea**: J. Schuemann, *See u. Seefahrt in S.'s Dramen*, 1876, 4to; W. B. Whall, *S.'s Sea Terms explained*, 1910, 8vo. **Sports**: D. H. Madden, *Diary of Master William Silence*, 1897, new ed. 1907, 8vo; W. L. Rushton, *S. an Archer*, 1897, 8vo.

X. Periodicals

S. Museum, edited by M. L. Moltke, Leipzig, 23rd April 1870 to 23rd February 1874, 20 Nos. (all published); *Shakespeariana*, 1883, &c., sm. 8vo; *New Shakespeareana* (N.Y. Shakespeare Soc.), 1902, &c. From the commencement of *Notes and Queries* in 1856, a special Shakespeare department (see Indexes) has been carried on.

XI. Shakespeare Societies and their Publications

Proceedings of the Sheffield S. Club (1819–29), 1829, 8vo; Shakespeare Society (1841) various publications, 1841–53, 48 vols. 8vo; New Shakspere Society, *Transactions* and other publications, reprints of quartos, &c., 1874, &c., 8vo; Deutsche *S.* Gesellschaft (1864), *Jahrbuch*, Weimar, 1865, &c., in progress. The *S.* Society of New York (1885) has published the *Bankside S.* (1888–92), 20 vols., and *Bankside Restoration S.* (1907, &c.), under the editorship of J. A. Morgan, its first President, and has issued other publications. The *S.* Societies of Philadelphia, Birmingham and Clifton may also be mentioned.

XII. Music

W. Linley, *S.'s Dramatic Songs*, n.d., 2 vols. folio; *The S. Album, or Warwickshire Garland* (C. Lonsdale), 1862, folio; G. G. Gervinus, *Händel u. S.*, Leipzig, 1868, 8vo; H. Lavoix, *Les Traducteurs de S. en musique*, 1869, 8vo; A. Roffe, *Handbook of S. Music*, 1878, 4to; *List of Songs and Passages set to Music* (N.S. Soc.), 1884, 8vo; E. W. Naylor, *S. and Music*, 1896; W. K. White, *Index to the Songs, &c., in S. which have been set to Music*, 1900, 8vo; L. C. Elson, *S. in Music*, 1901, 8vo; H. J. Conrat, *La Musica in S.*, 1903, 8vo. See also the musical works of J. Addison, T. A. Arne, C. H. Berlioz, Sir H. R. Bishop, C. Dibdin, W. Linley, M. Locke, G. A. Macfarren, F. Mendelssohn-Bartholdy, H. Purcell, Sir A. Sullivan, G. Verdi, &c.

XIII. Pictorial Illustrations

C. Taylor, *Picturesque Beauties of S.*, after Smirke, Stothard, &c., 1783–87, 2 vols. 4to; W. H. Bunbury, *Series of Prints illustrative of S.*, 1792–96, oblong folio; S. Harding, *S. illustrated*, 1793, 4to; S. Ireland, *Picturesque Scenes upon the Avon*, 1795, 8vo; J. and J. Boydell, *Collection of Prints from Pictures illustrating the Dramatic Works of S.*, 1802–3, 2 vols. atlas folio, 100 plates, forms supplement to Boydell's edition; reproduced by photography, 1864, 4to, reduced, and edited by J. P. Norris, Philadelphia, 1874, 4to; *S. Portfolio*, 1821–29, roy. 8vo; Stothard, *Illustrations of S.*, 1826, 8vo; F. A. M. Retzsch, *Gallerie zu S.'s dramat. Werken in Umrissen*, Leipzig, 1828–46, 8 vols. obl. 4to; J. Thurston, *Illustrations of S.*, 1830, 8vo; F. Howard, *The Spirit of the Plays of S.*, 1833, 5 vols. 8vo; L. S. Ruhl, *Skizzen zu S.'s dram. Werken*, Frankfort, 1827–31, Cassel, 1838–40, 6 vols. oblong folio; G. F. Sargent, *S. illustrated in a Series of Landscape and Architectural Designs*, 1842, 8vo, reproduced as *The Book of S. Gems*, 1846, 8vo; A. Pichot, *Galerie des personnages de S*, 1844, 4to; J. Tyrrel, *Cat. of an Extensive Collection of Prints illustrative of W. S.*, 1850, 8vo; W. v. Kaulbach, *S. Gallerie*, Berlin, 1857–58, 3 pts. folio; P. Konewka, *Ein Sommernachts traum*, Heidelb, 1868, 4to, and *Falstaff u. seine Gesellen*, Strasburg, 1872, 8vo; E. Dowden, *S. Scenes and Characters*, 1876, 4to, illustrations from A. F. Pecht's *S. Gallerie*, Leipzig, 1876, 4to; J. O. Halliwell Phillipps, *Hand List of Drawings and Engravings illustrative of the Life of S.*, 1884, 8vo; W. E. Henley, *The Graphic Gallery of S.'s Heroines*, 1888, folio; R. L. Böcke, *S.ian Costumes*, 1889, 8vo; R. Dudley and others, *S. Pictures*, 1896, 8vo; M. Miller, *S.ean Costumes* (characters of each play).

XIV. Biography

A.—*General Works*

N. Rowe, *The Life of Mr W. S.*, 1743, 8vo, the first separate life; N. Drake, *S. and his Times*, 1817, 2 vols. 4to; J. Britton, *Remarks on the Life and Writings of S.*, revised edition, 1818, sm. 8vo; A. Skottowe, *Life of S.*, 1824, 2 vols. 8vo; J. P. Collier, *New Facts*, 1835, 8vo [see XIX. Payne-Collier Controv.] and *Traditionary Anecdotes of S. collected in 1673*, 1838, 8vo; T. Campbell, *Life and Writings of W. S.*, 1838, 8vo; C. Knight, *S., a Biography*, 1843, 8vo, reprinted in *Studies*, 1850, 2 vols. 8vo; J. O. Halliwell-Phillipps, *The Life of W. S.*, 1848, 8vo, *S. Facsimiles*, 1863, folio, *Illustrations of the Life of S.*, 1874, folio, and *Outlines of the Life of S.*, 1881, 8vo, 6th ed. 1886, 2 vols. 8vo; F. P. G. Guizot, *S. et son temps*, 1852, 8vo, translated into English, 1852, 8vo; G. M. Tweddell, *S., his Times and Contemporaries*, 1852, 12mo, 2nd ed. 1861–63, unfinished; W. W. Lloyd, *Essays on Life and Plays of S.*, 1858, 8vo; S. Neil, *S., a Critical Biography*, 1861, 8vo; T. De Quincey, *S., a Biography*, 1864, 8vo; T. Kenny, *Life and Genius of S.*, 1864, 8vo; W. Bekk, *W. S., eine biogr. Studie*, Munich, 1864, sm. 8vo; S. W. Fullom, *The History of W. S.*, 2nd ed. 1864, 8vo; Victor M. Hugo, *W. S.*, 1864, 8vo, translated into Dutch, German and English; H. G. Bohn, *Biography and Bibliography of S.* (Philobiblon Soc., 1863), 8vo, illustrations; J. Jordan, *Original Collections on S. and Stratford*, 1780, edited by J. O. Halliwell Phillipps, 1864, 4to; J. A. Heraud, *S.'s Inner Life as intimated in his Works*, 1865, 8vo; R. G. White, *Memoirs of the Life of W. S.*, Boston, 1865, 8vo; S. A. Allibone, Biography of *S.* (in *Dictionary*, vol. 2, 1870); H. N. Hudson, *S.: his Life, Art, and Characters*, Boston, 1872, 4th ed. 1883, 2 vols. 12mo; K. Gende, *S., sein Leben u. s. Werke*, Hildburghausen, 1872, 8vo; F. K. Elze, *W. S.* Halle, 1876, large 8vo, transl. 1888; G. H. Calvert, *S.: A Biographic, Aesthetic Study*, Boston, 1879, 16mo; W. Tegg, *S. and his Contemporaries*, 1879, 8vo; W. Henty, *S., with some Notes on his early Biography*, 1882, sm. 8vo; E. Hermann, *Ergänzungen u. Berichtigungen der hergebrachten S. Biograph.*, Erl., 1884, 2 vols. 8vo; F. G. Fleay, *Chronicle History of the Life and Work of W. S.*, 1886, 8vo; R. Waters, *W. S. portrayed by himself*, 1888, 8vo (as in character of Prince Henry); W. J. Rolfe, *S. the Boy*, 1897, sm. 8vo; Sidney Lee, *Life of W. S.*, 1898, 6th ed. 1908, 8vo, illustrated ed. 1899, large 8vo; Goldwin Smith, *S. the Man*, Toronto, 1899, 8vo; G. Duval, *La Vie véridique de S.*, 2nd ed. 1900, sm. 8vo; D. H. Lambert, *Cartae Shianae, S.* documents, 1904, sm. 8vo; W. J. Rolfe, *Life of W. S.*, 1904, 8vo, illustrated; W. C. Hazlitt, *S., the Man and his Work*, 3rd ed., 1908, 8vo; Frank Harris, *The Man S. and his Tragic Life Story*, 1909, 8vo; E. Law, *S. as Groom of the Chamber*, 1910, sm. 8vo.

B.—*Special Works.*

Autograph: Sir F. Madden, *Autograph and Orthography of S.*, 1837, 4to; *S.'s Autograph*, copied and enlarged by J. Harris, &c. (Rodd), 1843; J. O. Halliwell Phillipps, *S.'s Will*, 1851, 4to; H. Staunton, *Memorials of S. Photographed*, 1864, folio; J. H. Friswell, *Photogr. Reprod. of S.'s Will*, 1864, 4to; J. Toulmin Smith, *S. Autographs*, 1864, 4to; F. J. Furnivall, *On S.'s Signatures*, 1895, 8vo; A. Hall, *S.'s Handwriting further illustrated*, 1899, 8vo; **Birthday**: B. Corney, *Argument on the Assumed Birthday*, 1864, 8vo. **Bones**: C. M. Ingleby, *S.'s Bones*, 1883, sm. 4to; W. Hall, *S.'s Grave, Notes of Traditions*, 1884, 8vo. **Crab Tree**: C. F. Green, *Legend of S.'s Crab Tree*, 1857, 4to, illustrated. **Deer Stealing**: C. H. Bracebridge, *S. no Deer Stealer*, 1862, 8vo, illustrated. **Genealogy and Family**: J. Jordan, *Pedigree of the Family of S.*, 1796, in vol. iii. of R. Ryan's *Dramatic Table Talk*, 1825–30, 3 vols. 8vo; *Memoirs of the Families of S. and Hart*, 1790, ed. Halliwell, 1865, 4to; G. R. French, *Shakespeareana Genealogica*, 1869, 8vo; J. O. Halliwell Phillipps, *Entries respecting S., his Family and Connexions*, 1864, 4to; C. C. Stopes, *S. Warwickshire Contemporaries*, 1897, new ed. 1907, 8vo, and *Family, with an Account of the Ardens*, 1901, 8vo; C. I. Elton, *W. S., His Family and Friends*, 1904, 8vo; J. W. Gray, *S.'s Marriage*, etc., 1905, 8vo. **Ghost-Belief**: A. Roffe, *The Ghost Belief of S.*, 1851, 8vo. For *S.'s* use of the supernatural see IX. Special Knowledge (**Folk-lore**, etc.). **Name**: J. O. Halliwell Phillipps, *New Lamps or Old?* 1880, 8vo, advocates "Shakespeare"; J. Winsor, *Was S. Shapleigh?* Boston, U.S., 1887, 8vo; W. H. Edwards, *Shaksper not S.*, 1900, 8vo; J. L. Haney, *The Name of W. S.*, 1906, 8vo. **Occupation**: See IX. Special Knowledge, above. **Religion**: F. Fritzart, *War S. ein Christ?* Heidelberg, 1832, 8vo; W. J. Birch, *Philosophy and Religion of S.*, 1848, sm. 8vo, thinks him a sceptic; E. Vehse, *S. als Protestant, Politiker, Psycholog, u. Dichter*, Hamburg, 1851, 2 vols. sm. 8vo; J. J. Reitmann, *Über S.'s religiöse u. ethische Bedeutung*, St Gall, 1853, 12mo; A. F. Rio, *S.* 1864, 8vo (S. Roman Catholic); W. Koenig, *S. als Dichter, Weltweiser, u. Christ*, Leipzig, 1873, 8vo; A. Gilman, *S.'s Morals*, N.Y., 1880, 8vo; J. M. Raich, *S.'s Stellung zur Kathol. Religion*, 1884, 8vo; J. M. Robertson, *The Religion of S.*, 1887, 8vo; W. Kloeti, *S. als religiöser Dichter*, Berlin, 1890, 8vo; G. W. Baynham, *Swedenborg and S.*, 1894, 8vo; J. Carter, *S., Puritan and Recusant*, 1897, sm. 8vo; S. Boswin, *The Religion of S.*, 1899, 8vo; H. S. Bowden, *The Religion of S., chiefly from the Writings of R. Simpson*, 1899, sm. 8vo; J. Countermine, *The Religious Belief of S.*, 1906, 8vo. **Stratford-upon-Avon**: R. B. Wheler, *History and Antiquities of Stratford*, 1806, 8vo, *Account of the Birthplace*, new edition, 1863, 8vo, and *Collectanea*, 1865, 4to; F. W. Fairholt, *The Home of S.*, 1847, 8vo, engravings reproduced in S. Neil's *Home of S.*, 1871, 8vo; J. O. Halliwell Phillipps, *New Boke about S. and Stratford*, 1850, 4to, *Brief Hand List of the Borough Records*, 1862, 8vo, *Descriptive Calendar*, 1863, folio, *Brief Guide to the Gardens*, 1863, 8vo, *Historical Account of the New Place*, 1864, folio illustrated, and *Stratford in the Times of the S.'s*, 1864, folio; E. Lees, *Stratford as connected with S.*, 1854, 8vo; J. R. Wise, *S., his Birthplace and its Neighbourhood*, 1861, 8vo; J. C. M. Bellew, *S.'s Home at New Place*, 1863, sm. 8vo, illustrated, with pedigrees; R. E. Hunter, *S. and Stratford*, 1864, 8vo; J. M.

Jephson, *S., his Birthplace, Home, and Grave*, 1864, 4to, illustrated; J. Walter, *S.'s Home and Rural Life*, 1874, 4to, illustrative of localities; C. M. Ingleby, *S. and the Welcombe Enclosures*, 1883, folio; S. Lee, *Stratford-on-Avon*, 1884, folio, illustrated, 1907, 8vo; T. Greene, *S. and Enclosure of Common Fields at Welcombe*, 1885, 4to; J. L. Williams, *The Home and Haunts of S.*, 1892, folio; C. J. Ribton Turner, *S.'s Land*, 1893, sm. 8vo; R. C. A. Windle, *S.'s Country*, 1899, 8vo; W. S. Brassington, *S.'s Homeland*, 1903, 8vo; Marie Corelli, *The Plain Truth of the Stratford-on-Avon Controversy*, 1903, 8vo, birthplace; S. Lee, *The Alleged Vandalism*, 1903, 8vo; G. Morley, *Sweet Avon*, 1906, 8vo.

XV. Portraits

G. Steevens, *Proposals for Publishing the Felton Portrait*, 1794, 8vo; J. Britton, *On the Monumental Bust*, 1816, 8vo; J. Boaden, *Authenticity of Various Pictures and Prints offered as Portraits of S.*, 1824, 4to; A. Wivell, *The Monumental Bust*, 1827, 8vo, and *Inquiry into the S. Portraits*, 1840, 8vo; H. Rodd, *The Chandos Portrait* [1849], 8vo; R. H. Forster, *Remarks on the Chandos Portrait*, 1849, 8vo; J. P. Collier, *Dissertation upon the Imputed Portraits*, 1851, 8vo; C. Wright, *The Stratford Portrait of S.*, 1861, 8vo; J. H. Friswell, *Life Portraits of W. S.*, 1864, 8vo; Sir G. Scharf, *On the Principal Portraits of S.*, 1864, 12mo; E. T. Craig, *S. and his Portraits, Bust, and Monument*, 2nd ed. 1864 and 1886, 8vo, and *S.'s Portraits phrenologically considered*, Philadelphia, 1875, 8vo; G. Harrison, *The Stratford Bust*, Brooklyn, 1865, 4to; W. Page, *Study of S.'s Portraits*, 1876, sm. 4to; J. P. Norris, *Bibliography of Works on the Portraits of S.*, Philadelphia, 1879, 8vo, 44 titles, *The Death Mask of S.*, 1884, and *The Portraits of S.*, Phil., 1885, 4to, with bibliography of 111 references and illustrations; Amédée Pichot, "*S.*, avec les portraits authentiques," *Revue Britannique*, Paris, 1888; Edwin Bormann, *Der S. Dichter: wer war's und wie sah er aus*, Leipzig, 1902 (Baconian); A. A. Bekk, *Des Dichters Bild*, Berlin, 1902, 8vo; John Corbin, *A New Portrait of S.* (the "Ely Palace"), 1903, 8vo; C. C. Stopes, *True Story of the Stratford Bust*, 1904, 8vo; M. H. Spielmann, *The Portraits of S.*, 1907, 8vo. An elaborate account by A. M. Knapp of the portraits in the Barton collection, Boston Public Library, may be found in the *S. Catalogue*, 1880, large 8vo. For medals and tokens, see E. Hawkins (ed. A. W. Franks and H. A. Grueber), *Medallic Hist. of Great Britain*, Brit. Mus., 1885; for tokens, James Atkin's *Tradesmen's Tokens of the 18th Century*, 1892.

XVI. Literary and Dramatic History

E. Malone, *Historical Account of the English Stage*, 1790, enlarged in Boswell's edition, 1821; J. P. Collier, *History of English Dramatic Poetry*, 1831, new ed. 1879, 3 vols. 8vo, *Memoirs of Edw. Alleyne* (Shakespeare Society), 1841, 8vo, *The Alleyne Papers* (Shakespeare Society), 1843, 8vo [see G. F. Warner's catalogue of the Dulwich MSS., 1881, 8vo], and *Memoirs of the Principal Actors in the Plays of S.* (Shakespeare Society), 1846, 8vo; N. J. Halpin, *The Dramatic Unities of S.*, 1849, 8vo, ed. by C. M. Ingleby (N.S. Soc., series i., 1875–76); N. Delius, *Über das englische Theaterwesen zu S.'s Zeit*, Bremen, 1853, 8vo; A. J. F. Mezières, *Prédécesseurs et contemporains de S.*, 1863, new ed. 1905, sm. 8vo, and *Contemporains et successeurs de S.*, 3rd ed. 1881; Rev. W. R. Arrowsmith, *S.'s Editors and Commentators*, 1865, 8vo; W. Kelly, *Notices of the Drama and Popular Amusements of the 16th and 17th Centuries*, 1865, 8vo; C. M. Ingleby, *Traces of the Authorship of the Works attributed to S.*, 1868, 8vo, *S.'s Centurie of Prayse, culled from Writers of the First Century after his Rise*, 1874, 4to (enlarged by Miss Toulmin Smith for N.S. Soc., 1879), and *S. Allusion Book*, 1874, re-ed. by J. Munro, 1909, 2 vols. 8vo; H. I. Ruggles, *The Method of S. as an Artist*, N.Y., 1870, 8vo; A. H. Paget, *S.'s Plays, a Chapter of Stage History*, 1875, 8vo; H. Ulrici, *S.'s Dramatic Art*, translated by L. D. Schmitz, 1876, 2 vols. 8vo; H. P. Stokes, *The Chronological Order of S.'s Plays*, 1878, 8vo; K. Knortz, *S. in Amerika*, Berlin, 1882, 8vo; C. Muerer, *Synchronist. Zusammenstellung der wichtigsten Notizen üb. S.'s Leben u. Werke*, 1882, 4to; J. A. Symonds, *S.'s Predecessors in the English Drama*, 1884, new ed. 1900, 8vo; A. R. Frey, *S. and the alleged Spanish Prototypes*, N.Y., 1886, sm. 4to; F. G. Fleay, *A Chronicle History of the London Stage 1559–1642*, 1890, 8vo, and *Biographical Chronicle of the English Drama*, 1891, 2 vols. 8vo; F. J. Furnivall, *Some 300 Fresh Allusions to S. 1594–1604*, 1886, la. 8vo; C. T. Gaedertz, *Zur Kentniss d. altengl. Bühne*, Bremen, 1888, 8vo; E. Walden, *S.ian Criticism, from Dryden to end of 18th Century*, 1895, 8vo; C. E. L. Wingate, *S.'s Heroines on the Stage*, 1895, 8vo; F. S. Boas, *S. and his Predecessors*, 1896, sm. 8vo; H. Schwab, *Das Schauspiel im Schauspiel zur Zeit S.'s*, Vienna, 1896, 8vo; A. Brandl, *Quellen des weltlichen Dramas in England vor S.*, Strassburg, 1898, 8vo; T. R. Lounsbury, *S.ean Wars*, N.Y., 1902, 8vo, and *The First Editors of S.*, 1906, 8vo, Pope and Theobald; F. E. Schelling, *The English Chronicle Play*, 1902, 8vo; G. Schiavello, *La Fama dello S. nel 18 sec.*, 1903, 8vo; D. N. Smith, *Eighteenth-Century Essays on S.*, 1903, 8vo; C. Brodmeir, *Die S.-Bühne*, Weimar, 1904, 8vo; C. Gaehde, *D. Garrick als S. Darsteller*, 1904, 8vo; C. E. Hughes, *The Praise of S.*, 1904, 8vo; A. H. Woolf, *S. and the Old Southwark Playhouses*, 1903, 8vo; P. Heuslowe, *Diary* (1593–1608), ed. W. W. Greg, 1904–8, 2 vols. la. 8vo; *Henslowe Papers* (1546–1662), ed. W. W. Greg, 1907, la. 8vo; S. Lee, *S. and the Modern Stage*, 1906, 8vo; L. L. Schnecking, *S. in lit. Urteil seiner Zeit*, 1908, 8vo; W. Raleigh, *Johnson on S.*, 1908, sm. 8vo; W. L. Rushton, *S. and the Arte of English Poesie*, 1909, sm. 8vo.

Germany: *S.'s Schauspiele erläutert von F. Horn*, Leipzig, 1823–31, 5 vols. 8vo; E. A. Hagen, *S.'s erstes Erscheinen auf den Bühnen Deutschlands*, Königs., 1832, 8vo; K. Assman, *S. und seine deutschen Übersetzer*, Liegnitz, 1843, 4to; N. Delius, *Die Schlegel-Tieckschе S. Übersets.*, Bonn, 1846, 12mo; C. Elze, *Die englische Sprache in Deutschland*, Dresden, 1864, 12mo; F. A. T. Kreyssig, *S. Cultus*, Elbing, 1864, 8vo; L. G. Lemcke, *S. in seinem Verhältnisse zu Deutschland*, Leipzig, 1864, 8vo; W. J. Thoms, "*S.* in Germany," in *Three Notelets*, 1865, 8vo; A. Cohn, *S. in Germany in the 16th and 17th Centuries*, 1865, 4to; C. Humbert, *Molière, S., und d. deutsche Kritik*, Leipzig, 1869, 8vo; W. Ochelhäuser, *Die Würdigung S.'s in Engl. u. Deutschland*, 1869, 8vo; R. Genée, *Geschichte d. S.'schen Dramen in Deutschland*, Leipzig, 1870, 8vo; M. Bernays, *Zur Entstehungsgeschichte des schlegelschen S.*, Leipzig, 1872, 8vo; R. J. Benedix, *Die S.omanie*, Stuttgart, 1873, 8vo; W. Wagner, *S. und die neueste Kritik*, Hamburg, 1874, 8vo; J. Meissner, *Die englischen Comödianten in Österreich*, Vienna, 1884, 8vo; E. Rossi, *Studien über S. u. das moderne Theater*, Berlin, 1885, 8vo; Merschberger, *Die Anfänge S. auf d. Hamburger Bühne*, 1890, 4to; R. Wegener, *S.'s Einfluss auf Goethe*, 1890, 8vo, and *Die Bühneneinrichtung des S. Theaters*, Halle, 1907, 8vo; H. Rauch, *Lens u. S.*, Berlin, 1892, 8vo; E. Koeppel, *Studien über S.'s Wirkung auf seitgenöss. Dramatiker*, 1905, 8vo; A. Boetlingk, *S. und unsere Klassiker*, 1909, 8vo.

France: H. Beyle, *Racine et S.* 1823–25, 2 pts. 8vo; J. B. M. A. Lacroix, *Histoire de l'influence de S. sur le théâtre français*, Brussels, 1856, 8vo; W. Reymond, *Cornelille, S., et Goethe*, Berlin, 1864, 8vo; A. Schmidt, *Voltaire's Verdienste um die Einführung S.*, 1864, 4to; C. Adolph, *Voltaire et le théâtre de S.*, 1883, 4to; P. Stapfer, *Molière et S.*, 1887, 4th ed. 1899, sm. 8vo; J. J. Jusserand, *S. en France sous l'ancien régime*, 1889, 1898, 8vo; T. R. Lounsbury, *S. and Voltaire*, 1902, sm. 8vo.

XVII. Shakespeare Jubilees

Essay on the Jubilee at Stratford, 1769, 8vo; *S.'s Garland*, 1769, 8vo, second edition 1826, 8vo; *Concise Account of Garrick's Jubilee, 1769, and the Festivals of 1827 and 1830*, 1830, 8vo; *Descriptive Account of the Second Gala*, 1830, 8vo; K. F. Gutzkow, *Eine S. Feier an der Ilm*, Leipzig, 1864, 8vo; P. H. A. Möbius, *Die deutsche S. Feier*, Leipzig, 1864, 8vo; *Tercentenary Celebration by the New England Historic-Genealogical Society at Boston*, 1864, 8vo; *Official Programme at the Tercentenary Festival at Stratford, with Life, Guide, &c.*, 1864, 8vo; *Proceedings of S.ian Entertainment at New Orleans*, 1894, 4to.

XVIII. Ireland Controversy

Miscellaneous Papers and Legal Instruments under the Hand and Seal of W. S., 1795, imp. folio, 2nd ed. 1796, 8vo (W. H. Ireland's forgeries); *Vortigern, an Historical Tragedy*, 1796, sm. 8vo, 2nd ed. 1832, 8vo (forgery); E. Malone, *Inquiry into the Authenticity of Certain Papers and Legal Instruments*, 1796, 8vo; W. H. Ireland, *Authentic Account of the S.ian MSS.*, 1796, 8vo; S. Ireland, *Investigation of Mr Malone*, 1797, 8vo; J. J. Eschenburg, *Über den vorgeblichen Fund S.scher Handschriften*, Leipzig, 1797, sm. 8vo; G. Chalmers, *Apology for the Believers in the S. Papers, &c.*, 1797 18cc 3 pts. 8vo; [G. Hardinge], *Chalmeriana*, 1800, 8vo; W. H. Ireland, *Confessions*, 1805, sm. 8vo, new edition, with introduction by R. G. White, 1874, 12mo.

XIX. Payne Collier Controversy

J. P. Collier, *New Facts regarding the Life of S.*, 1835, 8vo, *New Particulars*, 1836, 8vo, *Further Particulars*, 1839, 8vo, *Reasons for a new Edition of S.'s Works*, 1841, 2nd ed. 1842, 8vo, and *Notes and Emendations to the Text* (S. Soc.), 1852, and ed. 1853, 8vo, translated into German by Dr Leo, 1853, also in J. Frese's *Ergänzungsband zu S.'s Dramen*, 1853, 8vo; S. W. Singer, *The Text of S. vindicated*, 1853, 8vo, (anti-Collier); J. O. Halliwell Phillipps, *Curiosities of Modern S.ian Criticism*, 1853, 8vo (anti-Collier), *Observations on the MS. Emendations*, 1853, 8vo (anti-Collier), and *Observations on the S.ian Forgeries at Bridgewater House*, 1853, 4to (anti-Collier); C. Knight, *Old Lamps or New?* 1853, 12mo (pro-Collier); Rev. A. Dyce, *A Few Notes on S.*, 1853, 8vo; N. Delius, *Collier's alte handschr. Emendationen*, Bonn, 1853, 8vo (anti-Collier); F. A. Leo, *Die Delius'sche Kritik*, Berlin, 1853, 8vo (pro-Collier); R. G. White, *S.'s Scholar*, 1854, 8vo (anti-Collier); J. T. Mommsen, *Der Perkins S.*, Berlin, 1854, 8vo (anti-Collier); A. E. Brae, *Literary Cookery*, 1855, 8vo (anti-Collier), and *Collier, Coleridge, and S.*, 1860, 8vo, disputes authenticity of following lectures; S. T. Coleridge, *Seven Lectures on S. and Milton*, edited by J. P. Collier, 1856; Rev. A. Dyce, *Strictures on Mr Collier's New Edition* [1858], 1859, 8vo (anti-Collier); C. M. Ingleby, *The S. Fabrications*, 1859, sm. 8vo, and *Complete View of the S. Controversy*, 1861, with bibliography (anti-Collier); N. E. S. A. Hamilton, *Inquiry into the Genuineness of the MS. Corrections*, 1860, 4to (anti-Colliet); Collier's *Reply to Hamilton*, 1860, 8vo; Sir T. D. Hardy, *Review of the Present State of the S. Controversy*, 1860, 8vo; J. P. Collier, *Trilogy: Conversations*, 1874, 3 pts. 4to. H. B. Wheatley, *Account of Life of J. P. Collier*, 1884, 8vo.

XX. Shakespeare-Bacon Controversy

J. C. Hart, *The Romance of Yachting*, N.Y., 1848, 12mo, first work containing doubt of *S.'s* authorship; W. H. Smith, *Was Bacon the Author of S.'s Plays?* 1856, 8vo,—extended as *Bacon and S.*, 1857, 12mo (anti-*S.*); D. Bacon, *The Philosophy of the Plays of S. unfolded*, 1857, 8vo (anti-*S.*); N. Holmes, *Authorship of S.*, 1866, new ed. 1886, 2 vols. 12mo (anti-*S.*); Bacon's *Promus*, edited by Mrs H. Pott, 1883, 8vo (anti-*S.*); W. H. Wyman, *Bibliography of the Bacon-S. Controversy*, Cincinnati, 1884, 8vo, 255 entries (of which 117 pro-*S.*, 73 anti-, and 65 unclassified), continued in *S.iana*, 1886, &c.; I. Donnelly, *The Great Cryptogram*, 1888, 2 vols. la. 8vo (anti-*S.*); Sir T. Martin, *S. or Bacon?* 1888, sm. 8vo (pro-*S.*); J. A. Morgan, *S. in Fact and Criticism*, N.Y., 1888, sm. 8vo; C. C. Stopes, *The Bacon-S. Question*, 1888, 8vo; C. A. Lentzei, *Zur S.-Bacon Theorie*, Halle, 1890, 8vo; E. Bormann, *The S. Secret*, transl. 1895, 8vo; L. Schipper, *S. und dessen Gegner*, Münster, 1895, 8vo; C. Alten, *Notes on the Bacon-S. Question*, Boston, 1900, 8vo (pro-*S.*); Lord Penzance (ed. M. H. Kinnear), *The Bacon-S. Controversy*, 1902, 8vo; W. Willis, *The S.-Bacon Controversy*, 1902, 8vo; and *The Baconian Mint*, 1903, 8vo; G. G. Greenwood, *The S. Problem Restated*, 1908, 8vo, and *In re S., Beeching v. Greenwood*, 1909, 8vo (anti-*S.*); H. C. Beeching, *W. S., a Reply to Greenwood*, 1908, 8vo (pro-*S.*); Sir E. Durning-Lawrence, *Bacon is S.*, 1910, 8vo.

XXI. Bibliography

F. Meres, *Palladis Tamia: Witts Treasury*, 1598, 12mo, contains the earliest list of *S.'s* works; E. Capell, *Cat. of S.iana*, 1799, 8vo; J. Wilson, *Shakespeariana*,—*Catalogue of all the Books, &c. relating to S.*, 1827, sm. 8vo; W. T. Lowndes, *S. and his Commentators*, 1831, 8vo, reprinted from the *Manual*; J. O. Halliwell Phillipps, *Shakespeariana: Catalogue of Early Editions, Commentaries, &c.*, 1841, 8vo, *Some Account of Antiq. Books, MSS., &c., illust. of S., in his possession*, 1852, 4to, illustrated, *Garland of S.iana*, 1854, 4to, *Early Editions of S.*, 1857, 8vo (notices of 14 early quartos), *Brief Hand List of Books, &c., illustrative of S.*, 1859, 8vo, *Skeleton Hand List of the Early Quartos*, 1860, 8vo, *Hand List of Shakespeariana*, 1862, 8vo, *Brief Hand List of Collections formed by R. B. Wheler*, 1863, 4to, *List of Works illustrative of S.*, 1867, 8vo, *Catalogue of the S. Library and Museum at Stratford-on-Avon*, 1868 8vo, *Hand List of Early Editions*, 1867, 8vo, *Catalogue of Warehouse Library*, 1870 8vo, *Brief Hand List of Selected Parcels*, 1876, *Catalogue of S. Study Books*, 1876, 8vo, *Brief List of S. Rarities at Hollingbury Copse*, 1886, 8vo; J. Moulin, *Omtrukken eener algemeene Literatuur over W. S.*, Kampen, 1845, 8vo (only part 2 published); *S. Literatur in Deutschland, 1762–1851*, by P. H., Cassel, 1852, sm. 8vo; P. H. Sillig, *Die S. Literatur bis Mitte 1854, eingeführt v. H. Ulrici*, Leipzig, 1854, 8vo; [Lenox], *S.'s Plays in Folio*, 1861, 4to, bibliographical notice; H. G. Bohn, *Biography and Bibliography of S.*, Philobiblon Soc., 1863, sm. 8vo, bibliography with some additions from his edition of Lowndes; J. R. Smith, *S.iana, a Catalogue*, 1864, 8vo; *Shakespeareana: Verzeichniss*, Vienna, 1864, 8vo; F. Thimm, *S.iana from 1564*, 2nd edition containing the literature to 1871, 1872, 8vo, continued in *Transactions* of N. S. Soc.; bibliographies of each play may be found in H. H. Furness's New Variorum edition, Philadelphia, 1873, &c.; *Catalogue of the S. Memorial Library at the Cambridge Free Public Library*, 1881, nearly all presented by H. T. Hall; S. A. Allibone, Shakespeare Bibliography (see his *Dictionary*, v. 2, 1870), based on Bohn with additional Americana; A. Cohn, *S. Bibliographie*, 1871, &c., contributed to *S. Jahrbuch*; H. T. Hall, *Shakespearian Statistics*, new edition 1874, 8vo; J. D. Mullins, *Catalogue of the S. Memorial Library, Birmingham Free Libraries*, 1872–76, 3 pts. 8vo, a magnificent collection of 7000 vols. destroyed by fire in 1879, now fully replaced; A. C. Shaw, *Index to the S. Memorial Library*, Birmingham, 1903, 8vo; *Katalog d. Bibliothek der deutschen S. Ges.*, Weimar, 1876, 8vo; K. Knortz, *An American S. Bibliography*, 1876, 12mo; J. Winsor, *Bibliography of the Original Quartos and Folios*, Cambridge, U.S. 1876, 4to (with facsimiles), and *S.'s Poems, a Bibliography of the Early Editions*, 1879, 8vo; *Catalogue of Works of, and relating to, W. S.*, Barton Coll., Boston Pub. Lib., by J. M. Hubbard, 1878–80, 2 vols. la. 8vo, the largest collection in U.S.; H. H. Morgan, *Topical S.iana, arranged under Headings*, St. Louis, 1879, 8vo; *Topical Index* in *Shakespeariana*, 1885–86, pts. xv.–xxii., repr. as *Digesta*, pt. 1 (A–F), N.Y., 1886, 8vo; T. J. I. Arnold, *S. Bibliography in the Netherlands*, The Hague, 1879, sm. 8vo; L. Unflad, *Die S. Literatur in Deutschland*, 1880, 8vo; F. T. Hall, *The Separate Editions of S.'s Plays, with the Alterations by various Hands*, 1880, 8vo; J. Jeremiah, *Aid to S.ian Study*, 1880, 8vo; S. Timmins, *Books on S.*, 1885, sm. 8vo; F. Thimm, *S. in the British Museum* (Lib. Chr.), 1887; H. R. Tedder, *The Classification of Shakespeareana* (Lib. Chr.), 1887, 8vo; E. E. Baker, *Calendar of S. Rarities*, 1891, 8vo, collected by J. O. Halliwell-Phillipps; *Cat. of British Museum: W. S.*, 1897, folio; W. S. Brassington, *Hand List of Collective Editions of S. before 1800*, 1898, 8vo; S. Lee, *Catalogue of Shakespeareana*, 1899, 4to, very complete; and *Notes and Additions to Census of Copies of First Folio*, 1906, 8vo, *Four Quarto Editions of Plays by S.*, 1908, 8vo, and *A S. Reference Library*, 1910, 8vo; L. Haas, *Verleger u. Drucker der Werke S.'s bei 1640*, 1904, 8vo; F. Madan, &c., *The Original Bodleian Copy of the First Folio*, 1905, folio; R. Proelss, *Von d. ältest. Drucken d. Dramen S.'s*, Leipzig, 1905, 8vo; A. W. Pollard, *S. Folios and Quartos, 1594–1685*, 1909, folio; *Cat. of Early Editions of S. at Eton Coll.*, 1909, 8vo; G. W. Cole, *First Folio of S.*, N.Y., 1909, 8vo; *Cat. of the Books, Antiquities, &c., exhibited at Shakespeare's Birthplace*, 1910, 8vo. (H. R. T.)

SHALLOT, *Allium ascalonicum*, a hardy bulbous perennial, which has not been certainly found wild and is regarded by A. de Candolle as probably a modification of *A. Cepa*, dating from about the beginning of the Christian era (*Origin of Cultivated Plants*, p. 71). It is extensively cultivated and is much used in cookery, besides which it is excellent when pickled. It is propagated by offsets, which are often planted in September or October, but the principal crop should not be got in earlier than February or the beginning of March. In planting, the tops of the bulbs should be kept a little above ground, and it is a commendable plan to draw away the soil surrounding the bulbs when they have got root-hold. They should not be planted on ground recently manured. They come to maturity about July or August. There are two sorts—the common, and the Jersey or Russian, the latter being much larger and less pungent.

SHALMANESER [Ass. *Šulmānu-asarid*, "the god Sulman (Solomon) is chief"], the name of three Assyrian princes.

SHALMANESER I., son of Hadad-nirari I., succeeded his father as king of Assyria about 1310 B.C. He carried on a series of campaigns against the Aramaeans in northern Mesopotamia, annexed a portion of Cilicia to the Assyrian empire, and established Assyrian colonies on the borders of Cappadocia. According to his annals, discovered at Assur, in his first year he conquered eight countries in the north-west and destroyed the fortress of Arinnu, the dust of which he brought to Assur. In his second year he defeated Sattuara, king of Malatia, and his Hittite allies, and conquered the whole country as far south as Carchemish. He built palaces at Assur and Nineveh, restored "the world-temple" at Assur, and founded the city of Calah.

SHALMANESER II. succeeded his father Assur-nazir-pal III. 858 B.C. His long reign was a constant series of campaigns against the eastern tribes, the Babylonians, the nations of Mesopotamia and Syria, as well as Cilicia and Ararat. His armies penetrated to Lake Van and Tarsus, the Hittites of Carchemish were compelled to pay tribute, and Hamath (Hamah) and Damascus were subdued. In 854 B.C. a league formed by Hamath, Arvad, Ammon, "Ahab of Israel" and other neighbouring princes, under the leadership of Damascus, fought an indecisive battle against him at Karkar (Qarqar), and other battles followed in 849 and 846 (see JEWS § 10). In 842 Hazael was compelled to take refuge within the walls of his capital. The territory of Damascus was devastated, and Jehu of Samaria (whose ambassadors are represented on the Black Obelisk now in the British Museum) sent tribute along with the Phoenician cities. Babylonia had already been conquered as far as the marshes of the Chaldaeans in the south, and the Babylonian king put to death. In 836 Shalmaneser made an expedition against the Tibareni (Tabal) which was followed by one against Cappadocia, and in 832 came the campaign in Cilicia. In the following year the old king found it needful to hand over the command of his armies to the Tartan (commander-in-chief), and six years later Nineveh and other cities revolted against him under his rebel son Assur-danin-pal. Civil war continued for two years; but the rebellion was at last crushed by Samas-Rimmon or Samsi-Hadad, another son of Shalmaneser. Shalmaneser died soon afterwards in 823 B.C. He had built a palace at Calah, and the annals of his reign are engraved on an obelisk of black marble which he erected there.

See V. Scheil in *Records of the Past*, new series, iv. 36-79.

SHALMANESER III. (or IV.) appears as governor of Zimirra in Phoenicia in the reign of Tiglath-pileser IV. (or III.) and is supposed by H. Winckler to have been the son of the latter king. At all events, on the death of Tiglath-pileser, he succeeded to the throne the 25th of Tebet 727 B.C., and changed his original name of Ululā to that of Shalmaneser. The revolt of Samaria took place during his reign (see JEWS § 15), and while he was besieging the rebel city he died on the 12th of Tebet 722 B.C. and the crown was seized by Sargon.

For all these rulers see BABYLONIA AND ASSYRIA, Sections V. and VIII and works quoted. (A. H. S.)

SHAMANISM, the name commonly given to the religion of the Ural-Altaic peoples. Properly speaking, however, there is nothing to distinguish Shamanism from the religions of other peoples in a similar stage of culture. On the other hand, the shaman or priest (Tungus *saman*, Altain Turk *kama*, cf. Russian *kamlanie*) performs duties which differ in some respects from those of the ordinary magician; one of his main functions is to protect individuals from hostile supernatural influence. He deals both with good and bad spirits; he also performs sacrifices and procures oracles. The drum (*tungur*) is an important instrument in his ceremonies; it may be assumed that in many cases the effect of the preliminary performances is to induce autohypnotic phenomena. The shaman's office is held to be hereditary and his chief assistants are ancestral spirits.

See Radloff, *Aus Sibirien*, II.; C. de Harlez, *Religion nationale des Tatares orientaux*; Hiekisch, "Die Tungusen," *Mitt. der anthropologischen Gesellschaft*, Wien, XVIII. 165-182; *Revue de l'histoire des religions*, XL. 321, XLVII. 51.

SHAMASH, or ŠAMAŠ, the common name of the sun-god in Babylonia and Assyria. The name signifies perhaps "servitor," and would thus point to a secondary position occupied at one time by this deity. Both in early and in late inscriptions Shamash is designated as the "offspring of Nannar," *i.e.* of the moon-god, and since, in an enumeration of the pantheon, Sin generally takes precedence of Shamash, it is in relationship, presumably, to the moon-god that the sun-god appears as the dependent power. Such a supposition would accord with the prominence acquired by the moon in the calendar and in astrological calculations, as well as with the fact pointed out (see SIN) that the moon-cult belongs to the nomadic, and therefore earlier, stage of civilization, whereas the sun-god rises to full importance only after the agricultural stage has been reached. The two chief centres of sun-worship in Babylonia were Sippara (Sippar), represented by the mounds at Abu Habba, and Larsa, represented by the modern Senkerah. At both places the chief sanctuary bore the name E-barra (or E-babbara) "the shining house"—a direct allusion to the brilliancy of the sun-god. Of the two temples, that at Sippara was the more famous, but temples to Shamash were erected in all large centres—as Babylon, Ur, Nippur and Nineveh.

The attribute most commonly associated with Shamash is justice. Just as the sun disperses darkness, so Shamash brings wrong and injustice to light. Khammurabi attributes to Shamash the inspiration that led him to gather the existing laws and legal procedures into a code, and in the design accompanying the code the king represents himself in an attitude of adoration before Shamash as the embodiment of the idea of justice. Several centuries before Khammurabi, Ur-Engur of the Ur dynasty (*c.* 2600 B.C.) declared that he rendered decisions "according to the just laws of Shamash." It was a logical consequence of this conception of the sun-god that he was regarded also as the one who released the sufferer from the grasp of the demons. The sick man, therefore, appeals to Shamash as the god who can be depended upon to help those who are suffering unjustly. This aspect of the sun-god is vividly brought out in the hymns addressed to him, which are, therefore, among the finest productions in the entire realm of Babylonian literature.

It is evident from the material at our disposal that the Shamash cults at Sippara and Larsa so overshadowed local sun-deities elsewhere as to lead to an absorption of the minor deities by the predominating one. In the systematized pantheon these minor sun-gods become attendants that do his service. Such are Bunene, spoken of as his chariot driver, whose consort is Atgimakh, Kettu ("justice") and Mesharu ("right"), who are introduced as servitors of Shamash. Other sun-deities, as Ninib (*q.v.*) and Nergal (*q.v.*), the patron deities of important centres, retained their independent existence as certain phases of the sun, Ninib becoming the sun-god of the morning and of the spring time, and Nergal the sun-god of the noon and of the summer solstice, while Shamash was viewed as the sun-god in general.

Together with Sin and Ishtar, Shamash forms a second triad

by the side of Anu, Bel and Ea. The three powers, Sin, Shamash and Ishtar (*q.v.*), symbolized the three great forces of nature, the sun, the moon and the life-giving force of the earth. At times, instead of Ishtar, we find Adad (*q.v.*), the storm-god, associated with Sin and Shamash, and it may be that these two sets of triads represent the doctrines of two different schools of theological thought in Babylonia which were subsequently harmonized by the recognition of a group consisting of all four deities.

The consort of Shamash was known as A. She, however, is rarely mentioned in the inscriptions except in combination with Shamash. (M. Ja.)

SHAMBLES, a slaughter-house, a place where butchers kill animals for domestic food, an "abattoir." The word in the singular means properly a bench or stall on which butchers display their meat for sale in a market, and appears in O. Eng. *fōt-scamel*, foot-stool. It represents the Lat. *scamellum*, diminutive of *scamnum*, step, bench; the root is seen in Gr. σκήπτειν, to prop, cf. "sceptre." The distinct word "shamble," meaning to walk awkwardly, is to be traced to the O. Du. *schampelen*, to stumble, an adaptation of O. Fr. *escamper*, to decamp (Lat. *ex*, out of, and *campus*, field). The same French word has given the English "scamp," a worthless rascal, a rogue, vagabond.

SHAMMAI, a Jewish scribe of the time of King Herod, whom tradition almost invariably couples with Hillel (*q.v.*), with whom he stood in striking contrast, not merely in legal-religious decisions and discussions, but also in character and temperament. His motto (Aboth i. 15) reads: "Make thy study of the Thora a firmly established duty; say little and do much; and receive every man with friendly countenance." The last admonition is characteristic, as Shammai was choleric and brusque. The opposition between Shammai and Hillel was perpetuated by their respective schools, till, under Gamaliel II., the strife was decided at Jabneh in favour of the school of Hillel. (W. Ba.)

SHAMOKIN, a borough of Northumberland county, Pennsylvania, U.S.A., on Shamokin Creek, about 45 m. (73 m. by rail) N. by E. of Harrisburg. Pop. (1900) 18,202, of whom 2703 were foreign-born; (1906, estimate) 20,482. Shamokin is served by the Philadelphia & Reading, the Northern Central, and two interurban railways. There are two parks. The mining and shipping of anthracite coal and the manufacture of silk goods and of hosiery and knit goods are the borough's principal industries, but it has, also, foundries and machine shops, and manufactories of powder, powder-kegs, shirts, overalls, hooks and eyes, brick, flour and dressed lumber. The total value of its factory product in 1905 was $1,443,915. The borough was named from Shamokin Creek; the name is probably a mutilation of a Delaware Indian word meaning "full of eels." The Indian village named Shamokin was on the site of the present Sunbury, Pa. Shamokin was formed in 1852 by the union of two villages, Groveville and Mary Ann. It was incorporated as a borough in 1864.

SHAMPOO, a word now principally used as a hair-dresser's term for washing the head and hair with soap and water or some special preparation. It is properly the Hindustani word (*champna*, to thrust, press; imperative *champo*) for the kneading and rubbing of the body, &c., which is one of the principal features of the various forms of hot bath as practised in the East.

SHAMYL (*c.* 1797–1871), the leader of the tribes of the Caucasus in the war against Russia. He was born about 1797 and, educated by the Mullah Djemaleddin, soon took a leading part in preaching a holy war against the Russians. He was both the spiritual and military leader of the tribes, who maintained the struggle for twenty-five years (1834–1859). This perpetual guerrilla was a severe strain upon the resources of the great power, and Shamyl's romantic fight for independence, making him a sort of ally of England and France at the time of the Crimean War (1853–55), earned him a European reputation. But the capacity of the tribes for resistance was already failing, and when at the close of the Crimean War Russia was able to employ large forces on the Caucasus, the defenders were gradually subdued, Shamyl himself being captured in 1859. The rest of his life was spent in an easy captivity at Kaluga, St Petersburg and Kiev. He died at Mecca during a pilgrimage in 1871. One of his sons took service in the Russian, the other in the Turkish army.

SHANGALLA, or Shankalla, a name loosely applied by Abyssinians to the non-Arab and non-Abyssinian tribes living west of Gojam in the Abyssinian-Sudan frontier lands. The principal tribes included are the Legas, Bertat, Gumus, Kadalos and Sienetjo. In some tribes Galla blood appears to predominate; others are Negroids.

SHANGHAI, a city in the Chinese province of Kiang-su. The native city of Shanghai is situated in 31° 15′ N., 121° 27′ E. and stands on the left or W. bank of the Hwang-p'u river, about 12 m. from the point where that river empties itself into the estuary of the Yangtsze-kiang. The walls which surround it are about 3½ m. in circumference, and are pierced by seven gates. The streets and thoroughfares may be said to illustrate all the worse features of Chinese cities; while the want of any building of architectural or antiquarian interest robs the city of any redeeming traits. On the E. face of the city, between the walls and the river, stands the principal suburb, off which the native shipping lies anchored. Situated in the extreme E. portion of the province of Kiang-su, and possessing a good and commodious anchorage, as well as an easy access to the ocean, it forms the principal port of central China. From the W. wall of the city there stretches a rich alluvial plain extending over 45,000 sq. m., which is intersected by waterways and great chains of lakes and bears a population of 800 to the sq. m. The products of this fertile district, as well as the teas and silks of more distant regions, find their natural outlet at Shanghai. The looms of Suchow and the tea plantations of Ngan-hui, together with the rice of this "garden of China," for many years before treaty days, supplied the Shanghai junks with their richest freight. But though thus favourably situated as an emporium of trade, Shanghai did not attract the attention of foreign diplomatists until the outbreak of the War of 1841, when the inhabitants purchased protection from the attacks of Admiral Parker by the payment of a ransom of £145,000. In the Nanking treaty, which was signed in the following year, Shanghai was included among the four new ports which were thrown open to trade. In 1843 Captain (afterwards Sir) George Balfour was appointed British consul, and it was on his motion that the site of the present English settlement, which is bounded on the N. by the Suchow creek, on the S. by the Yang-king canal, and on the E. by the river, was chosen. The site, thus defined on its three sides (on the W. no boundary was marked out), is three-fifths of a mile in length, and was separated from the native city by a narrow strip of land which was subsequently selected as the site of the French settlement. Later again the Americans established themselves on the other side of the Suchow creek, on a piece of land fronting on the river, which there makes a sharp turn in an easterly direction.

A handsome bund runs along the river frontage of the three foreign settlements, and the public buildings, especially in the British settlement, are large and fine. The cathedral, which is built in the Gothic style, is a notable example of Sir G. Gilbert Scott's skill, and the municipal offices, club-house and hospitals are all admirable in their way. The climate is somewhat trying. Shanghai lies low, and, though the early winter is enjoyable, snow and ice being occasionally seen, the summer months are excessively hot. Cholera occurs in the native city every summer, malarial fever exists and dysentery is apt to become chronic in spring and autumn on account of the sudden changes of temperature—a fall of 20° to 30° taking place in a few hours—and the moisture-laden atmosphere. Smallpox is endemic in the Chinese city during the autumn and winter, and enteric is common in the autumn. In the foreign settlements, owing to sanitary enactments, cholera is rare, and Europeans who adopt ordinary precautions "have nothing to fear from the climate of Shanghai" (*China Sea Directory*, vol. iii., ed. 1904).

At first merchants appeared disinclined to take advantage of the opportunities offered them at Shanghai. "At the end of the first year of its history as an open port Shanghai could count only 23 foreign residents and families, 1 consular flag, 11 merchants' houses, and 2 Protestant missionaries. Only

forty-four foreign vessels had arrived during the same period."[1] By degrees, however, the manifold advantages as a port of trade possessed by Shanghai attracted merchants of all nationalities; and from the banks of the Hwang-p'u arose handsome dwelling-houses, which have converted a reed-covered swamp into one of the finest cities in the East.

The number of foreigners, other than British, who took up their abode in the British settlement at Shanghai made it soon necessary to adopt some more catholic form of government than that supplied by a British consul who had control only over British subjects, and by common agreement a committee of residents, consisting of a chairman and six members, was elected by the renters of land for the purposes of general municipal administration. It was expected when the council was formed that the three settlements—the British, French and Americans—would have been incorporated into one municipality, but international jealousy prevented the fulfilment of the scheme, and it was not until 1863 that the Americans threw in their lot with the British. In 1853 the prosperity of the settlements received a severe check in consequence of the capture of the native city by the T'ai-p'ing rebels, who held possession of the walls from September in that year to February 1855. This incident, though in many ways disastrous, was the cause of the establishment of the foreign customs service, which has proved of such inestimable advantage to the Chinese government. The confusion into which the customs system was thrown by the occupation of the city by the rebels induced the Chinese authorities to request the consuls of Great Britain, France and the United States to nominate three officers to superintend the collection of the revenue. This arrangement was found to work so well that on the reoccupation of the city the native authorities proposed that it should be made permanent, and H. N. Lay, of the British consular service, was in consequence appointed inspector of the Shanghai customs. The results of Mr Lay's administration proved so successful that when arranging the terms of the treaty of 1858 the Chinese willingly assented to the application of the same system to all the treaty ports, and Mr Lay was thereupon appointed inspector-general of maritime customs. On the retirement of Mr Lay in 1862 Sir Robert Hart was appointed to the post.

From 1856 to 1864 the trade of Shanghai vastly increased, and its prosperity culminated between 1860 and 1864, when the influx of Chinese into the foreign settlement in consequence of the advance E. of the T'ai-p'ing rebels added enormously to the value of land. Both in 1860 and again in 1861 the rebels advanced to the walls of Shanghai, but were driven back by the British troops and volunteers, aided by the naval forces of England and France. It was in this connexion that General Gordon assumed the command of the Chinese force, which under his direction gave a reality to the boastful title of "ever-victorious army" it had assumed under the two American adventurers Ward and Burgevine. To Shanghai the successful operations of Gordon brought temporarily disastrous consequences. With the disappearance of the T'ai-p'ings the refugees returned to their homes, leaving whole quarters deserted. The loss thus inflicted on the municipality was very considerable, and was intensified by a commercial crisis in cotton and tea, in both of which there had been a great deal of over-speculation. But, though the abnormal prosperity was thus suddenly brought to an end, the genuine trade of the port has steadily advanced, subject of course to occasional fluctuations. For example, in 1880 the value of trade was £8,223,017, and in 1908 it was £40,400,000. The total burthen of foreign steamers which entered and cleared at Shanghai during 1884 was 3,145,242 tons, while in 1908 it was over 15,000,000 tons. The principal items of import are cotton yarns, metals, sugar, petroleum and coal; of export, silk, representing in value 34 % of the total exports, cotton, tea, rice, hides and skins, wool, wheat and beans. Great Britain and the British colonies supply nearly 31 % of the imports, Japan 12½ %, and the United States 12 %; and of the exports Great Britain and the British colonies take 18 %, the United States 12 % and Japan 10 %. Shanghai, moreover, is not only a port of trade, but is rapidly becoming a large manufacturing and industrial centre. In this category the first place must be given to cotton mills, which, though not very numerous, give promise of considerable development. The demand in China for cotton yarn, chiefly the produce of the Bombay mills, has been steadily on the increase. On the other hand, China produces raw cotton in indefinite quantity, and has hitherto been the main source of supply for the Japanese mills. Cloth weaving has been tried in two of the mills, but abandoned in favour of spinning. Next in importance is the reeling of silk cocoons by machinery. This is gradually supplanting the wasteful method of native reeling, giving a much better finished and consequently more valuable article. Shanghai also contains three large establishments for docking, repairing and building ships. Among minor industries are match factories, rice and paper mills, ice, cigarette, piano, carriage and furniture factories, wood carving, &c.

The vastness of British interests in China and the large British population at Shanghai gave rise in 1865 to the establishment of a British supreme court for China and Japan, Sir Edmund Hornby, then judge of the British court at Constantinople, being the first judge appointed to the new office. Now, by virtue of extra-territorial clauses in the various treaties, all foreigners, subjects of any treaty power, are exempted from the jurisdiction of the Chinese authorities, and made justiciable only before their own officials. As there are now fourteen treaty powers represented at Shanghai, there are consequently fourteen distinct courts sitting side by side, each administering the law of its own nationality. In addition, there is also a Chinese court, commonly called the Mixed Court, though it is no more mixed than any of the others in an international sense, except that a foreign assessor sits with the Chinese judge in cases where any of his own nationality are interested as plaintiffs. At first sight this arrangement seems somewhat complicated, but the principle is simple enough, viz. that a defendant must always be sued in the court of his own nationality. In criminal cases there is, of course, no difficulty. For the British, English law alone prevails, and they can only be tried and punished in the British court, and so on for every nationality. In civil cases, where both parties are of the same nationality, there is also no difficulty, *e.g.* for British subjects the British court is the forum, for German subjects it is the German court. In cases involving cross actions with mutual accounts, say between an Englishman and a German, if the German constitutes himself plaintiff he must sue his opponent before the British court, and vice versa. The greatest anomaly, however, in respect of the government of Shanghai is the local municipal control. This is exercised by the foreign community as a whole without regard to nationality, and is a share of the power which properly belonged to the Chinese local authorities, but which by convention or usage they have allowed to fall into foreign hands. It is exercised only within the area termed the foreign settlements, which were originally nothing more than the "area set apart for the residence of foreign merchants." Of these "settlements" there were and are still only three—the British, acquired in 1845, the French, acquired in 1849, and the American, acquired in 1862. At an early date, as a foreign town began to spring up, the necessity of having some authority to lay out and pave streets, to build drains, &c., for the common benefit, became evident, and as the Chinese authorities shirked the work and the expense, the foreigners resolved to tax themselves voluntarily, and appointed a committee of works to see the money properly laid out. In 1854 the consuls of Great Britain, France and the United States drew up a joint code of regulations applicable to both the then settlements, British and French, which being ratified by the respective governments became binding on their respective subjects. The two areas thus became an international settlement, and the subjects of all three nationalities—the only powers then interested—acquired the same privileges and became liable to the same burdens. The code thus settled was acquiesced in by the Chinese authorities and by other nationalities as they came in, and it conferred on the foreign community local self-government, practically free from official control of any description. In 1863 the area covered by the regulations was extended by the addition of the American settlement, which meanwhile had been obtained by that government from the Chinese. But about the same time, 1862, the French decided to withdraw from the joint arrangement, and promulgated a set of municipal regulations of their own applicable to the French area. These regulations differed from those applicable to the joint settlement, in that a general supervision over municipal affairs was vested in the French consul-general, his approval being made necessary to all votes, resolutions, &c., of the ratepayers before they could be enforced at law. Since the above date there have, consequently, been two municipalities at Shanghai, the French and the amalgamated British and American settlements, to which the original regulations continued to apply. The area of the latter now amounts to some 9 or 10 sq. m. The regulations have been altered and amended from time to time, and they have been accepted expressly or impliedly by all the treaty powers which have since come into the field. The settlements have thus lost their original character of British or American, and become entirely cosmopolitan. The consuls of all the treaty powers rank equally, and claim to have an equal voice in municipal affairs with the British or American consuls.

The powers of self-government thus conferred on the foreign community consist in exclusive police control within the area, in draining, lighting, maintenance of streets and roads, making and enforcement of sanitary regulations, control of markets, dairies and so forth. To meet these expenses the foreign ratepayers are authorized to levy taxes on land and houses, to levy wharfage dues on goods landed or shipped, and to charge licence fees. Taxes are payable by every one living within the settlements, Chinese included, though the latter have no voice in the local administration.

[1] *The Treaty Ports of China and Japan*, by W. F. Mayers.

The executive is entrusted to a municipal council of nine, elected annually from among the general body of foreign ratepayers, irrespective of nationality. The legislative function is exercised by all ratepayers possessing a certain pecuniary qualification in public meeting assembled. Proxies for absentee landlords are allowed. One such public meeting must be held annually to pass the budget and fix the taxation for the year. No official sanction is required, and no veto is allowed for such money votes. Special meetings may be held at any time for special purposes. New legislation of a general kind requires to be approved by all the treaty powers in order to be binding on their several nationalities, but within certain limits the ratepayers can pass by-laws which do not require such sanction. The French municipality is worked on similar lines, except that every vote and every disbursement of money is subject to the approval of the French consul-general. The executive council consists of eight members, four of whom must be French and four may be foreign. The French consul-general is chairman *ex officio*, so that the control in any case is French and practically official.

Both settlements were originally intended for the residence of foreign merchants only, but as the advantages of living under foreign protection became evident by reason of the security it gave from arbitrary taxation and arrest, Chinese began to flock in. This movement has continued, and is now particularly noticeable in the cases of retired officials, many of whom have made Shanghai their home. The total native population in the settlements by the census of 1895 was 286,753, and the estimated population of the native city was 125,000, making a total for all Shanghai of 411,753. The census of the foreign population in 1905 showed 3713 British, 2157 Japanese, 1329 Portuguese, 991 Americans, 785 Germans and 568 Indians, out of a total of 11,497. The magnitude of the foreign interests invested in Shanghai may be gathered from the following rough summary: Assessed value of land in settlements registered as foreign-owned £5,500,000; docks, wharves and other industrial public companies—market value of stock, £2,250,000; private property estimated £1,500,000 — total £9,250,000. This is exclusive of banks, shipping and insurance companies, and other institutions which draw profits from other places besides Shanghai.

SHANHAI-KWAN, a garrison town in the extreme east of the province of Chih-li, China. Pop. about 30,000. It is situated at the point where the range of hills carrying the Great Wall of China dips to the sea, leaving a *kwan* or pass of limited extent between China proper and Manchuria. It is thus an important military station, and the thoroughfare of trade between Manchuria and the great plain of China. The Imperial Northern railway from Tientsin and Taku, 174 m. from the former, runs through the pass, and skirts the shore of the Gulf of Liao-tung as far as the treaty port of Niu-chwang, where it connects with the railways leading from Port Arthur to the Siberian main line. The pass formed the southern limit of the Russian sphere of influence as defined in the convention between Great Britain and Russia of the 28th of April 1899.

SHANKARSETT, JAGANNATH (1800–1865), the recognized leader of the Hindu community of Bombay for more than forty years, was born in 1800 into a family of goldsmiths of the Daivadnya caste. Unlike his forefathers, he engaged in commerce, and soon acquired what was in those days a large fortune, a great part of which he devoted to the good of the public. So high was his credit that Arabs, Afghans and other foreign merchants chose to place their treasures in his custody rather than with the banks. Foreseeing the need of better methods of education, he became one of the founders of the School Society and the Native School of Bombay, the first of its kind in Western India, which in 1824 developed into the Bombay Native Institution, and again in 1840 into the Board of Education which preceded the Elphinstone Educational Institution founded in 1856. When the Students' Literary and Scientific Society first opened their girls' schools, in spite of strong opposition of the Hindu community, he set the good example of providing another girls' school entirely at his private cost. His zeal for progress was also shown in his starting the English School, the Sanskrit Seminary and the Sanskrit Library, all in Girgaum. To Jagannath Shankarsett and his public-spirited friends, Sir George Birdwood and Dr Bhau Daji, Bombay is also indebted for the reconstruction which, beginning in 1857, gradually changed a close network of lanes and streets into a spacious and airy city, adorned with fine avenues and splendid buildings. He was the first Indian to be nominated to the legislative council of Bombay under the Act of 1861. While his influence was used by Sir John Malcolm to induce the Hindus to acquiesce in the suppression of suttee or widow-burning, his own community remember gratefully that to him they owe the cremation ground at Sonapur. He died at Bombay on the 31st of July 1865, regretted by all classes of society, who, about a year before his death, in a public meeting assembled at the Town Hall, voted a marble statue to perpetuate his memory.

SHANKLIN, a watering-place in the Isle of Wight, England, 8½ m. S. of Ryde by rail. Pop. of urban district (1901) 4533. It is beautifully situated on the cliffs bordering the S.E. coast, and is sheltered W. by high-lying downs. The church of St John the Baptist is Perpendicular. There are several modern churches and chapels, numerous villas, a pier and a lift connecting the town with the esplanade beneath the cliff. The picturesque winding chasm of Shanklin Chine breaches the cliffs S. of the town.

SHANNON, CHARLES HAZELWOOD (1865–), English artist, was born at Sleaford in Lincolnshire, the son of the Rev. Frederic Shannon. He attended the Lambeth school of art, and was subsequently considerably influenced by his friend Charles Ricketts and by the example of the great Venetians. In his early work he was addicted to a heavy low tone, which he abandoned subsequently for clearer and more transparent colour. He achieved great success with his portraits and his Giorgionesque figure compositions, which are marked by a classic sense of style, and with his etchings and lithographic designs. The Dublin Municipal Gallery owns his circular composition "The Bunch of Grapes" and "The Lady with the Green Fan" (portrait of Mrs Hacon). His "Study in Grey" is at the Munich Gallery, a "Portrait of Mr Staats Forbes" at Bremen, and a "Souvenir of Van Dyck" at Melbourne. One of his most remarkable pictures is "The Toilet of Venus" in the collection of Lord Northcliffe. Complete sets of his lithographs and etchings have been acquired by the British Museum and the Berlin and Dresden print rooms. He was awarded a first-class gold medal at Munich in 1895 and a first-class silver medal in Paris in 1900.

SHANNON, JAMES JEBUSA (1862–), Anglo-American artist, was born at Auburn, New York, in 1862, and at the age of eight was taken by his parents to Canada. When he was sixteen, he went to England, where he studied at South Kensington, and after three years won the gold medal for figure painting. His portrait of the Hon. Horatia Stopford, one of the queen's maids of honour, attracted attention at the Royal Academy in 1881, and in 1887 his portrait of Henry Vigne in hunting costume was one of the successes of the exhibition, subsequently securing medals for the artist at Paris, Berlin and Vienna. He soon became one of the leading portrait painters in London. He was one of the first members of the New English Art Club, and in 1897 was elected an associate of the Royal Academy, and R.A. in 1909. His picture, "The Flower Girl," was bought in 1901 for the National Gallery of British Art.

SHANNON, the principal river of Ireland. It flows with a bow-shaped course from N. to S. and S.W., from the N.W. part of the island to its mouth in the Atlantic on the S.W. coast, with a length of about 240 m. and a drainage area of 4544 sq. m. Rising in county Cavan in some small pools at the foot of Cuilcagh Mountain, the Shannon crosses county Leitrim, traversing the first of a series of large lakes, Lough Allen (9 m. in length). It then separates county Roscommon on the right (W.) bank from counties Leitrim, Longford, Westmeath and King's County on the left. In this part of its course it forms Loughs Boderg (7 m. long), Forbes (3 m.) and Ree (18 m.), and receives from W. the river Boyle and from E. the Inny, while in county Longford it is joined by the Royal Canal. It now separates county Galway on the right from King's County and county Tipperary; receiving the Suck from W. and the Brosna from E., and forming Lough Derg (23 m.). Dividing county Clare from counties Tipperary and Limerick, the Shannon reaches the city of Limerick as a broad and noble river, and debouches upon an estuary 60 m. in length with a direction nearly E. and W. This divides county Clare on the right from counties Limerick and Kerry on the left.

A wide branch estuary, that of the Fergus, joins from N., and the rivers Mulkear, Maigne and Deel enter from S. From Lough Allen to Limerick, where the Shannon becomes tidal, its fall is 144 ft. With the assistance of short canals the river is navigable for light vessels to Lough Allen, and for small steamers to Athlone; while Limerick is accessible for large vessels. The salmon-fishing is famous; trout are also taken in the loughs and tributary streams. Carrick-on-Shannon, Athlone, Killaloe, and Castle-connel are favourite stations for sportsmen. The scenery is generally pleasant, and on the loughs, with their deeply indented shores and numerous islands, often very beautiful. These islands are in several cases sites of early religious settlements, while of those on the river-banks the most noteworthy is that of the seven churches of Clonmacnoise.

SHANS, a collective name, probably from Chinese *Shan-tse, Shan-yen* (*Shan* = "mountain"), "highlanders," given by the Burmese to all the tribes of Thai stock subject to the former kingdom of Burma (see SHAN STATES below). The Shans call themselves Tai or Punong; while the Chinese call them Pai or Pai-yi. Among them exist the purest types of the Thai race. They are found all over the province of Yunnan and in the border-land between China and Burma. Politically, where not under the direct control of Chinese magistrates, the tribes are organized under their own chiefs, who are recognized by the Chinese government and endowed with official rank and title. In Burmese such native chiefs are termed *Sawbwa.*

For the history of the Thai race see THAIS. See also LAOS, MIAOTZE, LOLOS. Also A. R. Colquhoun, *Amongst the Shans* (1885); E. Aymonier, "Les Tchaines," in *Revue de l'histoire des religions* for 1891.

SHAN-SI, a northern province of China, bounded N. by Mongolia, E. by Chih-li, S. by Ho-nan, and W. by Shen-si. Estimates of its area vary from 66,000 to 81,000 sq. m. and it has besides its capital, Tai-yuen Fu (pop. 230,000), eight prefectural cities. The population is returned as 12,200,000. It includes, in the northern districts, about 500,000 Mongols. The configuration of Shan-si is noteworthy, forming, from its southern frontier as far north as Ning-wu Fu—an area of about 30,000 sq. m.—a plateau 2600 to 6000 ft. above the level of the sea, the whole of which is one vast coal-field. North and west the plateau is bounded by high mountain ranges trending south-west and north-east. Down the central line of the province from north to south lies a series of deep depressions, all of which are ancient lake basins. But though forming a series these lakes were not formerly connected with each other, some being separated from those next adjoining by high ridges, and being drained by different rivers and in different directions. The Fên-ho, the largest river in Shan-si, with a general S.S.W. direction, and the Chin-ho, also a considerable stream, are both tributaries of the Yellow river.

Shan-si is one of the most remarkable coal and iron regions in the world, a veritable second Pennyslvania, and Baron von Richthofen gave it as his opinion that the world, at the present rate of consumption of coal, could be supplied for thousands of years from Shan-si alone. In the south the neighbourhood of Tsi-chow Fu abounds in both coal and iron, and has probably, partly through being within reach of the populous plain of Hwai-king Fu, of the Yellow river, of Tao-kow Chin and Sew-wu Hien (the shipping places for Tientsin and the Grand Canal) and of Ho-nan Fu, furnished more iron to the Chinese than any other region of a similar extent in the empire. The iron is of great purity and easily fusible, while clay and sand for crucibles, moulds, &c., and a superior anthracite coal, lie ready to hand. The coal is of two kinds, bituminous and anthracite, the line of demarcation between the two being formed by the hills which are the continuation of the Ho-shan range, the fields of bituminous coal being west of these hills, and those of anthracite east. In the neighbourhood of P'ing-ting Chow the extent of the coal-field is incalculable; and speaking of the whole plateau, Baron von Richthofen says: "These extraordinary conditions, for which I know no parallel on the globe, will eventually give rise to some curious features in mining. It may be predicted that, if a railway should ever be built from the plain to this region, . . . branches of it will be constructed within the body of one or other of these beds of anthracite, which are among the thickest and most valuable known anywhere, and continue for miles underneath the hills west of the present coal-belt of P'ing-ting Chow. Such a tunnel would allow of putting the produce of the various coal-beds immediately on rail-road carts destined for distant places." These mines are worked by the Peking Syndicate, who have gained a concession to develop them, and have a railway to connect their workings with the Lu-Han trunk line, which traverses the east of the province.

A vast coal-field.

Salt is produced in the prefecture of P'ing-yang in the south of the province, both from a salt lake and from the alluvial soil in the neighbourhood of the Fên-ho. Shan-si produces cereals, tobacco, cotton and sometimes rice, but in agricultural products the province is poor; the means of transport are rude and insufficient. The people of Shan-si are great traders, and nearly all the commerce of southern Mongolia is in their hands. A railway connecting the capital with Pekin was opened in 1908. The only wagon road leading into and through Shan-si is the great highway from Peking to Si-gan Fu, which enters Shan-si west of Chêng-ting Fu, and leaves the province at Tung-kwan at the great bend of the Hwang-ho. Transport is chiefly on the backs of camels, mules and asses. The province suffered from a terrible famine in 1878–1879, about which time Protestant missionaries began work in the capital. In the north, beyond the Great Wall, is the city of Kwei-hwa-Cheng (pop. about 200,000), formerly the residence of the grand Lama of Mongolia; it has many Lama monasteries.

Shan-si university, one of the best equipped in China, owes its existence to the Boxer rising. Certain Protestant missionary bodies in the province refused to accept the compensation awarded them for damage to their property, and at their request the money was devoted to the foundation of a university, the missionaries being guaranteed for ten years the control of the western side of the education given therein.

See Richard's *Comprehensive Geography of the Chinese Empire* (Shanghai, 1908), § 1, ch. iii. and the authorities there cited.

SHAN STATES, a collection of semi-independent states on the E. frontier of Upper Burma inhabited by the Shan or Thai race. The Shan States have a total area of 57,915 sq. m. and a total population (1901) of 1,137,444. There are six states under the supervision of the superintendent of the N. Shan States, and 37 under the superintendent and political officer of the S. Shan States. In addition, two states are under the commissioner of the Mandalay division, namely, Hkamti Lông on the N. of Myitkyina district and Möng Mit which is temporarily administered as a subdivision of the Ruby Mines district; and two states, Sinkaling Hkamti and Hsawng Hsup, near Manipur, are under the supervision of the commissioner of the Sagaing division. There are besides a number of Shan States beyond the border of Burma, which are tributary to China, though China exercises an authority which is little more than nominal. The British Shan States were tributary to Burma and came under British control at the time of the annexation of Upper Burma. They rank as British territory, not as native states. By section 11 of the Burma Laws Act 1898, the civil, criminal and revenue administration of each state is vested in the chief, subject to the restriction specified in the *sanad* or order of appointment granted to him. Under the same section the law to be administered is the customary law of each state so far as it is in accordance with justice, and not opposed to the spirit of the law in British India.

Physical Features.—The shape of the Shan States is roughly that of a triangle, with its base on the plains of Burma and its apex on the Mekong river. The Shan plateau is properly only the country between the Salween and Irrawaddy rivers. On the W. it is abruptly marked by the long line of hills, which begin about Bhamo and run S. till they sink into the plains of Lower Burma. On the E it is no less sharply defined by the deep and narrow rift of the Salween. The average height of the plateau is between 2000 and 3000 ft., but it is seamed and ribbed by mountain ranges, which split up and run into one another. On the N. the Shan States are barred across by the E. and W. ranges which follow the line of the Namtu. The huge mass of Loi Ling, 9000 ft., projects S. from this, and from either side of it and to the S. extends the wide plain which extends down to Möng Nai. The highest peaks are in the N. and the S. Loi Ling is the highest point W. of the Salween, and in Kokang and other parts of N. Hsenwi there are many peaks above 7000 ft. The majority of the intermediate parallel ranges have an average of between 4000 and 5000 ft. with peaks rising to over 6000. The country beyond the Salween is a mass of broken hills, ranging in the S. towards the Menam from 2000 to 3000 ft., while in the N. towards the Wa states they average from 5000 to 7000. Several peaks rise to 8000 ft. such as Loi Maw (8102). The climate varies

considerably. From December to March it is cool everywhere, and 10° of frost are experienced on the open downs. The hot season temperature is 80° to 90°, rising to 100° in the Salween valley. The rains begin about the end of April, but are not continual till August, which is usually the wettest month. They last until the end of October or beginning of November. The annual rainfall varies from 60 in. in the broader valleys to 100 on the higher mountains.

Race and Language.—According to the census of 1901 there were 787,087 Shans (see above) in Burma. The Thai or Tai, as they call themselves, were first known to the Burmese as Tarôks or Tarets. The original home of the Thai race was S.W. China, or rather that was the region where they attained to a marked separate development as a people. It is probable that their first settlement in Burma proper was in the Shweli valley, and that from this centre they radiated at a comparatively recent date N., W. and S.E. through Upper Burma into Assam. It is supposed that the Thai race boasts of representatives across the whole breadth of Indo-China, from the Brahmaputra as far as the gulfs of Siam and Tongking; that it numbers among its members not only the Shans proper, the Laos and the Siamese, but also the Muongs of French Indo-China, the Hakas of S. China, and the Li, the inhabitants of the interior of the far Eastern island of Hainan in the China seas. But no exhaustive survey of the Thai has yet been accomplished. For the purposes of Burma they may be divided into the N.W., the N.E., the E. and the S. Shans. The Siamese and the Laos are the principal representatives of the S. division. Siamese are found in considerable numbers in the districts of Amherst, Tavoy and Mergui in the Tenasserim division. The total at the time of the census of 1901 was 31,800, while that of the Laos was 1047. The country of the E. Shans lies between the Rangoon-Mandalay railway and the Mekong, and is bounded roughly on the N. and S. by the 22nd and 20th parallels of latitude. It includes the S. Shan States, and comprises the country of the Lü and the Hkün of the states of Kēngtūng and Kēnghūng. Linguistically the connexion between the latter two races and the Laos is very close, but apparently the racial affinity is not sufficiently near to justify the classification of the Hkün and the Lü with the S. Thai. The N.W. Shan region is the area extending from Bhamo to Assam between the 23rd and 28th parallels of latitude. It corresponds more or less with those portions of Katha, Myitkyina, Bhamo and Upper Chindwin districts which at one time or other during the palmy days of the Shan dominion acknowledged the suzerainty of the Sawbwa of Mogaung. The N.E. Shans are the Chinese-Shans who are found where Upper Burma and the N. Shan states border on China.

The Thai language may be divided into two sub-groups, the N. and the S. The S. includes Siamese, Lao, Lü and Hkün; the N., the three forms of Shan, namely, N. Burmese-Shan, S.-Burmese Shan and Chinese-Shan with Hkamti and Ahom. The vernacular of the people who are directly known in Burma as Shan is S. Burmese-Shan. This language is isolating and polytonic. It possesses five tones, a mastery of which is a *sine qud non* if the language is to be properly learnt. It is exhaustively described in the works of Dr Cushing. The Shans are a peaceful race, fond of trading. During the past decade the trade with Burma has increased very largely, and with the construction of the railway to Lashio a still further increase may be expected in the N. states. The cultivation of wheat and potatoes in the S. states promise them wealth also when a railway furnishes them means of getting the produce out of the country. Since 1893 the peace of the Shan States has been practically undisturbed.

See Ney Elias, *Introductory Sketch of the History of the Shans in Upper Burmah and West Yun-nan* (Calcutta, 1876); Cushing, *Shan Dictionary* (Introduction); Bock, *Temples and Elephants*; Sir A. Phayre, *History of Burmah*; A. R. Colquhoun, *Across Chrysé* (London, 1883), and *Amongst the Shans* (1885); Diguet, *Étude de la langue Thaï* (Paris, 1896). (J. G. Sc.)

SHAN-TUNG ("East of the Mountains"), a maritime province of China, bounded N. by the province of Chih-li and the Gulf of Chih-li, E. by the Yellow Sea, S. by Kiang-su and the Yellow Sea and W. by Chih-li. Area about 56,000 sq. m., population (estimated) 37,500,000. It is the most densely inhabited part of China, and is celebrated as the native province both of Confucius and Mencius. It is divided into ten prefectures, with as many prefectural cities, of which Chi-nan Fu (*q.v.*), the provincial capital, is the chief.

The physical features of the province are very plainly marked. The centre and eastern are occupied by mountain ranges running N.E. and S.W., between which lie fertile valleys, while the north-western, southern and western portions form part of the great deltaic plain of the north of China. The mountainous region projects seaward beyond the normal coast line forming a large peninsula, the shores of which are deeply indented and contain some good harbours, such as that of Kiao-chow. The most considerable range of mountains occupies the centre of the province, the highest peak being the T'ai-shan (5060 ft.), a mountain famous in Chinese history for more than 4000 years, and to which hundreds of pilgrims annually resort. The Lao-shan, east of Kiao-chow, fringes the south-eastern coast for about 18 m. With the exception of the Hwang-ho, which traverses the province in a north-easterly direction to the sea, there are no large rivers in Shan-tung. The most considerable are the Wei, which flows into the Gulf of Chih-li; the I-ho, which empties into a lake lying east of the Grand Canal; and the Ta-wen, which rises at the southern foot of the I-sham Mountains and terminates in the Grand Canal. The canal traverses the provinces S. to N. east of the mountain region. There are several lakes, notably the Tu-shan Hu, which borders on the Grand Canal in the south-west. The fauna includes wild boars, wolves, foxes, badgers, partridges, quails and snipe. Cotton, silk, coal, grain, &c. are produced in the fertile tracts in the neighbourhood of the lakes. Not being a loess region, the mountains are unproductive, and yield only brushwood and grass, while the plain to the north is so impregnated with salt that it is almost valueless, especially near the sea, for agricultural purposes. The valleys between the mountains and the plain to the south-west are, however, extremely rich and fertile.

The chief wealth of Shan-tung consists in its minerals, the principal of which is coal. Several coal-fields are worked; the most considerable lies in the valley of the Lao-fu river in the centre of the province. Another large field lies on the plain a little to the south of I-chow Fu in the south. A third field is in the district of Wei Hien to the north; and a fourth in the neighbourhood of I Hien in the south-west. Iron ore, ironstone, gold, galena, lead and copper are also found in considerable quantities in many districts.

Agricultural products are wheat, millet, Indian corn, pulse, arrowroot and many varieties of fruits and vegetables. Rice is grown in the extreme south of the province. Among trees, stunted pines, dwarf oaks, poplars, willows and the cypress are fairly plentiful. The castor-oil plant is common, and the wax tree grows plentifully in the neighbourhood of Lai-yang in the east, giving rise to a considerable trade in the wax produced by the wax insects. Unlike those of their kind in Sze Ch'uen, the wax insects of Shan-tung breed and become productive in the same districts. They are placed upon the trees in the spring, and at the close of the summer they void a peculiar substance which when melted forms wax. In the autumn they are taken off the trees, and are preserved within doors until the following spring. Sericulture is an important industry. The worms are fed in the west on mulberry leaves, in the east on those of the dwarf oak, the material made from the silk produced from the oak-fed worms being known as *pongee* or Chifu silk. The worm itself, after the cocoon has been used, is eaten and is esteemed a delicacy.

Besides Chi-nan Fu, the provincial capital, other inland cities are Tsao-Chow Fu (pop. 150,000) on the Grand Canal (an industrial centre) and Wei-hsien (100,000), a commercial centre. The ports of Shan-tung include Chifu, Wei-hai-wei and Kiao-chow (Tsing-tao), all separately noticed.

As part of compensation for the murder of two German missionaries in 1897 in this province—Protestant mission work in Shan-tung dates from 1860—the Germans took possession on lease of the port of Kiao-chow, 300 m. N. of Shanghai, a 36 hours' run by steamer, with which were associated many railway and mining rights in the district. In fulfilment of these rights a railway has been constructed connecting Kiao-chow with Chinan-fu, the capital; there it connects with another railway crossing the province north to south and forming part of the Tientsin and Chin-kiang line. In consequence of this acquisition of territory by Germany and the subsequent seizure of Port Arthur by Russia, Great Britain accepted the lease of Wei-hai-wei on the same terms. The convention confirming this arrangement was signed on the 1st of July 1898. It was in Shang-tung that the Boxer movement was first turned against foreigners (see CHINA, § *History*).

See M. Broomhall, *The Chinese Empire* (London, 1907), pp. 93-100; L. Richard, *Comprehensive Geography of the Chinese Empire* (Shanghai, 1908), pp. 79-89, and authorities there cited.

SHAPIRA, M. W. (*c.* 1830–1884), Polish vendor of spurious antiquities, was of Jewish birth, but appears to have become a Christian early in life. He opened a shop for the sale of antiquities in Palestine, and after the discovery of the Moabite Stone in 1872 was successful in selling to the Prussian government for 20,000 thaler a number of alleged pieces of Moabite pottery. These were shown by Clermont-Ganneau and others (cf. Kautzsch and A. Socin, *Ächtheit der moabitischen Altertümer*, 1876) to be forgeries produced by Shapira's client Selim al-Kari. Undeterred by this exposure, Shapira continued to do a considerable trade especially in Hebrew MSS. from Yemen, but

ultimately ruined himself by a fraud perpetrated upon the British Museum. In 1883 he offered, for the price, it is said, of £1,000,000, a number of leather strips containing speeches of Moses varying in many particulars from, though similar in matter to, those in Deuteronomy, and written in archaic Hebrew characters. He pretended that he had obtained them from a Bedouin who had discovered them in a Moabite cave. The fragments were submitted to C. D. Ginsburg, who published translations in *The Times* of Aug. 4, 17, 22, 1883. The French government, however, sent over Clermont-Ganneau to investigate, and, though the British Museum authorities declined to give him permission to make a complete study, he satisfied himself from a few strips which were publicly exhibited that the whole collection must be a forgery (*The Times*, Aug. 15). This view was confirmed by Ginsburg's report to the Museum. Shapira, who was never shown to have been the actual forger, committed suicide in Rotterdam on the 11th of March 1884.

For the fragments see Guthe, *Fragmenta einer Lederhandschrift* (Leipzig, 1884); see also Clermont-Ganneau, *Les Fraudes archéologiques* (Paris, 1885), iii., iv.

SHAPUR (Pahlavi, *Shāhpuhre*, "son of the king"; Greek *Sapores*, commonly *Sapor*), the name of three Sassanian kings.

1. SHAPUR I. (A.D. 241–272), son of Ardashir I. The Persian legend which makes him the son of an Arsacid princess is not historical. Ardashir I. had towards the end of his reign renewed the war against Rome; Shapur conquered the Mesopotamian fortresses Nisibis and Carrhae and advanced into Syria; but he was driven back by C. Furius Timesitheus,[1] father-in-law of the young emperor, Gordianus III., and beaten at Resaena (243). Shortly afterwards Timesitheus died, and Gordianus (*q.v.*) was murdered by Philip the Arabian, who concluded an ignominious peace with the Persians (244). When the invasion of the Goths and the continuous elevation of new emperors after the death of Decius (251) brought the Roman empire to utter dissolution, Shapur resumed his attacks. He conquered Armenia, invaded Syria, and plundered Antioch. At last the emperor Valerianus marched against him, but suffered near Edessa the fate of Crassus (260). Shapur advanced into Asia Minor, but was beaten by Ballista; and now Odaenathus (Odainath), prince of Palmyra, rose in his rear, defeated the Persian army, reconquered Carrhae and Nisibis, captured the royal harem, and twice invested Ctesiphon (263–265). Shapur was unable to resume the offensive; he even lost Armenia again. But according to Persian and Arabic traditions, which appear to be trustworthy, he conquered the great fortress of Hatra in the Mesopotamian desert; and the great glory of his reign was that a Roman emperor was by him kept prisoner to the day of his death. In the valley of Istakhr (near Persepolis), under the tombs of the Achaemenids at Nakshi Rustam, Shapur is represented on horseback, in the royal armour, with the crown on his head; before him kneels Valerian, in Roman dress, asking for grace. The same scene is represented on the rocks near the ruins of the towns Darabjird and Shapur in Persis. Shapur left other reliefs and rock inscriptions; one, at Nakshi-Rajab near Persepolis, is accompanied by a Greek translation; here he calls himself "the Mazdayasnian (worshipper of Ahuramazda), the god Sapores, king of kings of the Aryans (Iranians) and non-Aryans, of divine descent, son of the Mazdayasnian, the god Artaxares, king of kings of the Aryans, grandson of the god-king Papak." Another long inscription at Hajjiabad (Istakhr) mentions the king's exploits in archery in the presence of his nobles.

From his titles we learn that Shapur I. claimed the sovereignty over the whole earth, although in reality his domain extended little farther than that of Ardashir I. Shapur built the great town Gundev-Shapur near the old Achaemenian capital Susa, and increased the fertility of this rich district by a barrage through the Karun river near Shushter, which was built by the Roman prisoners and is still called Band-i-Kaisar, "the mole of the Caesar." Under his reign the prophet Mani, the founder of Manichaeism (*q.v.*) began his preaching in Persia, and the king himself seems to have favoured his ideas.

For the monuments and inscriptions cf. Sir R. Ker Porter, *Travels*; Flandin and Coste, *Voyage en Perse*; Stolze, *Persépolis*; Thomas, *Journal R. Asiat. Soc.*, new series, iii., 1868; West in *Grundriss der iranischen Philologie*, ii. 76 f.; Dittenberger, *Orientis Graeci inscr.* i., No. 434. A gem with the portrait of the king is in the museum of Gotha, cf. Pertsch, *Zeitsch. d. deutschen morgenl. Ges.* xxii. 280.

2. SHAPUR II. (310–379). When King Hormizd II. (302–310) died, the Persian magnates killed his eldest son, blinded the second, and imprisoned the third (Hormizd, who afterwards escaped to the Romans); the throne was reserved for the unborn child of one of the wives of Hormizd. This child, named Shapur, was therefore born king; the government was conducted by his mother and the magnates. But when Shapur came of age, he turned out to be one of the greatest monarchs of the dynasty. Under his reign the collection of the *Avesta* was completed, heresy and apostasy punished, and the Christians persecuted. This was the natural oriental reaction against the transformation of the Roman empire into a Christian empire by Constantine. In 337, just before the death of Constantine, Shapur broke the peace concluded in 297 between Narses and Diocletian, which had been observed for forty years, and a war of twenty-six years (337–363) began. Shapur attempted with varying success to conquer the great fortresses of Roman Mesopotamia, Singara, Nisibis (which he invested three times in vain), Amida (Diarbekr). The emperor Constantius II. was always beaten in the field. Nevertheless Shapur made scarcely any progress; the military power of his kingdom was not sufficient for a lasting occupation of the conquered districts. At the same time he was attacked in the E. by nomad tribes, among whom the Chionites are named. After a prolonged struggle they were forced to conclude a peace, and their king, Grumbates, accompanied Shapur in the war against the Romans. Shapur now conquered Amida after a siege of seventy-three days (359), and took Singara and some other fortresses in the next year. In 363 the emperor Julian, at the head of a strong army, advanced to Ctesiphon, but was killed. His successor Jovian was defeated and made an ignominious peace, by which the districts on the Tigris and Nisibis were ceded to the Persians, and the Romans promised to interfere no more in Armenia. In the rock-sculptures near the town Shapur in Persis (Stolze, *Persépolis*, pl. 141) this great success is represented; under the hoofs of the king's horse lies the body of an enemy, probably Julian, and a suppliant Roman, the emperor Jovian, asks for peace.

Shapur now invaded Armenia, took king Arsaces III. (of the Arsacid race), the faithful ally of the Romans, prisoner by treachery and forced him to commit suicide. He then attempted to introduce Zoroastrian orthodoxy into Armenia. But the Armenian nobles resisted him successfully, secretly supported by the Romans, who sent King Pap, the son of Arsaces III. into Armenia. The war with Rome threatened to break out again; but Valens sacrificed Pap and caused his assassination in Tarsus, where he had taken refuge (374). Shapur had conducted great hosts of captives from the Roman territory into his dominions, most of whom were settled in Susiana. Here he rebuilt Susa, after having killed her rebellious inhabitants, and founded some other towns. He was successful in the east, and the great town Nishapur in Khorasan (E. Parthia) was founded by him.

3. SHAPUR III. (383–388), son of Shapur II., elevated to the throne by the magnates against his uncle, Ardashir II., and killed by them after a reign of five years. He concluded a treaty with Theodosius the Great. (ED. M.)

SHARE (O.Eng. *scearu*, chiefly in compounds, *e.g. land-scearu*, a share of land, from *sceran*, to cut; cf. "shear"), something cut off, a portion, a definite part of anything distributed among a

[1] Timesitheus is the generally accepted variant for the Misitheus ("God-Hater") of Capitolinus; Zosimus, i. 16. 17, preferred Timesicles. In a paper read before a meeting of the British School of Archaeology at Rome on the 30th of January, 1908, Mr A. S. Yeames endeavoured to show that Timesitheus is the general commemorated by a bust in the Sala delle Colombe of the Capitoline Museum, and by the great sarcophagus in the Museo delle Terme, representing a battle between Romans and barbarians. On the forehead in each case is a non-Christian incised cross of unknown significance.

number of persons. The word is particularly applied to the fixed and equal amounts into which the capital of a limited company is divided (see STOCKS AND SHARES; COMPANY; and DEBENTURES). From the same O. Eng. verb *sceran* is derived "share" (O. Eng. *scear*), the cutting blade of a plough (*q.v.*).

SHARI, an important river of North-Central Africa, carrying the drainage of a large area into Lake Chad (*q.v.*). Its head-streams rise on the watersheds between the Lake Chad basin and those of the Nile and Congo. The principal headstream, known variously as the Wahme, Wa, Wam or Wom, rises, in about 6° 30′ N., 15° E., in mountainous country forming the divide between the Chad system and the basin of the Sanga affluent of the Congo.

The Wam flows east and then north and in about 7° 20′ N., 18° 20′ E. is joined by the Fafa, a considerable stream rising east of the Wam. The upper course of the Wam is much obstructed by rapids, but from a little above the Fafa confluence it becomes navigable. Below the confluence the river, now known as the Bahr Sara, receives three tributaries from the west. In about 9° 20′ N., 18° E., it is joined by the Bamingi, which is formed by the junction of the eastern headstreams of the Shari. The Bamingi, before the exploration of the Wam, was thought to be the true upper course of the Shari. One of its branches, the Kukuru, rises in about 7° N., 21° 15′ E. Some 90 m. from its source the Bamingi becomes navigable, being 12 ft. deep and flowing with a gentle current. In 8° 42′ N. it receives on the west bank the Gribingi, a river rising in about 6° 20′ N. It is narrow and tortuous with rocky banks and often broken by rapids, but navigable at high water to 7° N. It flows in great part through a forest-clad country. A few miles above its confluence with the Bahr Sara the Bamingi receives on the right hand another large river, the Bangoran, which rises in about 7° 45′ N. and 22° E., in a range of hills which separates the countries of Dar Runga and Dar Banda, and, like the Bamingi, flows through open or bush-covered plains with isolated granite ridges.

Below the junction of the Bahr Sara and the Bamingi the Shari, as it is now called, becomes a large river, reaching, in places, a width of over 4 m. in the rains; while its valley, bordered by elevated tree-clad banks, contains many temporary lakes and back-waters. Its waters abound with hippopotami and crocodiles, and the country on either side with game of all kinds. In 9° 46′ N. it receives the Bakare or Awauk (Aouk) from the east, known in its upper course as the Aukadebbe. This, like the Bahr es Salamat, which enters the Shari in 10° 2′ N., traverses a wide extent of arid country in southern Wadai, and brings no large amount of water to the Shari. In 10° 12′ a divergent branch, the Ergig, leaves the main stream, only to rejoin it in 11° 30′.

In 12° 15′ N. and 15° E. the Shari receives on the west bank its largest tributary, the Logone, the upper branches of which rise far to the south between 6° and 7° N. The principal headstreams are the Pende and the Mambere. The Pende rises some 30 m. N. by E. of the source of the Wam. It flows northwards through a fertile valley and in 9° 35′ N. and 16° E. is joined by the Mambere, which rises in the hills of Adamawa and flows in a course roughly parallel to the Pende. Below the junction of the Pende and Mambere the Logone is a broad and deep river. Its system is connected with that of the Benue (see NIGER) by the Tuburi Swamp, which sends northward a channel joining the Logone in about 10° 30′ N. Below the Logone confluence the Shari, here a noble stream, soon splits up into various arms, forming an alluvial delta, flooded at high water, before entering Lake Chad. From the source of the Wam to the mouth of the river is a distance, following the windings of the stream, of fully 1400 m.

The existence of the Shari was made known by Oudney, Denham and Clapperton, the first Europeans to reach Lake Chad (1823). In 1852 Heinrich Barth spent some time in the region of the lower Shari and Logone, and in 1872–1873 Gustav Nachtigal studied their hydrographical system and explored the Gribingi, which he called the Bahr el Ardhe. It was not, however, until the partition of the Chad basin between Great Britain, France and Germany (1885–1890) that the systematic exploration of the Shari and its affluents was undertaken. The most prominent explorers have been Frenchmen. In 1896 Émile Gentil reached the Bamingi and in a small steamer passed down the river to its mouth. The existence of the Bahr Sara had been made known by C. Maistre in 1892, and in 1894 F. J. Clozel discovered the Wam. In 1900 A. Bernard demonstrated the identity of these two streams. In 1907 an expedition under Captain E. Lenfant followed the Wam-Bahr Sara from its source to the confluence with the Bamingi and showed it to be the true upper course of the Shari. The same expedition also discovered the Pende tributary of the Logone. Captain Lenfant had previously demonstrated (1903) the connexion between the Benue and Logone. From the mouth of the Shari in Lake Chad there is a current towards the Bahr-el-Ghazal channel at the south-eastern end of that lake. This channel has been supposed to be a dried-up affluent of the lake (see CHAD). Investigations by the French scientists E. F. Gautier and R. Chudeau led Chudeau to the conclusion that the Shari did not end in Lake Chad, but, by way of the Bahr-el-Ghazal, passed between Tibesti and Ennedi and ended in some *shat* in the Libyan desert. That the Shari may have reached the Nile is an hypothesis not absolutely rejected. (See *Missions au Sahara*, tome ii. (Paris, 1909), and for theories as to the Niger-Nile connexion see NIGER.)

From the spot where it is intersected by 10° 40′ N. to Lake Chad the Shari forms the boundary between the German colony of Cameroon and French Congo. The best route from the Congo to Lake Chad is via the Sanga affluent of the Congo to the station of Carnot, and thence across the watershed to the Pende.

See the works of Barth, Nachtigal and other travellers, especially Lenfant's *La Découverte des grandes sources du centre de l'Afrique* (Paris, 1909).

SHARK, a Selachian fish (see SELACHIANS), belonging to the order Plagiostomi, suborder Squali.

Sharks are almost exclusively inhabitants of the sea, but some species enter the mouths of large rivers, and one species (*Carcharias gangeticus*) occurs frequently high up in the large rivers of India. *C. nicaraguensis* of the lake of Nicaragua and the Rio San Juan appears to have taken up its residence permanently in fresh water. Sharks are most numerous between the tropics, a few only reaching the Arctic circle; it is not known how far they advance S. in the Antarctic region. Altogether some hundred and fifty different species have been described.

With regard to their habits many are littoral species, the majority pelagic, and a few are known to belong to the deep-sea fauna, having hitherto been obtained down to a depth of nearly 1000 fathoms.

Littoral Sharks.—The littoral forms are of small size, and generally known under the name of "dog-fishes," "hounds," &c. Some pelagic sharks of larger size also live near the shore on certain parts of a coast, but they are attracted to it by the abundance of food, and are as frequently found in the open sea, which is their birthplace; therefore we shall refer to them when we speak of the pelagic kinds.

The majority of the littoral species live on the bottom, sometimes close inshore, and feed on small marine animals or on any animal substance. The following are deserving of special notice.

The tope (*Galeus*) is common on the coasts not only of England, Ireland and of S. Europe, but also of S. Africa, California, Tasmania and New Zealand. Its teeth are equal in both jaws, of rather small size, flat, triangular, with the point directed towards the one side, and with a notch and denticulations on the shorter side (fig. 1). It is of a uniform slaty-grey colour, and attains to a length of 6 ft. The female brings forth some thirty living young at one birth in May. It becomes troublesome at times to fishermen by taking their bait and driving away other fish they desire to catch. The fins of *G. zyopterus* of the Californian coast are much esteemed for culinary purposes by the Chinese.



FIG. 1.—Teeth of Tope. *u*, Upper; *l*, lower. (× 2.)

The hounds proper (*Mustelus*) possess a very different dentition, the teeth being small, obtuse, numerous, arranged in several rows like pavement (fig. 2). Five or six species are known from the shores of the various temperate and subtropical seas, one (*M. vulgaris*) being common on the coasts of Great Britain and the United States, on the Pacific as well as the Atlantic side. It is of a uniform grey colour or sparingly spotted with white, and attains to a length of 3 or


FIG. 2.—Teeth of *Mustelus*.

4 ft. The young, about twelve in number, are brought forth alive in November. It is comparatively harmless and feeds on shells, crustaceans and decomposing animal substances.

The dogfishes proper (*Scyllium, Chiloscyllium,* &c.) are spread over nearly all the temperate and tropical seas. Their teeth are small, in several series, with a longer pointed cusp in the middle, and generally one or two smaller ones on each side (figs. 3 and 5). They are all oviparous, their oblong egg-shells being produced at each corner into a long thread by which the egg is fastened to some fixed object. Some of the tropical species are ornamented with a pretty pattern of coloration. The two British species, the lesser and the larger spotted dogfish (*Sc. canicula* and *Sc. catulus*), belong to the most common fishes of the coast and are often confounded with each other. But the former is finely dotted with brown above, the latter having the same parts covered with larger rounded brown spots, some of which are nearly as large as the eye. As regards size, the latter exceeds somewhat the other species, attaining to a length of 4 ft. Dogfishes may become extremely troublesome by the large numbers in which they congregate at fishing stations; they are rarely used as food, except in the Mediterranean countries, in China and Japan, and in the Orkneys, where they are dried for home consumption. The black-mouthed dogfish (*Pristiurus melanostomus*) is rarely caught on the British coasts, and is recognized



FIG. 3.—Teeth of *Scyllium canicula.*



FIG. 4.—*Chiloscyllium trispeculare.*

by a series of small, flat spines with which each side of the upper edge of the caudal fin is armed.

The tiger-shark (*Stegostoma tigrinum*) is one of the commonest and handsomest sharks in the Indian Ocean. The ground colour is a brownish-yellow, ornamented with black or brown transverse bands or rounded spots. It is a littoral species, but adult specimens, which are from 10 to 15 ft. long, are met far from land. It is easily recognized by its enormously long bladelike tail, which is half as long as the whole fish. The teeth are small, trilobed, in many series. The fourth and fifth gill-openings are close together.

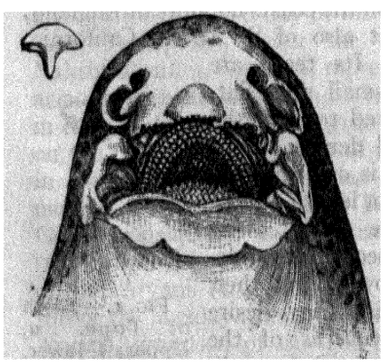


FIG. 5.—Confluent Nasal and Buccal Cavities of the same fish.

The genus *Crossorhinus,* of which three species are known from the coasts of Australia and Japan, is remarkable as the only instance in this group of fishes in which the integuments give a "celative" rather than a "protective" resemblance to their surroundings. Skinny frond-like appendages are developed near the angle of the mouth, or form a wreath round the side of the head, and the irregular and varied coloration of the whole body closely assimilates that of a rock covered with short vegetable and coralline growth. The species of *Crossorhinus* grow to a length of 10 ft.

The so-called Port Jackson shark (*Heterodontus Cestracion*) is likewise a littoral form. Besides the common species (*H. philippi*), three other closely allied kinds from the Indo-Pacific are known. This genus, which is the only existing type of a separate family, is one of special interest, as similar forms occur in Primary and Secondary strata. The jaws are armed with small obtuse teeth in front, which in young individuals are pointed, and provided with from three to five cusps. The lateral teeth are larger, pad-like, twice as broad as long and arranged in oblique series (fig. 7). The fossil forms far exceeded in size the living, which scarcely attain to a length of 5 ft. The shells of their eggs are found thrown ashore like those of our dogfishes. The shell is pyriform, with two broad lamellar ridges each wound edgewise five times round it (fig. 8).

The spiny or piked dogfish (*Acanthias*) inhabits the temperate seas of both the N. and S. hemispheres. For some part of the year it lives in deeper water than the sharks already noticed,

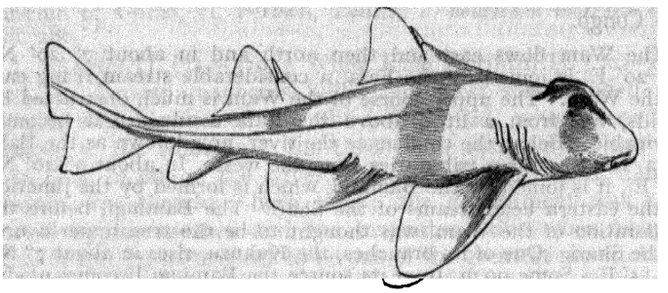


FIG. 6.—*Heterodontus galeatus.*

but at uncertain irregular times it appears at the surface and close inshore in almost incredible numbers. Couch says that he has heard of 20,000 having been taken in a seine at one time; and in March 1858 the newspapers reported a prodigious shoal reaching W. to Uig, whence it extended from 20 to 30 m. seaward, and in an unbroken phalanx E. to Moray, Banff and Aberdeen. These fishes are distinguished by each of the two dorsal fins being armed in front by an acute spine. They do not possess an anal fin. Their teeth are rather small, placed in a single series, with the point so much turned aside that the inner margin of the tooth forms the cutting edge (fig. 9). The spiny

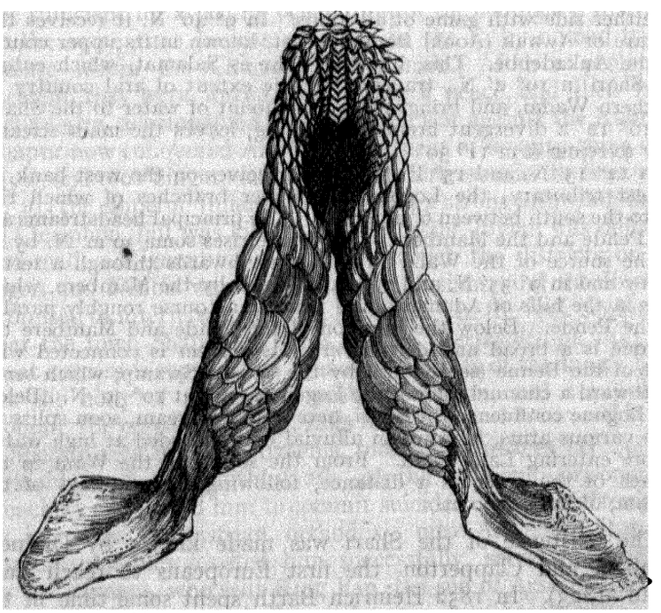


FIG. 7.—Upper Jaw of Port Jackson Shark (*Heterodontus philippi*). ($\times \frac{1}{2}$.)

dogfish are of a greyish colour, with some whitish spots in young specimens, and attain to a length of 2 or 3 ft. They are viviparous, the young being produced throughout the summer months.

Finally, we have to notice among the littoral sharks the "angel-fish" or "monk-fish" (*Rhina squatina*), which, by its broad flat head and expanded pectoral fins, approaches in general appearance the rays. It occurs in the temperate seas of the S. as well as the N. hemisphere, and is not uncommon on sandy parts of the coast of England and Ireland. It does not seem to exceed a length of 5 ft., and is too rare to do much injury to other fish. It is said to produce about twenty young at a birth.

Pelagic Sharks.—All these are of large size, and some are surpassed in bulk and length only by the larger kinds of cetaceans.

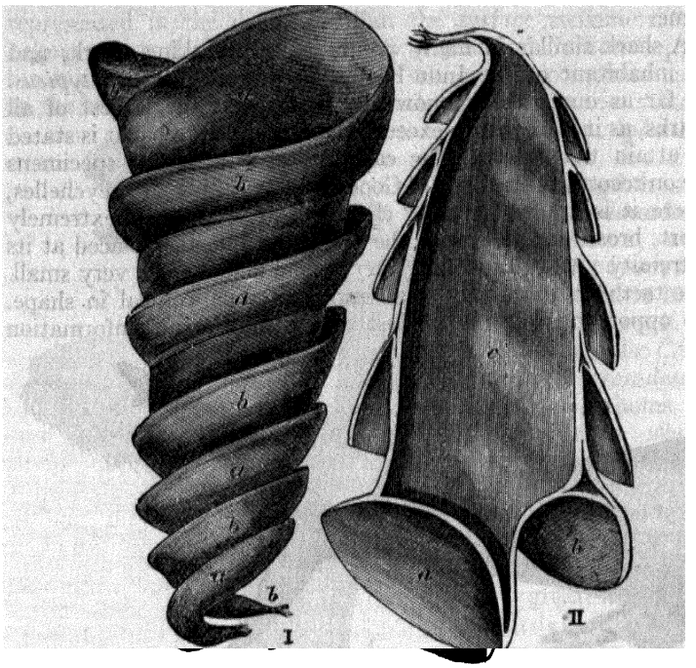


FIG. 8.—Egg-shell of same fish (×½). I., External view; II., section; *a* and *b*, the two dorsal ridges; *c*, cavity for the ovum.

Those armed with powerful cutting teeth are dangerous to man, whilst others, which are provided with numerous but very small teeth, feed on small fishes only or marine invertebrates, and are of a timid disposition, which causes them to retire into the solitudes of the open sea. On this account we know very little of their life. All pelagic sharks have a wide geographical range, and nearly all seem to be viviparous.



FIG. 9.—Teeth of *Acanthias vulgaris*.

Of the more remarkable forms which we propose to notice here the genus most abundantly represented in species and individuals is *Carcharias*, now split up by many authors into several separate genera. Perhaps nine-tenths of the sharks of which we read in books of travel belong to this genus. Between

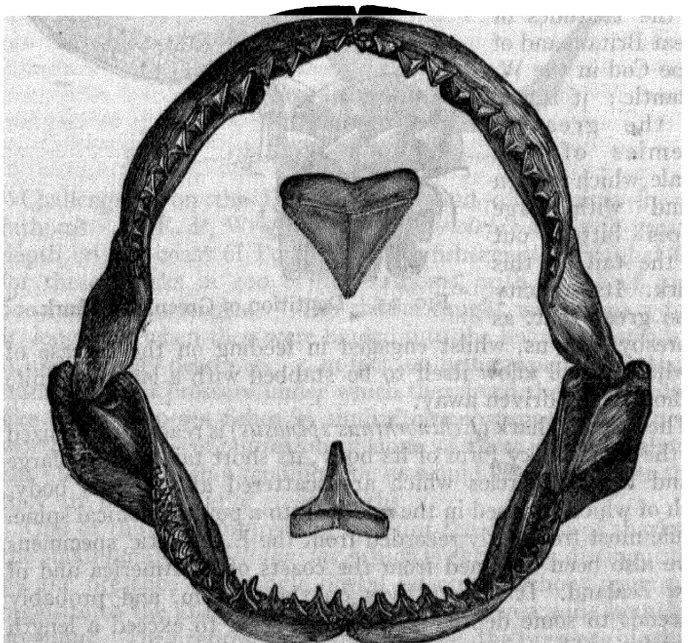


FIG. 10.—Dentition of the Blue Shark (*Carcharias glaucus*). *a*) The single teeth are of the natural size.

thirty and forty species have been distinguished, all of which are found in tropical seas. They are the sharks which so readily attach themselves to sailing vessels, following them for weeks. Others affect more the neighbourhood of land. One of the most common species is the blue shark (*Carcharias glaucus*), of which specimens (4 to 6 ft. long) are frequently caught on the S. coasts of England and Ireland. Other species of *Carcharias* attain a length of 30 ft. The mouth of all is armed with a series of large flat triangular teeth, which have a sharp, smooth or serrated edge (fig. 10).

Galeocerdo is likewise a large shark very dangerous to man, differing from the preceding chiefly by having the outer side of its teeth deeply notched. It has long been known to occur in the N. Atlantic, close to the Arctic Ocean (*G. arcticus*), but its existence in other parts has been ascertained within a recent period; in fact, it seems to be one of the most common and dangerous sharks of the Indo-Pacific, the British Museum having obtained specimens from Mauritius, Kurrachee, Madras and the W. coast of Australia.



FIG. 11.—Upper and Lower Tooth of *Lamna*.

Hammerheaded sharks (*Sphyrna*=*Zygaena*) are sharks in which the anterior portion of the head is produced into a lobe on each side, the extremity of which is occupied by the eye. The relation of this unique configuration of the head to the economy of the fish is unknown. Otherwise these sharks resemble *Carcharias*, and are equally formidable, but seem to be more stationary in their habits. They occur in all tropical and subtropical seas, even in the Mediterranean, where *S. Zygaena* is by no means rare. In the Indian Ocean it is common, and Cantor states that specimens may be often seen ascending from the clear blue depths of the ocean like a great cloud.

The porbeagles (*Lamna*) differ from the preceding sharks in their dentition and are not dangerous to man; at least there is no instance known of a person having been attacked by the species common on the British coast (*L. cornubica*). This is referred to in the works of older British authors as "Beaumaris shark." The short and stout form of its body contrasts strikingly with its much attenuated tail, which, however, is strengthened by a keel on each side and terminates in a large and powerful caudal fin. The snout is pointed, and the jaws are armed with strong lanceolate teeth, each of which bears a small cusp on each side of the base (see fig. 11). The teeth are not adapted for cutting, like the flat triangular teeth of man-eating sharks, but rather for seizing and holding the prey, which consists chiefly of various kinds of fishes and cephalopods. In the upper jaw there are from thirteen to sixteen teeth on each side, the third being remarkable for its small size; in the lower jaw from twelve to fourteen. The gill-openings are very wide. The porbeagle attains to a length of 10 or 12 ft., and is a pelagic fish, not rare in the N. Atlantic and Mediterranean, and frequently wandering to the British and more rarely to the American shores. This species is widely distributed over the N. of the Atlantic and Pacific Oceans. Other closely allied species (*L. spallanzanii*, *L. glauca*) are known to occur in the S. Atlantic, from the Mediterranean to the Cape of Good Hope.

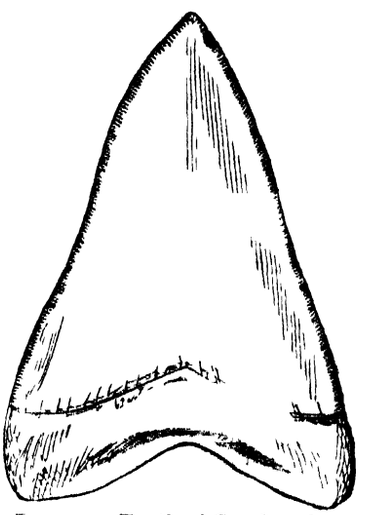


FIG. 12.—Tooth of *Carcharodon rondeletii*.

To the genus *Carcharodon* particular interest is attached, because the single still existing species is the most formidable of all sharks, as were those which preceded it in Tertiary times. The existing species (*C. rondeletii*) occurs in almost all tropical and subtropical seas, but seems to be verging towards extinction. It is known to attain to a length of 40 ft. The tooth figured

here of the natural size (fig. 12) is taken from a jaw much shrunk in drying, but still 20 in. wide in its transverse diameter, and taken from a specimen 36½ ft. long. The extinct species must have been still more gigantic in bulk, probably reaching a length of 90 ft., as we may judge from teeth which are found in the crag or which were dredged up from the Pacific Ocean by the "Challenger" expedition, and which are 4 in. wide at the base and 5 in. long measured along their lateral margin. In some Tertiary strata these teeth are extremely abundant, so much so that—for instance, in Florida—the strata in which they occur are quarried to obtain the fossil remains for export to England, where they are converted into artificial manure.

The fox-shark or thresher (*Alopecias vulpes*), of which every year specimens are captured on the British coast, but which is common in the N. and S. hemispheres, is readily recognized

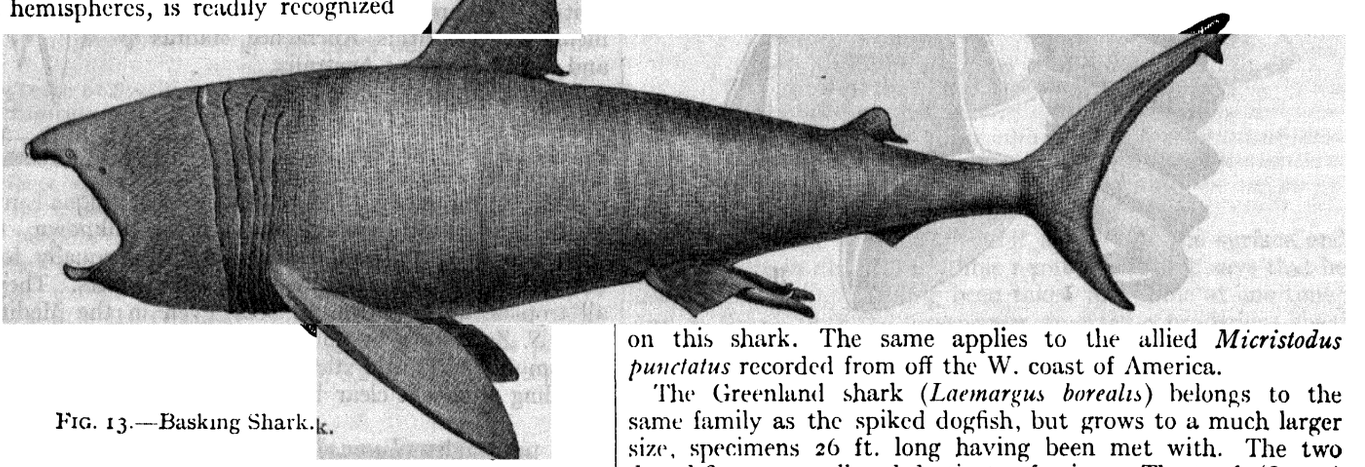


FIG. 13.—Basking Shark.

by its extremely slender tail, the length of which exceeds that of the remainder of the body. Its teeth are small, flat, triangular and without serrature. It follows the shoals of herrings, pilchards and sprats in their migrations, destroying incredible numbers and frequently injuring the nets. When feeding it uses the long tail in splashing the surface of the water, whilst it swims in gradually decreasing circles round a shoal of fishes which are thus kept crowded together. Sometimes two threshers may be seen working together. Statements that it has been seen to attack whales and other large cetaceans rest upon erroneous observations; its dentition is much too weak to bite through their skin. The thresher attains to a length of 15 ft., the tail included.

The basking shark (*Selache maxima*), sometimes erroneously called "sunfish," is the largest fish of the N. Atlantic, growing



FIG. 14.—Greenland Shark (*Laemargus borealis*).

to a length of more than 30 ft. Though best known from the N. of the Atlantic or Pacific oceans, this species has also been recorded from the Australian seas. The mouth is of an extraordinary width, and, like the gill-cavity, capable of great expansion, so as to enable the fish to take at one gulp an enormous quantity of the small fish and other marine creatures on which it subsists. Also the gill-clefts are of great width, and the internal opening of each is guarded by a kind of strainer, formed by the enormously elongated gill-rakers, which serves to prevent the food organisms from passing out through the clefts. The teeth are very small, numerous, arranged in several series, conical and probably without use in feeding. This shark is therefore quite harmless if not attacked. Off the W. coast of Ireland it was at one time hunted for the sake of the oil from the liver, one fish yielding from a ton to a ton and a half. Its capture is not unattended with danger, as one blow from the tail is sufficient to stave in the sides of a large boat. The basking shark is gregarious, and may be seen in calm weather lying with the upper part of the back raised above the surface of the water, a habit which it has in common with the true sunfish (*Orthagoriscus*), and from which it has derived its name.

A shark similar in many points to the basking shark, and an inhabitant of the Indo-Pacific Ocean, is *Rhinodon typicus*. So far as our present knowledge goes, it is the largest of all sharks, as it is known to exceed a length of 50 ft., but it is stated to attain that of 70. The captures of only a few specimens are on record, at the Cape of Good Hope and near the Seychelles, where it is known as the "chagrin." The snout is extremely short, broad and flat, with the mouth and nostrils placed at its extremity; the gill-openings very wide, and the eye very small. The teeth are extremely small and numerous, conical in shape. No opportunity should be lost of obtaining exact information on this shark. The same applies to the allied *Micristodus punctatus* recorded from off the W. coast of America.

The Greenland shark (*Laemargus borealis*) belongs to the same family as the spiked dogfish, but grows to a much larger size, specimens 26 ft. long having been met with. The two dorsal fins are small and destitute of spines. The teeth (fig. 15) in the upper jaw are small, narrow, conical in shape; those of the lower flat, arranged in several series, one on the top of the other, so that only the uppermost forms the sharp dental edge of the jaw. The points of these lower teeth are so much turned aside that the inner margin only enters the dental edge. The Greenland shark is an inhabitant of the Arctic regions, sometimes straying to the latitudes of Great Britain and of Cape Cod in the W. Atlantic; it is one of the greatest enemies of the whale, which is often found with large pieces bitten out of the tail by this shark. Its voracity is so great that, as Scoresby tells us, whilst engaged in feeding on the carcase of a whale it will allow itself to be stabbed with a lance or knife without being driven away.

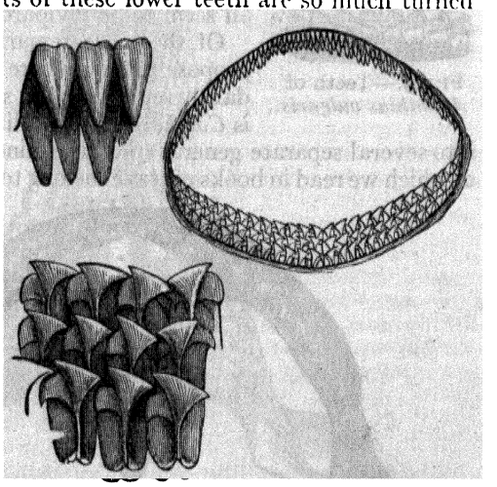


FIG. 15. Dentition of Greenland Shark.

The spinous shark (*Echinorhinus spinosus*) is readily recognized by the short bulky form of its body, its short tail, and the large round bony tubercles which are scattered all over its body, each of which is raised in the middle into a pointed conical spine. While most frequently recorded from the E. Atlantic, specimens have also been obtained from the coasts of N. America and of New Zealand. It always lives on the bottom, and probably descends to some depth. It does not seem to exceed a length of 10 ft.

Bathybial Sharks.—Sharks do not appear to have yet reached the greatest depths of the ocean; and so far as we know at present we have to fix the limit of their vertical distribution at 1000 fathoms. Those which we find to have reached or to pass

the 100 fathoms line belong to generic types which, if they include littoral species, are ground-sharks—as we generally find the bottom-feeders of our littoral fauna much more strongly represented in the deep sea than the surface swimmers. All belong to two families only, the *Scylliidae* and *Spinacidae*, the littoral members of which live for the greater part habitually on the bottom and probably frequently reach to the 100 fathoms line. Distinctly bathybial species are two small dogfishes—*Spinax granulatus* from 120 fathoms, and *Scyllium canescens* from 400 fathoms, both on the S.W. coast of S. America; also *Centroscyllium granulatum* from 340 fathoms in the S. Ocean, whose congener from the coast of Greenland probably descends to a similar depth. The shark which reaches the greatest depth recorded hitherto appears to be *Scylliorhinus indicus* obtained by the Valdivia expedition from a depth of nearly 1000 fathoms in the W. Indian Ocean. It belongs to the genus *Centrophorus*, of which some ten species are known, all from deep water in the N. Atlantic, Mediterranean, the Molucca and Japanese seas. The Japanese species were discovered by the naturalists of the

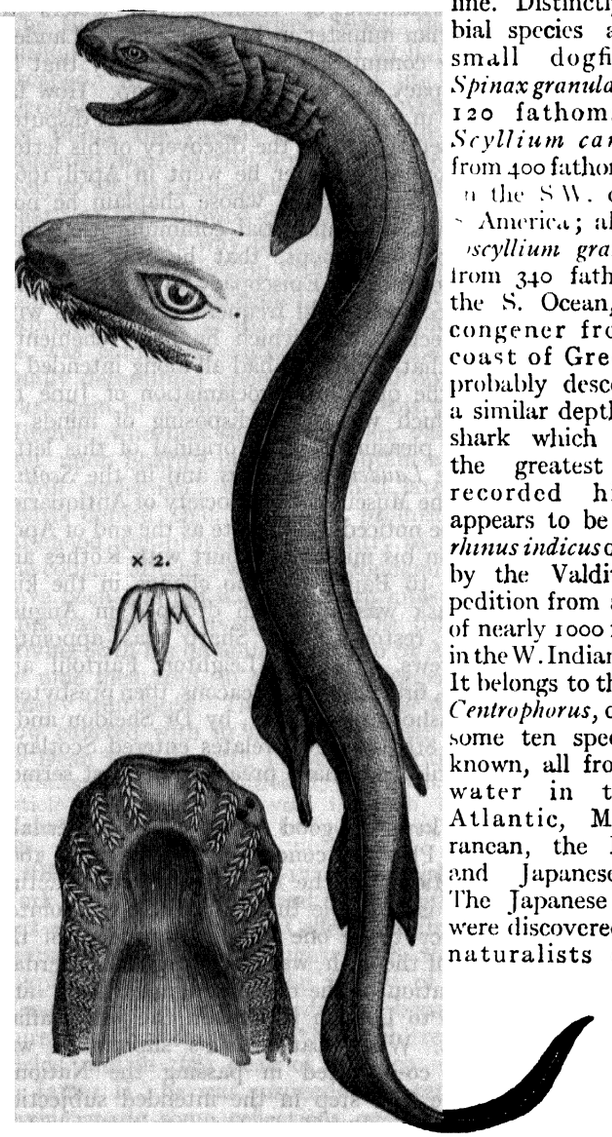


FIG. 16.—*Chlamydoselachus anguineus.*

"Challenger" on the Hyalonema ground off Inosima in 345 fathoms. Dr E. P. Wright found *C. coelolepis* at a still greater depth on the coast of Portugal. The fishermen of Sétubal fish for these sharks in 400 or 500 fathoms, with a line of some 600 fathoms in length. "The sharks caught were from 3 to 4 ft. long, and when they were hauled into the boat fell down into it like so many dead pigs"; in fact, on being rapidly withdrawn from the great pressure under which they lived they were killed, like other deep-sea fishes in similar circumstances. It is noteworthy that the organization of none of these deep-sea sharks has undergone such a modification as would lead us to infer that they are inhabitants of great depths.

One of the most interesting types of the division of sharks is the small family of *Notidanidae*, which is externally distinguished by the presence of a single dorsal fin only, without spine and opposite to the anal, and by having six or seven wide branchial openings. They represent an ancient type, the presence of which in Jurassic formations is shown by teeth extremely similar to those of the living species. Their skeleton is notochordal. Only four species are known, of which one (*Notidanus griseus*) has now and then strayed N. to the English coast. Allied to the Notidanidae are the Chlamydoselachidae or frilled sharks, represented so far as is known by a single living species, *C. anguineus* Garman (fig. 16), which occurs frequently in deep water off the coast of Japan and as isolated specimens off the coasts of New South Wales, Madeira and Norway. A fossil species has been described from the Pliocene of N. Italy. It resembles a conger in shape, and differs from the *Notidani* proper by its elongated body, wide nearly terminal mouth, extremely wide gill-openings and peculiarly formed teeth. The teeth are similar in both jaws, each composed of three slender curved cusps separated by a pair of minute intermediate points, and with a broad base directed backwards.

A few words may be added with reference to the economic uses of this group of fishes. As mentioned above, some of the smaller dogfishes are eaten at certain seasons by the captors, and by the poorer classes of the population. An inferior kind of oil, chiefly used for the adulteration of cod-liver oil, is extracted on some of the N. fishing-stations from the liver of the spiked dogfishes, and occasionally of the larger sharks. Cabinet-makers make extensive use of shark's-skin under the name of "shagreen" for smoothing or polishing wood. This shagreen is obtained from species (such as our dogfishes) whose skin is covered with small, pointed, closely set, calcified papillae, whilst very rough skins, in which the papillae are large or blunt, are useless for this purpose. The dried fins of sharks (and of rays) form in India and China an important article of trade, the Chinese preparing gelatin from them, and using the better sort for culinary purposes. They are assorted in two kinds, viz. "white" and "black." The former consists exclusively of the dorsal fins, which are reputed to yield more gelatin than the other fins. The pectoral, ventral and anal fins constitute the "black" sort, the caudal are not used. (A. C. G., J. G. K.)

SHARON, a borough of Mercer county, Pennsylvania, U.S.A., on the Shenango river, about 70 m. by rail N.N.W. of Pittsburg. Pop. (1900) 8916, of whom 1805 were foreign-born and 113 were negroes; (1908, local estimate) 15,000. Sharon is served by the Erie, the Lake Shore & Michigan Southern, and the Pennsylvania (Erie and Pittsburg division) railways. Sharon has an excellent public school system, and the F.H. Buhl Club (1895) is a social and educational institution, named in honour of its founder, an iron manufacturer of the borough. The borough has blast furnaces and rolling-mills; and iron and steel products, tin-plate and terne-plate are its principal manufactures. The total value of factory products in 1905 was $4,776,914, being 26·9% more than in 1900. Sharon and South Sharon (pop. by local estimate in 1908, 8000), which was separately incorporated as a borough in 1901, form what is virtually a single industrial community. Sharon was first settled in 1795, but was only a small village when a movement for developing the coal-mines in the vicinity was begun in 1836. It was incorporated as a borough in 1841.

SHARP, GRANVILLE (1735-1813), English philanthropist, was the ninth of the fourteen children of Thomas Sharp (1693–1758), a prolific theological writer and biographer of his father, John Sharp, archbishop of York. Granville, who was born at Durham in 1735, was educated at the grammar school there, and apprenticed to a London draper, but obtained employment in the government ordnance department in 1758. Sharp's tastes were scholarly; he managed to acquire knowledge of Greek and Hebrew, and before 1770 he had published more than one treatise on biblical criticism. His fame rests, however, on his untiring efforts for the abolition of slavery. In 1767 he had become involved in litigation with the owner of a slave called Jonathan Strong, in which it was decided that a slave remained in law the chattel of his master even on English soil. Sharp devoted himself to fighting this judgment both with his pen and in the courts of law; and finally it was laid down in the case of James Sommersett that a slave becomes free the moment he sets foot on English territory. Sharp was an ardent sympathizer with the revolted American colonists, and at home advocated parliamentary reform and the legislative independence of Ireland, and agitated against the impressment of sailors for the navy. It was through his efforts that bishops for the United States of America were consecrated by the archbishop of Canterbury in 1787. In the same year he was the means of founding a society for the abolition of slavery, and a settlement for

emancipated slaves at Sierra Leone. Granville Sharp was also one of the founders of the British and Foreign Bible Society, and of the Society for the Conversion of the Jews. One of his tracts, entitled *Remarks on the Uses of the definitive article in the Greek text of the New Testament*, published in 1798, propounded the rule known as "Granville Sharp's canon," which on account of its important bearing on Unitarian doctrine led to a celebrated controversy, in which many leading divines took part, including Christopher Wordsworth. This rule was to the effect that "when two personal nouns of the same case are connected by the copulate καί, if the former has the definite article and the latter has not, they both belong to the same person." Sharp died on the 6th of July 1813, and a memorial of him was erected in Westminster Abbey.

See Prince Hoare, *Memoirs of Granville Sharp* (London, 1820), which contains observations by Bishop Burgess on Sharp's biblical criticisms; Sir James Stephen, *Essays in Ecclesiastical Biography* (London, 1860); Thomas Clarkson, *History of the Rise, Progress and Accomplishment of the Abolition of the African Slave Trade by the British Parliament* (London, 1839).

SHARP, JAMES (1618–1679), Scottish divine, the son of William Sharp, sheriff-clerk of Banffshire, and Isabel Leslie or Lesley, daughter of Leslie of Kininvie, of the family of Halyburtons of Pitcur in Angus, was born in Banff Castle on the 4th of May 1618. In 1633 he went to King's College, Aberdeen, and graduated in 1637. He there studied divinity for one or two years, Aberdeen being at that time the home of Episcopal sentiment. On the outbreak of the Covenanting war he went to England (1639) and visited Oxford and perhaps Cambridge, becoming acquainted with the principal English divines. Upon his return he was chosen in 1643, through the influence of Lord Rothes, to be one of the "regents" of philosophy in St Leonard's College, St Andrews. In December 1647 he went through his ordinary trials for the ministerial office before the presbytery of St Andrews, and was appointed minister of Crail in Fifeshire, on the presentation of the earl of Crawford, in January 1648. In the great schism of Resolutioners and Protestors, he, with the large majority of educated men, took active part with the former. As early as March 1651 he was recognized as one of the leading men of the party, and was taken prisoner by Cromwell's forces. For eight months he was kept in the Tower of London, and liberated on parole. His first public employment was in 1656, when he went to London to endeavour to counteract with the Protector the influence of Archibald Johnston, Lord Warriston, who was acting for the Protestors. He displayed all his undoubted talents for small diplomacy, and considerable subtlety in argument, while on this service, and his mission was decidedly successful. He returned to Scotland in 1659, but upon Monk's march to London was again, in February 1660, sent by the Resolutioners to watch over their interests in London, where he arrived on the 13th of February. He was most favourably received by Monk, to whom it was of great importance to remain on good terms with the dominant party in Scotland. His letters to Douglas and others during this period, if they may be trusted, are useful towards following the intrigues of the time day by day. In the beginning of May he was despatched by Monk to the king at Breda. His letters on this occasion to Douglas show that he regarded himself equally as the emissary of the Scottish kirk. It is to be noticed that he was also the bearer of a secret letter from Lauderdale to the king. There can be little doubt that while on this mission he was finally corrupted by Charles and Clarendon, not indeed so far as to make up his mind to betray the kirk, but at any rate to decide in no way to imperil his own chances by too firm an integrity. The first thing that aroused the jealousy of his brethren was his writing from Holland in commendation of Clarendon. This jealousy was increased on his return to London (May 26) by his plausible endeavours to stop all coming of Presbyterian commissioners from Scotland and Ireland, though he professed to desire the presence of Douglas and Dickson, by his urgent advice that the Scots should not interfere in the restoration of Episcopacy in England, and by his endeavours to frustrate the proposed union of Resolutioners and Protestors. He informed them that Presbyterianism was a lost cause in England, but as late as August 11 he intimated that, though there had been great danger for the Scottish kirk as well, this danger had been constantly and successfully warded off by his efforts. He returned to Scotland in this month, and busied himself in endeavouring to remove all suspicions of his loyalty to the kirk; but at the same time he successfully stopped all petitions from Scottish ministers to king, parliament or council. His letters to Drummond, a Presbyterian minister in London, and to Lauderdale, without absolutely committing him, show clearly that he was certain that Episcopacy was about to be set up. How far he was actively a traitor in the matter had always been disputed until the question was set at rest by the discovery of his letter, dated May 21, from London, whither he went in April 1661, to Middleton, the high commissioner, whose chaplain he now was, showing that he was in confidential communication with Clarendon and the English bishops, that he was earnestly co-operating in the restoration of Episcopacy in Scotland, that he had before leaving Scotland held frequent conferences with Middleton on the subject (a fact which he had vehemently denied) and was aware that Middleton had all along intended it, and that he drew up the quibbling proclamation of June 10, the sole purpose of which was "the disposing of minds to acquiesce in the king's pleasure." The original of this letter (which is printed in the *Lauderdale Papers* and in the *Scottish Review*) is preserved in the Museum of the Society of Antiquaries, Edinburgh. It should be noticed that as late as the end of April, on the eve of starting on his mission to court with Rothes and Glencairne, he declared to Baillie that no change in the kirk was intended. The mask was at length dropped in August, when Episcopacy was restored, and Sharp was appointed archbishop of St Andrews. He and Leighton, Fairfoul and Hamilton "were dubbed, first preaching deacons, then presbyters, and then consecrated bishops in one day, by Dr Sheldon and a few others." On April 8th the new prelates entered Scotland, and on the 20th of April 1662 Sharp preached his first sermon at St Andrews.

Sharp had carefully kept on good terms with Lauderdale, and when the Billeting Plot was concocted in September 1662 against the latter by Middleton, he managed to avoid acting against him; indeed it is probable that, after being appointed under an oath of secrecy to be one of the scrutineers of the billets, he, in violation of the oath, was the cause of Lauderdale receiving timely information of the decision against him; and yet he shortly went up to London to explain the whole affair in Middleton's interest. When Lauderdale's supremacy was established he readily co-operated in passing the National Synod Act in 1663, the first step in the intended subjection of the church to the crown. In 1664 he was again in London, returning in April, having secured the grant of a new church commission. So oppressive was his conduct and that of others of the bishops that it called forth a written protest from Gilbert Burnet. Sharp at once summoned him before the bishops and endeavoured to obtain a sentence of deprivation and excommunication against him, but was overruled by his brethren. On the death of Glencairne, the chancellor's greatest efforts were made to secure the vacant office for Sharp, and he was not inactive in his own interest; the place was not, however, filled up until 1667, and then by the appointment of Rothes. He was in strict alliance with Rothes, Hamilton and Dalyell, and the other leaders of oppression, and now placed himself in opposition to the influence of Lauderdale, attacking his friends, and especially the earl of Kincardine. In 1665 he was again in London, where, through his own folly and mendacity, he suffered a complete humiliation at the hands of Lauderdale, well described by the historian Burnet. The result of their system of violence and extortion was the rising of the Covenanters, during which, being in temporary charge during Rothes's absence, he showed, according to Bellenden, the utmost fear, equalled only by his cruelty to the prisoners after the rout of Pentland. When the convention of estates met in January 1667 Hamilton was substituted for him as president. He now

wrote letters of the most whining contrition to Lauderdale, who extended him a careless reconciliation. For a time he made himself actively useful, and helped to restrain his brethren from writing to London to complain of the conciliation policy which for a while Lauderdale carried out. On July 10, 1668 an attempt was made upon his life by James Mitchell, who fired a pistol at him while driving through the streets of Edinburgh. The shot, however, missed Sharp, though his companion, the bishop of Orkney, was wounded by it, and Mitchell for the time escaped. In August Sharp went up to London, returning in December, and with his assistance Tweeddale's tolerant proposals for filling the vacant parishes with some of the "outed" ministers were carried out. In the debates on the Supremacy Act, by which Lauderdale destroyed the autonomy of the church, Sharp at first showed reluctance to put in motion the desired policy, but gave way upon the first pressure. When, however, Leighton, as archbishop of Glasgow, endeavoured to carry out a comprehensive scheme, Sharp actively opposed him, and expressed his joy at the failure of the attempt. From this time he was completely subservient to Lauderdale, who had now finally determined upon a career of oppression, and in 1674 he was again in London to support this policy. In this year also Mitchell, who had shot at him six years before, was arrested, and, upon Sharp's promise to obtain a pardon, privately made a full confession. When Mitchell later claimed this promise, Sharp denied that any such promise had been given. His falsehood was proved by the entry of the act in the records of the court. Mitchell was finally condemned, but a reprieve would have been granted had not Sharp himself insisted on his death. This was speedily avenged. On the 3rd of May 1679, as he was driving with his daughter Isabel to St Andrews, he was set upon by nine men, and, in spite of the appeals of his daughter, was cruelly murdered. The place of the murder, on Magus Muir, now covered with fir trees, is marked by a monument erected by Dean Stanley, with a Latin inscription recording the deed.

Unless otherwise mentioned, the proofs of the statements in this article will be found in vols. i. and ii. of the *Lauderdale Papers* (Camden Society) and in two articles in the *Scottish Review*, July 1884 and January 1885.

SHARP, JOHN (1645–1714), English divine, archbishop of York, was born at Bradford on the 16th of February 1645, and was educated at Christ's College, Cambridge. He was ordained deacon and priest on August 12th 1667, and until 1676 was chaplain and tutor in the family of Sir Heneage Finch at Kensington House. Meanwhile he became archdeacon of Berkshire (1673), prebendary of Norwich, rector of St Giles's-in-the-Fields, and in 1681 dean of Norwich. In 1686, when chaplain to James II., he was suspended for ten months on a charge of having made some reflections on the king, and in 1688 was cited for refusing to read the declaration of indulgence. Under William and Mary he succeeded Tillotson as dean of Canterbury in 1689, and (after declining a choice of sees vacated by non-jurors who were his personal friends) followed Thomas Lamplugh as archbishop of York in 1691. He made a thorough investigation of the affairs of his see, and regulated the disordered chapter of Southwell. He preached at the coronation of Queen Anne and became her almoner and confidential adviser in matters of church and state. He welcomed the Armenian bishops who came to England in 1713, and corresponded with the Prussian court on the possibility of the Anglican liturgy as a means of reconciliation between Lutherans and Calvinists. He died at Bath on the 2nd of February 1714.

His works (chiefly sermons) were published in 7 volumes in 1754, and in 5 volumes at Oxford in 1829.

SHARP, RICHARD (1759–1835), known as "Conversation Sharp," was born in Newfoundland in 1759, the son of a British officer in garrison there. He was for many years in business in London, and amassed a large fortune. He was the host of leading literary and political men at his houses in Park Lane and near Dorking. Johnson, Burke, Rogers, Hallam, Grattan, Sydney Smith, James Mill, Wordsworth and Coleridge were among his many friends. From 1806 to 1812 he was M.P. for Castle Rising, and subsequently he represented Portarlington and Ilchester. He was the author of a volume of *Letters and Essays in Prose and Verse* (1834), which the *Quarterly Review* declared to be remarkable for "wisdom, wit, knowledge of the world and sound criticism." Sharp died at Dorchester on the 30th of March 1835.

SHARP, WILLIAM (1749–1824), English line-engraver, was born at London on the 29th of January 1749. He was originally apprenticed to what is called a bright engraver, and practised as a writing engraver, but gradually became inspired by the higher branches of the engraver's art. Among his earlier plates are some illustrations, after Stothard, for the *Novelists' Magazine*. He engraved the "Doctors Disputing on the Immaculateness of the Virgin" and the "Ecce Homo" of Guido Reni, the "St Cecilia" of Domenichino, the "Virgin and Child" of Dolci, and the portrait of John Hunter of Sir Joshua Reynolds. His style of engraving is thoroughly masterly and original, excellent in its play of line and rendering of half-tints and of "colour." He died at Chiswick on the 25th of July 1824. In his youth, owing to his hotly expressed adherence to the politics of Paine and Horne Tooke, he was examined by the privy council on a charge of treason. Mesmer and Brothers found in Sharp a stanch believer; and for long he maintained Joanna Southcott at his own expense. As an engraver he achieved a European reputation, and at the time of his death he enjoyed the honour of being a member of the Imperial Academy of Vienna and of the Royal Academy of Munich.

SHARP, WILLIAM (1856–1905), Scottish poet and man of letters, was born at Paisley on the 12th of September 1856. His was a double personality, for during his lifetime he was known solely by a series of poetical and critical works of great, but not of outstanding merit, while from 1894 onwards he published, with elaborate precautions of secrecy, under the name of "Fiona Macleod," a series of stories and sketches in poetical prose which made him perhaps the most conspicuous Scottish writer of the modern Gaelic renaissance. His early life was spent chiefly in the W. highlands of Scotland, and after leaving Glasgow University he went to Australia in 1877 in search of health. After a cruise in the Pacific he settled for some time in London as clerk to a bank, became an intimate of the Rossettis, and began to contribute to the *Pall Mall Gazette* and other journals. In 1885 he became art critic to the *Glasgow Herald*. He spent much time abroad, in France and Italy, and travelled extensively in America and Africa. In 1885 he married his cousin, Elizabeth Amelia Sharp, who helped him in much of his literary work and collaborated with him in compiling the *Lyra Celtica* (1896). His volumes of verse were *The Human Inheritance* (1882), *Earth's Voices* (1884), *Romantic Ballads and Poems of Fantasy* (1886), *Sospiri di Roma* (1891), *Flower o' the Vine* (1894), *Sospiri d' Italia* (1906). William Sharp was the general editor of the "Canterbury Poets" series. He was a discriminating anthologist, and his *Sonnets of the Century* (1886), to which he prefixed a useful treatise on the sonnet, ran through many editions. This was followed by *American Sonnets* (1889). He wrote biographies of Dante Gabriel Rossetti (1882), of Shelley (1887), of Heinrich Heine (1888), of Robert Browning (1890), and edited the memoirs of Joseph Severn (1892). The most notable of his novels was *Silence Farm* (1899). During the later years of his life he was obliged for reasons of health to spend all his winters abroad. The secret of his authorship of the "Fiona Macleod" books was faithfully kept until his death, which took place at the Castello di Manlace, Sicily, on the 12th of December 1905. As late as the 13th of May 1899 Fiona Macleod had written to the *Athenaeum* stating that she wrote only under that name and that it was her own. She began to publish her tales and sketches of the primitive Celtic world in 1894 with *Pharais: A Romance of the Isles*. They found only a limited public, though an enthusiastic one. The earlier volumes include *The Mountain Lovers* (1895), *The Sin-Eater* (1895), *The Washer of the Ford and other Legendary Moralities* (1896), &c. In 1897 a collected edition of the shorter stories, with some new ones, was issued as *Spiritual Tales, Barbaric Tales and Tragic Romances*. Later volumes are *The Dominion*

of Dreams (1899); *The Divine Adventure: Iona: and other Studies in Spiritual History* (1900), and *Winged Destiny* (1904).

SHARPE, DANIEL (1806–1856), English geologist, was born in Marylebone, London, on the 6th of April 1806. His mother was a sister of Samuel Rogers, the poet. At the age of 16 he entered the counting-house of a Portuguese merchant in London. At the age of 25, after spending a year in Portugal, he joined his elder brother as a partner in a Portuguese mercantile business. As a geologist he first became known by his researches (1832–1840) on the geological structure of the neighbourhood of Lisbon. He studied the Silurian rocks of the Lake District and North Wales (1842–1844), and afterwards investigated the structure of the Alps (1854–1855). He was elected F.R.S. in 1850. He published several essays on cleavage (1847–1852), and showed from the evidence of distortion of organic remains that the direction of the pressure producing contortions in the rocks was perpendicular to the planes of cleavage. Most of his papers were published in the *Quarterly Journal of the Geological Society*, but one "On the Arrangement of the Foliation and Cleavage of the Rocks of the North of Scotland," was printed in the *Phil. Trans.* 1852. He was author also of a *Monograph on the Cephalopoda of the Chalk*, published by the Palaeontographical Society (1853–1857). In 1856 he was elected president of the Geological Society, but he died in London, from the effects of an accident, on the 31st of May that year.

SHARPSBURG, a borough of Allegheny county, Pennsylvania, U.S.A., on the Allegheny river, opposite the N.E. part of Pittsburg. Pop. (1900) 6842, of whom 1280 were foreign-born. Sharpsburg is served by the Pennsylvania and the Baltimore & Ohio railways. Coal is mined in the vicinity. Among the manufactures are iron pipes, truck and bar iron, wire, stoves, paint and lubricating oil. Sharpsburg was settled in 1826, was named in honour of James Sharp, the original proprietor, and was incorporated in 1841.

SHASI, a city in the province of Hu-peh, China, on the left bank of the river Yangtsze, about 85 m. below Ich'ang. Pop. about 80,000. It was opened to foreign trade under the Japanese treaty of 1895. The town lies below the summer level of the Yangtsze, from which it is protected by a strong embankment. Formerly Shasi was a great distributing centre, but the opening of Ich'ang to foreign trade diverted much of the traffic to the last-named port. It is the terminus of an extensive network of canals which run through the low country lying on the north bank of the Yangtsze as far down as Hankow. Native boats, as a rule, prefer the canal route to the turbulent waters of the Yangtsze, their cargoes being transhipped at Shasi across the embankment into river boats. Foreign residents are few, and the trade passing through the maritime customs is comparatively insignificant. The place is still, however, a large distributing centre for native trade, and is the seat of an extensive manufacture of native cotton cloth. The British consulate was withdrawn in January 1899, British interests being placed under the care of the consul at Ich'ang.

SHAW, GEORGE BERNARD (1856–), British dramatist and publicist, was born in Dublin on the 26th of July 1856. His father, George Carr Shaw, was a retired civil servant, the younger son of Bernard Shaw, high sheriff of Kilkenny. His mother, Lucinda Elizabeth Gurly, was a good musician, who eventually became a teacher of singing in London. G. B. Shaw went to school in Dublin, and began to earn his living when he was fifteen. He was for five years a clerk in the office of an Irish land-agent, but came to London with his family in 1876, and in 1879 was, according to his own account in the preface to *The Irrational Knot*, in the offices of the Edison telephone company. He had begun to write novels, which did not immediately find their market. *The Irrational Knot*, written in 1880, and *Love among the Artists* (written in 1881) first appeared as serials in *Our Corner*, a monthly edited by Mrs Annie Besant; *Cashel Byron's Profession* (reprinted in 1901 in the series of "Novels of his Nonage") and *An Unsocial Socialist* first appeared in a Socialist magazine *To-Day*, which no longer exists. Shaw joined the Fabian Society in 1884, a year after its formation, and was active in socialistic propaganda, both as a street orator and as a pamphleteer. In 1889 he edited the *Fabian Essays*, to which he contributed "The Economic Basis of Socialism" and "The Transition to Social Democracy." He began journalism, through the influence of William Archer, on the reviewing staff of the *Pall Mall Gazette* in 1885; he then became art and musical critic, writing from 1888 to 1890 for the *Star*, where his articles were signed "Corno di Bassetto," and then in 1890 to 1894 for the *World*. In 1895 to 1898 he was dramatic critic to the *Saturday Review*, his articles being collected in 1907 as *Dramatic Opinions and Essays*. He was an early champion of Richard Wagner and of Henrik Ibsen, and indicated his aesthetic point of view in the pamphlets, *The Quintessence of Ibsenism* (1891) and *The Perfect Wagnerite* (1898). His first play, *Widowers' Houses*, two acts of which had been written in 1885 in collaboration with Mr William Archer, was produced by the Independent Theatre under the management of Mr J. T. Grein at the Royalty in 1892. This found few admirers outside Socialist circles, and was hooted by the ordinary playgoer. In 1893 he wrote *The Philanderer*, a topical comedy on Ibsenism and the "new woman," for the same theatre, but the piece proved technically unsuitable for Mr Grein's company. To replace it Mr Shaw wrote *Mrs Warren's Profession*, a powerful but disagreeable play, which was rejected by the censor and not presented until the 5th of January 1902, when it was privately given by the Stage Society at the New Lyric Theatre. When it was played in New York by Mr Arnold Daly's company in 1905 the actors were prosecuted. These three plays were classed by the author as "unpleasant plays" in the printed version. *Arms and the Man* was produced at the Avenue Theatre (21st of April 1894) by Miss Florence Farr, who was experimenting on the lines of the Independent Theatre, and by Mr Richard Mansfield at the Herald Square Theatre, New York (the 17th of Sept. 1894). The scene was laid in Bulgaria, the piece being a satire on romanticism, a destructive criticism on military "glory." *Candida* was written in 1894 for Mr Mansfield, who did not produce it until December 1903; but it was played in Aberdeen in July 1897 by the Independent Theatre Company. This defence of the poetic point of view against brute force and common sense was admirably constructed and it proved one of the most popular of his plays. The pieces which followed are: *The Man of Destiny* (written in 1895, played at Croydon in 1897 by Mr Murray Carson), a Napoleonic drama, which was revived at New York by Arnold Daly in 1904; *You Never Can Tell* (written in 1896, produced at the Strand Theatre in 1900), a farcical comedy; *The Devil's Disciple* (produced at New York by Richard Mansfield in 1897, and in London in 1899), the scene of which is laid in the War of American Independence, *Caesar and Cleopatra* (1898) and *Captain Brassbound's Conversion* (1898)—printed as *Three Plays for Puritans* (1900); *The Admirable Bashville* (Stage Society, Imperial Theatre, 1903), a dramatization of *Cashel Byron's Profession*.

He had found no regular English audience when he published *Plays Pleasant and Unpleasant* (2 vols.) in 1898, and his pieces first became well known to the ordinary playgoer by the performances given at the Royal Court Theatre under the management of Messrs Vedrenne and H. Granville Barker. *Man and Superman* (published in 1903) was produced there on the 23rd of May 1905, in a necessarily abridged form, with Granville Barker in the part of John Tanner, the author of the "Revolutionist's Handbook and Pocket Companion," printed as an appendix to the play. Mr Shaw asserted that the piece originated in a suggestion from Mr A. B. Walkley that he should write a Don Juan play, which he proceeded to do in a characteristic topsy-turvy fashion. John Tanner (Juan Tenor) is a voluble exponent of Schopenhauer and Nietzsche, who finally falls a victim to the life force in Ann. *Major Barbara* (Court Theatre, Nov. 1905), a "discussion in three acts," placed the Salvation Army on the stage. The Vedrenne-Barker management also revived *Candida* (April 1904), *You Never Can Tell* (May 1905), *Captain Brassbound's Conversion* (March 1906) and *John Bull's other Island* (November 1904), a statement of the Irish land

question, which had been produced at the Camden Theatre in 1903, and later by the Stage Society. At the same theatre was produced (20th of November 1906) *The Doctor's Dilemma*, a satire on the medical profession, and *How He lied to Her Husband* (Feb. 1905), which had been previously played in New York. Later plays were: *Getting Married* (1908), *The Showing-up of Blanco Posnet* (1909) and *Press-cuttings* (1909). Among Mr Shaw's later writings on economics are: *Socialism for Millionaires* (1901), *The Common Sense of Municipal Trading* (1904), and *Fabianism and the Fiscal Question* (1904). Although an energetic member of the South St Pancras borough council, he failed to secure election to the London County Council when he stood as a candidate in 1904. Mr Shaw married in 1898 Miss Charlotte Frances Payne-Townshend.

There are essays on his work by H. L. Mencken (Boston and London, 1905), by E. E. Hale (*Dramatists of To-Day*, London, 1906), &c.; "The Plays of Mr Bernard Shaw," in the *Edinburgh Review* (April 1905); "Mr Bernard Shaw's Counterfeit Presentment of Women," in the *Fortnightly Review* (March 1906); "Bernard Shaw as Critic," in the *Fortnightly Review* (June 1907); and an appreciation by Holbrook Jackson, *Bernard Shaw* (1907).

SHAW, HENRY WHEELER (1818–1885), American humorist, known by the pen-name of "Josh Billings," was born of Puritan stock at Lanesborough, Massachusetts, on the 21st of April 1818, the son of Henry Shaw (1788–1857), who was a representative in Congress in 1817–1821. The son left Hamilton College to go West. In 1858 he settled in Poughkeepsie, N.Y., as a land-agent and auctioneer, and began writing newspaper articles, especially for the *Poughkeepsie Daily Press*. His "Essa on the Muel bi Josh Billings" (1860) in a New York paper was followed by many similar articles, chiefly in the *New York Weekly* and the *New York Saturday Press*, and by several popular volumes, among which are *Josh Billings: His Sayings* (1866), *Josh Billings on Ice* (1868), *Everybody's Friend* (1876), *Josh Billings: His Works, Complete* (1876), *Trump Kards* (1877), *Old Probabilities* (1879), *Josh Billings' Spice-Box* (1881), and *Josh Billings' Farmers' Allminax*, burlesquing the *Old Farmers' Almanac*, issued annually between 1870 and 1880, and collected into a volume in 1902 under the title *Josh Billings' Old Farmers' Allminax*. He died in Monterey, California, on the 14th of October 1885. His platform lectures, such as "Milk," "Hobby Horse," "The Pensive Cockroach," and "What I kno about Hotels," his mannerisms and apparently unstudied witticisms made him conspicuous.

See *Life and Adventures of Josh Billings* (New York, 1883), by Francis S. Smith.

SHAW, LEMUEL (1781–1861), American jurist, was born at Barnstable, Massachusetts, son of the minister of the West Parish there, on the 9th of January 1781. He graduated from Harvard College in 1800, and was admitted to the bar (of New Hampshire and of Massachusetts) in 1804. In 1805 he began to practise law in Boston. He was a prominent Federalist and was a member of the Massachusetts house of representatives in 1811–1814, in 1820, and in 1829, and of the state senate in 1821–1822, a delegate to the state constitutional convention of 1820–1821, and chief justice of the Supreme Court of the state from 1830 to 1860. He died in Boston on the 30th of March 1861. As chief justice Shaw maintained the high standard of excellence set by Theophilus Parsons. He presided over the trial in 1850 of Professor John White Webster (1793–1850) for the murder of Dr George Parkman. His work in extending the equity, jurisdiction and powers of the court was especially notable. He was also largely instrumental in defeating an attempt (1843) to make a reduction of salary apply to judges already in office, and an attempt (1853) to abolish the life term of judges. His opinion in *Cary* v. *Daniels* (8 Metcalf) is the basis of the present law in Massachusetts as to the regulation of water power rights of riparian proprietors.

See the address by B. F. Thomas in *Proceedings of the Massachusetts Historical Society*, x. 50-79 (Boston, 1869); and the sketches by Samuel S. Shaw and P. Emory Aldrich in vol. iv. pp. 200-247, of *Memorial Biographies of the New England Historic Genealogical Society* (Boston, 1885).

SHAW, RICHARD NORMAN (1831–), British architect, was born in Edinburgh on the 7th of May 1831. At the age of sixteen he went to London and became a pupil of William Burn. In Burn's office he formed that friendship with William Eden Nesfield which so profoundly influenced the careers of both, and was thoroughly grounded in the science of planning and in the classical vernacular of the period. He also attended the architectural schools of the Royal Academy, and devoted careful study both to ancient and to the best contemporary buildings. In 1854, having finished his term of apprenticeship with Burn, he gained the gold medal and travelling studentship of the Royal Academy, and until 1856 travelled on the continent, studying and drawing old work. On his return in 1856 he was requested by the Council of the Royal Academy to publish his drawings. This work, entitled *Architectural Sketches from the Continent*, was issued in 1858. In the meantime Nesfield was continuing his studies with Anthony Salvin; Mr Shaw also entered his office, and remained there until 1857, when he widened his experience by working for three years under George Edmund Street. In 1863, after sixteen years of severe training, he began to practise. For a short time he and Nesfield joined forces, but their lines soon diverged. Mr Shaw's first work of importance was Leyes Wood, in Surrey, a building of much originality, followed shortly afterwards by Cragside, for Lord Armstrong, which was begun in 1869. From that time until he retired from active practice his works followed one another in quick succession. In 1872 Mr Shaw was elected an Associate of the Royal Academy, and a full member in 1877; he joined the "retired" list towards the end of 1901.

Other characteristic examples of Shaw's work are Preen Manor, Shropshire; New Zealand Chambers, Leadenhall Street; Pierrepont, Wispers, and Merrist Wood, in Surrey; Lowther Lodge, Kensington; Adcote, in Shropshire; his houses at Kensington, Chelsea, and at Hampstead; Flete House, Devonshire; Greenham Lodge, Berkshire; Dawpool, in Cheshire; Bryanstone, in Dorsetshire; Chesters, Northumberland; New Scotland Yard, on the Thames Embankment; besides several fine works in Liverpool and the neighbourhood. He also built and restored several churches, the best known of which are St John's Church, Leeds; St Margaret's, Ilkley, and All Saints', Leek. His early buildings were most picturesque, and contrasted completely with the current work of the time. The use of "half timber" and hanging tiles, the projecting gables and massive chimneys, and the cunningly contrived bays and recessed fireplaces, together with the complete freedom from the conventions and trammels of "style," not only appealed to the artist, but gained at once a place in public estimation. Judged in the light of his later work, some of those early buildings appear almost too full of feature and design; they show, however, very clearly that Mr Shaw, in discarding "academic style," was not drifting rudderless on a sea of fancy. His buildings, although entirely free from archaeological pedantry, were the outcome of much enthusiastic and intelligent study of old examples, and were based directly on old methods and traditions. As his powers developed, his buildings gained in dignity, and had an air of serenity and a quiet homely charm which were less conspicuous in his earlier works; the "half timber" was more sparingly used, and finally disappeared entirely. His work throughout is especially distinguished by treatment of scheme. There is nothing tentative or hesitating. His planning is invariably fine and full of ingenuity. Adcote (a beautiful drawing of which hangs in the Diploma Gallery at Burlington House) is perhaps the best example of the series of his country houses built between 1870 and 1880. The elements are few but perfectly proportioned and combined, and the scale throughout is consistent. The Great Hall is the keynote of the plan, and is properly but not unduly emphasized. The grouping of the rooms round the Hall is very ably managed—each room is in its right position, and has its proper aspect. New Zealand Chambers, in Leadenhall Street, another work of about the same period (1870–1880), is a valuable example of Mr Shaw's versatility. Here he employed a completely different method of expression from any of his preceding works, in all of which there is a trace of "Gothic" feeling. This is a façade only of two storeys, divided by piers of brickwork into three equal spaces, filled by shaped bays rich with modelled plaster; above, drawing the whole composition together, is a finely enriched plaster cove. An attic storey, roofed with three gables, completes the building, which is the antithesis of the accepted type of city offices; it is yet perfectly adapted to modern uses. New Scotland Yard is undoubtedly Mr Shaw's finest and most complete work. The plain granite base is not only subtly suggestive of the purposes of the building, but by dividing the height with a strongly marked line gives a greater apparent width to the structure; it suggests also a division of departments. By its mass, too, it prevents the eye from dwelling on the necessary irregularity of the lower windows, which are not only different in character from those of the upper storeys, but more numerous and quite irregularly spaced. The projecting

angle turrets are most happily conceived, and besides giving emphasis to the corners, form the main point of interest in the composition of the river front. The chimneys are not allowed to cut the sky-line in all directions, but have been drawn together into massive blocks, and contribute much to the general air of dignity and strength for which this building is remarkable. Simple roofs of ample span complete a composition conspicuous for its breadth and unity.

Mr Shaw's influence on his generation can only be adequately gauged by a comparison of current work with that which was in vogue when he began his career. The works of Pugin, Scott, and others, and the architectural literature of the time, had turned the thoughts both of architects and the public towards a "revived Gothic." Before he entered the field, this teaching had hardened into a creed. Mr Shaw was not content to hold so limited a view, and with characteristic courage threw over these artificial barriers and struck out a line of his own. The rapidity with which he conceived and created new types, and as it were set a new fashion in building, compelled admiration for his genius, and swelled the ranks of his adherents. It is largely owing to him that there is now a distinct tendency to approach architecture as the art of Building rather than as the art of Designing, and the study of old work as one of methods and expressions which are for all time, rather than as a means of learning a language of forms proper only to their period.

SHAW-KENNEDY, SIR JAMES (1788–1865), British soldier and military writer, was the son of Captain John Shaw, of Dalton, Kirkcudbrightshire. Joining the 43rd (Monmouthshire) Light Infantry in 1805, he first saw service in the Copenhagen Expedition of 1807 as a lieutenant, and under Sir David Baird took part in the Corunna Campaign of 1808–9. In the retreat Shaw contracted a fever, from the effects of which he never fully recovered. The 43rd was again engaged in the Douro and Talavera Campaigns, and Shaw became adjutant of his now famous regiment at the battle of Talavera. As Robert Craufurd's aide-de-camp he was on the staff of the Light Division at the Coa and the Agueda, and with another officer prepared and edited the "Standing Orders of the Light Division" (printed in Home's *Précis of Modern Tactics*, pp. 257-277) which serve as a model to this day. He was wounded at Almeida in 1810, but rejoined Craufurd at the end of 1811 and was with his chief at the siege of Ciudad Rodrigo in January 1812. At the great assault of January 19th Shaw carried his general, mortally wounded, from the glacis, and at Badajoz, now once more with the 43rd, he displayed, at the lesser breach, a gallantry which furnished his brother officer William Napier with the theme of one of his most glorious descriptive passages (*Peninsular War*, bk. xvi. ch. v.). At the siege and the battle of Salamanca, in the retreat from Burgos, Shaw, still a subaltern, distinguished himself again and again, but he had to return to England at the end of the year, broken in health. Once more in active service in 1815, as one of Charles Alten's staff officers, Captain Shaw, by his reconnoitring skill and tactical judgment was of the greatest assistance to Alten and to Wellington, who promoted him brevet-major in July, and brevet lieut.-colonel in 1819. During the occupation of France by the allied army Shaw was commandant of Calais, and on his return to England was employed as a staff officer in the North. In this capacity he was called upon to deal with the Manchester riots of 1819, and his memorandum on the methods to be adopted in dealing with civil disorders embodied principles which have been recognized to the present day. In 1820 he married, and in 1834, on succeeding, in right of his wife, to the estate of Kirkmichael, he took the name of Kennedy. Two years later Colonel Shaw-Kennedy was entrusted with the organization of the Royal Irish Constabulary, which he raised and trained according to his own ideas. He remained inspector-general of the R.I.C. for two years, after which for ten years he led a retired country life. In 1848, during the Chartist movements, he was suddenly called upon to command at Liverpool, and soon afterwards was offered successively a command in Ireland and the governorship of Mauritius. Ill-health compelled him to decline these, as also the Scottish command a little later, and for the rest of his life he was practically an invalid. He became full General in 1862 and was made K.C.B. a year later. In 1859, at the time of the Orsini case, he published a remarkable essay on *The Defence of Great Britain and Ireland*, and in 1865 appeared his famous *Notes on Waterloo*, appended to which is a *Plan for the defence of Canada*. He died the same year.

See the autobiographical notice in *Notes on Waterloo*, also the regimental history of the 43rd, and Napier, *passim*.

SHAWL, a square or oblong article of dress worn in various ways dependent from the shoulders. The term is of Persian origin (*shál*), and the article itself is most characteristic of the natives of N.W. India and Central Asia; but in various forms, and under different names, the same piece of clothing is found in most parts of the world. The shawls made in Kashmir occupy a pre-eminent place among textile products; and it is to them and to their imitations from Western looms that specific importance attaches. The Kashmir shawl is characterized by the elaboration of its design, in which the "cone" pattern is a prominent feature, and by the glowing harmony, brilliance, depth, and enduring qualities of its colours. The basis of these excellences is found in the very fine, soft, short, flossy under-wool, called pashm or pashmina, found on the shawl-goat, a variety of *Capra hircus* inhabiting the elevated regions of Tibet. There are several varieties of pashm, but the finest is a strict monopoly of the maharaja of Kashmir. Inferior pashm and Kirman wool—a fine soft Persian sheep's wool—are used for shawl weaving at Amritsar and other places in the Punjab, where colonies of Kashmiri weavers are established. Of shawls, apart from shape and pattern, there are only two principal classes: (1) loom-woven shawls called tiliwalla, tilikár or káni kár—sometimes woven in one piece, but more often in small segments which are sewn together with such precision that the sewing is quite imperceptible; and (2) embroidered shawls—amlikár—in which over a ground of plain pashmina is worked by needle a minute and elaborate pattern.

SHAWM, SHALM (Fr. *chalumeau, chalemelle, hautbois*; Ger. *Schalmei, Schalmey*; Ital. *Piffar cenamelle*; Lat. *calamus*; *tibia*; Gr. αὐλός), the medieval forerunner of the oboe, the treble members of the large family of reed instruments known in Germany as the *Pommer* (*q.v.*), *Bombart* or *Schalmey* family. Michael Praetorius, at the beginning of the 17th century, enumerates the members of this family (see OBOE); the two of highest pitch are Schalmeys, the first or little Schalmey being in B♭ (third line) or A, and the second, also called cantus or discant, in E or D below. The shawm or Schalmey had a compass of two octaves, the second diatonic octave being obtained by overblowing each of the notes of the first octave an octave higher; the chromatic semitones were produced by half stopping the holes and by cross-fingering. In some instances the reed mouthpiece was half enclosed in a *pirouette*, a small case having a slit through which that part of the reed which is taken into the mouth of the player was alone exposed, the edges of the slit thus forming a rest for his lips.

In the miniatures of the illuminated MSS. of all countries, more especially from the 14th century, and in early printed books, Schalmeys and Pommers are represented in every conceivable phase of social life in which music takes a part. (K. S.)

SHAWNEE, or SHAWANO (said to mean "southerner"), a tribe of North American Indians of Algonquian stock. They are said to have been first found in Wisconsin. Under the name Sacannahs towards the end of the 17th century they had their headquarters in South Carolina on the upper Savannah. Moving eastward they came in contact with the Iroquois, by whom they were driven S. again into Tennessee. Thence they crossed the mountains into South Carolina and again spread northward as far as New York state and southward to Florida. Subsequently they recrossed the Alleghany mountains, once more came in contact with the Iroquois and were driven into Ohio. They joined in Pontiac's conspiracy. They fought on the English side in the War of Independence and again in 1812 under Tecumseh. They are now on a reservation in Oklahoma.

SHAWNEE, a city of Pottawatomie county, Oklahoma, U.S.A., on the North Fork of the Canadian river, about 38 m. E.S.E. of Oklahoma city. Pop. (1907) 10,955, including 748 negroes and 20 Indians; (1910) 12,474. Shawnee is served by the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, and the Missouri, Kansas & Texas railways and by interurban electric

lines. The city has two large public parks and a Carnegie library, and is the seat of the Curtice Industrial School. Shawnee is situated in a fine agricultural region, is a shipping-point for alfalfa, cotton and potatoes, is an important market for mules, and has large railway repair shops, and cotton-gins and cotton compresses; among its manufactures are cotton-seed oil, cotton goods, lumber, bricks and flour. Shawnee was first settled in 1895 and was chartered as a city in 1896.

SHAYS, DANIEL (1747–1825), American soldier, the leader of Shays's Insurrection in W. Massachusetts in 1786–1787 (see MASSACHUSETTS: *History*), was born in Hopkinton, Massachusetts, in 1747. In the War of Independence he served as second lieutenant in a Massachusetts regiment from May to December 1775, became captain in the 5th Massachusetts regiment in January 1777, and resigned his commission in October 1780. After the collapse of Shays's Insurrection he escaped to Vermont. He was pardoned in June 1788, and died at Sparta, New York, on the 29th of September 1825.

SHEARER, THOMAS, English 18th-century furniture designer and cabinet-maker. The solitary biographical fact we possess relating to this distinguished craftsman is that he was the author of most of the plates in *The Cabinet Makers' London Book of Prices and Designs of Cabinet Work*, issued in 1788 "For the London Society of Cabinet Makers." The majority of these plates were republished separately as *Designs for Household Furniture*. They exhibit their author as a man with an eye at once for simplicity of design and delicacy of proportion. Indeed some of his pieces possess a dainty and slender elegance which has never been surpassed in the history of English furniture.

There can be little doubt that Shearer exercised considerable influence over Hepplewhite, with whom there is reason to suppose that he was closely associated, while Sheraton has recorded his admiration for work which has often been attributed to others. Shearer, in his turn, owes something to the brothers Adam, and something, no doubt, to the stock designs of his predecessors. There is every reason to suppose that he worked at his craft with his own hands and that he was literally a cabinet-maker—so far as we know, he never made chairs. Much of the elegance of Shearer's work is due to his graceful and reticent employment of inlays of satinwood and other foreign woods. But he was as successful in form as in decoration, and no man ever used the curve to better purpose. In Shearer's time the sideboard was in process of evolution; previously it had been a table with drawers, the pedestals and knife-boxes being separate pieces. He would seem to have been first to combine them into the familiar and often beautiful form they took at the end of the 18th century. The combination may have been made before, but his plate is, in point of time, the first published document to show it.

Shearer, like many of his contemporaries, was much given to devising "harlequin" furniture. He was a designer of high merit and real originality, and occupies a distinguished place among the little band of men, often, like himself, ill-educated and obscure of origin, who raised the English cabinet-making of the second half of the 18th century to an illustrious place in artistic history.

SHEARS, an implement for cutting or clipping. The O. Eng. *sceran*, to clip, cut, represents one branch of a very large number of words in Indo-European languages which are to be referred to the root *skar-*, to cut, and of which may be mentioned Gr. κείρειν, Lat. *curtus*, Eng. "short," "share," "sherd," "score." For cutting cloth "shears" take the form of a large, heavy pair of scissors with two crossed flat blades pivoted together, each with a looped handle for the insertion of the fingers; for clipping or "shearing" sheep the usual form is a single piece of steel bent round, the ends being shaped into the cutting blades, and the bend or "bow" forming a spring which opens the blades when the pressure used in cutting is released. Another form of the same word, "sheers," is used of an apparatus for hoisting heavy weights, generally known as "sheer-legs." These consist of two or more uprights meeting at the top, where the hoisting tackle is placed, and set wide apart at the bottom. The masting of ships was formerly carried out from another vessel, a dismasted hulk, hence called a "sheer-hulk," on which the "sheer-legs" were placed (see CRANE). From this word must be distinguished "sheer," straight, precipitous, also absolute, downright; this is to be connected with Dan. *skjaer*, clear, bright, Ger. *schier*, free, clear; the root is also seen in O. Eng. *scinan*, to shine. The nautical phrase "to sheer off," to deviate from a course, is due to a similar Dutch use of *scheren*, to cut, shear, to cut off a course abruptly.

SHEARWATER, the name of a bird, first published in F. Willughby's *Ornithologia* (p. 252), as made known to him by Sir T. Browne, who sent a picture of it with an account that is given more fully in J. Ray's translation of that work (p. 334), stating that it is "a Sea-fowl, which fishermen observe to resort to their vessels in some numbers, swimming[1] swiftly to and fro, backward, forward and about them, and doth as it were *radere aquam*, shear the water, from whence perhaps it had its name."[2] Ray's mistaking young birds of this kind obtained in the Isle of Man for the young of the coulterneb, now usually called "Puffin," has already been mentioned under that heading; and not only has his name *Puffinus anglorum* hence become attached to this species, commonly described in English books as the Manx puffin or Manx shearwater, but the barbarous word *Puffinus* has come into use for all birds thereto allied, forming a well-marked group of the family Procellariidae (see PETREL), distinguished chiefly by their elongated bill, and numbering some twenty species, if not more—the discrimination of which has taxed the ingenuity of ornithologists. Shearwaters are found in nearly all the seas and oceans of the world,[3] generally within no great distance from the land, though rarely resorting thereto, except in the breeding season. But they also penetrate to waters which may be termed inland, as the Bosporus, where they are known to the French-speaking part of the population as *âmes damnées*, it being held by the Turks that they are animated by condemned human souls. Four species of *Puffinus* are recorded as visiting the coasts of the United Kingdom; but the Manx shearwater is the only one that at all commonly breeds in the British Islands. It is a very plain-looking bird, black above and white beneath, and about the size of a pigeon. Some other species are larger, and almost whole-coloured, being of a sooty or dark cinereous hue both above and below. All over the world shearwaters seem to have precisely the same habits, laying their single purely white egg in a hole under ground. The young are thickly clothed with long down, and are extremely fat. In this condition they are thought to be good eating, and enormous numbers are caught for this purpose in some localities, especially of a species, the *P. brevicaudus* of Gould, which frequents the islands off the coast of Australia, where it is commonly known as the "Mutton-bird." (A. N.)

SHEATHBILL, a bird so called by T. Pennant in 1781 (*Gen. Birds*, ed. 2, p. 43) from the horny case[4] which ensheaths the basal part of its bill. It was first made known from having been met with on New-Year Island, off the coast of Staten Land, where Cook anchored on New Year's eve 1774.[5] A few days

[1] Meaning, no doubt, skimming or "hovering," the latter the word used by Browne in his *Account of Birds found in Norfolk* (Mus. Brit. MS. Sloane, 1830, fol. 5. 22 and 31), written in or about 1662. Edwards (*Gleanings*, iii. 315) speaks of comparing his own drawing "with Brown's old draught of it, still preserved in the British Museum," and thus identifies the latter's "shearwater" with the "puffin of the Isle of Man."

[2] *Lyrie* appears to be the most common local name for this bird in Orkney and Shetland; but *Scraib* and *Scraber* are also used in Scotland. These are from the Scandinavian *Skraape* or *Skrofa*, and considering Skeat's remarks (*Etym. Dictionary*) as to the alliance between the words *shear* and *scrape* it may be that Browne's hesitation as to the derivation of "shearwater" had more ground than at first appears.

[3] The chief exception would seem to be the Bay of Bengal and thence throughout the W. of the Malay Archipelago, where, though they may occur, they are certainly uncommon.

[4] A strange fallacy arose that this case or sheath was movable. It is absolutely fixed.

[5] Doubtless some of the earlier voyagers had encountered it, as Forster suggests (*Descr. animalium*, p. 330) and Lesson asserts

later he discovered the islands that now bear the name of South Georgia, and there the bird was again found—in both localities frequenting the rocky shores. On his third voyage, while seeking some land reported to have been found by Kerguelen, Cook in December 1776 reached the cluster of desolate islands now generally known by the name of the French explorer, and here, among many other kinds of birds, was a Sheathbill, which for a long while no one suspected to be otherwise than specifically identical with that of the western Antarctic Ocean; but, as will be seen, its distinctness has been subsequently admitted.

The Sheathbill, so soon as it was brought to the notice of naturalists, was recognized as belonging to a genus hitherto unknown, and J. R. Forster in 1788 (*Enchiridion*, p. 37) conferred upon it, from its snowy plumage, the name *Chionis*, which has most properly received general acceptance, though in the same year the compiler Gmelin termed the genus *Vaginalis*, as a rendering of Pennant's English name, and the species *alba*. It has thus become the *Chionis alba* of ornithology. It is about the size of and has much the aspect of a Pigeon;[1] its plumage is pure white, its bill somewhat yellow at the base, passing into pale pink towards the tip. Round the eyes the skin is bare, and beset with cream-coloured papillae, while the legs are bluish-grey. The second or eastern species, first discriminated by G. Hartlaub (*Rev. zoologique*, 1841, p. 5; 1842, p. 402, pl. 2)[2] as *C. minor*, is smaller in size, with plumage just as white, but having the bill and bare skin of the face black and the legs much darker. The form of the bill's "sheath" in the two species is also quite different, for in *C. alba* it is almost level throughout, while in *C. minor* it rises in front like the pommel of a saddle. The western and larger species gathers its food, consisting chiefly of sea-weeds and shell-fish, on rocks at low water; but it is also known to eat birds' eggs. As to the flavour of its flesh, some assert that it is wholly uneatable, and others that it is palatable. Though most abundant as a shore-bird, it is frequently met with far out at sea, and has once been shot in Ireland. It is not uncommon on the Falkland Isles, where it breeds. *C. minor* of Kerguelen Land, Prince Edward Island, Marion Island and the Crozets, is smaller, with pinkish feet. The eggs of both species, though of peculiar appearance, bear an unmistakable likeness to those of oyster-catchers, while occasionally exhibiting a resemblance to those of the tropic-birds.

The systematic position of the sheathbills has been the subject of much hesitation, but they are now placed in a special family, Chionidae, amongst Charadriiform birds (see BIRDS), not far from the curious little group of "seed-snipes" of the genera *Thinocorvs* and *Attagis*, which are peculiar to certain localities in S. America and its islands. (A. N.)

SHEBOYGAN, a city and the county seat of Sheboygan county, Wisconsin, U.S.A., on the W. shore of Lake Michigan at the mouth of the Sheboygan river, about 52 m. N. of Milwaukee. Pop. (1910 census) 26,398. The population is largely of German descent, and two German newspapers are published; many Greeks settled here after 1895. Sheboygan is served by the Chicago & North-Western railway, by interurban electric lines and by a steam-boat line (the Goodrich Transportation Co.). The city N. of the river and the southern half of the part S. of the river are built on a plateau 20-40 ft. above the lake level. Along the river is the factory district. The principal public buildings are a fine Federal building in which are housed the post office and the office of the internal revenue; a Carnegie library, the Sheboygan County Court House, an opera house, St Nicholas Hospital and a county insane asylum. Included in the public school system is a school for deaf children, partly supported by the state. The city has a good harbour and is an important distributing point for coal and salt. A rich agricultural region, devoted largely to dairying, extends to the N., S. and W., and large quantities of cheese are exported. Among the city's other manufactures are furniture, particularly chairs (for which the city is noted), toys, machinery, bee hives, gloves, knit goods, brick, carriages, wagons, excelsior, tanned leather, shoes, enamel ware, canned vegetables (especially peas), beer, flour, pianos and plumbing supplies. The total value of the factory product in 1905 was $10,086,648, 38·1 % representing furniture; and 56·7 % of the whole number of factory wage-earners were employed in the furniture factories. A trading post at the mouth of the Sheboygan river was established about 1820 and was maintained for about fourteen years; in 1834 a saw-mill was built at the first rapids of the river, about 2 m. from its mouth, and during the next three years many settlers came and a great city was platted on paper. Sheboygan was incorporated as a village in 1846, and was first chartered as a city in 1853. Several miles from Sheboygan Falls (pop. in 1905, 1411), a village about 5 m. W. of Sheboygan and S.W. of Plymouth (pop. in 1905, 2764), the Spring Farms Association, a Fourierite community of ten families, farmed successfully thirty acres of land from 1845 until 1848, when lack of interest in the experiment brought about a dissolution by mutual agreement.

SHECHEM (mod. *Nāblus*), an ancient town of Palestine, S.E. of Samaria, which first appears in history as the place where Jacob and his family settled for a while (Gen. xxxiii. 18; cf. John iv. 12). It was occupied then by Hivites (Gen. xxxiv. 2), and a tragedy took place in connexion with the chieftain's violation of Jacob's daughter Dinah. It was set apart as a city of refuge (Jos. xx. 7) and was occupied by the Kohathite Levites in the tribe of Ephraim (xxi. 21). Here, between Ebal and Gerizim, Joshua made his last speech to the elders of the Israelites (Jos. xxiv. 1). The mother of Abimelech the son of Gideon was a Shechemite, and Shechem was the centre of his short-lived kingdom (Jud. viii. 31, ix.). Here Rehoboam made the foolish speech which kindled the revolt of the N. kingdom (1 Kings xii. 1), after which it was for a time the headquarters of Jeroboam (1 Kings xii. 25).

Shechem was evidently a holy place in remote antiquity. The "oak" under which Jacob hid his teraphim (Gen. xxxv. 4) was doubtless a sacred tree, as there the images (which it was not seemly to bring on a pilgrimage to Beth-el) would be safe. The god of the Canaanite city was Baal-Berith: his temple was destroyed when Abimelech quelled the rising of his fickle subjects (Jud. ix. 4, 46). A great standing stone under an oak-tree here was traditionally associated with Joshua's last speech (Jos. xxiv. 26). During the latter part of the Hebrew monarchy we hear nothing of Shechem, no doubt on account of the commanding importance of the neighbouring city of Samaria. It no doubt owed its subsequent development to the destruction of Samaria and the rise in the district surrounding of the Samaritan nation founded on the colonists settled by Sargon and Assurbani-pal. To Josephus it was "the new city" by the inhabitants called Mabortha (*B. J.*, IV. viii. 1), but the official name *Neapolis* or *Flavia Neapolis*, so called to commemorate its restoration by Vespasian (Titus Flavius Vespasianus), soon became universal, and is still preserved in the modern name Nāblus—a signal exception to the general rule that the place-names of Palestine, whenever disturbed by foreign influence, usually revert in time to the old Semitic nomenclature.

There was a bishopric at Neapolis during the Byzantine period, and an attack made by the Samaritans on the bishop (Pentecost, A.D. 474) was punished by the emperor Zeno, who gave Gerizim to the Christians. It was captured by the crusaders under Tancred soon after the conquest of Jerusalem (1099); they held it till 1184, when they lost it to Saladin. The principal mosque of the town is a church of the crusaders converted to Mahommedan worship. Towards the end of the 18th century it was the headquarters of the turbulent sheikh Kasim el-Ahmad. In 1834 the soldiers of Ibrahim Pasha pillaged it.

Nāblus is now the chief town of a subdivision of the province of Beirut. It lies in the valley between Ebal and Gerizim, on the main caravan route from Jerusalem northward. The situation

(*Man. d'ornithologie*, ii. 343); but for all practical purposes we certainly owe its discovery to the naturalists of Cook's second voyage. By some error, probably of transcription, New Zealand, instead of New-Year Island, appears in many works as the place of its discovery, while not a few writers have added thereto New Holland. Hitherto there is no real evidence of the occurrence of a Sheathbill in the waters of Australia or New Zealand.

[1] In the Falkland Isles it is called the "Kelp-Pigeon," and by some of the earlier French navigators the "Pigeon blanc antarctique." The cognate species of Kerguelen Land is named by the sealers "Sore-eyed Pigeon," from its prominent fleshy orbits, as well as "Paddy-bird"—the last doubtless from its white plumage calling to mind that of some of the smaller Egrets, so called by the English in India and elsewhere.

[2] Lesson (*loc. cit.*) cites a brief but correct indication of this species as observed by Lesquin (*Lycée armoricain*, x. 36) on Crozet Island, and, not suspecting it to be distinct, was at a loss to reconcile the discrepancies of the latter's description with that given of the other species by earlier authors.

is famous for its beauty. There are about 24,000 inhabitants—all Moslems except about 150 Samaritans and perhaps 700 Christians. The inhabitants are notorious for fanaticism and lawlessness, and Europeans are usually greeted with vile epithets. There are missions, both Protestant and Roman Catholic; and an important hospital under the auspices of the Church Missionary Society. There is a flourishing trade in soap, which is here manufactured, and a considerable commerce in wool and cotton with the regions E. of the Jordan.

In the neighbourhood of Nāblus are shown: (1) a modern building which covers the traditional site of the tomb of Joseph, as accepted by Jews, Samaritans and Christians. The authority for the burial of Joseph at Shechem is the speech of Stephen (Acts vii. 16), though Josephus places the sepulchre at Hebron (*Ant.* II. viii. 2). Moslem tradition also regards Shechem as the burial-place of Joseph; but it appears as though the actual site, as shown, has not been always in one unvarying spot. (2) The well of Jacob, about a mile and a half from Nāblus on the way to Jerusalem, which is an excavation of great depth. The tradition fixing this hallowed place seems to have been constant throughout the whole of the Christian centuries, and it is one of the very few "holy places" shown to travellers and pilgrims in Palestine, the authenticity of which deserves consideration. It is one of the small number of sites mentioned by the Bordeaux pilgrim (A.D. 333).

The site of the sacred oak has been sought at two places: one called *El-'Amūd*, "the column"—where is "Joseph's tomb"; and the other at *Balāta* (a name containing the consonants of the Semitic word for "oak"), near Jacob's well. (R. A. S. M.)

SHED. (1) A small hut, shelter or outhouse, especially one with a "shed roof" or "lean-to," a roof with only one set of rafters, falling from a higher to a lower wall, like an aisle roof. "Shed" is also the term applied to a large roofed shelter open at the sides for the storage of goods, rolling-stock, locomotives, &c., on a railway or dock-wharf. According to Skeat, the word is a Kentish form of "shade," "shadow," in O. Eng. *scæd*, *sceadu*, cf. Ger. *Schatten*; the ultimate origin is the root *ska-*, to cover, seen in Gr. σκιά, shadow, σκηνή, tent, shelter, stage, whence Eng. "scene"; the Eng. "sky" comes from a closely allied root *sku*, also to cover, cf. Lat. *obscurus*. (2) To spill, to scatter, to cast off; originally the word seems to have meant to part, to divide, a use only surviving in "watershed." The O. Eng. verb was *sceádan*, in Mid. Eng. *shæden*, to divide, separate. "Shed" in the sense of to spill has, however, by some etymologists been taken to be a separate word from that meaning to part; it would in that case appear to be connected with O. Fris. *schedda*, to shake, the root of which is found in "shudder."

SHEDD, WILLIAM GREENOUGH THAYER (1820–1894), American Presbyterian, was born in Acton, Massachusetts, on the 21st of June 1820. In 1839 he graduated at the University of Vermont, and in 1843 at Andover Theological Seminary. After a short pastorate at Brandon, Vermont, he was successively professor of English literature in the University of Vermont (1845–1852), professor of sacred rhetoric in Auburn Theological Seminary (1852–1854), professor of church history in Andover Theological Seminary (1854–1862), and, after one year (1862–1863) as associate pastor of the Brick Church of New York City, of sacred literature (1863–1874) and of systematic theology (1874–1890) in Union Theological Seminary. He died in New York City on the 17th of November 1894.

Dr Shedd was a high Calvinist and was one of the greatest systematic theologians of the American Presbyterian church. His great work was *Dogmatic Theology* (3 vols., 1888–1894). He also wrote *Lectures on the Philosophy of History* (1856), in which he applied to history the doctrine of organic evolution; *Discourses and Essays* (1856); *A Manual of Church History* (2 vols., 1857), a translation of Guericke; *A History of Christian Doctrine* (2 vols., 1863); *Theological Essays* (1877); *Literary Essays* (1878); *Commentary on the Epistle to the Romans* (1879); *The Doctrine of Endless Punishment* (1885); and he edited Coleridge's *Complete Works* (7 vols., New York, 1894).

SHEE, SIR MARTIN ARCHER (1770–1850), English portrait-painter and president of the Royal Academy, was born in Dublin on the 23rd of December 1770. He was sprung from an old Irish family, and his father, a merchant, regarded the profession of a painter as no fit occupation for a descendant of the Shees. Young Shee became, nevertheless, a student of art in the Dublin Society, and came early to London, where he was, in 1788, introduced by Burke to Reynolds, by whose advice he studied in the schools of the Royal Academy. In 1789 he exhibited his first two pictures, the Head of an Old Man and Portrait of a Gentleman. During the next ten years he steadily increased in practice. He was chosen an associate of the Royal Academy in 1798, shortly after Flaxman, and in 1800 he was made a Royal Academician. In the former year he had married, removed to Romney's house in Cavendish Square, and set up as his successor. Shee continued to paint with great readiness of hand and fertility of invention, although his portraits were eclipsed by more than one of his contemporaries, and especially by Lawrence, Hoppner, Phillips, Jackson and Raeburn. The earlier portraits of the artist are carefully finished, easy in action, with good drawing and excellent discrimination of character. They show an undue tendency to redness in the flesh painting—a defect which is still more apparent in his later works, in which the handling is less "square," crisp and forcible. In addition to his portraits he executed various subjects and historical works, such as Lavinia, Belisarius, his diploma picture Prospero and Miranda, and the Daughter of Jephthah. In 1805 he published a poem consisting of *Rhymes on Art*, and it was succeeded by a second part in 1809. Byron spoke well of it in his *English Bards and Scotch Reviewers*, and invoked a place for "Shee and genius" in the temple of fame. Shee published another small volume of verses in 1814, entitled *The Commemoration of Sir Joshua Reynolds, and other Poems*, but this effort did not greatly increase his fame. He now produced a tragedy called *Alasco*, of which the scene was laid in Poland. The play was accepted at Covent Garden, but Colman, the licenser, refused it his sanction, on the plea of its containing certain treasonable allusions, and Shee, in great wrath, resolved to make his appeal to the public. This violent threat he carried out in 1824, but *Alasco* is still on the list of unacted dramas. On the death of Lawrence in 1830, Shee was chosen president of the Royal Academy, and shortly afterwards he received the honour of knighthood. In the dispute regarding the use of rooms to be provided by government, and in his examination before the parliamentary committee of 1836, he ably defended the rights of the Academy. He continued to paint till 1845, and died on the 13th of August 1850.

SHEEP (from the Anglo-Saxon *sceáp*, a word common in various forms to Teutonic languages; *e.g.* the German *Schaf*), a name originally bestowed in all probability on the familiar domesticated ruminant (*Ovis aries*), but now extended to include its immediate wild relatives. Although many of the domesticated breeds are hornless, sheep belong to the family of hollow-horned ruminants or Bovidae (*q.v.*). Practically they form a group impossible of definition, as they pass imperceptibly into the goats. Both sexes usually possess horns, but those of the females are small. In the males the horns are generally angulated, and marked by fine transverse wrinkles; their colour being greenish or brownish. They are directed outwards, and curve in an open spiral, with the tips directed outwards. Although there may be a fringe of hair on the throat, the males have no beard on the chin; and they also lack the strong odour characteristic of goats. Usually the tail is short; and in all the wild species the coat takes the form of hair, and not wool. Like goats, sheep have narrow upper molar teeth, very different from those of the oxen, and narrow hairy muzzles. Between the two middle toes, in most species, is lodged a deep glandular bag having the form of a retort with a small external orifice, which secretes an unctuous and odorous substance. This, tainting the herbage or stones over which the animal walks, affords the means by which, through the powerfully developed sense of smell, the neighbourhood of other individuals of the species is recognized. The crumen or suborbital face-gland, which is so largely developed and probably performs the same office in some antelopes and deer, is present, although in a comparatively rudimentary form, in most species, but is absent in others. Wild sheep attain their maximum development, both in respect of number and size, in Central Asia. They associate either in large flocks, or in family-parties; the old males generally keeping apart from the rest. Although essentially mountain animals, sheep generally frequent open,

undulating districts, rather than the precipitous heights to which goats are partial. It may be added that the long tails of most tame breeds are, like wool, in all probability the results of domestication.

The Pamir plateau, on the confines of Turkestan, at an elevation of 16,000 ft. above the sea-level, is the home of the magnificent *Ovis poli*, named after the celebrated Venetian traveller Marco Polo, who met with it in the 13th century. It is remarkable for the great size of the horns of the old rams and the wide open sweep of their curve, so that the points stand boldly out on each side, far away from the animal's head, instead of curling round nearly in the same plane, as in most of the allied species. A variety inhabiting the Thian Shian is known as *O. poli carelini*. An even larger animal is the argali, *O. ammon*, typically from the Altai, but represented by one race in Ladak and Tibet (*O. ammon hodgsoni*), and by a second in Mongolia. Although its horns are less extended laterally than those of *O. poli*, they are grander and more massive. In their short summer coats the old rams of both species are nearly white. *Ovis sairensis* from the Sair mountains and *O. littledalei* from Kulja are allied species. In the Stanovoi mountains and neighbouring districts of E. Siberia and in Kamchatka occur two sheep which have been respectively named *O. borealis* and *O. nivicola*. They are, however, so closely allied to the so-called bighorn sheep of N. America,



A Mouflon Ram (*Ovis musimon*).

that they can scarcely be regarded as more than local races of *O. canadensis*, or *O. cervina*, as some naturalists prefer to call the species. These bighorns are characterized by the absence of face-glands, and the comparatively smooth front surface of the horns of the old rams, which are thus very unlike the strongly wrinkled horns of the argali group. The typical bighorn is the khaki-coloured and white-rumped Rocky Mountain animal; but on the Stickin river there is a nearly black race, with the usual white areas (*O. canadensis stonei*), while this is replaced in Alaska by the nearly pure white *O. c. dalli*; the grey sheep of the Yukon (*O. c. fannini*) being perhaps not a distinct form. Returning to Asia, we find in Ladak, Astor, Afghanistan and the Punjab ranges, a sheep whose local races are variously known as urin, urial and shapo, and whose technical name is *O. vignei*. It is a smaller animal than the members of the argali group, and approximates to the Armenian and the Sardinian wild sheep or mouflon (*Ovis orientalis* and *O. musimon*) (see MOUFLON.) We have in Tibet the bharal or blue sheep, *Ovis* (*Pseudois*) *bharal*, and in N. Africa the udad or aoudad, *O.* (*Ammotragus*) *lervia*, both of which have no face-glands, and in this and their smooth horns approximate to goats (see BHARAL and AOUDAD).

The sheep was domesticated in Asia and Europe before the dawn of history, though unknown in this state in the New World until after the Spanish conquest. It has now been introduced by man into almost all parts of the world where agricultural operations are carried on, but flourishes especially in the temperate regions of both hemispheres. Whether this well-known and useful animal is derived from any one of the existing wild species, or from the crossing of several, or from some now extinct species, are matters of conjecture. The variations of external characters seen in the different breeds are very great. They are chiefly manifested in the form and number of the horns, which may be increased from the normal two to four or even eight, or may be altogether absent in the female alone or in both sexes; in the shape and length of the ears, which often hang pendent by the side of the head; in the peculiar elevation or arching of the nasal bones in some eastern races; in the length of the tail, and the development of great masses of fat at each side of its root or in the tail itself; and in the colour and quality of the fleece.

On the W. coast of Africa two distinct breeds of hairy sheep are indigenous, the one characterized by its large size, long limbs and smooth coat, and the other by its inferior stature, lower build and heavily maned neck and throat. Both breeds, which have short tails and small horns (present only in the rams), were regarded by the German naturalist Fitzinger as specifically distinct from the domesticated *Ovis aries* of Europe; and for the first type he proposed the name *O. longipes* and for the second *O. jubata*. Although such distinctions may be doubtful (the two African breeds are almost certainly descended from one ancestral form), the retention of such names may be convenient as a provisional measure.

The long-legged hairy sheep, which stands a good deal taller than a Southdown, ranges, with a certain amount of local variation, from Lower Guinea to the Cape. In addition to its long limbs, it is characterized by its Roman nose, large (but not drooping) ears, and the presence of a dewlap on the throat and chest The ewes are hornless, but in Africa the rams have very short, thick and somewhat goatlike horns. On the other hand, in the W. Indian breed, which has probably been introduced from Africa, both sexes are devoid of horns. The colour is variable. In the majority of cases it appears to be pied, showing large blotches of black or brown on a white ground; the head being generally white with large black patches on the sides, most of the neck and the fore-part of the body black, and the hind-quarters white with large coloured blotches. On the other hand, these sheep may be uniformly yellowish white, reddish brown, greyish brown or even black. The uniformly reddish or chestnut-brown specimens approach most nearly to the wild mouflon or urial in colour, but the chestnut extends over the whole of the underparts and flanks; domestication having probably led to the elimination of the white belly and dark flank band, which are doubtless protective characters. The feeble development of the horns is probably also a feature due to domestication.

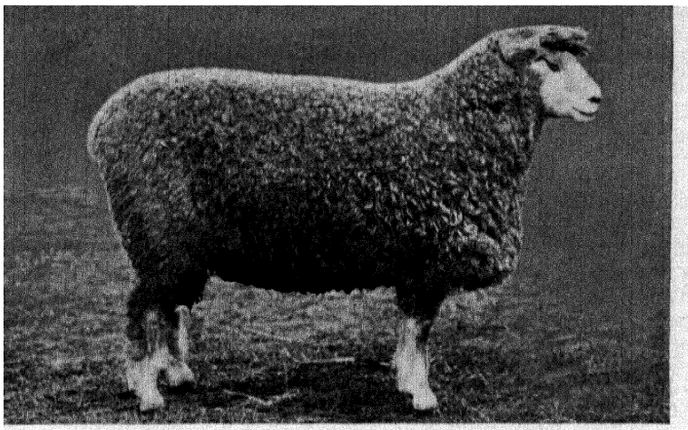
In Angola occurs a breed of this sheep which has probably been crossed with the fat-tailed Malagasy breed; while in Guinea there is a breed with lappets, or wattles, on the throat, which is probably the result of a cross with the lop-eared sheep of the same district. The Guinea lop-eared breed, it may be mentioned, is believed to inherit its drooping ears and throat wattles from an infusion of the blood of the Roman-nosed hornless Theban goat (see GOAT). Hairy long-legged sheep are also met with in Persia, but are not pure-bred, being apparently the result of a cross between the long-legged Guinea breed and the fat-tailed Persian sheep.

The maned hairy sheep (*Ovis jubata*), which appears to be confined to the W. coast of Africa, takes its name from a mane of longish hair on the throat and neck; the hair on the body being also longer than in the ordinary long-legged sheep. This breed is frequently black or brown and white; but in a small sub-breed from the Cameroons the general colour is chestnut or foxy red, with the face, ears, buttocks, lower surface of tail and under-parts black. The most remarkable thing about this Cameroon sheep is, however, its extremely diminutive size, a full-grown ram standing only 19 in. at the withers.

In point of size this pigmy Cameroon breed comes very close to an exceedingly small sheep of which the limb-bones have been

SHEEP

PLATE I.



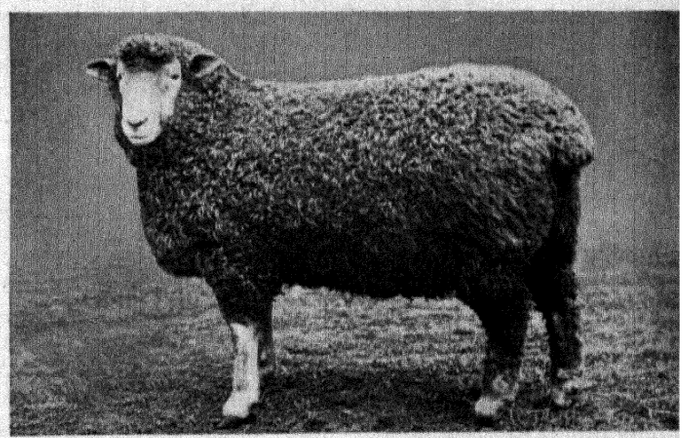
LINCOLN LONGWOOL RAM.



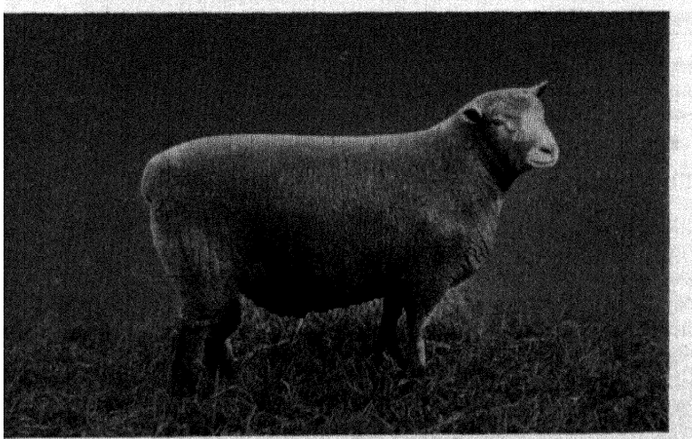
LEICESTER RAM.



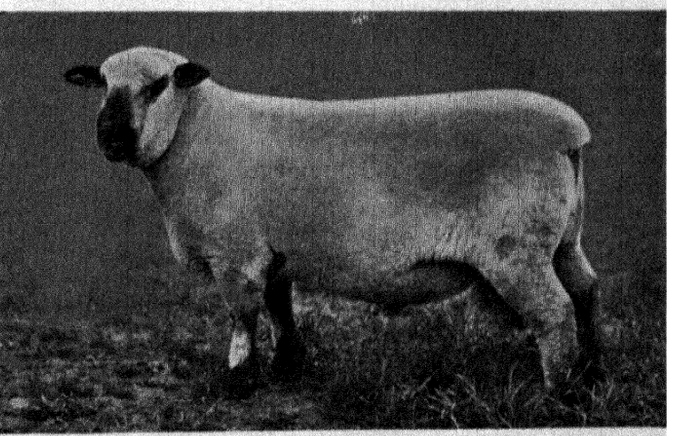
WENSLEYDALE RAM.



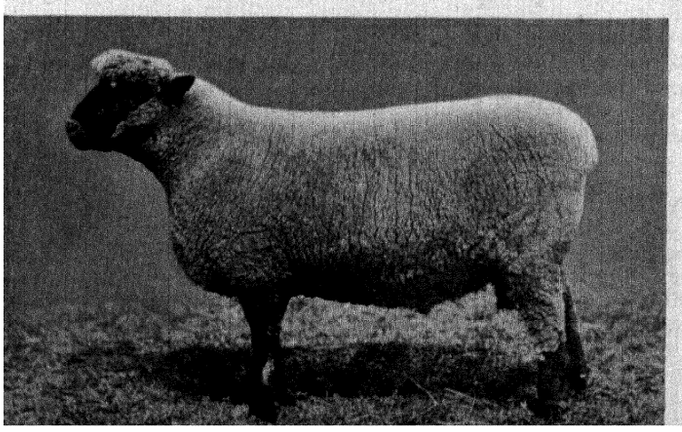
DEVON LONGWOOL RAM.



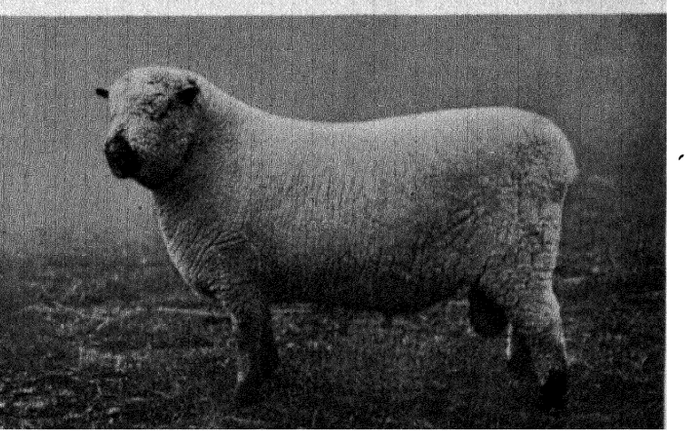
SOUTHDOWN RAM.



HAMPSHIRE DOWN RAM.



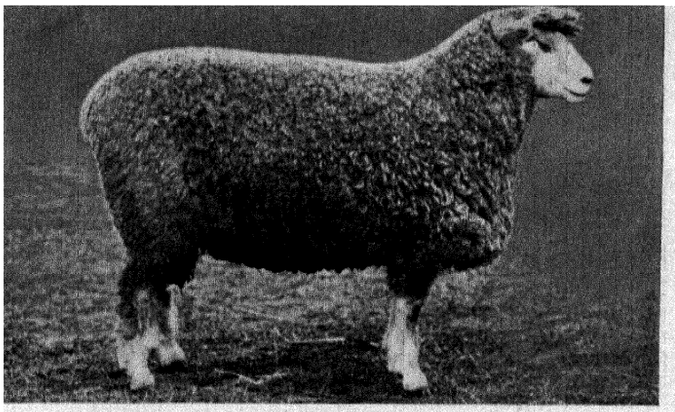
OXFORD DOWN RAM.



SHROPSHIRE RAM.

BRITISH BREED [illegible] HUFF [illegible] photograph by E. Rabbage. The comparative size of the [illegible] the scale of reproduction.

SHEEP



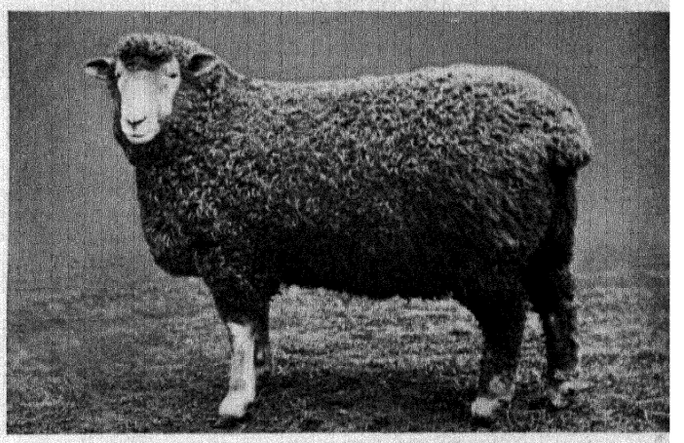
LINCOLN LONGWOOL RAM.



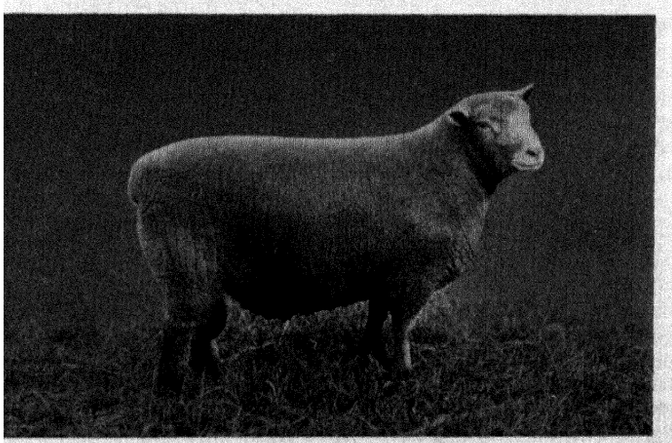
LEICESTER RAM.



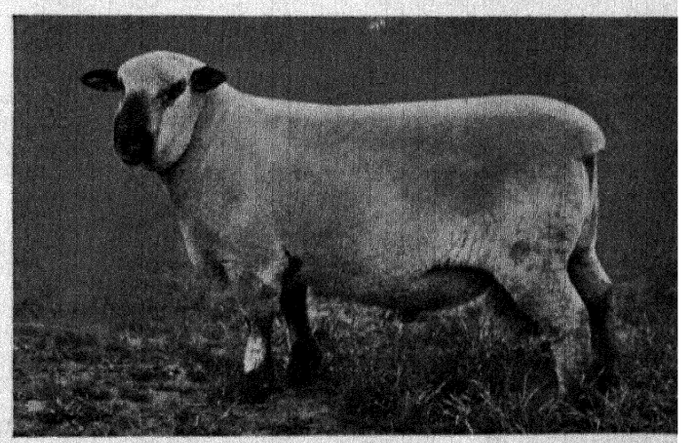
WENSLEYDALE RAM.



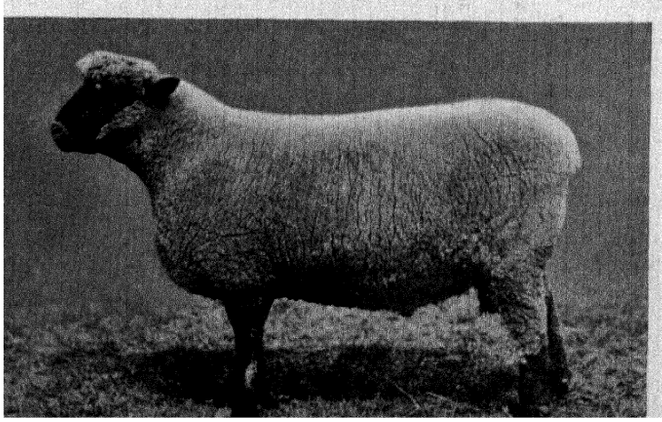
DEVON LONGWOOL RAM.



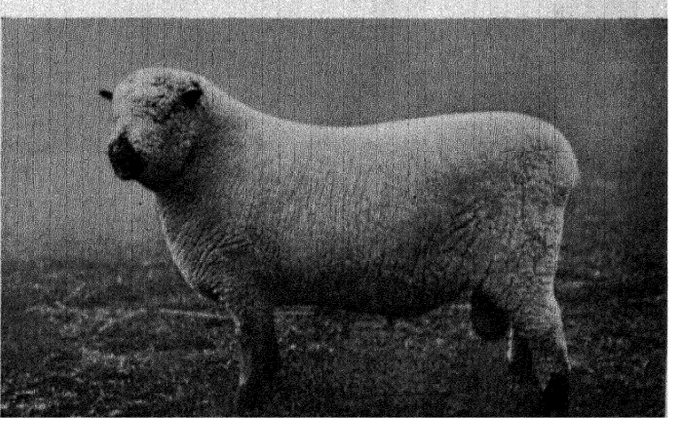
SOUTHDOWN RAM.



HAMPSHIRE DOWN RAM.



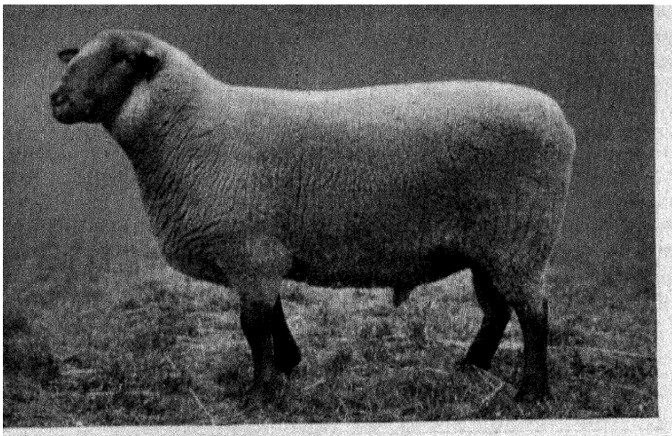
OXFORD DOWN RAM.



SHROPSHIRE RAM.

BRITISH BREEDS OF SHEEP. Photographs by J. Babbage. [Illegible] the scale of reproduction. [Illegible]

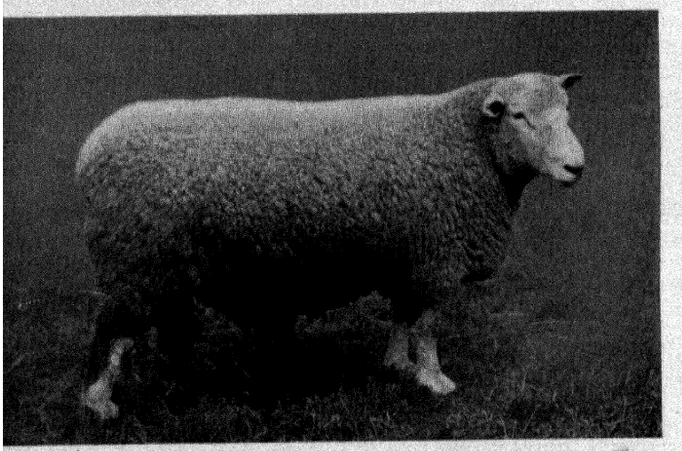
SHEEP



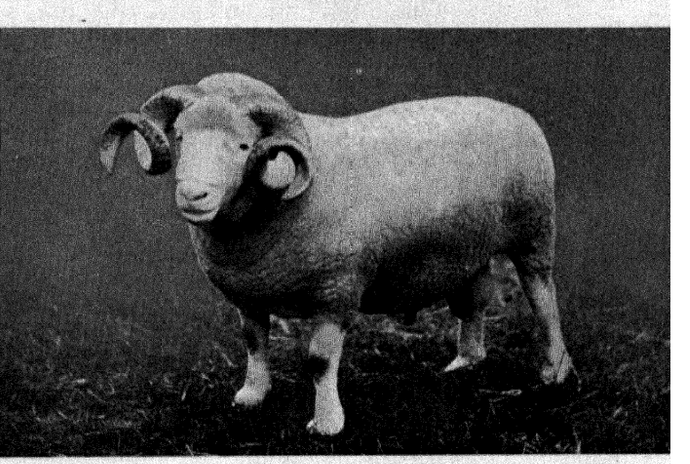
SUFFOLK RAM.



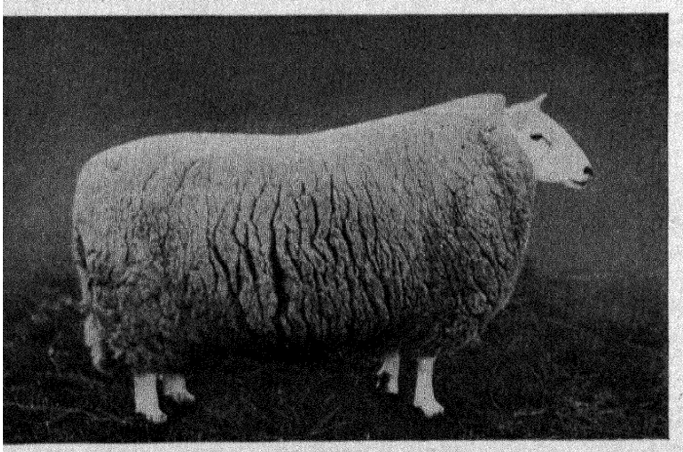
RYELAND RAM.



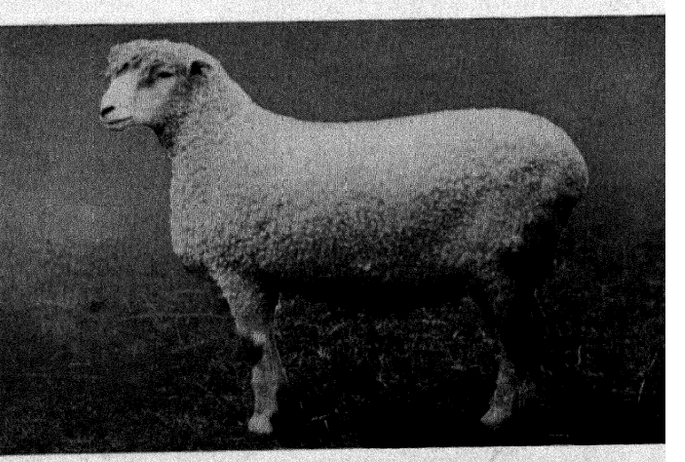
KENT OR ROMNEY MARSH RAM.



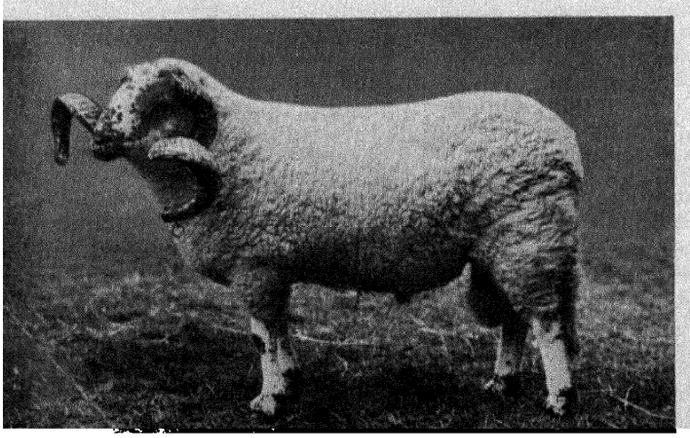
DORSET HORN RAM.



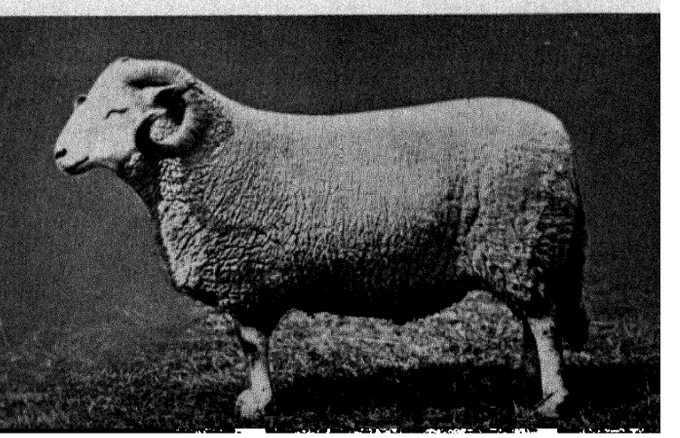
CHEVIOT RAM.



COTSWOLD RAM.



LONK RAM



WELSH MOUNTAIN RAM

BRITISH BREEDS OF SHEEP from photographs by F. Hobbs. The comparative size of the animals are indicated by the scale of reproduction

found in certain ancient deposits in the S. of England; and the question arises whether the two breeds may not have been nearly related. Although there are no means of ascertaining whether the extinct pigmy British sheep was clothed with hair or with wool, it is practically certain that some of the early European sheep retained hair like that of their wild ancestor; and there is accordingly no prima facie reason why the breed in question should not have been hairy. On the other hand, since the so-called peat-sheep of the prehistoric Swiss lake-dwellers appears to be represented by the existing Graubünden (Grisons) breed, which is woolly and coloured something like a Southdown, it may be argued that the former was probably also woolly, and hence that the survival of a hairy breed in a neighbouring part of Europe would be unlikely. The latter part of the argument is not very convincing, and it is legitimate to surmise that in the small extinct sheep of the S. of England we may have a possible relative of the pigmy hairy sheep of W. Africa.

Fat-rumped sheep, *Ovis steatopyga*, are common to Africa and Asia, and are piebald with rudimentary horns, and a short hairy coat, being bred entirely for their milk and flesh. In fat-tailed sheep, on the other hand, which have much the same distribution, the coat is woolly and generally piebald. Four-horned sheep are common in Iceland and the Hebrides; the small half-wild breed of Soa often showing this reduplication. There is another four-horned breed, distinguished by its black (in place of brown) horns, whose home is probably S. Africa. In the unicorn sheep of Nepal or Tibet the two horns of the rams are completely welded together. In the Himalayan and Indian hunia sheep, the rams of which are specially trained for fighting, and have highly convex foreheads, the tail is short at birth. Most remarkable of all is the so-called Wallachian sheep, or Zackelschaf (*Ovis strepsiceros*), represented by several more or less distinct breeds in E. Europe, in which the long upright horns are spirally twisted like those of the mazkhor wild goat.

For the various breeds of wild sheep see R. Lydekker, *Wild Oxen, Sheep and Goats* (London, 1898), and later papers in the *Proceedings of the Zoological Society of London*. Also Rowland Ward, *Records of Big Game* (5th ed., London, 1906). (R. L.*)

Modern British Breeds of Sheep.—The sheep native to the British Isles may be classified as the lowland and the mountain breeds, and subdivided into longwools and shortwools—the latter including the Down breeds, sometimes termed black-faced. The *longwool* breeds are the Leicester, Border Leicester, Cotswold, Lincoln, Kent, Devon Longwool, South Devon, Wensleydale and Roscommon. The *shortwool* breeds are the Oxford Down, Southdown, Shropshire, Hampshire Down, Suffolk, Ryeland, Dorset and Somerset Horn, Kerry Hill, Radnor and Clun Forest. The *mountain* breeds include the Cheviot, Scotch Black-face, Lonk, Rough Swaledale, Derbyshire Gritstone, Penistone, Limestone, Herdwick, Dartmoor, Exmoor and Welsh Mountain. These breeds are all English, except the Border Leicester, Cheviot and Scotch Black-face, which belong to Scotland; the Welsh Mountain, which belongs to Wales; and the Roscommon, which is Irish. The majority of the true mountain breeds are horned, the males only in the cases of Cheviot, Herdwick, Penistone and Welsh, though most Cheviot and many Herdwick rams are hornless. Of Derbyshire Gritstone neither sex has horns. In the other horned breeds, the Dorset and Somerset, Limestone, Exmoor, Old Norfolk, and Western or Old Wiltshire, both sexes have horns. The remaining breeds are hornless. The white-faced breeds include the Leicester, Border Leicester, Lincoln, Kentish, Cheviot, Ryeland, Devon Longwool, South Devon, Dorset and Somerset Horn, Limestone, Penistone, Exmoor and Roscommon.

The *Leicester*, though now not numerous, is of high interest. It was the breed which Robert Bakewell took in hand in the 18th century, and greatly improved by the exercise of his skill and judgment. Bakewell lived at Dishley Grange, Leicestershire, and in France the Leicester sheep are still called Dishleys. In past times Leicester blood was extensively employed in the improvement or establishment of other longwool breeds of sheep. The Leicester, as seen now, has a white wedge-shaped face, the forehead covered with wool; thin mobile ears; neck full towards the trunk, short and level with the back; width over the shoulders and through the heart; a full broad breast; fine clean legs standing well apart; deep round barrel and great depth of carcass; firm flesh, springy pelt, and pink skin, covered with fine, curly, lustrous wool. The breed is maintained pure upon the rich pastures of Leicestershire, E. and N. Yorkshire, Cheshire, Cumberland and Durham, but its chief value is for crossing, when it is found to promote maturity and to improve the fattening propensity.

The *Border Leicester* originated after the death in 1795 of Bakewell, when the Leicester breed, as it then existed, diverged into two branches. The one is represented by the breed still known in England as the Leicester. The other, bred on the Scottish Borders, with an early admixture of Cheviot blood, acquired the name of Border Leicester. The distinguishing characteristics of the latter are: that it is an upstanding animal of gay appearance with light offal; and has a long though strong neck carrying a long, lean, clean head covered with white, hard, but not wiry hair, free from wool, long highset ears and a black muzzle; back broad and muscular, belly well covered with wool; legs clean, and a fleece of long white wavy wool, arranged in characteristic locks or pirls.

The *Blue-faced Wensleydales* take their name from the Yorkshire dale of which Thirsk is the centre. They are longwool sheep, derived from the old Teeswater breed by crossing with Leicester rams. They have a tuft of wool on the forehead. The skin of the body is sometimes blue, whilst the wool has a bright lustre, is curled in small distinct pirls, and is of uniform staple. The rams are in much favour in Scotland and the N. of England for crossing with ewes of the various black-faced horned mountain breeds to produce mutton of superior quality and to use the cross-ewes to breed to a pure longwool or sometimes a Down ram.

The *Cotswold* is an old-established breed of the Gloucestershire hills, extending thence into Oxfordshire. It was but slightly crossed for improvement by the Dishley Leicesters and has retained its characteristic type for generations. They are big, handsome sheep, with finely-arched necks and graceful carriage. With their broad, straight backs, curved ribs, and capacious quarters, they carry a great weight of carcass upon strong, wide-standing legs. The fine white fleece of long wavy wool gives the Cotswold an attractive appearance, which is enhanced by its topknot or forelock. The mutton of the Cotswolds is not of high quality except at an early age, but the sheep are useful for crossing purposes to impart size, and because they are exceptionally hardy.

The *Lincolns* are descended from the old native breed of Lincolnshire, improved by the use of Leicester blood. They are hardy and prolific, but do not quite equal the Cotswolds in size. They have larger, bolder heads than the Leicesters. Breeders of Lincoln rams like best a darkish face, with a few black spots on the ears; and white legs. The wool has a broad staple, and is denser and longer, and the fleece heavier, than in any other British breed. For this reason it has been the breed most in favour with breeders in all parts of the world for mating with Merino ewes and their crosses. The progeny is a good general-purpose sheep, giving a large fleece of wool but only a medium quality of mutton. With a greater proportion of Lincoln blood in the mixed flocks of the world there is a growing tendency to produce finer mutton by using Down rams, but at the sacrifice of part of the yield of wool. In 1906 Henry Dudding, of Riby Grove, Lincolnshire, obtained at auction the sum of 1450 guineas for a Lincoln ram bred by him,—the highest price paid for a sheep in the United Kingdom. In the same year Robert and William Wright, of Nocton Heath, Lincoln, sold their flock of 950 animals to Señor Manuel Cobo, Buenos Aires, for £30,000.

The *Devon Longwool* is a breed locally developed in the valleys of W. Somerset, N. and E. Devon, and parts of Cornwall. It originated in a strong infusion of Leicester blood amongst the old Bampton stock of Devonshire. The Devon Longwool is not unlike the Lincoln, but is coarser. It is white-faced, with a lock of wool on the forehead.

The *South Devon* or *South Dum* are, like the cattle of that

name, a strictly local breed, which likewise exemplify the good results of crossing with the Leicesters. The South Devons have a fairly fine silky fleece of long staple, heavier than that of the Devon Longwool, which it also excels in size.

The *Roscommon*—the one breed of modern sheep native to Ireland—is indebted for its good qualities largely to the use of Leicester blood. It is a big-bodied, high-standing sheep, carrying a long, wavy, silky fleece. It ranges mainly from the middle of Ireland westwards, but its numbers have declined considerably in competition with the Shropshire.

The *Kent* or *Romney Marsh* is native to the rich tract of grazing land on the S. coast of Kent. They are hardy, white-faced sheep, with a close-coated longwool fleece. They were gradually, like the Cotswolds, improved from the original type of slow-maturity sheep by selection in preference to the use of rams of the Improved Leicester breed. With the exception of the Lincoln, no breed has received greater distinction in New Zealand, where it is in high repute for its hardiness and general usefulness. When difficulties relating to the quantity and quality of food arise the Romney is a better sheep to meet them than the Lincolns or other longwools.

The *Oxford Down* is a modern breed which owes its origin to crossing between Cotswolds and Hampshire Downs and Southdowns. Although it has inherited the forelock from its longwool ancestors, it approximates more nearly to the shortwool type, and is accordingly classified as such. An Oxford Down ram has a bold masculine head; the poll well covered with wool and the forehead adorned by a topknot; ears self-coloured, upright, and of fair length; face of uniform dark brown colour; legs short, dark, and free from spots; back level and chest wide; and the fleece heavy and thick. The breed is popular in Oxford and other midland counties. Its most notable success in recent years is on the Scottish and English borders, where, at the annual ram sales at Kelso, a greater number of rams is auctioned of this than of any other breed, to cross with flocks of Leicester-Cheviot ewes especially, but also with Border Leicesters and three-parts-bred ewes. It is supplanting the Border Leicester as a sire of mutton sheep; for, although its progeny is slower in reaching maturity, tegs can be fed to greater weights in spring—65 to 68 lb per carcass—without becoming too fat to be classed as finest quality.

The *Southdown*, from the short close pastures upon the chalky soils of the South Downs in Sussex, was formerly known as the Sussex Down. In past times it did for the improvement of the shortwool breeds of sheep very much the same kind of work that the Leicester performed in the case of the longwool breeds. A pure-bred Southdown sheep has a small head, with a light brown or brownish grey (often mouse-coloured) face, fine bone, and a symmetrical, well-fleshed body. The legs are short and neat, the animal being of small size compared with the other Down sheep. The fleece is of fine, close, short wool, and the mutton is excellent. "Underhill" flocks that have been kept for generations in East Anglia, on the Weald, and on flat meadow land in other parts of the country, have assumed a heavier type than the original "Upperdown" sheep. It was at one time thought not to be a rent-paying breed, but modern market requirements have brought it well within that category.

The *Shropshire* is descended from the old native sheep of the Salopian hills, improved by the use of Southdown blood. Though heavier in fleece and a bulkier animal, the Shropshire resembles an enlarged Southdown. As distinguished from the latter, however, the Shropshire has a darker face, blackish brown as a rule, with very neat ears, whilst its head is more massive, and is better covered with wool on the top and at the sides. This breed has made rapid strides in recent years, and it has acquired favour in Ireland as well as abroad. It is an early-maturity breed, and no other Down produces a better back to handle for condition—the frame is so thickly covered with flesh and fat.

The *Hampshire Down* is another breed which owes much of its improved character to an infusion of Southdown blood. Early in the 19th century the old Wiltshire white-faced horned sheep, with a scanty coat of hairy wool, and the Berkshire Knot, roamed over the downs of their native counties. Only a remnant of the former under the name of the *Western* sheep survives in a pure state, but their cross descendants are seen in the modern Hampshire Down, which originated by blending them with the Southdown. Early maturity and great size have been the objects aimed at and attained, this breed, more perhaps than any other, being identified with early maturity. One reason for this is the early date at which the ewes take the ram. Whilst heavier than the Shropshire, the Hampshire Down sheep is less symmetrical. It has a black face and legs, a big head with Roman nose, darkish ears set well back, and a broad level back (especially over the shoulders) nicely filled in with lean meat.

The *Dorset Down* or *West Country Down*, "a middle type of Down sheep pre-eminently suited to Dorsetshire," is a local variety of the Hampshire Down breed, separated by the formation of a Dorset Down sheep society in 1904, about eighty years after the type of the breed had been established.

The *Suffolk* is another Down, which took its origin about 1790 in the crossing of improved Southdown rams with ewes of the old black-face Horned Norfolk, a breed still represented by a limited number of animals. The characteristics of the latter are retained in the black face and legs of the Suffolk, but the horns have been bred out. The fleece is moderately short, the wool being of close, fine, lustrous fibre, without any tendency to mat. The limbs, woolled to the knees and hocks, are clean below. The breed is distinguished by having the smoothest and blackest face and legs of all the Down breeds and no wool on the head. Although it handles hard on the back when fat, no breed except the old Horned Norfolk equals it in producing a saddle cut of mutton with such an abundance of lean red meat in proportion to fat. It carried off the highest honours in the dressed carcass competition at Chicago in 1903, and the championship in the "block test" at Smithfield Club Show was won for the five years 1902-1906 by Suffolks or Suffolk cross lambs from big-framed Cheviot ewes. In 1907, the championship went to a Cheviot wether, but in the two pure, short-woolled classes all the ten awards were secured by Suffolks, and in the two cross-bred wether classes nine of the ten awards went to a Suffolk cross. The mutton of all the Down breeds is of superior quality, but that of the Suffolk is pre-eminently so.

The *Cheviot* takes its name from the range of hills stretching along the boundary between England and Scotland, on both sides of which the breed now extends, though larger types are produced in East Lothian and in Sutherlandshire. The Cheviot is a hardy sheep with straight wool, of moderate length and very close-set, whilst wiry white hair covers the face and legs. Put to the Border Leicester ram the Cheviot ewe produces the *Half-bred*, which as a breeding ewe is unsurpassed as a rent-paying, arable-land sheep.

The *Scotch Black-face* breed is chiefly reared in Scotland, but it is of N. of England origin. Their greater hardiness, as compared with the Cheviots, has brought them into favour upon the higher grounds of the N. of England and of Scotland, where they thrive upon heather hills and coarse and exposed grazing lands. The colour of face and legs is well-defined black and white, the black predominating. The spiral horns are low at the crown, with a clear space between the roots, and sweep in a wide curve, sloping slightly backwards, and clear of the cheek. The fashionable fleece is down to the ground, hairy and strong, and of uniform quality throughout.

The *Lonk* has its home amongst the moorlands of N. Lancashire and the W. Riding of Yorkshire, and it is the largest of the mountain breeds of the N. of England and Scotland. It bears most resemblance to the Scotch Black-face, but carries a finer, heavier fleece, and is larger in head. Its face and legs are mottled black and white, and its horns are strong. The tail is long and rough.

The *Herdwick* is the hardiest of all the breeds thriving upon the poor mountain land in Cumberland and Westmorland. The rams sometimes have small, curved, wide horns like those of the Cheviot ram. The colour of the fleece is white, with a few darkish spots here and there; the faces and legs are dark in the lambs, gradually becoming white or light grey in a few years.

The wool is strong and coarse, standing up round the shoulders and down the breast like a mane. The forehead has a topknot, and the tail is well covered.

The *Limestone* is a breed of which little is heard. It is almost restricted to the fells of Westmorland, and is probably nearly related to the Scotch Black-face. The breed does not thrive off its own geological formation, and the ewes seek the ram early in the season. The so-called "Limestones" of the Derbyshire hills are really Leicesters.

The *Welsh Mountain* is a small, active, soft-woolled, white-faced breed of hardy character. The legs are often yellowish, and this colour may extend to the face. The mutton is of excellent quality. The ewes, although difficult to confine by ordinary fences, are in high favour in lowland districts for breeding fattening lambs to Down and other early maturity rams.

The *Clun Forest* is a local breed in W. Shropshire and the adjacent part of Wales. It is descended from the old Tan-faced sheep. It is now three parts Shropshire, having been much crossed with that breed, but its wool is rather coarser.

The *Radnor* is short-limbed and low-set with speckled face and legs. It is related to the Clun Forest and the Kerry Hill sheep. The draft ewes of all three breeds are in high demand for breeding to Down and longwool rams in the English midlands.

The *Ryeland* breed is so named from the Ryelands, a poor upland district in Herefordshire. It is a very old breed, against which the Shropshires have made substantial headway. Its superior qualities in wool and mutton production have been fully demonstrated, and a demand for rams is springing up in S. as well as in N. America. The Ryeland sheep are small, hornless, have white faces and legs, and remarkably fine short wool, with a topknot on the forehead.

The *Dartmoor*, a hardy local Devonshire breed, is a large hornless, longwool, white-fleeced sheep, with a long mottled face. It has been attracting attention in recent years.

The *Exmoor* is a horned breed of Devonshire moorland, one of the few remaining remnants of direct descent from the old forest breeds of England. They have white legs and faces and black nostrils. The coiled horns lie more closely to the head than in the Dorset and Somerset Horn breed. The Exmoors have a close, fine fleece of short wool. They are very hardy, and yield mutton of choice flavour.

The *Dorset and Somerset Horn* is an old west-country breed of sheep. The fleece is fine in quality, of close texture, and the wool is intermediate between long and short, whilst the head carries a forelock. Both sexes have horns, very much coiled in the ram. The muzzle, legs and hoofs are white; the nostrils pink. This is a hardy breed, in size somewhat exceeding the Southdown. The special characteristic of the breed is that the ewes take the ram at an unusually early period of the year, and cast ewes are in demand for breeding house lamb for Christmas. Two crops of lambs in a year are sometimes obtained from the ewes, although it does not pay to keep such rapid breeding up regularly.

The *Merino* is the most widely distributed sheep in the world.



From a photo in Professor Robert Wallace's *Farm Live Stock of Great Britain* (4th edition).

Champion Merino Ram.

It has been the foundation stock of the flocks of all the great sheep countries. A few have existed in Britain for more than a hundred years. They thrive well there, as they do everywhere, but they are wool-sheep which produce slowly a secondary quality of mutton—thin and blue in appearance. The Merino resemble the Dorset Horn breed. The rams possess large coiling horns—the ewes may or may not have them. The muzzle is flesh-coloured and the face covered with wool. The wool, densely set on a wrinkled skin, is white and generally fine, although it is classined into long, short, fine and strong. Merino cross with early-maturity longwool, Down, or other close-wooled rams, are good butchers' sheep, and most of the frozen mutton imported into the United Kingdom has had more or less of a merino origin. (W. Fr.; R. W.)

Lowland Sheep-breeding and Feeding.—A Shropshire flock of about two hundred breeding ewes is here taken as a typical example of the numerous systems of managing sheep on a mixed farm of grazing and arable land. The ewes lamb from early in January till the end of February. The lambs have the shelter of a lambing shed for a few days. When drafted to an adjoining field they run in front of their mothers and get a little crushed oats and linseed cake meal, the ewes receiving kail or roots and hay to develop milk. Swedes gradually give place to mangolds, rye and clover before the end of April, when shearing of the ewe flock begins, to be finished early in May. At this time unshorn lambs are dipped and dosed with one of Cooper's tablets of sulphur-arsenic dip material to destroy internal parasites. The operation is repeated in September. The lambs are weaned towards the end of June and the ewes run on the poorest pasture till August to lose surplus fat. In August the ewes are culled and the flock made up to its full numbers by selected shearling ewes. All are assorted and mated to suitable rams. Most of the older ewes take the ram in September, but maiden ewes are kept back till October. During the rest of the year the ewes run on grass and receive hay when necessary, with a limited amount of dry artificial food daily, ¼ lb each, gradually rising as they grow heavy in lamb to 1 lb per day. Turnips before lambing, if given in liberal quantities, are an unsafe food. To increase the number of doubles, ewes are sometimes put on good fresh grass, rape or mustard a week before the tups go out a ram to sixty ewes is a usual proportion, though with care a stud ram can be got to settle twice the number. With good management twenty ewes of any of the lowland breeds should produce and rear thirty lambs, and the proportion can be increased by breeding from ewes with a prolific tendency. The period of gestation of a ewe is between 21 and 22 weeks, and the period of oestrum 24 hours. If not settled the ewe comes back to the ram in from 13 to 18 (usually 16) days. To indicate the time or times of tupping three colours of paint are used. The breast of the ram is rubbed daily for the first fortnight with blue, for a similar period with red, and finally with black.

Fattening tegs usually go on to soft turnips in the end of September or beginning of October, and later on to yellows, green-rounds and swedes and, in spring and early summer, mangolds. The roots are cut into fingers and supplemented by an allowance of concentrated food made up of a mixture of ground cakes and meal, ¼ lb rising to about ½ lb; and ½ lb to 1 lb of hay per day. The dry substance consumed per 100 lb live weight in a ration of ½ lb cake and corn, 12 lb roots and 1 lb hay daily, would be 10½ lb per week, and this gives an increase of nearly 2 % live weight or 1 lb of live weight increase for 8¼ lb of dry food eaten. Sheep finishing at 135 lb live weight yield about 53 % of carcass or over 70 lb each.

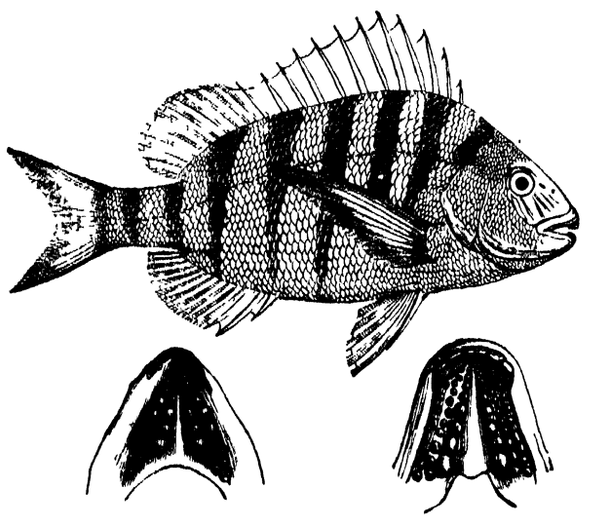
Management of Mountain Breeds. Ewes on natural pastures receive no hand feeding except a little hay when snow deeply covers the ground. The rams come in from the hills on the 1st of January and are sent to winter on turnips. Weak ewes, not safe to survive the hardships of spring, are brought in to better pasture during February and March. Ewe hogs wintered on grass in the low country from the 1st of November are brought home in April, and about the middle of April on the average mountain ewes begin to lamb. One lamb at weaning time for every ewe is rather over the normal amount of produce. Cheviot and cross-bred lambs are marked, and the males are castrated, towards the end of May. Nearly a month later black-face lambs are marked and the eild sheep are shorn—the shearing of milch ewes being delayed till the second week of July. Towards the end of July sheep are all dipped to protect them from maggot flies (which are generally worst during August) with materials containing arsenic and sulphur, like that of Cooper and Bigg. Fat wethers for the butcher are drafted from the hills in August and the two succeeding months. Lamb sales are most numerous in August, when lowland farmers secure their tegs to feed in winter. In this month breeding ewes recover condition and strength to withstand the winter storms. Ram auctions are on in September and draft ewe sales begin and continue through October. Early this month winter dipping is done at midday in dry weather. Early in November stock sheep having lost the distinguishing "buist" put on at clipping time with a large iron letter dipped in hot tar, have the distinctive paint or kiel mark claimed by the farm to which they belong rubbed on the wool. The rams are turned out to the hills between the 15th and the 24th of November.

Lowland rams put to breed half-bred and cross lambs receive about 1 lb of grain daily to prevent their falling off too rapidly in condition, as they would do if exclusively supported on mountain fare.

LITERATURE.—D. Low, *Breeds of the Domestic Animals of the British Isles* (1842, illustrated, and 1845); R. Wallace, *Farm Live Stock of Great Britain* (1907); J. Coleman, *Sheep of Great Britain* (1907), and the *Flock Books* of the various breed societies. (R. W.)

SHEEPSHANKS, JOHN (1787–1863), British manufacturer and art collector, was born in Leeds, and became a partner in his father's business as a cloth manufacturer. His brother Richard (1794–1855) was a distinguished astronomer and man of science, whose collection of instruments eventually passed to the Royal Astronomical Society. John Sheepshanks collected pictures, mainly by British artists, and in 1857 presented his magnificent collection to the nation. He retired from business in 1833 and died a bachelor in 1863.

SHEEPSHEAD, the name of one of the largest species of the genus *Sargus*, marine fishes known on the coasts of S. Europe as "sargo" or "saragu." These fishes possess two kinds of teeth:—one, broad and flat, like incisors, occupying in a single series the front of the jaws; the other, semiglobular and molar-like, arranged in several series on the sides of the jaws. The genus belongs to the Acanthopterygian family *Sparidae* which includes the Sea-breams. The sheepshead, *Sargus ovis*, occurs in abundance on the Atlantic coasts of the United States, from Cape Cod to Florida, and is one of the most valued food-fishes of



Sheepshead.

North America. It is said to attain to a length of 30 in. and a weight of 15 lb. Its food consists of shellfish, which it detaches with its incisors from the base to which they are fixed, crushing them with its powerful molars. It may be distinguished from other allied species by seven or eight dark cross-bands traversing the body, by a recumbent spine in front of the dorsal fin, by twelve spines and as many rays of the dorsal and ten rays of the anal fin, and by forty-six scales along the lateral line. The term "sheepshead" is also given in some parts of North America to a freshwater Sciaenoid, *Corvina oscula*, which is much less esteemed for the table.

SHEERNESS, a garrison town and naval seaport in the Faversham parliamentary division of Kent, England, in the Isle of Sheppey, on the right bank of the Medway estuary at its junction with the Thames, 51 m. E. of London by the South-Eastern & Chatham railway. Pop. of urban district (1901) 18,179. Blue Town, the older part of the town, with the dockyard, is defended by strong modern-built fortifications, especially the forts of Garrison Point and Barton's Point, commanding the entrance of both the Thames and the Medway. The dockyard, chiefly used for naval repairs, covers about 60 acres, and consists of three basins and large docks, the depth of water in the basins ranging down to 26 ft. Within the yard there are extensive naval stores and barracks. Outside the dockyard are the residences of the admiral of the home fleet and other officers, and barracks. The harbour is spacious, sheltered, and deep even at low water. Sheerness has some trade in corn and seed, and there is steamboat connexion with Port Victoria, on the opposite side of the Medway; with Southend, on the opposite side of the Thames; and with Chatham and London, and the town is in some favour as a seaside resort. A small fort was built at Sheerness by Charles II., which, on the 10th of July 1667, was taken by the Dutch fleet under De Ruyter.

SHEET, an expanse or surface, flat and thin, of various materials; a rope attached to a sail. These two apparently widely separated meanings are to be explained by the generally received etymology. In O. Eng. there are three words, all from the root seen in "shoot," to dart, let fly, thrust forward; *scete* or *scȳte*, a sheet of cloth, *sceat*, corner or fold of a garment, projecting angles, region (*e.g. sæs sceât*, portion of the sea, gulf, bay), and *scēata*, foot of a sail, *pes veli* (Wright, *Gloss.*). The original meaning, according to Skeat, is "projection," or that which shoots out, then a corner, especially of a garment or of a cloth; after which it was extended to mean a whole cloth or "sheet." In Icelandic, the cognate word *skaut* has much the same meanings, including that of a rope attached to a sail. Other cognate forms in Teutonic languages are Ger. *Schoss*, lap, bosom, properly fold of a garment, Dutch *schoot*, Icel. *skaut*, &c. In current English usage, "sheet" is commonly applied to any flat, thin surface, such as a sheet of paper, a sheet of metal, or, in a transferred application, to an expanse of water, ice, fire, &c. More specifically it is used of a rectangular piece of linen or cotton used as that part of the usual bed clothes which are next the sleeper's body. In nautical usage the term "sheet" is applied to a rope or chain attached to the lower corners of a sail for the purpose of extension or change of direction (see RIGGING). The connexion in derivation with "shoot" is clearly seen in "sheet-anchor," earlier "shoot-anchor"—one that is kept in reserve, to be "shot" in case of emergency (see ANCHOR).

SHEFFIELD, JOHN BAKER HOLROYD, 1ST EARL OF (1735–1821), English politician, came of a Yorkshire family, a branch of which had settled in Ireland. He inherited considerable wealth, and in 1769 bought Sheffield Place in Sussex from Lord de la Warr. Having served in the army he entered the House of Commons in 1780, and in that year was prominent against Lord George Gordon and the rioters. In 1783 he was created an Irish peer as Baron Sheffield of Roscommon, a barony of the United Kingdom (Sheffield of Sheffield, Yorks.) being added in 1802. In 1816 he was created Viscount Pevensey and earl of Sheffield. He was a great authority on farming, and in 1803 he was made president of the Board of Agriculture; but he is chiefly remembered as the friend of Gibbon (*q.v.*), whose works he afterwards edited. His son and grandson succeeded as 2nd and 3rd earls, the latter (1832–1909) being a well-known patron of cricket, at whose death the earldom became extinct. The Irish barony, however, under a special remainder, passed to the 4th baron Stanley of Alderley, who thus became Baron Sheffield of Roscommon.

SHEFFIELD, a city, and municipal, county and parliamentary borough in the West Riding of Yorkshire, England, 158½ m. N.N.W. from London. Pop. (1901) 409,070. It is served by the Midland, Great Central and Great Northern railways, and has direct connexion with all the principal lines in the north of England. The principal stations are Victoria (Great Central) and Midland. Sheffield is situated on hilly ground in the extreme south of the county, and at the junction of several streams with the river Don, the principal of which are the Sheaf, the Porter, the Rivelin and the Loxley. The manufacturing quarter lies mainly in the Don valley, while the chief residential suburbs extend up the picturesque hills to the south. The centre of the city, with the majority of the public buildings, lies on the slope south of the Don, and here are several handsome thoroughfares. The older portions were somewhat irregular and overcrowded, but a great number of improvements were effected under an act of 1875, and have been steadily continued. There is an extensive system of tramways, serving the outlying townships. The parish church of St Peter is a cruciform building, mainly Perpendicular. The original Norman building is supposed

to have been burned during the wars of Edward III. with the barons, and the most ancient existing part is the tower, dating from the 14th century. A restoration in 1880, when transepts and a W. front were added, improved the church by demolishing the galleries and other heavy internal fittings. There are a number of interesting mural monuments; and the Shrewsbury chapel contains a fine tomb of the 4th earl of Shrewsbury, who founded it in the 16th century. Of the principal public buildings, the town hall was opened by Queen Victoria in 1897. It is a fine building in the style of the Renaissance, surmounted by a lofty tower, which is crowned by an emblematic statue in bronze. The Cutlers' hall was built in 1832 and enlarged in 1857 by the addition of a magnificent banqueting hall. The handsome corn exchange, in Tudor style, and the market hall were acquired from the duke of Norfolk by the corporation. Among several theatres, the Theatre Royal was originally erected in 1793. Others are the Alexandra, Lyceum and Alhambra. There are extensive barracks. Literary and social institutions include the Athenaeum (1847), with news-room and library; the literary and philosophical society (1822), the Sheffield club (1862), the Sheffield library, founded in 1777, and the free library (1856), with several branches. The public museum and the Mappin art gallery are situated in Weston Park; and in Meersbrook Hall is the fine Ruskin museum, containing Ruskin's art, mineralogical, natural history, and botanical collections, and some original drawings and valuable books. These are in the custody of the corporation. Beyond St Peter's church relics of antiquity are few, but there remains a part of the manor-house of Hallam, dating from the 16th century. In the S. of the city is Broom Hall, a fine ancient half-timbered building.

The educational establishments are important. University College, constituted by that title in 1897, was founded in 1879 as the Firth College by Mark Firth (1819–1880), an eminent steel-manufacturer. This institution was enlarged in 1892, and comprised, besides the college, a technical department (1886) occupying the buildings of the former grammar school, and equipped with metallurgical laboratories, steel works, iron foundry, a machine and fitting shop, &c.; and a medical school, together with a school of pharmacy. In 1903 the foundation was laid of a building, at Western Bank, to contain the departments of medicine, arts, pure science, commerce, &c. When the college became dissociated in 1904 from the Victoria University, Manchester, of which it had formed a constituent, the necessary financial and other preparations were taken in hand to enable the college to be incorporated as the Sheffield University, and it was opened as such by King Edward VII. Other educational institutions are the free writing school (1715, rebuilt in 1827), the boys' charity school (founded 1706), the girls' charity school (1786), the Church of England educational institute, the Roman Catholic reformatory (1861), the Wesley College, associated with London University, Ranmoor College of the Methodist New Connexion, the mechanics' institute, and the school of art.

Among numerous medical or benevolent institutions may be mentioned the general infirmary, opened in 1797; the public hospital, erected in 1858 in connexion with the Sheffield medical school established in 1792; the school and manufactory for the blind, 1879, and the South Yorkshire lunatic asylum, 1872. Among many charities founded by citizens the most noteworthy is the Shrewsbury hospital for twenty men and twenty women, originally founded by the 7th earl of Shrewsbury (d. 1616), but greatly enlarged by successive benefactions.

Among public monuments are the statue of Queen Victoria before the town hall; the statue to James Montgomery the poet (1771–1854), chiefly erected by the Sunday school teachers of Sheffield; the monument in Weston Park to Ebenezer Elliot (1781–1849), known as the Corn Law rhymer; the column to Godfrey Sykes the artist (1825–1866); the monument to those who died during an outbreak of cholera in 1833; and the monument to the natives of Sheffield who fell in the Crimean War. Sir Francis Chantrey, the eminent sculptor, was born (1781) and died (1842) near Norton in Derbyshire, in the neighbourhood of Sheffield, which was the scene of his earlier work.

Sheffield is well supplied with parks and public grounds. In the western suburbs is Weston Park, occupying the grounds of Weston Hall, purchased by the corporation in 1873. The Firth Park, of 36 acres, on the N.E. of the city, was presented by Mark Firth, and was opened in 1875 by King Edward VII. and Queen Alexandra when prince and princess of Wales. There are botanical gardens of 18 acres in the western suburbs. A park and other recreation grounds have been presented by the duke of Norfolk as lord of the manor. To the N.W., towards Penistone, is Wharncliffe, retaining much of the characteristics of an ancient forest, and overlooking the valley of the Don from bold rocky terraces and ridges. The Bramall Lane cricket ground in Sheffield is the scene of many of the Yorkshire county cricket matches.

The prosperity of Sheffield is chiefly dependent on the manufacture of steel. The smelting of iron in the district is supposed to date from Roman times, and there is distinct proof carrying it back as far as the Norman Conquest. The town had become famed for its cutlery by the 14th century, as is shown by allusions in Chaucer. There was an important trade carried on in knives in the reign of Elizabeth, and the Cutlers' Company was incorporated in 1624. In early times cutlery was made of blister or bar steel; afterwards shear steel was introduced for the same purpose; but in 1740 Benjamin Huntsman of Handsworth introduced the manufacture of cast steel, and Sheffield retains its supremacy in steel manufacture, notwithstanding foreign competition, especially that of Germany and the United States, its trade in heavy steel having kept pace with that in the other branches. It was with the aid of Sheffield capital that Henry Bessemer founded his pioneer works to develop the manufacture of his invention, and a large quantity of Bessemer steel is still made in Sheffield. The heavy branch of the steel manufacture includes armour plates, rails, tyres, axles, large castings for engines, steel shot, and steel for rifles. The cutlery trade embraces almost every variety of instrument and tool—spring and table knives, razors, scissors, surgical instruments, mathematical instruments, edge tools, files, saws, scythes, sickles, spades, shovels, engineering tools, hammers, vices, &c. The manufacture of engines and machinery is also largely carried on, as well as that of stoves and grates. The art of silver plating was introduced by Thomas Bolsover in 1742, and specimens of early Sheffield plate are highly prized. Among the other industries of the town are tanning, confectionery, cabinet-making, bicycle-making, iron and brass founding, silver refining, the manufacture of brushes, combs, optical instruments, horse-hair cloth, and railway fittings, and testing. The Cutlers' Company (1624) exercises, by acts of 1883–1888, jurisdiction in all matters relating to the registration of trade marks, over all goods composed in whole or in part of any metal, wrought or unwrought, as also over all persons carrying on business in Hallamshire and within 6 m. thereof. There are numerous collieries in the neighbourhood.

Sheffield is the seat of a suffragan bishop in the diocese of York. The town trust for the administration of property belonging to the town dates from the 14th century, and in 1681 the number and manner of election of the "town trustees" was definitely settled by a decree of the Court of Chancery. Additional powers were conferred on the trustees by an act passed in 1874. The town first returned members to parliament in 1832. In 1885 the representation was increased from two to five members, the parliamentary divisions being Attercliffe, Brightside, Central, Ecclesall and Hallam. The county borough was created in 1888, and in 1893 the town became a city. The corporation consists of a lord mayor (the title was conferred on the chief magistrate in 1897), 16 aldermen, and 48 councillors. Area, 23,662 acres.

At the time of the Domesday Survey the four manors of Grimesthorpe, Hallam, Attercliffe and Sheffield (Escafeld) made up what is now the borough of Sheffield. Of these Hallam was the most important, being the place where Earl Waltheof, the Saxon lord of the manors, had his court. After the Conquest the earl was allowed to retain his possessions, and when he was executed for treason they passed to his widow Judith, niece of William the Conqueror, of whom Roger de Busli was holding Hallam with the three less important manors at the time of the Domesday Survey. From him the manors passed to the family of de Lovetot, but in the reign of Henry II., William de Lovetot, the 2nd lord, died without male issue, and his property passed to his daughter Maud, afterwards married to Gerard de Furnival. By the end of the 14th century Sheffield had become more important than Hallam, partly no doubt on account of the castle which one of the Furnivals had built here. Thomas de Furnival, great-great-grandson of Gerard and Maud, in 1296 obtained a grant of a market every Tuesday and a fair every year on the

eve, day and morrow of Holy Trinity, and in the following year he gave the inhabitants a charter granting them the privileges of holding the town at a fee-farm rent of £3, 8s. 9½d. yearly, of having a court baron held every three weeks, and of freedom from toll throughout the whole of Hallamshire. From the Furnivals the manor passed by marriage to John Talbot, afterwards earl of Shrewsbury, whose descendant the 6th earl was entrusted with the care of Mary Queen of Scots during her twelve years' imprisonment in Sheffield castle. In the reign of Edward VI. the property belonging to the town which had been amalgamated with other land left to the burgesses in trust for certain charitable uses was forfeited to the crown under the act for the suppression of colleges and chantries, but on their petition it was restored in 1554 by Queen Mary, who at the same time incorporated the town under the government of twelve capital burgesses.

See *Victoria County History, Yorkshire*: Joseph Hunter, *Hallamshire: the history and topography of the parish of Sheffield* (1869).

SHEFFIELD PLATE, the name applied to a variety of articles of domestic use or ornament, made of copper coated with silver by a special and now abandoned process. Many of them were actually manufactured in Birmingham, but as the secret of producing the material was discovered and brought to perfection in Sheffield, the name of that town was naturally connected with it, and thence transferred to articles constructed from it.

In 1742 a workman named Thomas Bolsover was mending the handle of a knife made of silver and copper, when, accidentally overheating it, he caused the metals to fuse and flow, and found that as a consequence the silver adhered to the copper as a thin coating. Being an intelligent man, he perceived the commercial value of his chance discovery, and began the manufacture of articles which, with all the appearance of silver, were both cheaper and stronger than those made of the pure metal. He apparently, however, confined himself to applying the silver direct to the surface of the copper after the latter had been given the shape destined to it, and was thus limited to the production of small articles such as snuff-boxes, knife handles, toilet articles, &c. It was reserved to Joseph Hancock to realize that by making the plate first and working it into the desired form afterwards he could almost indefinitely extend the possibilities of the material. The process in its final and highest development was as follows. The groundwork was a mixture of copper and brass, either metal alone having serious defects. This was cast into an oblong ingot, 1 to 1½ in. in thickness, 2½ in. in breadth, and of a length regulated by the size of the plate desired. The surface of this was brought by planing, grinding and other means to the highest possible pitch of smoothness and evenness. A sheet of silver of a finer quality than standard, ranging in thickness from $\frac{1}{16}$ in. to nearly 1 in. according to the quality aimed at, and of the same superficial extent as the copper bar, was levelled and polished in the same way and accurately fitted to it, neither surface at any time being soiled by contact with the workman's fingers. A sheet of copper, rather smaller than the other two and $\frac{1}{16}$ in. thick was laid upon the silver, and on the top of all was added a piece of iron, ¼ in. thick, 1 in. wide, and a little shorter than the three others, to protect them from the direct contact of the strong iron wire with which all were firmly bound together. The junction of the edges of the silver and copper-blend was treated with a flux of borax and the whole was submitted to the heat of a furnace until the silver was seen to be melting, when it was instantly removed, care being taken to avoid pressing upon the upper or lower surfaces, as the liquid silver in that case would have been squeezed out from between the two enclosing plates and the operation ruined. It was then left to cool, and after being thoroughly cleansed presented the appearance of a copper ingot with one silver side. This was passed again and again between gradually approximated rollers, with occasional annealing, until the desired thickness had been attained. The great extension of surface thus produced had the drawback of exaggerating any small defect in the union of the two metals, increasing it to a blister of an inch or more in diameter. It was, however, fortunately found easy to remedy this. The blister if unbroken was heated, pricked, and then rubbed level with a burnisher; if, as sometimes happened, the silver had flaked away it was replaced by coatings of pure leaf silver rubbed in with a burnisher. The plate when passed as flawless was cut into the desired form and moulded as far as possible into shape, the edges where necessary being soldered. At first only one surface of the copper was plated with silver and thus its usefulness was necessarily restricted, but it was a simple matter to apply the silver to both sides and thenceforward whatever was made in solid metal could be reproduced in plate, and firm after firm went into the business, ever and anon introducing further improvements. The possibility of embossing the metal beyond a certain point without fracturing the coating of silver was got over by casting or stamping the raised ornament in silver, filling the hollows with a form of pewter and soldering the result to the appropriate part of the general design. Another difficulty, the concealment of the inner core of copper which was seen as a thin red line when a cut edge was exposed, was met about 1784 by George Cadman, who adopted the practice of soldering on an edging, generally ornamented, of solid silver so as to cover the junction, and the presence of this is one of the trustworthy tests by which genuine Sheffield plate may be recognized. The labour of rolling the metal by hand was done away with about 1760, by the firm of Tudor, Leader & Sherburn, who first employed horse-power, and for more than half a century the trade both in Sheffield and Birmingham continued to flourish. In 1736 there were under 10,000 inhabitants in the former city; in 1760 when Horace Walpole passed through it, buying for two guineas a pair of candlesticks of the local plate, which he thought "quite pretty," and pronouncing it to be "one of the foulest towns in England," there were two-and-twenty thousand who remitted eleven thousand pounds a week to London. It would be impossible, were it desirable, to enumerate all the varieties of the articles turned out, or to overpraise the beauty and elegance of most of them. The designs were identical with those in favour with the gold- and silver-smiths of the period, which was happily one when exceptionally good taste prevailed. The appreciation of light and well-proportioned curves and the skilful employment of well-contrived pierced work are conspicuous features.

The success was, however, doomed to be short-lived and to come to an end as swiftly as it had grown up. In the year 1800 W. Cruikshank was already experimenting with a process of electro-plating, and in 1837 Mr Spencer in England, and in 1838 Professor M. H. Jacobi (1801–1874) in Russia, working independently, succeeded in contriving methods which could be made commercially profitable. Two years later Messrs Elkington in London and M. de Ruolz of Paris started in business on those lines, and the slower and consequently more costly manufacture at Sheffield and Birmingham rapidly died out.

Of recent years old Sheffield plate after long neglect has come into fashion again, and genuine articles in good condition have greatly gone up in value, often exceeding in cost those of more modern date in sterling silver. Concurrently fraudulent imitation has regrettably increased. In some cases the whole object is a modern reproduction in electro-plate, but more often really old articles from which the original plating has been worn off in course of time have been replated, both equally being in the eyes of the connoisseur unworthy of serious attention and comparatively valueless. The difference after a little experience is not difficult to detect, though inexpressible in words. The pressure to which the Sheffield plate was submitted produces a definite colour and texture which is absent from the surface produced by the deposit of silver in a liquid medium by electrical means, and the coat of silver is spread by the latter uniformly over the whole surface without a break, while in the former the junction between the embossed ornaments and the silver strips covering the cut edges may often be detected on careful examination.

See *Sheffield Plate* by Bertie Wyllie; H. N. Veitch, *Sheffield Plate: its history, manufacture and art* (London, 1908). (M. Be.)

SHEIKH, or Shaikh, an Arabic title of respect. Strictly it means a venerable man, of more than fifty years of age. It is specially borne by heads of religious orders, chiefs of

tribes and headmen of villages. Every village, however small, every separate quarter of a town, has a sheikh in whom is lodged the executive power of government—a power loosely defined, and of more or less extent according to the personal character and means of the individual who wields it. A village sheikh is a sort of head magistrate and chief of police. The Koran, the sole authentic authority in all matters, legal or civil, never accurately distinguished between the sheikh and the cadi (*q.v.*), and its phrases, besides, are vague and capable of admitting different and even opposite interpretations. (For the Sheikh ul-Islam see MUFTI.)

SHEIL, RICHARD LALOR (1791–1851), Irish politician and writer, was born at Drumdowney, Tipperary, on the 17th of August 1791. His father, Edward Sheil, had acquired considerable wealth in Spain, and owned an estate in Tipperary. The son was taught French and Latin by the Abbé de Grimeau, a French refugee. He was then sent to a school in Kensington, London, presided over by another émigré, M. de Broglie. In October 1804 he was removed to Stonyhurst college, Lancashire, and in November 1807 entered Trinity College, Dublin, where he specially distinguished himself in the debates of the Historical Society. After taking his degree in 1811 he entered Lincoln's Inn, and was admitted to the Irish bar in 1814. His play of *Adelaide, or the Emigrants*, was played at the Crow Street theatre, Dublin, on the 19th of February 1814, with complete success, and on the 23rd of May 1816 it was performed at Covent Garden. The *Apostate*, produced at the latter theatre on the 3rd of May 1817, firmly established his reputation as a dramatist. His principal other plays are *Bellamira* (written in 1818), *Evadne* (1819), *Huguenot*, produced in 1822, and *Montini* (1820). In 1822 he began, along with W. H. Curran, to contribute to the *New Monthly Magazine* a series of graphic and racy papers entitled *Sketches of the Irish Bar*. These were edited by M. W. Savage in 1855 in two volumes, under the title of *Sketches Legal and Political*. Sheil was one of the principal founders of the Catholic Association in 1823 and drew up the petition for inquiry into the mode of administering the laws in Ireland, which was presented in that year to both Houses of Parliament. In 1825 Sheil accompanied O'Connell to London to protest against the suppression of the Catholic Association. The protest was unsuccessful, but, although nominally dissolved, the association continued its propaganda after the defeat of the Catholic Relief Bill in 1825; and Sheil was one of O'Connell's leading supporters in the agitation persistently carried on till Catholic emancipation was granted in 1829. In the same year he was returned to Parliament for Milborne Port, and in 1831 for Louth. He took a prominent part in all the debates relating to Ireland, and although he was greater as a platform orator than as a debater, he gradually won the somewhat reluctant admiration of the House. In August 1839 he became vice-president of the board of trade in Lord Melbourne's ministry. After the accession of Lord John Russell to power in 1846 he was appointed master of the mint, and in 1850 he was appointed minister at the court of Tuscany. He died at Florence on the 23rd of May 1851.

See *Memoirs of Richard Lalor Sheil*, by W. Torrens M'Cullagh (2 vols., 1855). His *Speeches* were edited in 1845 by Thomas McNevin.

SHEKEL (from Heb. *shakal*, to weigh), originally a Jewish unit of weight ($\frac{1}{60}$ of a mina, and $\frac{1}{3000}$ of a talent) and afterwards a coin of the same weight. The Biblical references to shekels must refer to uncoined ingots. In the time of Josephus it seems that the *light* shekel weighed from 210 to 210·55 grains; the *heavy* shekel was twice that amount, which is practically identical with the Phoenician weight (224·4 grains). It corresponds to 1s. 4½d. and 2s. 9d. respectively in English silver. Jewish shekels were first coined by Simon the Hasmonean, probably in 139–138 B.C. These bear inscriptions in the archaic Hebrew and various emblems, such as the cup or chalice, the lily branch with three flowers, the candlestick, the citron and palm branch and so forth. They never bear the portraits of rulers or figures of animals. A later series of shekels, belonging to the Roman period, are tetradrachms, "which came from the mints of Caesarea and Antioch and were used as blanks on which to impress Jewish types." Hence in Matt. xvi. 24 the temple tax of half a shekel is called a didrachm (2 drams). In 2 Samuel xiv. 26 we read of "shekels after the King's weight." The royal norm was heavier than the common norm. The Hebrews divided the shekel into 20 parts, each of which was called a *gerah*. (See also NUMISMATICS.)

See articles in *Ency. Bibl.* col. 4442, and Hastings' *Dict. of the Bible*, ii. 417 seq.; F. W. Madden, *Coins of the Jews* (1881); T. Reinach, *Jewish Coins* (1903). (I. A.)

SHEKINAH, a Hebrew word meaning "that which dwells" or "the dwelling." It is one of the expressions used in the Targums in place of "God."

In the Targums.—The word "Shekinah" is of constant occurrence in the *Targums* or Aramaic paraphrases of the Biblical lections that were read in the synagogue-service to the people. Great care was taken by the scribes in these renderings to mitigate the anthropomorphic expressions applied to God in the Scriptures, and by paraphrase, the use of abstract terms and indirect phraseology, to prevent such expressions from giving rise to erroneous views as to God's personal manifestation in the popular mind. Whenever, *e.g.* any indication of local limitation or action was implied or expressed, in the Hebrew text, of God the Targumists were careful to substitute some expression involving the use of "Shekinah." In these connexions "Shekinah" thus becomes the equivalent of "God" or its synonyms. One or two examples will make the Targum-usage clear. Thus Ex. xxix. 45 ("and I will dwell among the children of Israel and will be their God") is rendered in the Targum (Onkelos): "And I will *cause my Shekinah to dwell* in the midst of the children of Israel, and I will be their God." All expressions implying God's *local* presence are similarly rendered: thus *e.g.* Habak. ii. 20 ("Jehovah is in His holy temple") is rendered "Jehovah *was pleased to cause His Shekinah to dwell*," &c. "To see" God is similarly paraphrased. Thus Is. xxxiii. 17 ("thine eyes shall see the King in His beauty") is rendered (Targum of Jonathan): "Thine eyes shall see *the Shekinah of the king of the worlds* in His beauty." So too "hiding the face" when used of God is regularly paraphrased "remove His Shekinah" (Is. lvii. 17, viii. 17, lix. 2; Jer. xxxiii. 5; cf. Is. i. 15, &c.).

Closely connected with the idea of the Shekinah, but distinct from it, is that of "the glory of the Lord." "Glory," indeed, in this connexion was conceived of as a property of the Shekinah (as, in fact, it is of God for whom "Shekinah" is the equivalent). For the divine "glory" as a property of the Shekinah, cf. *e.g.* Is. vi. 5 ("mine eyes have seen the King, the Lord of hosts"), which is rendered in the Targum: "mine eyes have seen *the glory of the Shekinah* of the King of the worlds the Lord of hosts."

In the New Testament.—In the new Testament both the term and the idea are referred to in various ways. The close association of the divine "glory" with the visible Shekinah has already been referred to. This Shekinah-glory is several times denoted in the New Testament by δόξα. The most notable passage is Rom. ix. 4 where St Paul, enumerating the list of Israel's privileges, says: "whose is the adoption, *and the glory*" (*i.e.* the Shekinah-glory, the visible presence of God among His people), &c. cf. Luke ii. 9. There is also an obvious allusion to the Shekinah in the description of the theophanic cloud of the transfiguration-narrative (St. Matt. xvii. 5: "a bright cloud overshadowed them, and behold a voice out of the cloud, saying" &c.; cf. St Mark ix. 7; St Luke ix. 34), the same verb being used as in the LXX. of Exod. xl. 34, 35, of the cloud which rested on the tabernacle when it was filled with "the glory of the Lord." There can be no doubt, too, that the word rendered "tabernacle" (σκηνή) with the corresponding verb "to tabernacle" (σκηνοῦν) has been chosen for use in St John i. 14 and Rev. xii. 3, from its likeness both in sound and meaning to the term "Shekinah." The passage in Revelation runs: "Behold the tabernacle (σκηνή) of God is with men, and He will tabernacle (σκηνώσει) with them." In St John i. 14 there is an allusion to the Word (= *memra* of the Targums), the Shekinah, and the Shekinah-glory,

all of which the writer declares became incarnate in Jesus. Cf. also Heb. i. 3 (" effulgence of the [Shekinah] glory ").

In Talmud and Midrash.—It is remarkable that the *memra* (= Logos or " Word ") of the Targums almost entirely disappears in the Midrashic literature and the Talmud, its place being taken by *Shekinah*. The Rabbis apparently dreaded the possibility of such terms becoming hypostasized into personal entities distinct from God. Against this they emphasized the Shekinah-idea. It is safe to say that wherever Shekinah is mentioned in Rabbinic literature it is God's direct action or activity that is thought of. Independent personality is never imputed to it.[1] It is probable that the use of the term was often in Rabbinic writings polemical (against Jewish Christians or gnostic sects).

See under " Shekinah " in Hastings' *Dict. of the Bible*, and *Dict. of Christ and the Gospels*, and in the *Jewish Encyclopedia*; also Weber, *Jüdische Theologie*, 2nd ed., especially pp. 185-190. For the Targums in English, cf. Etheridge, *The Targums on the Pentateuch* (2 vols., 1862 and 1865); and Pauli, *The Chaldee Paraphrase of the Prophet Isaiah* (London, 1871). (G. H. Bo.)

SHELBY, ISAAC (1750–1826), American soldier and pioneer, was born at North Mountain, near Hagerstown, Maryland, on the 11th of December 1750. With his father, Evan Shelby (1720–1794), an emigrant from Wales, he removed to what is now Bristol, Tennessee, in 1771, and in 1774 took a conspicuous part in the battle of Point Pleasant.[2] He was a surveyor in Kentucky for the Transylvania Company in 1775; became a captain of Virginia minute-men in 1776, and in 1777 became commissary with supervision over transportation of supplies from Staunton, Virginia, to the frontier. In 1779 he was elected to the Virginia house of delegates, but, by the line established between Virginia and North Carolina at this time, he became a resident of North Carolina and he was appointed colonel of the Sullivan county militia, which in 1780 he commanded in guerilla fighting, and he led the left centre of the American force at King's Mountain (October 7). He served under General Francis Marion in 1781, and in 1782 was a member of the North Carolina House of Commons. He was active in the movement for the erection of the state of Kentucky, was a member of the Kentucky Constitutional Convention of 1792, and was governor of the new state in 1792–1796 and in 1812–1816; in 1813 he commanded twelve Kentucky regiments at the battle of the Thames, and for his services received the thanks of Congress and a gold medal. In 1818 he was a commissioner with Andrew Jackson to the Chickasaws. He died on his estate in Lincoln county, Kentucky, on the 18th of July 1826.

SHELBYVILLE, a city and the county-seat of Shelby county, Indiana, U.S.A., about 27 m. S.E. of Indianapolis, on the Big Blue river. Pop. (1890) 5451; (1900) 7169, of whom 326 were foreign-born. It is served by the Cleveland, Cincinnati, Chicago & St Louis and the Pittsburg, Cincinnati, Chicago & St Louis railways, and by an interurban electric line. It has a public library, a hospital and a children's home. The city is a trading centre for the surrounding farming region; among its manufactures furniture is the most important. Shelbyville, named in honour of General Isaac Shelby of Kentucky, was platted in 1822, incorporated as a town in 1850, and chartered as a city in 1860.

SHELD-DRAKE, or, as commonly spelt in its contracted form, SHELDRAKE, a word whose derivation[3] has been much discussed, one of the most conspicuous birds of the duck tribe, *Anatidae*, called, however, in many parts of England the " Burrow-Duck " and in some districts by the almost obsolete name of " Bergander " (Du. *Berg-eende*, Ger. *Bergente*), a word used by Turner in 1544.

The sheldrake is the *Anas tadorna*[4] of Linnaeus, and the *Tadorna cornuta* of modern ornithology, a bird somewhat larger and of more upright stature than an ordinary duck, having its bill, with a basal fleshy protuberance (whence the specific term *cornuta*), pale red, the head and upper neck very dark glossy green, and beneath that a broad white collar, succeeded by a still broader belt of bright bay extending from the upper back across the upper breast. The outer scapulars, the primaries, a median abdominal stripe, which dilates at the vent, and a bar at the tip of the middle tail-quills are black; the inner secondaries and the lower tail-coverts are grey; and the *speculum* or wing-spot is a rich bronzed-green. The rest of the plumage is pure white, and the legs are flesh-coloured. There is little external difference between the sexes, the female being only somewhat smaller and less brightly coloured. The sheldrake frequents the sandy coasts of nearly the whole of Europe and North Africa, extending across Asia to India, China and Japan, generally keeping in pairs and sometimes penetrating to favourable inland localities. The nest is always made under cover, usually in a rabbit-hole among sandhills, and in the Frisian Islands the people supply this bird with artificial burrows, taking large toll of it in eggs and down.

T. radjah of Australia, Papuasia and the Moluccas almost equals the true sheldrake in its brightly contrasted plumage, but the head is white in both sexes. Barbary, south-eastern Europe, and Central Asia are inhabited by an allied species of more inland range and very different coloration, the *T. casarca* or *Casarca rutila* of ornithologists, the ruddy sheldrake of English authors—for it has several times strayed to the British Islands—and the " Brahminy Duck " of Anglo-Indians, who find it resorting in winter, whether by pairs or by thousands, to their inland waters. This species is of an almost uniform bay colour all over, except the quill-feathers of the wings and tail, and (in the male) a ring round the neck, which are black, while the wing-coverts are white and the *speculum* shines with green and purple; the bill and legs are dark-coloured.[5] A species closely resembling the last, but with a grey head, *C. cana*, inhabits South Africa. In Australia occurs another species of more sombre colours, the *C. tadornoides*; and New Zealand is the home of another species, *C. variegata*, still less distinguished by bright hues. In the last two the plumage of the sexes differs not inconsiderably.

Sheldrakes will, if attention be paid to their wants, breed freely in captivity, crossing if opportunity be given them with other species, and an incident therewith connected possesses an importance hardly to be overrated by the philosophical naturalist. In the Zoological Society's gardens in London in the spring of 1859 a male of *T. cornuta* mated with a female of *C. cana*, and, as will have been inferred from what has been before stated, these two species differ greatly in the colouring of their plumage. The young of their union, however, presented an appearance wholly unlike that of either parent, and an appearance which can hardly be said, as has been said (*P.Z.S.*, 1859, p. 442), to be " a curious combination of the colours of the two." Both sexes of this hybrid have been admirably portrayed by J. Wolf; and, strange to say, when these figures are compared with equally faithful portraits by the same master of the Australian and New Zealand species, *C. tadornoides* and *C. variegata*, it will at once be seen that the hybrids present an appearance almost midway

[1] Maimonides, however, regarded the Shekinah, like the *memra* and " the glory," as a distinct entity.

[2] Isaac Shelby's letter describing the battle is printed in Theodore Roosevelt's *Winning of the West*, i. 341-344.

[3] Ray in 1674 (*Engl. Words*, p. 76) gave it from the local " sheld " (= particoloured), which, applied to animals, as a horse or a cat, still survives in East Anglia. This opinion is not only suitable but is confirmed by the bird's Old Norsk name *Skjöldungr*, from *Skjöldr*, primarily a patch, and now commonly bestowed on a piebald horse, just as *Skjalda* (Cleasby's *Icel. Dict., sub voce*), from the same source, is a particoloured cow. But some scholars interpret *Skjöldungr* by the secondary meaning of *Skjöldr*, a shield, asserting that it refers to " the shield-like band across the breast " of the bird. If they be right the proper spelling of the English word would be " Shield-drake," as some indeed have it. A third suggested meaning, from the Old Norsk *Skjól*, shelter, is philologically to be rejected, but, if true, would refer to the bird's habit, described in the text, of breeding under cover.

[4] This is the Latinized form of the French *Tadorne*, first published by Belon (1555), a word on which Littré throws no light except to state that it has a southern variant *Tardone*.

[5] Jerdon (*B. India*, iii. 793) tells of a Hindu belief that once upon a time two lovers were transformed into birds of this species, and that they or their descendants are condemned to pass the night on the opposite banks of a river, whence they unceasingly call to one another: " Chakwa, shall I come? " " No, Chakwi." " Chakwi, shall I come? " " No, Chakwa." As to how, in these circumstances, the race is perpetuated the legend is silent.

between the two species last named—species which certainly had nothing to do with their production.[1]

The genera *Tadorna* and *Casarca*, as shown by the tracheal characters and coloration, are most nearly related to *Chenalopex*, containing the bird so well known as the Egyptian goose, *C. aegyptiaca*, and an allied species, *C. jubata*, from South America. For the same reason the genus *Plectropterus*, composed of the spur-winged geese of Africa, and perhaps the Australian *Anseranas* and the Indian and Ethiopian *Sarcidiornis*, also appear to belong to the same group, which should be reckoned rather to the Anatine than to the Anserine section of the *Anatidae*. (A. N.)

SHELDON, CHARLES MONROE (1857–), American Congregational clergyman, was born in Wellsville, New York, on the 26th of February 1857. Graduating at Brown University in 1883 and at Andover Theological Seminary in 1886, he was pastor of a church at Waterbury, Vermont, in 1886–1888, and in 1889 became pastor of the Central Congregational Church of Topeka, Kansas. He is well known as the author of a number of widely read books of fiction, which at the same time inculcate an uncompromising obedience to the precepts of the Gospel in every-day life. Of these, *In His Steps* (1896), though not the earliest, is perhaps the best, and it is this one which first brought him into prominence.

SHELDON, GILBERT (1598–1677), archbishop of Canterbury, was born at Stanton in the parish of Ellastone, Staffordshire, and educated at Oxford. He was ordained in 1622 and was appointed chaplain to Thomas Lord Coventry (1578–1640). Four years later he was elected warden of All Souls' College, Oxford. During the years 1632–1639 he received the livings of Hackney (1633); Oddington, Oxfordshire; Ickford, Buckinghamshire (1636); and Newington, Oxfordshire; besides being a prebendary of Gloucester from 1632. In 1638 he was on a commission appointed to visit Merton College, Oxford. He was intimate with the Royalist leaders, participated in the negotiations for the Uxbridge treaty of 1644, and collected funds for Charles II. in exile. In 1648 he was ejected from All Souls' by order of parliament, and imprisoned for some months, but he regained the wardenship in 1659. In 1660 he became bishop of London and master of the Savoy, and the Savoy Conference was held at his lodgings. He was consecrated archbishop of Canterbury in 1663. He was greatly interested in the welfare of Oxford University, of which he became chancellor in 1667, succeeding Clarendon (1609–1674). The Sheldonian theatre at Oxford was built and endowed at his expense.

SHELL (O. Eng. *scell*, *scyll*, cf. Du. *schel*, shell, Goth. *skalja*, tile; the word means originally a thin flake, cf. Swed. *skalja*, to peel off; it is allied to "scale" and "skill," from a root meaning to cleave, divide, separate), the hard outside natural covering of anything, as of some fruits and seeds; more particularly, the conch (*q.v.*) or integument which acts as a defence for the bodies of various animals (see MOLLUSCA, GASTROPODA, MALACOSTRACA, &c.), the test, crust or carapace; also the outer covering of an egg. The word is also used of many objects resembling the natural shell in use or shape, and especially of a hollow projectile filled with explosives (see AMMUNITION, § *Shell*, and ORDNANCE).

See also SHELL-HEAPS, SHELL-MONEY.

SHELLEY, MARY WOLLSTONECRAFT (1797–1851), English writer, only daughter of William Godwin and his wife Mary Wollstonecraft, and second wife of the poet Percy Bysshe Shelley, was born in London on the 30th of August 1797. For the history of her girlhood and of her married life see GODWIN, WILLIAM, and SHELLEY, P. B. When she was in Switzerland with Shelley and Byron in 1816 a proposal was made that various members of the party should write a romance or tale dealing with the supernatural. The result of this project was that Mrs Shelley wrote *Frankenstein*, Byron the beginning of a narrative about a vampyre, and Dr Polidori, Byron's physician, a tale named *The Vampyre*, the authorship of which used frequently in past years to be attributed to Byron himself. *Frankenstein*, published in 1818, when Mrs Shelley was at the utmost twenty-one years old, is a very remarkable performance for so young and inexperienced a writer; its main idea is that of the formation and vitalization, by a deep student of the secrets of nature, of an adult man, who, entering the world thus under unnatural conditions, becomes the terror of his species, a half-involuntary criminal, and finally an outcast whose sole resource is self-immolation. This romance was followed by others: *Valperga, or the Life and Adventures of Castruccio, Prince of Lucca* (1823), an historical tale written with a good deal of spirit, and readable enough even now; *The Last Man* (1826), a fiction of the final agonies of human society owing to the universal spread of a pestilence—this is written in a very stilted style, but possesses a particular interest because Adrian is a portrait of Shelley; *The Fortunes of Perkin Warbeck* (1830); *Lodore* (1835), also bearing partly upon Shelley's biography, and *Falkner* (1837). Besides these novels there was the *Journal of a Six Weeks' Tour* (the tour of 1814 mentioned below), which is published in conjunction with Shelley's prose-writings; and *Rambles in Germany and Italy* in 1840–1842–1843 (which shows an observant spirit, capable of making some true forecasts of the future), and various miscellaneous writings. After the death of Shelley, for whom she had a deep and even enthusiastic affection, marred at times by defects of temper, Mrs Shelley in the autumn of 1823 returned to London. At first the earnings of her pen were her only sustenance; but after a while Sir Timothy Shelley made her an allowance, which would have been withdrawn if she had persisted in a project of writing a full biography of her husband. In 1838 she edited Shelley's works, supplying the notes that throw such invaluable light on the subject. She succeeded, by strenuous exertions, in maintaining her son Percy at Harrow and Cambridge; and she shared in the improvement of his fortune when in 1840 his grandfather acknowledged his responsibilities and in 1844 he succeeded to the baronetcy. She died on the 21st of February 1851.

SHELLEY, PERCY BYSSHE (1792–1822), English poet, was born on the 4th of August 1792 at Field Place, near Horsham, Sussex. He was the eldest child of Timothy Shelley (1753–1844), M.P. for Shoreham, by his wife Elizabeth, daughter of Charles Pilfold, of Effingham, Surrey. His father was the son and heir of Sir Bysshe Shelley, Bart. (d. 1815), whose baronetcy (1806) was a reward from the Whig party for political services. Sir Bysshe's father Timothy had emigrated to America, and he himself had been born in Newark, New Jersey; but he came back to England, and did well for himself by marrying successively two heiresses, the first, the mother of Timothy, being Mary Catherine, daughter of the Rev. Theobald Michell of Horsham. He was a handsome man of enterprising and remarkable character, accumulated a vast fortune, built Castle Goring, and lived in sullen and penurious retirement in his closing years. None of his talent seems to have descended to his son Timothy, who, except for being of a rather oddly self-assertive character, was undistinguishable from the ordinary run of commonplace country squires. The mother of the poet is described as beautiful, and a woman of good abilities, but not with any literary turn; she was an agreeable letter-writer. The branch of the Shelley family to which the poet Percy Bysshe belonged traces its pedigree to Henry Shelley, of Worminghurst, Sussex, who died in 1623. These Worminghurst or Castle Goring Shelleys are of the same stock as the Michelgrove Shelleys, who trace up to Sir William Shelley, judge of the common pleas under Henry VII., thence to a member of parliament in 1415, and to the reign of Edward I., or even to the epoch of the Norman Conquest. The Worminghurst branch was a family of credit, but not of special distinction, until its fortunes culminated under the above-named Sir Bysshe.

In the character of Percy Bysshe Shelley three qualities became early manifest, and may be regarded as innate: impressionableness or extreme susceptibility to external and internal impulses of feeling; a lively imagination or erratic fancy, blurring a sound estimate of solid facts; and a resolute repudiation

[1] It is further worthy of remark that the young of *C. variegata* when first hatched closely resemble those of *C. rutila*, and when the former assume their first plumage they resemble their father more than their mother (*P.Z.S.*, 1866, p. 150).

of outer authority or the despotism of custom. These qualities were highly developed in his earliest manhood, were active in his boyhood, and no doubt made some show even on the borderland between childhood and infancy. At the age of six he was sent to a day school at Warnham, kept by the Rev. Mr Edwards; at ten to Sion House School, Brentford, of which the principal was Dr Greenlaw, while the pupils were mostly sons of local tradesmen; at twelve (or immediately before that age, on the 29th of July 1804) to Eton. The headmaster of Eton, up to nearly the close of Shelley's sojourn in the school, was Dr Goodall, a mild disciplinarian; it is therefore a mistake to suppose that Percy (unless during his very brief stay in the lower school) was frequently flagellated by the formidable Dr Keate, who only became headmaster after Goodall. Shelley was a shy, sensitive, mopish sort of boy from one point of view—from another a very unruly one, having his own notions of justice, independence and mental freedom; by nature gentle, kindly and retiring—under provocation dangerously violent. He resisted the odious fagging system, exerted himself little in the routine of school-learning, and was known both as "Mad Shelley" and as "Shelley the Atheist." Some writers try to show that an Eton boy would be termed atheist without exhibiting any propensity to atheism, but solely on the ground of his being mutinous. However, as Shelley was a declared atheist a good while before attaining his majority, a shrewd suspicion arises that, if Etonians dubbed him atheist, they had some relevant reason for doing so.

Shelley entered University College, Oxford, in April 1810, returned thence to Eton, and finally quitted the school at midsummer, and commenced residence in Oxford in October. Here he met a young Durham man, Thomas Jefferson Hogg, who had preceded him in the university by a couple of months; the two youths at once struck up a warm and intimate friendship. Shelley had at this time a love for chemical experiment, as well as for poetry, philosophy, and classical study, and was in all his tastes and bearing an enthusiast. Hogg was not in the least an enthusiast, rather a cynic, but he also was a steady and well-read classical student. In religious matters both were sceptics, or indeed decided anti-Christians; whether Hogg, as the senior and more informed disputant, pioneered Shelley into strict atheism, or whether Shelley, as the more impassioned and unflinching speculator, outran the easy-going jeering Hogg, is a moot point; we incline to the latter opinion. Certain it is that each egged on the other by perpetual disquisition on abstruse subjects, conducted partly for the sake of truth and partly for that of mental exercitation, without on either side any disposition to bow to authority or stop short of extreme conclusions. The upshot of this habit was that Shelley and Hogg, at the close of some five months of happy and uneventful academic life, got expelled from the university. Shelley—for he alone figures as the writer of the "little syllabus," although there can be no doubt that Hogg was his confidant and coadjutor throughout—published anonymously a pamphlet or flysheet entitled *The Necessity of Atheism*, which he sent round to bishops and all sorts of people as an invitation or challenge to discussion. It amounted to saying that neither reason nor testimony is adequate to establish the existence of a deity, and that nothing short of a personal individual self-revelation of the deity would be sufficient. The college authorities heard of the pamphlet, identified Shelley as its author, and summoned him before them—"our master, and two or three of the fellows." The pamphlet was produced, and Shelley was required to say whether he had written it or not. The youth declined to answer the question, and was expelled by a written sentence, ready drawn up. Hogg was next summoned, with a result practically the same. The precise details of this transaction have been much controverted; the best evidence is that which appears on the college records, showing that both Hogg and Shelley (Hogg is there named first) were expelled for "contumaciously refusing to answer questions," and for "repeatedly declining to disavow" the authorship. Thus they were dismissed as being mutineers against academic authority, in a case pregnant with the suspicion—not the proof—of atheism; but how the authorities could know beforehand that the two undergraduates would be contumacious and stiff against disavowal, so as to give warrant for written sentences ready drawn up, is nowhere explained. Possibly the sentences were worded without ground assigned, and would only have been produced *in terrorem* had the young men proved more malleable. The date of this incident was the 25th of March 1811.

Shelley and Hogg came up to London, where Shelley was soon left alone, as his friend went to York to study conveyancing. Percy and his incensed father did not at once come to terms, and for a while he had no resource beyond pocket-money saved up by his sisters (four in number altogether) and sent round to him, sometimes by the hand of a singularly pretty school-fellow, Miss Harriet Westbrook, daughter of a retired and moderately rich hotel-keeper. Shelley, in early youth, had a somewhat "priggish" turn for moralizing and argumentation, and a decided mania for proselytizing; his school-girl sisters, and their little Methodist friend Miss Westbrook, aged between fifteen and sixteen, must all be enlightened and converted to anti-Christianity. He therefore cultivated the society of Harriet, calling at the house of her father, and being encouraged in his assiduity by her much older sister Eliza. Harriet not unnaturally fell in love with him; and he, though not it would seem at any time ardently in love with her, dallied along the flowery pathway which leads to sentiment and a definite courtship. This was not his first love-affair; for he had but a very few months before been courting his cousin Miss Harriet Grove, who, alarmed at his heterodoxies, finally broke off with him—to his no small grief and perturbation at the time. It is averred, and seemingly with truth, that Shelley never indulged in any sensual or dissipated amour; and, as he advances in life, it becomes apparent that, though capable of the passion of love, and unusually prone to regard with much effusion of sentiment women who interested his mind and heart, the mere attraction of a pretty face or an alluring figure left him unenthralled. After a while Percy was reconciled to his father, revisited his family in Sussex, and then stayed with a cousin in Wales. Hence he was recalled to London by Miss Harriet Westbrook, who wrote complaining of her father's resolve to send her back to her school, in which she was now regarded with repulsion as having become too apt a pupil of the atheist Shelley. He replied counselling resistance. "She wrote to say" (these are the words of Shelley in a letter to Hogg, dating towards the end of July 1811) "that resistance was useless, but that she would fly with me, and threw herself upon my protection." Shelley, therefore, returned to London, where he found Harriet agitated and wavering; finally they agreed to elope, travelled in haste to Edinburgh, and there, on the 28th of August, were married with the rites of the Scottish Church. Shelley, it should be understood, had by this time openly broken, not only with the dogmas and conventions of Christian religion, but with many of the institutions of Christian polity, and in especial with such as enforce and regulate marriage; he held—with William Godwin and some other theorists—that marriage ought to be simply a voluntary relation between a man and a woman, to be assumed at joint option and terminated at the after-option of either party. If, therefore, he had acted upon his personal conviction of the right, he would never have wedded Harriet, whether by Scotch, English or any other law; but he waived his own theory in favour of the consideration that in such an experiment the woman's stake, and the disadvantages accruing to her, are out of all comparison with the man's. His conduct, therefore, was so far entirely honourable; and, if it derogated from a principle of his own (a principle which, however contrary to the morality of other people, was and always remained matter of genuine conviction on his individual part), this was only in deference to a higher and more imperious standard of right.

Harriet Shelley was not only beautiful; she was amiable, accommodating, adequately well educated and well bred. She liked reading, and her reading was not strictly frivolous. But she could not (as Shelley said at a later date) "feel poetry and understand philosophy." Her attractions were all on the surface;

there was (to use a common phrase) "nothing particular in her." For nearly three years Shelley and she led a shifting sort of life upon an income of £400 a year, one-half of which was allowed (after his first severe indignation at the *mésalliance* was past) by Mr Timothy Shelley, and the other half by Mr Westbrook. The couple left Edinburgh for York and the society of Hogg; broke with him upon a charge made by Harriet, and evidently fully believed by Shelley at the time, that, during a temporary absence of his upon business in Sussex, Hogg had tried to seduce her (this quarrel was entirely made up at the end of about a year); moved off to Keswick in Cumberland, where they received kind attentions from Southey, and some hospitality from the duke of Norfolk, who, as chief magnate in the Shoreham region of Sussex, was at pains to reconcile the father and his too unfilial heir; sailed thence to Dublin, where Shelley was eager, and in some degree prominent, in the good cause of Catholic emancipation, conjoined with repeal of the union; crossed to Wales, and lived at Nant-Gwillt, near Rhayader, then at Lynmouth in Devonshire, then at Tanyrallt in Carnarvonshire. All this was between September 1811 and February 1813. At Lynmouth an Irish servant of Shelley's was sentenced to six months' imprisonment for distributing and posting up printed papers, bearing no printer's name, of an inflammatory or seditious tendency—being a *Declaration of Rights* composed by the youthful reformer, and some verses of his named *The Devil's Walk*. At Tanyrallt Shelley was (according to his own and Harriet's account, confirmed by the evidence of Miss Westbrook, the elder sister, who continued an inmate in most of their homes) attacked on the night of 26th February by an assassin who fired three pistol-shots. It was either a human assassin or (as Shelley once said) "the devil." The motive of the attack was undefined; the fact of its occurrence was generally disbelieved, both at the time and by subsequent inquirers. Shelley was full of wild unpractical notions; he dosed himself occasionally with laudanum as a palliative to spasmodic pains; he was given to strange assertions and romancing narratives (several of which might properly be specified here but for want of space), and was not incapable of conscious fibbing. His mind no doubt oscillated at times along the line which divides sanity from insane delusion. It is now, however, at last proved that he did not invent such a monstrous story to serve a purpose. The *Century Magazine* for October 1905 contained an article entitled "A Strange Adventure of Shelley's," by Margaret L. Croft, which shows that a shepherd close to Tanyrallt, named Robin Pant Evan, being irritated by some well-meant acts of Shelley in terminating the lives of dying or diseased sheep, did really combine with two other shepherds to scare the poet, and Evan was the person who played the part of "assassin." He himself avowed as much to members of a family, Greaves, who were living at Tanyrallt between 1847 and 1865. This was the break-up of the residence of the Shelleys at Tanyrallt; they revisited Ireand, and then settled for a while in London. Here, in June 1813, Harriet gave birth to her daughter Ianthe Eliza (she married a Mr Esdaile, and died in 1876). Here also Shelley brought out his first poem of any importance, *Queen Mab*; it was privately printed, as its exceedingly aggressive tone in matters of religion and morals would not allow of publication. In July the Shelleys took a house at Bracknell near Windsor Forest, where they had congenial neighbours, Mrs Boinville and her family.

The speculative sage whom Shelley especially reverenced was William Godwin, the author of *Political Justice* and of the romance *Caleb Williams*; in 1796 he had married Mary Wollstonecraft, authoress of *The Rights of Woman*, who died shortly after giving birth, on the 30th of August 1797, to a daughter Mary. With Godwin Shelley had opened a volunteered correspondence late in 1811, and he had known him personally since the winter which closed 1812. Godwin was then a bookseller, living with his second wife, who had been a Mrs Clairmont; there were four other inmates of the household, two of whom call for some mention here—Fanny Wollstonecraft, the daughter of the authoress and Mr Imlay, and Claire (Clara Mary Jane), the daughter of Mrs Clairmont. Fanny committed suicide in October 1816, being, according to some accounts which remain unverified, hopelessly in love with Shelley; Claire was closely associated with all his subsequent career. It was towards May 1814 that Shelley first saw Mary Wollstonecraft Godwin as a grown-up girl (she was well on towards seventeen); he instantly fell in love with her, and she with him. Just before this, on the 24th of March, Shelley had remarried Harriet in London, apparently with a view to strengthening his position in his relations with his father as to the family property; but, on becoming enamoured of Mary, he seems to have rapidly made up his mind that Harriet should not stand in the way. She was at Bath while he was in London. They had, however, met again in London and come to some sort of understanding before the final crisis arrived—Harriet remonstrating and indignant, but incapable of effective resistance—Shelley sick of her companionship, and bent upon gratifying his own wishes, which, as we have already seen, were not at odds with his avowed principles of conduct. For some months past there had been bickerings and misunderstandings between him and Harriet, aggravated by the now detested presence of Miss Westbrook in the house; more than this cannot be said, and it seems dubious whether more will be hereafter known. Shelley, and not he alone, alleged grave misdoing on Harriet's part—perhaps mistakenly. The upshot came on the 28th of July, when Shelley aided Mary to elope from her father's house, Claire Clairmont deciding to accompany them. They crossed to Calais, and proceeded across France into Switzerland. Godwin and his wife were greatly incensed. Though he and Mary Wollstonecraft had entertained and avowed bold opinions regarding the marriage-bond, similar to Shelley's own, and had in their time acted upon these opinions, it is not clearly made out that Mary Godwin had ever been encouraged by paternal influence to think or do the like. Shelley and she chose to act upon their own likings and responsibility—he disregarding any claim which Harriet had upon him, and Mary setting at nought her father's authority. Both were prepared to ignore the law of the land and the rules of society.

The three young people returned to London in September. In the following January 1815 Sir Bysshe Shelley died, and Percy, who had lately been in great money-straits, became the immediate heir to the entailed property inherited by his father Sir Timothy. This entailed property seems to have been worth £6000 per annum, or little less. There was another very much larger property which Percy might shortly before have secured to himself, contingently upon his father's death, if he would have consented to put it upon the same footing of entail; but this he resolutely refused to do, on the professed ground of his being opposed upon principle to the system of entail; therefore, on his grandfather's death the larger property passed wholly away from any interest which Percy might have had in it, in use or in expectancy. He now came to an understanding with his father as to the remaining entailed property; and, giving up certain future advantages, he received henceforth a regular income of £1000 a year. Out of this he assigned £200 a year to Harriet, who had given birth in November to a son, Charles Bysshe (he died in 1826). Shelley, and Mary as well, were on moderately good terms with Harriet, seeing her from time to time. His peculiar views as to the relations of the sexes appear markedly again in his having (so it is alleged) invited Harriet to return to his and Mary's house as a domicile: a curious arrangement which of course did not take effect. He had, undoubtedly, while previously abroad with Mary, invited Harriet to stay in their immediate neighbourhood. Shelley and Mary (who was naturally always called Mrs Shelley) now settled at Bishopgate, near Windsor Forest; here he produced his first excellent poem, *Alastor, or the Spirit of Solitude*, which was published soon afterwards with a few others. Thomas Love Peacock was one of his principal associates at Bishopgate.

In May 1816 the pair left England for Switzerland, together with Miss Clairmont, and their own infant son William. They went straight to Sécheron, near Geneva; Byron, whose separation from his wife had just then taken place, arrived there immediately afterwards. A great deal of controversy has arisen as to the

motives and incidents of this foreign sojourn. The clear fact is that Miss Clairmont, who had a fine voice and some inclination for the stage, had seen Byron, as connected with the management of Drury Lane theatre, early in the year, and an amorous intrigue had begun between them in London, Prima facie it seems quite reasonable to suppose that she had explained the facts to Shelley or to Mary, or to both, and had induced them to convoy her to the society of Byron abroad; were this finally established as the fact, it would show no inconsistency of conduct, or breach of his own code of sexual morals, on Shelley's part. On the other hand, documentary evidence exists showing that Mary was totally ignorant of the amour shortly before they went abroad. Whether or not they knew of it while they and Claire were in daily intercourse with Byron, and housed close by him on the shore of the Lake of Geneva, may be left unargued. The three returned to London in September 1816, Byron remaining abroad; and in January 1817 Miss Clairmont gave birth to his daughter named Allegra.

The return of the Shelleys was closely followed by two suicides —first that of Fanny Wollstonecraft (already referred to), and second that of Harriet Shelley, who on the 9th of November drowned herself in the Serpentine. The body was not found until the 10th of December. The latest stages of the lovely and ill-starred Harriet's career have never been very explicitly recorded. It seems that she formed a connexion with some gentleman from whom circumstances or desertion separated her, that her habits became intemperate, and that she was treated with contumelious harshness by her sister during an illness of their father. She had always had a propensity (often laughed at in earlier and happier days) to the idea of suicide, and she now carried it out in act—possibly without anything which could be regarded as an extremely cogent predisposing motive, although the total weight of her distresses, accumulating within the past two years and a half, was beyond question heavy to bear. Shelley, then at Bath, hurried up to London when he heard of Harriet's death, giving manifest signs of the shock which so terrible a catastrophe had produced on him. Some self-reproach must no doubt have mingled with his affliction and dismay; yet he does not appear to have considered himself gravely in the wrong at any stage in the transaction, and it is established that in the train of quite recent events which immediately led up to Harriet's suicide he had borne no part.

This was the time when Shelley began to see a great deal of Leigh Hunt, the poet and essayist, editor of the *Examiner*; they were close friends, and Hunt did something to uphold the reputation of Shelley as a poet—which, we may here say once for all, scarcely obtained any public acceptance or solidity during his brief lifetime. The death of Harriet having removed the only obstacle to a marriage with Mary Godwin, the wedding ensued on the 30th of December 1816, and the married couple settled down at Great Marlow in Buckinghamshire. Their tranquillity was shortly disturbed by a Chancery suit set in motion by Mr Westbrook, who asked for the custody of his two grandchildren, on the ground that Shelley had deserted his wife and intended to bring up his offspring in his own atheistic and anti-social opinions. Lord Chancellor Eldon delivered judgment on the 27th of March 1817. He held that Shelley, having avowed condemnable principles of conduct, and having fashioned his own conduct to correspond, and being likely to inculcate the same principles upon his children, was unfit to have the charge of them. He appointed as their curator Dr Hume, an orthodox army-physician, who was Shelley's own nominee. The poet had to pay for the maintenance of the children a sum which stood eventually at £120 per annum; if it was at first (as generally stated) £200, that was no more than what he had previously allowed to Harriet. This is the last incident of marked importance in the perturbed career of Shelley; the rest relates to the history of his mind, the poems which he produced and published, and his changes of locality in travelling. The first ensuing poem was *The Revolt of Islam*, referred to near the close of this article.

In March 1818, after an illness which he regarded (rightly or wrongly) as a dangerous pulmonary attack, Shelley, with his wife, their two infants William and Clara, and Miss Clairmont and her baby Allegra, went off to Italy, where the short remainder of his life was passed. Allegra was soon sent on to Venice, to her father, who, ever since parting from Miss Clairmont in Switzerland, showed a callous and unfeeling determination to see and know no more about her. In 1818 the Shelleys—always nearly with Miss Clairmont in their company—were in Milan, Leghorn, the Bagni di Lucca, Venice and its neighbourhood, Rome, and Naples; in 1819 in Rome, the vicinity of Leghorn, and Florence (both their infants were now dead, but a third was born late in 1819, Percy Florence Shelley, who in 1844 inherited the baronetcy); in 1820 in Pisa the Bagni di Pisa (or di San Giuliano), and Leghorn; in 1821 in Pisa and with Byron in Ravenna; in 1822 in Pisa and on the Bay of Spezia, between Lerici and San Terenzio. The incidents of this period are but few, and of no great importance apart from their bearing upon the poet's writings. In Leghorn he knew Mr and Mrs Gisborne, the latter a once intimate friend of Godwin; she taught Shelley Spanish, and he was eager to promote a project for a steamer to be built by her son by a former marriage, the engineer Henry Reveley; it would have been the first steamer to navigate the Gulf of Lyons. In Pisa he formed a sentimental intimacy with the Contessina Emilia Viviani, a girl who was pining in a convent pending her father's choice of a husband for her; this impassioned but vague and fanciful attachment—which soon came to an end, as Emilia's character developed less favourably in the eyes of her Platonic adorer—produced the transcendental love-poem of *Epipsychidion* in 1821. In Ravenna the scheme of the quarterly magazine the *Liberal* was concerted by Byron and Shelley, the latter being principally interested in it with a view to benefiting Leigh Hunt by such an association with Byron. In Pisa Byron and Shelley were very constantly together, having in their company at one time or another Shelley's cousin and schoolfellow Captain Thomas Medwin (1788–1869), Lieutenant Edward Elliker Williams (1793–1822) and his wife, to both of whom the poet was very warmly attached, and Captain Edward John Trelawny, the adventurous and romantic-natured seaman, who has left important and interesting reminiscences of this period. Byron admired very highly the generous, unworldly and enthusiastic character of Shelley, and set some value on his writings; Shelley half-worshipped Byron as a poet, and was anxious, but in some conjunctures by no means able, to respect him as a man. In Pisa he knew also Prince Alexander Mavrocordato, one of the pioneers of Grecian insurrection and freedom; the glorious cause fired Shelley, and he wrote the drama of *Hellas* (1821).

The last residence of Shelley was the Casa Magni, a bare and exposed dwelling on the Gulf of Spezia. He and his wife, with the Williamses, went there at the end of April 1822 to spend the summer, which proved an arid and scorching one. Shelley and Williams, both of them insatiably fond of boating, had a small schooner named the "Don Juan" (or more properly the "Ariel"), built at Genoa after a design which Williams had procured from a naval friend, but the reverse of safe. They received her on the 12th of May, found her rapid and alert, and on the 1st of July started in her to Leghorn, to meet Leigh Hunt, whose arrival in Italy had just been notified. After doing his best to set things going comfortably between Byron and Hunt, Shelley returned on board with Williams on the 8th of July. It was a day of dark, louring, stifling heat. Trelawny took leave of his two friends, and about half-past six in the evening found himself startled from a doze by a frightful turmoil of storm. The "Don Juan" had by this time made Via Reggio; she was not to be seen, though other vessels which had sailed about the same time were still discernible. Shelley, Williams and their only companion, a sailor-boy, perished in the squall. The exact nature of the catastrophe was from the first regarded as somewhat disputable. The condition of the "Don Juan" when recovered did not favour any assumption that she had capsized in a heavy sea—rather that she had been run down by some other vessel, a felucca or fishing-smack. In the absence of any counter-evidence this would be supposed to have occurred by accident; but a rumour, not strictly verified and certainly not refuted,

exists that an aged Italian seaman on his deathbed confessed that he had been one of the crew of the fatal felucca, and that the collision was intentional, as the men had plotted to steal a sum of money supposed to be on the "Don Juan," in charge of Lord Byron. In fact there was a moderate sum there, but Byron had neither embarked nor intended to embark. This may perhaps be the true account of the tragedy; at any rate Trelawny, the best possible authority on the subject, accepted it as true. He it was who laboriously tracked out the shore-washed corpses of Williams and Shelley, and who undertook the burning of them, after the ancient Greek fashion, on the shore near Via Reggio, on the 15th and 16th of August. The great poet's ashes were then collected, and buried in the new Protestant cemetery in Rome. He was, at the date of his untimely death, within a month of completing the thirtieth year of his age—a surprising example of rich poetic achievement for so young a man.

The character of Shelley can be considered according to two different standards of estimation. We can estimate the original motive forces in his character; or we can form an opinion of his actions, and thence put a certain construction upon his personal qualities. We will first try the latter method. It cannot be denied by his admirers and eulogists, and is abundantly clear to his censors, that his actions were in some considerable degree abnormal, dangerous to the settled basis of society, and marked by headstrong and undutiful presumption. But it is remarkable that, even among the censors of his conduct, many persons are none the less impressed by the beauty of his character; and this leads us back to our first point—the original motive forces in that. Here we find enthusiasm, fervour, courage (moral and physical), an unbounded readiness to act upon what he considered right principle, however inconvenient or disastrous the consequences to himself, sweetness and indulgence towards others, extreme generosity (he appears to have given Godwin, though sometimes bitterly opposed to him, between £4000 and £5000), and the principle of love for humankind in abundance and superabundance. He respected the truth, such as he conceived it to be, in spiritual or speculative matters, and respected no construction of the truth which came to him recommended by human authority. No man had more hatred or contempt of custom and prescription; no one had a more authentic or vivid sense of universal charity. The same radiant enthusiasm which appeared in his poetry as idealism stamped his speculation with the conception of perfectibility and his character with loving emotion.

In person Shelley was attractive, winning and almost beautiful, but not to be called handsome. His height was nearly 5 ft. 11; he was slim, agile, and strong, with something of a stoop; his complexion brilliant, his hair abundant and wavy, dark brown but early beginning to grizzle; the eyes, deep blue in tint, have been termed "stag-eyes"—large, fixed and beaming. His voice was wanting in richness and suavity—high-pitched, and tending to the screechy; his general aspect, though extremely variable according as his mood of mind and his expression shifted, was on the whole uncommonly juvenile. The only portrait of Shelley, from which some idea of his looks used to be formed, is that painted by an amateur, Miss Curran, in 1819; Mrs Shelley, later, pronounced it to be "in many things very like." This is now in the National Portrait Gallery, together with a quasi-duplicate of it painted by Clint, chiefly from Miss Curran's likeness, and partly from a water colour (now lost) by Lieutenant Williams. In 1905 (*Century Magazine*) another portrait was brought forward: a pencil sketch taken in the last month of the poet's life by an American artist, William E. West, followed by an oil-painting founded on that sketch. The two works differ very considerably, and neither of them resembles Miss Curran's portrait, yet we incline to believe that the sketch was really taken from Shelley.

If we except Goethe (and leave out of count any living writers, whose ultimate value cannot at present be assessed), we must consider Shelley to be the supreme poet of the new era which, beginning with the French Revolution, remains continuous into our own day. Victor Hugo comes nearest to him in poetic stature, and might for certain reasons be even preferred to him; Byron and Wordsworth also have their numerous champions—not to speak of Tennyson or Browning. The grounds, however, on which Shelley may be set highest of all are mainly three. He excels all his competitors in ideality, he excels them in music, and he excels them in importance. By importance we here mean the direct import of the work performed, its controlling power over the reader's thought and feeling, the contagious fire of its white-hot intellectual passion, and the long reverberation of its appeal. Shelley is emphatically the poet of the future. In his own day an alien in the world of mind and invention, and in our day but partially a denizen of it, he appears destined to become, in the long vista of years, an informing presence in the innermost shrine of human thought. Shelley appeared at the time when the sublime frenzies of the French revolutionary movement had exhausted the elasticity of men's thought—at least in England—and had left them flaccid and stolid; but that movement prepared another in which revolution was to assume the milder guise of reform, conquering and to conquer. Shelley was its prophet. As an iconoclast and an idealist he took the only position in which a poet could advantageously work as a reformer. To outrage his contemporaries was the condition of leading his successors to triumph and of personally triumphing in their victories. Shelley had the temper of an innovator and a martyr; and in an intellect wondrously poetical he united speculative keenness and humanitarian zeal in a degree for which we might vainly seek his precursor. We have already named ideality as one of his leading excellences. This Shelleian quality combines, as its constituents, sublimity, beauty and the abstract passion for good. It should be acknowledged that, while this great quality forms the chief and most admirable factor in Shelley's poetry, the defects which go along with it mar his work too often—producing at times vagueness, unreality and a pomp of glittering indistinctness, in which excess of sentiment welters amid excess of words. This blemish affects the long poems much more than the pure lyrics; in the latter the rapture, the music and the emotion are in exquisite balance, and the work has often as much of delicate simplicity as of fragile and flower-like perfection.

Some of Shelley's principal writings have already been mentioned above; we must now give a brief account of others. Of his early work prior to *Queen Mab*—such romances as *Zastrozzi* and *St Irvyne*, such verse as the *Poems by Victor and Cazire*, and the *Fragments of Margaret Nicholson*—we can only here say that they are intrinsically worthless. *Alastor* was succeeded (1817) by *The Revolt of Islam*, a poem of no common length in the Spenserian stanza, preaching bloodless revolution; it was written in a sort of friendly competition with Keats (who produced *Endymion*) and is amazingly fine in parts, but as a whole somewhat long-drawn and exhausting. This transcendental epic (for such it may be termed) was at first named *Laon and Cythna, or the Revolution of the Golden City*, and the lovers of the story were then brother and sister as well as lovers—an experiment upon British endurance which the publishers would not connive at. The year 1818 produced *Rosalind and Helen*, a comparatively weak poem, begun in England and finished in Italy, and *Julian and Maddalo*, a very strong one, written in the neighbourhood of Venice—demonstrating in Shelley a singular power of seeing ordinary things with directness, and at once figuring them as reality and transfiguring them into poetry. In each of these two poems Shelley gives a quasi-portraiture of himself. The next year, 1819, was his culmination, producing as it did the grand tragedy of *The Cenci* and the sublime ideal drama *Prometheus Unbound*, composed partly on the ruins of the Baths of Caracalla in Rome. This last we have no hesitation in calling his masterpiece. It embodies, in forms of surpassing imagination and beauty, Shelley's deepest and most daring conceptions. Prometheus, the human mind and will, has invested with the powers proper to himself Jupiter, the god of heaven, who thereupon chains and torments Prometheus and oppresses mankind; in other words, the anthropomorphic god of religion is a creation of the human mind, and both the

mind of man and man himself are enslaved as long as this god exercises his delegated but now absolute power. Prometheus, who is from of old wedded to Asia, or Nature, protests against and anathematizes the usurper enthroned by himself. At last the anathema (although Prometheus has revoked it by an act of self-conquest) takes effect: Eternity, Demogorgon, dismisses Jupiter to unending nothingness. Prometheus is at once unbound, the human mind is free; he is reunited to his spouse Nature, and the world of man passes from thraldom and its degradation into limitless progression, or (as the phrase goes) perfectibility, moral and material. This we regard as in brief the argument of *Prometheus Unbound*. It is closely analogous to the argument of the juvenile poem *Queen Mab*, but so raised in form and creative touch that, whereas to write *Queen Mab* was only to be an ambitious and ebullient tiro, to invent *Prometheus Unbound* was to be the poet of the future. *The Witch of Atlas* (1820) is the most perfect work among all Shelley's longer poems, though it is neither the deepest nor the most interesting. It may be rated as a pure exercise of roving imagination—guided, however, by an intense sense of beauty, and by its author's exceeding fineness of nature. The poem has often been decried as practically unmeaning; we do not subscribe to this opinion. The "witch" of this subtle and magical invention seems to represent that faculty which we term "the fancy"; using this assumption as a clue, we find plenty of meaning in the poem, but necessarily it is fanciful or volatile meaning. The elegy on Keats, *Adonais*, followed in 1821; the *Triumph of Life*, a mystical and most impressive allegory, constructed upon lines marked out by Dante and by Petrarch, was occupying the poet up to the time of his death. The stately fragment which remains is probably a minor portion of the projected whole. The translations—chiefly from Homer, Euripides, Calderon and Goethe—date from 1819 to 1822, and testify to the poetic endowment of Shelley not less absolutely than his own original compositions; there are also prose translations from Plato.

Shelley, it will be seen, was not only a prolific but also a versatile poet. Works so various in faculty and in form as *The Revolt of Islam*, *Julian and Maddalo*, *The Cenci*, *Prometheus Unbound*, *Epipsychidion*, and the grotesque effusions of which *Peter Bell the Third* is the prime example, added to the consummate array of lyrics, have seldom to be credited to a single writer—one, moreover, who died before he was thirty years of age. In prose Shelley could be as admirable as in poetry. His letters to Thomas Love Peacock and others, and his uncompleted *Defence of Poetry*, are the chief monuments of his mastery in prose; and certainly no more beautiful prose—having much of the spirit and the aroma of poetry, yet without being distorted out of its proper essence—is to be found in the English language.

The chief original authorities for the life of Shelley (apart from his own writings, which contain a good deal of autobiography, if heedfully sifted and collated) are—(1) the notices by Mrs Shelley interspersed in her edition of the *Poems*; (2) Hogg's amusing, discerning and authentic, although in some respects exaggerated, book; (3) Trelawny's *Records*; (4) the *Life* by Medwin; and (5) the articles written by Peacock. Some other writers, especially Leigh Hunt, might be mentioned, but they come less close to the facts. Among biographical books produced since Shelley's death, by authors who did not know him personally, the leading work is the *Life* by Professor Dowden (2 vols., 1886), which embodies important materials imparted by the Shelley family. *The Real Shelley*, by J. C. Jeaffreson (1885), is controversial in method and decidedly hostile in tendency, and tries a man of genius by tests far from well adapted (in our opinion) to bring out a right result; it contains, however, an ample share of solid information and sharp disquisition. The memoir by W. M. Rossetti, prefixed to an edition of Shelley's *Poems* in two forms of publication (1870 and 1878), was an endeavour to formulate in brief space, out of the then confused and conflicting records, an accurate account of Shelley—admiring, but not uncandidly one-sided. There is valuable material in Lady Shelley's *Shelley Memorials*, and in Dr Garnett's *Relics of Shelley*; and the memoir by J. Addington Symonds, in the *English Men of Letters* series, is characteristic of the writer. The most complete edition of Shelley's poems is now the Oxford edition, edited by Thomas Hutchinson (Clarendon Press, 1905), which includes several pieces not in any other edition, and uses the emendations, &c., published by Mr C. D. Locock (1903) from examination of the MSS. in the Bodleian Library. Mr Buxton Forman's earlier and excellent edition includes the writings in prose as well as in verse. (W. M. R.)

SHELLEY'S CASE, RULE IN, an important decision in the law of real property. The litigation was brought about by the settlement made by Sir William Shelley (*c.* 1480–1549), a judge of the common pleas, of an estate which he had purchased on the dissolution of Sion Monastery. After prolonged argument the celebrated rule was laid down by Lord Chancellor Sir Thomas Bromley, who presided over an assembly of all the judges to hear the case in Easter term 1580–1581. The rule may be stated as follows: when an ancestor by any gift or conveyance takes an estate of freehold and in the same gift or conveyance an estate is limited, either mediately or immediately, to his heirs or the heirs of his body, in such a case the word "heirs" is a word of limitation and not of purchase; that is to say, the estate of the ancestor is not a life or other freehold estate with remainder to the heirs or heirs of the body, but an estate in fee or an estate tail according to circumstances. The rule is a highly technical one, and has led to much litigation and in many cases without a doubt to the defeat of a testator's intentions. It is said to have had its origin in the wish of the law to preserve to the lords their right of wardship, which would have been ousted by the heir taking as purchaser and not as successor. The rule is reported by Lord Coke in 1 *Reports* 93 b. (see also *Van Grutten* v. *Foxwell*, 1897, A.C. 658). In the United States the rule in Shelley's case was at one time in operation as a part of the common law, but it has been repealed by statute in most states.

SHELL-HEAPS, or KITCHEN-MIDDEN (Dan. *Kjokken-modding*), prehistoric refuse heaps or mounds found in all quarters of the globe, which consist chiefly of the shells of edible molluscs mixed with fragments of animal bones, and implements of stone, bone and horn. They may sometimes, as in the Straits of Magellan, be seen in process of formation. Many having a prehistoric origin have been examined, notably on the eastern coast of Denmark. These were at first thought to be raised beaches, but a cursory examination at once proved their artificial construction. Further investigation by archaeologists proved these shell-heaps to belong to a very ancient period, probably the early part of the Neolithic age, "when the art of polishing flint implements was known, but before it had reached its greatest development" (Lord Avebury, *Prehistoric Times*, 6th ed. p. 235). They contained the remains of quadrupeds, birds and fish, which served as the food of the prehistoric inhabitants. Among the bones were those of the wild bull or aurochs, beaver, seal and great auk, all now extinct or rare in this region. Moreover, a striking proof of the antiquity of these shell-heaps is that they contain full-sized shells of the common oyster, which cannot live at present in the brackish waters of the Baltic except near its entrance, the inference being that the shores where the oyster at that time flourished were open to the salt sea. Thus also the eatable cockle, mussel and periwinkle abounding in the kitchen-middens are of full ocean size, whereas those now living in the adjoining waters are dwarfed to a third of their natural size by the want of saltness. It thus appears that the connexion between the ocean and the Baltic has notably changed since the days of these rude stone-age peoples. The masses of debris were in some places ten to twenty feet thick and stretched a thousand feet. It does not appear that the men of the kitchen-middens had any knowledge of agriculture, no traces of grain of any sort being found. The only vegetable remains were burnt pieces of wood and some charred substance, possibly a sea-plant used in the production of salt. Flat stones blackened with fire, forming hearths, were also found. That periods of scarcity must have been frequent in the absence of cereals is indicated by the discovery of bones of the fox, wolf and other carnivora, which would hardly have been eaten from choice. The kitchen-middens of Denmark were not mere summer-quarters: the ancient fishermen appear to have stayed in the neighbourhood for two-thirds, if not the whole, of the year. This is suggested by an examination of the bones of the wild animals, from which it is often possible to tell the time of year when they were killed. Thus the remains of the wild swan (*Cygnus musicus*),

a winter visitor, leaving the Danish coast in March and returning in November, are found in abundance. Additional proof is afforded among the mammalian remains by two periodical phenomena, the shedding of the stag's antlers and the birth and growth of the young. The flint implements found include flakes, axes, awls, sling-stones or net-weights, and rude lance-heads. A fragment of one polished axe was found at Havelse which had been worked up into a scraper. Small pieces of coarse pottery are also met with. The Danish kitchen-midden men were not cannibals. In physique they seem to have resembled the Lapps, a race of small men with heavy over-hanging brows and round heads. The excavation of the Danish shell-heaps was followed by the investigation of others in other countries. At Omori (Japan), in the Aleutian Islands, in British Columbia, Oregon and California shell-mounds were explored, always with the result of proving that the present populations had been preceded by ruder tribes of great antiquity. On the Atlantic coast of Brazil shell-heaps, which must have taken thousands of years to accumulate, are now overgrown with dense forests.

BIBLIOGRAPHY.—Paul Schumacher, *Kjokken-möddings on the Northern Coast of America* (Smithsonian Reports, 1873); E. Reclus, *The Earth and its Inhabitants* (New York, 1890), vol. xix.; D. G. Brinton, *Artificial Shell-deposits of the United States* (Smithsonian Reports, Washington, 1866); Lord Avebury, *Prehistoric Times* (6th ed., 1900); J. Wyman, "Fresh-water Shell-mounds of Florida," *Memoirs of the Peabody Academy of Sci.* vol. i. (Salem, Mass., 1875); Morse, *Shell-mounds of Omori* (Tokio, 1879); F. H. Cushing, *Ancient Key-Dwellers' Remains* (Philadelphia, 1897); W. H. Dall, *Tribes of the Extreme North-West: Contributions to North American Ethnology*, vol. i. (Washington, 1877).

SHELL-MONEY, a medium of exchange common to many primitive races, consisting of sea shells or pieces of them worked into beads or artificially shaped. Shell-money has not been restricted to one quarter of the globe, but in some form or other appears to have been almost universal. It has been found in America, Asia, Africa and Australia. The shell used by the Indians of Alaska and California was the *Dentalium pretiosum*, a species of tusk-shell found along the north-west coast. It received its name from its tusk-like appearance, and was valued by length and not by the number of shells. The usual method of measuring was by the finger-joints, and the *ligua*, the highest denomination of their coinage, consisted of twenty-five shells strung together, which from end to end made a total measurement of a fathom (6 ft.) or thereabouts, equalling in English coinage about £50. Farther south on the shore of California the Indians used the *Saxidomus gracilis* or *Tapis gracilis*, while in the islands close to the littoral the *Litornia obesa* was in commonest use.

But the shell most used by primitive peoples has always been the *Cypraea moneta*, or money-cowry (see COWRY). It is most abundant in the Indian Ocean, and is collected more particularly in the Maldive Islands, in Ceylon, along the Malabar coast, in Borneo and other East Indian islands, and in various parts of the African coast from Ras Hafun to Mozambique. It was formerly in familiar use in Bengal, where, though it required 3840 to make a rupee, the annual importation was valued at about £30,000. In western Africa it was, until past the middle of the 19th century, the usual tender, and before the abolition of the slave trade there were large shipments of cowry shells to some of the English ports for reshipment to the slave coast. As the value of the cowry was very much greater in West Africa than in the regions from which the supply was obtained, the trade was extremely lucrative, and in some cases the gains are said to have been 500%. The use of the cowry currency gradually spread inland in Africa, and about 1850 Heinrich Barth found it fairly recognized in Kano, Kuka, Gando, and even Timbuktu. Barth relates that in Muniyoma, one of the ancient divisions of Bornu, the king's revenue was estimated at 30,000,000 shells, every full-grown man being required to pay annually 1000 shells for himself, 1000 for every pack-ox, and 2000 for every slave in his possession. In the countries on the coast the shells were fastened together in strings of 40 or 100 each, so that fifty or twenty strings represented a dollar; but in the interior they were laboriously counted one by one, or, if the trader were expert, five by five. The districts mentioned above received their supply of *kurdi*, as they were called, from the west coast; but the regions to the north of Unyamwezi, where they were in use under the name of *simbi*, were dependent on Moslem traders from Zanzibar. The shells are still used in the remoter parts of Africa, but are yearly tending to give way to ordinary currency. The shell of the land-snail, *Achatina monetaria*, cut into circles with an open centre has been long used as coin in Benguella, Portuguese West Africa. In parts of Asia *Cyprocea annulus*, the ring cowry, so called from the bright orange-coloured ring on the back or upper side of the shell, was commonly used. Many specimen were found by Sir Henry Layard in his excavations at Nimrud in 1845 1851.

In north Australia different shells were used, one tribe's shell being often absolutely valueless in the eyes of another tribe. In the islands north of New Guinea the shells are broken into flakes. Holes are bored through these flakes, which are then valued by length, as in the case of the American tusk-shell, the measuring, however, being done between the nipples of the breasts instead of by the finger-joints. Two shells are used by these Pacific islanders, one a cowry found on the New Guinea coast, and the other the common pearl shell broken into flakes. As late as 1882 local trade in the Solomon Islands was carried on by means of a coinage of shell beads, small shells laboriously ground down to the required size by the women. No more than were actually needed were made, and as the process was difficult, the value of the coinage was satisfactorily maintained. The custom of breaking or flaking shells was common among some of the American Indian tribes, but the shells so manipulated were of the ponderous *Pachyderma crassatelloides* species, while in the South Pacific Islands the *Oliva carneola* was used.

AUTHORITIES.—Robert E. C. Stearns, "Ethno-conchology: a Study of Primitive Money," in *Smithsonian Report*, part ii. (Bureau of Ethnology, Washington), for 1887; "Shell-money," in *The American Naturalist*, vol. iii. (Salem, 1869); "Aboriginal Shell money," in *The American Naturalist* (1877), vol. xi.; "On the Shell-money of New Britain," in *Jour. Anthrop. Institute* (1888), vol. xvii.; "Aboriginal Shell-money," *Proc. California Acad. of Science* (San Francisco, 1875), vol. v.; E. Ingersoll in *Country Cousins* (New York, 1884); S. Powers, *Contributions to North American Ethnology* (Washington, 1877), vol. iii.

SHELTON, THOMAS (fl. 1612–1620), English translator of *Don Quixote*. In the dedication of *The delightfull history of the wittie knight, Don Quishote* (1612) he explains to his patron, Lord Howard de Walden, afterwards 2nd Earl of Suffolk, that he had translated *Don Quixote* from Spanish into English some five or six years previously in the period of forty days for a "very dear friend" who was unable to understand the original. Shelton did not use the original edition of Cervantes, but one published in Brussels in 1607. On the appearance of the Brussels imprint of the second part of *Don Quixote* in 1616, he translated that also into English, completing his task in 1620, and printing at the same time a revised edition of the first part. His performance has become a classic among English translations for its racy, spirited rendering of the original. Light was thrown on Thomas Shelton's personal history by the researches of Mr Alexander T. Wright in a paper published in October 1898. Among the kinsfolk of the earl of Suffolk were three persons bearing the name Thomas Shelton, and though all died before 1600 he was probably a member of the same family. It seems safe to identify him with the Thomas Shelton who wrote a sonnet prefixed to the *Restitution of Decayed Intelligence* (1605) of Richard Verstegan, who was most likely the friend referred to in Shelton's preface, for there is reason to believe that both of them were then employed in a matter of doubtful loyalty, the intrigues of the Roman Catholics in England. He was acquainted with the "cries of the wild Irish," and seems to have been honestly employed in carrying letters to persons in England from Lord Deputy Fitzwilliam at Dublin Castle. But in 1599 he apparently acted as agent for Florence McCarthy to offer his service to the king of Spain, a commission for which his knowledge of Spanish especially fitted him. Soon afterwards an official précis of the facts was drawn up, in which Shelton was implicated

by name. A second version of this document in 1617 is actually signed by him, but all reference to his share in the matter is omitted. Lady Suffolk, the wife of his patron, received yearly £1000 in secret service money from the Spanish king, and Shelton may have been her accomplice. If the "many affairs" of his preface were official he would not wish to call attention to his antecedents by owning friendship with Verstegan.

The 1012 edition is available in Mr Fitzmaurice Kelly's reprint for the *Tudor Translations* (1892); that of 1620 is reproduced in Macmillan's "Library of English Classics" with an introduction by Mr A. W. Pollard, who incorporates the suggestions made by Mr A. T. Wright in his *Thomas Shelton, Translator*.

SHEM (Hebrew for "name, renown, posterity"), in the Bible, the eldest of the three sons of NOAH, whose superiority over Canaan is reflected in the tradition that Noah pronounced a curse upon the latter (Gen. ix. 20-27). In the genealogies (x. 21 sqq.), Shem numbers among his descendants Assyrian, Arabian, Aramaean and Hebrew populations, whence the ethnic *Semitic* (strictly speaking, *Shemitic*) has been coined as a convenient term for these peoples. It is not altogether scientific, since the Lydians (Lud) and Elamites are included among Shem's "sons," apparently on account of their geographical position or because of their indebtedness to Assyrian culture. On the traditions of Shem, see E. Meyer, *Israeliten u. Nachbarstämme* (Halle, 1906), pp. 219 sqq.

SHEMAKHA, a town of Russian Transcaucasia, in the government of Baku, 70 m. W. of the town of Baku, and in 40° 38′ N. and 48° 40′ E. It has some 20,000 inhabitants, consisting of Tatars (75 %), Armenians and Russians. Shemakha was the capital of the khanate of Shirvan, and was known to the Roman geographer Ptolemy as Kamachia. About the middle of the 16th century it was the seat of an English commercial factory, under the traveller Jenkinson, afterwards envoy extraordinary of the khan of Shirvan to Ivan the Terrible of Russia. In 1742 Shemakha was taken and destroyed by Nadir Shah of Persia, who, to punish the inhabitants for their creed (Sunnite Mahommedanism), built a new town under the same name about 16 m. to the W., at the foot of the main chain of the Caucasus. The new Shemakha was at different times a residence of the khan of Shirvan, but it was finally abandoned, and the old town rebuilt. The Russians first entered Shirvan in 1723, but soon retired. In 1795 they captured Shemakha as well as Baku; but the conquest was once more abandoned, and Shirvan was not finally annexed to Russia until 1805.

SHENANDOAH, a borough of Schuylkill county, Pennsylvania, U.S.A., about 40 m. N.N.W. of Reading. Pop. (1910, census), 25,774. Among the foreign-born the Lithuanians and Poles predominate—in 1910 a Lithuanian and a Polish paper were published here. Shenandoah is served by the Pennsylvania, the Lehigh Valley and the Philadelphia & Reading railways. The borough has a public library. The United Greek Catholic Church (Ruthenian Rite) here is said to be the first of this sect in the United States; it was organized as St Michael's Parish in 1885, the first building was erected in 1886, and a new building was completed in 1909. Shenandoah is situated in the eastern part of the middle basin of the great anthracite coal region of Pennsylvania, and the mining and shipping of coal are its chief industries. A log house was built on the site of the present Shenandoah as early as 1835, but there was no further development until 1862, when the first colliery was opened. The borough was incorporated in 1866.

SHENANDOAH VALLEY CAMPAIGNS. During the American Civil War the Shenandoah Valley was frequently the scene of military operations, and at two points in the war these operations rose to the height of separate campaigns possessing great significance in the general development of the war. From a military point of view the Shenandoah Valley was valuable to the army which controlled it as a requisitioning area, for in this fertile region crops and cattle were plentiful. There were, moreover, numerous mills and factories. For the Confederates the Valley was also a recruiting area. A macadamized road from Lexington via Staunton and Winchester to Martinsburg gave them easy access to Maryland and enabled them to cover Lynchburg from the north. By a system of railways which united at Gordonsville and Charlottesville troops from Richmond and Lynchburg were detrained within easy distance of five good passes over Blue Ridge, and as Strasburg in the valley lies almost due west of Washington it was believed in the North that a Confederate army thereabouts menaced a city the protection of which was a constant factor in the Federal plan of campaign. The Valley was 60 m. wide at Martinsburg and had been cleared of timber, so that the movements of troops were not restricted to the roads: the creeks and rivers were fordable at most places in summer by levelling the approaches: the terrain was specially suitable for mounted troops. The existence of the parallel obstacle between Strasburg and Newmarket, the two forks of the Shenandoah river enclosing the Massanutton range, afforded opportunities for strategic manœuvres.

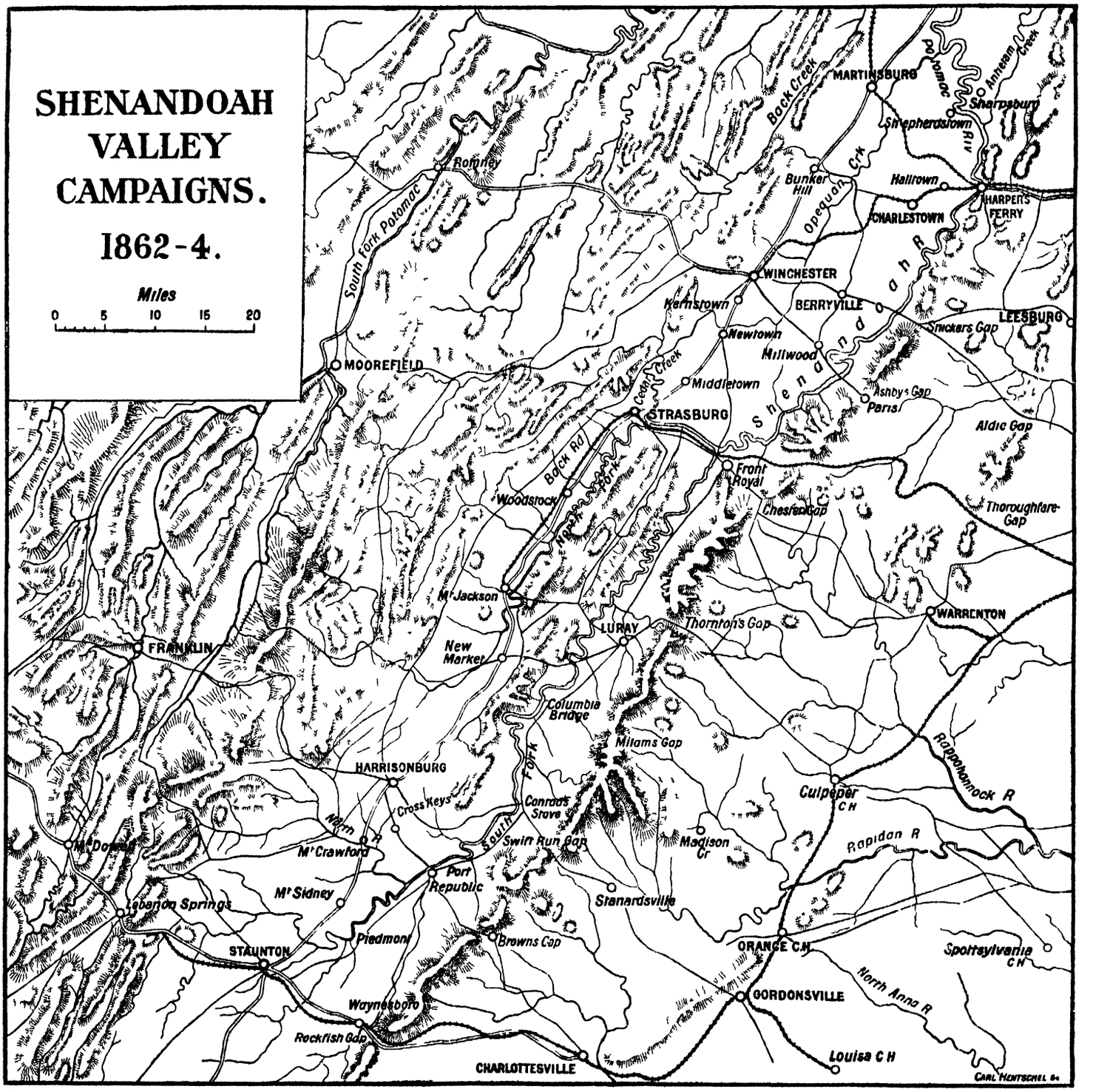
In the spring of 1862 the immense army organized by General McClellan advanced and threatened to sweep all before it. The Confederates, based on Richmond, were compelled to show a front westward to the Alleghanies, northward to the Potomac and eastwards to the Atlantic. The main armies were engaged on the Yorktown peninsula and the other operations were secondary. Yet in one instance a Confederate detachment that varied in strength between 5000 and 17,000 contrived to make some stir in the world and won renown for its commander. General Thomas J. Jackson with small means achieved great results, if we look at the importance which politics played in the affairs of the belligerents; and even in a military sense he was admirable for skilfully utilizing his experiences, so that his discomfitures of the winter of 1861, when Rosecrans and Lander and Kelley were opposed to him, taught him how to deal with such Federal leaders as Shields and Banks, Milroy and Frémont, fettered as they all were by the Lincoln administration. The Valley operations in 1862 began by a retrograde movement on the part of the Confederates, for Jackson on the 12th of March retired from Winchester, and Banks at the head of 20,000 men took possession. Banks pushed a strong detachment under General Shields on to Strasburg a week later, and Jackson then withdrew his small division (5000) to Mount Jackson, so yielding the Shenandoah Valley for 40 m. south of Winchester. He was now acting under instructions to employ the invaders in the Valley and prevent any large body being sent eastward to reinforce their main army; but he was not to expose himself to the danger of defeat. He was to keep near the enemy, but not so near as to be compelled to fight Banks's superior forces. Such instructions, however, were difficult to carry out. When, on the 21st of March, Banks recalled Shields in accordance with orders from Washington, Jackson conceived that he was bound to follow Shields, and, when Shields stood at bay at Kernstown on the 23rd of March with 7000 men, Jackson at the head of 3500 attacked and was badly beaten.

For such excess of zeal two years later Sigel was removed from his command. But in 1862 apparently such audacity was true wisdom, for the proof thus afforded by Jackson of his inability to contend with Shields seems to have been regarded by the Federal authorities as an excuse for reversing their plans: Shields was reinforced by Williams's division, and with this force Banks undertook to drive Jackson from the Valley. A week after the battle of Kernstown, Banks moved to Strasburg with 16,000 men, and a month later (April 29) is found at Newmarket, after much skirmishing with Jackson's rear-guard which burnt the bridges in retiring. Meanwhile Jackson had taken refuge in the passes of Blue Ridge, where he too was reinforced. Ewell's division joined him at Swift Run Gap, and at the beginning of May he decided to watch Banks with Ewell's division and to proceed himself with the remainder of his command to join Edward Johnson's division, then beset by General Milroy west of Staunton. Secretly moving by rail through Rockfish Gap, Jackson united with Johnson and in a few days located Milroy at the village of McDowell. After reconnaissance Jackson concentrated his forces on Setlington Hill and proposed to attack on the morrow (May 8th), but on this occasion the Federals (Milroy having just been joined by Schenck) took the initiative, and after a four

hours' battle Jackson was able to claim his first victory. The Confederates lost 500 out of 6000 men and the Federals 250 out of 2500 men. Jackson's pursuit of Milroy and Schenck was profitless, and he returned to his camp at McDowell on the 14th of May. Meanwhile General Banks had been ordered by President Lincoln to fall back from Newmarket, to send Shields's division to reinforce General McDowell at Fredericksburg, to garrison Front Royal and to entrench

Jackson's campaign.

there was of brief duration, for McDowell was moving westward from Fredericksburg and Frémont eastward from Franklin under instructions from Washington to intercept him. On the 31st of May Frémont had reached Cedar Creek, McDowell was at Front Royal and Jackson had retired to Strasburg, where he was compelled to wait for a detachment to come in. This rejoined on the evening of the 1st of June. Ewell's division held Frémont back until Jackson was on his way to Newmarket.



the remainder of his command at Strasburg: and in this situation the enemy found him on the 22nd of May. Jackson's opportunity had come to destroy Banks's force completely. The Confederates numbered 16,000, the Federals only 6000 men Jackson availed himself of the Luray Valley route to intercept Banks after capturing the post at Front Royal. He captured the post, but failed to intercept Banks, who escaped northwards by the turnpike road and covered his retreat across the Potomac by a rear-guard action at Winchester on the 25th of May. Jackson followed and reached Halltown a few days later. But his stay

McDowell had sent Shields up the Valley by the Luray route. But Jackson gained Newmarket in safety and destroyed the bridge by which Shields could emerge from the Luray Valley to join Frémont, who was left to cope with Jackson single-handed. Jackson's rearguard destroyed the bridges and otherwise impeded Frémont's advance, but a week later (June 7th) Frémont at Harrisonburg located his enemy at Cross Keys and next day he attacked with 10,500 men. Shields was still at Luray. Jackson held Frémont with Ewell's division (8000) and with the remainder proceeded to the left bank

Cross Keys and Port Republic.

of the Shenandoah near Port Republic to await developments, for Shields had pushed forward a strong advanced guard under General Tyler, whose vanguard (two squadrons) crossed the river while Frémont was engaged with Ewell. Tyler's cavalry was driven back with heavy loss. Jackson retained possession of the bridge by which Tyler and Frémont could unite, and next day he crossed the river to attack Tyler's two brigades. The engagement of the 9th of June is called the battle of Port Republic. Jackson with 13,000 men attacked Tyler with 3000 men, and Tyler, after stoutly resisting in the vain hope that the main body under Shields would come up from Conrad's Store or that Frémont would cross the river and fall upon Jackson, retired with a loss of some 800 men, leaving as many Confederates *hors de combat*. Tyler's brave efforts were in vain, for Shields had once more received orders from Washington which appeared to him to justify leaving his detachment to its fate, and Frémont could not reach the river in time to save the bridge, which Ewell's rear-guard burnt after Jackson had concentrated his forces against Tyler on the right bank. A few days later Jackson received orders to quit the Valley and join the main army before Richmond, and President Lincoln simultaneously discovered that he could not afford to keep the divisions of Frémont, Banks and McDowell engaged in operations against Jackson: so the Valley was at peace for a time.

In stricter connexion with the operations of the main armies in Virginia, the Confederates brought off two great *coups* in the Valley—Jackson's capture of Harper's Ferry and Martinsburg in the autumn of 1862 and Ewell's expulsion of Milroy from Martinsburg and Winchester in June 1863. The concentration of the Federal forces in N. Virginia in May 1864 for the campaign which ultimately took Grant and Lee south of the James involved a fresh series of operations in the Valley. At first a Union containing force was placed there under Sigel; this general, however, took the offensive and unwisely accepted battle and was defeated at Newmarket. Next Hunter, who superseded Sigel in command in West Virginia and the Valley, was to co-operate with the Army of the Potomac by a movement on Staunton and thence to Gordonsville and Lynchburg, with the object of destroying the railways and canal north of the James river by which troops and supplies reached the Confederates from the West. Sigel meanwhile was to cover the Ohio railroad at Martinsburg. Hunter encountered Jones's division at Piedmont (Mount Crawford) on the 5th of June and caused General Lee to detach from his main army a division under Breckinridge to aid Jones. Grant then detached Sheridan to join Hunter at Charlottesville, but Lee sent Hampton's cavalry by a shorter route to intercept Sheridan, and a battle at Trevillian Station compelled Sheridan to return and leave Hunter to his fate. The losses in this cavalry combat exceeded 1000, for the dense woods, the use of barricades and the armament of the mounted troops caused both sides to fight on foot until lack of ammunition brought the action to an end. Sheridan during his three months' command of the Federal cavalry had steadfastly adhered to the principle of always fighting the enemy's cavalry, and, though now compelled to return to the Pamunkey, he contrived to draw Hampton's force after him in that direction. Meanwhile on the 13th of June General Early had moved from Cold Harbor to add his command to the Confederate forces in the Valley. Early succeeded in interposing between Hunter and Lynchburg, and within a week drove Hunter out of Virginia by the Kanawha river route. Early then moved down the Valley turnpike unmolested. Expelling Sigel from Martinsburg on the 4th of July and crossing the Potomac opposite Sharpsburg, he soon appeared before Washington, after defeating an improvised force under Lew Wallace on the Monocacy. Grant then detached Wright's corps (VI.) from Petersburg and called Emory's corps (XIX.) from the West to oppose Early, who after creating serious alarm retired, on the 13th of July, by Leesburg and Snicker's Gap into the Valley at Winchester. Hunter had meanwhile gained Harper's Ferry via the Baltimore and Ohio Railroad, and, when Early withdrew towards Strasburg, General Crook collected the forces of Hunter and Sigel to follow the Confederates, but Early turned upon Crook and drove him back to the Potomac. Early then sent a detachment into Maryland to burn the town of Chambersburg. The alarm in the North for the safety of Washington was only quieted by the appointment of General Sheridan to command in the Valley.

He arrived on the scene early in August. His mission was to drive Early up the Valley or, if the Confederates crossed into Maryland, to intercept their return, and in any case he was to destroy all supplies in the country which could not be consumed by his own army. Sheridan made Harper's Ferry his headquarters and concentrated at Halltown. Early retained his position about Bunker's Hill, destroyed the Ohio railroad, and held the main road up the Valley until Sheridan moved out in force on the 10th of August. Early then retreated up the Valley to Fisher's Hill (Strasburg), where he expected to be joined by Anderson's corps from Richmond. Sheridan had followed Early, but hearing of this reinforcement to the enemy, he decided to take up a defensive line at Halltown—the only point in the Valley which did not favour flanking operations—and await reinforcements. Sheridan's retrograde movement from Cedar Creek on the 17th of August was, however, regarded in the North as a sign of pusillanimity, and his removal from the Valley command was loudly called for. During the retreat Sheridan's cavalry encountered Early's reinforcements, Anderson's corps and Fitz Lee's cavalry, about Winchester. Early had observed the Federal movements from the heights south of Strasburg, and now followed Sheridan down to Halltown. On the 21st of August he again attacked Sheridan at Summit Point south of Charlestown. A few days later Early detached a force to raid Williamsport, and concentrated his main body behind the Opequan near Bunker's Hill, leaving outposts on the railway, a position which he held at the end of August. Sheridan meanwhile had moved out between the Shenandoah and the Opequan to seize all routes towards Washington, from Martinsburg on Early's left as far up as the Winchester-Berryville turnpike by which his own reinforcements reached the Valley through Snicker's Gap. Sheridan also held the Smithfield crossing of the Opequan in Early's front. Each commander, however, hesitated to bring on a battle, Sheridan because the result of the Presidential election would be seriously affected by his defeat at this moment, and Early because with his inferior forces he was content to know that his position on Sheridan's flank effectively covered the Valley. But Sheridan was now at the head of the most formidable army that had ever invaded this region. It consisted of three small army corps under Wright (VI.), Emory (XIX.) and Crook (VIII.) and Torbert's cavalry (6000) in three divisions under Averell, Merritt and Wilson, the whole numbering 30,000 infantry, 6000 cavalry and 27 batteries. Early continued to hold Winchester with four divisions under Rodes, Gordon, Breckinridge and Ramseur and two cavalry divisions under Fitz Lee and Lomax. He had soon been deprived of Anderson's corps which was sorely needed at Richmond, a fact which Sheridan discovered through his spies in Winchester, and indeed Sheridan had been waiting a fortnight for this movement by which Early's command was to be reduced. For a month the two armies had manœuvred between Halltown and Strasburg, each commander hoping for such an increase to his own or decrease of his enemy's numbers as would justify attack. The Valley operations were aided indirectly by assaults and sorties about Petersburg. Grant aimed at preventing Lee sending reinforcements to Early until Sheridan's plans had been carried out. Meanwhile Early had been gathering up the harvests in the lower Valley, but on the 20th of August Sheridan was able to report "I have destroyed everything that was eatable south of Winchester, and they will have to haul supplies from well up to Staunton." Sheridan in September could put 23,000 infantry and 8000 cavalry into action, and at this moment he was visited by Grant, who encouraged his subordinate to seize an opportunity to attack the enemy.

Sheridan's campaign.

The first encounter of Sheridan and Early took place on the

19th of September about 2 m. east of Winchester. Sheridan had crossed the Opequon and found the enemy in position astride the Winchester-Berryville road. Early was outnumbered and outfought, but he attributed his defeat to the enemy's "immense superiority in cavalry," and in fact Sheridan depicts Merritt's division as charging with sabre or pistol in hand and literally riding down a hostile battery, taking 1200 prisoners and 5 guns. The Federal victory, however, cost Sheridan 4500 casualties and he had hoped for greater success, since Early had divided his forces. Sheridan's plan was to overwhelm Ramseur before he could be supported by Rodes and Gordon, but Early contrived to bring these divisions up and counter-attack while Sheridan was engaged with Ramseur. Early had confided his left to Fitz Lee's cavalry and taken Breckinridge to strengthen his right. But Merritt's horsemen rode through the Confederate cavalry, who fled, communicating their panic to the infantry of the left wing, and the day was lost. Early retreated through Newtown and Strasburg, but at Fisher's Hill behind Tumbling Run, where the Valley was entrenched on a front of 3 m. between the Shenandoah river and Little North Mountain, Early rallied his forces and again detailed his cavalry to protect his left from a turning movement. But Sheridan repeated his manœuvre, and again on the 22nd of September Early was attacked and routed, General Crook's column having outflanked him by a détour on the western or Back road. Early now retreated to Mount Jackson, checked the pursuit at Rode's Hill, and, evading all Sheridan's efforts to bring him again to battle, reached Port Republic on the 25th of September. On learning of this disaster, and the distress of his troops, General Lee promised to send him boots, arms and ammunition, but under pressure of Grant's army, he could not spare any troops. Lee had estimated Sheridan's force at 12,000 effective infantry, and Early's report as to his being outnumbered by three or four to one was not credited. Yet Early had much to do to avoid destruction, for Sheridan had planned to cut off Early by moving his cavalry up the Luray Valley to Newmarket while the infantry held him at Fisher's Hill; but Torbert with the cavalry blundered. Sheridan made Harrisonburg his headquarters on the 25th of September, where he relieved Averell of his command for having failed to pursue after the battle of Fisher's Hill. In the first week of October Sheridan held a line across the Valley from Port Republic along North river to the Back road, and his cavalry had advanced to Waynesboro to destroy the railroad bridge there, to drive off cattle, and burn the mills and all forage and breadstuffs. Early had taken refuge in Blue Ridge at Rockfish Gap, where he awaited Rosser's cavalry and Kershaw's division (Longstreet's corps), for Lee had resolved upon again reinforcing the Valley command, and upon their arrival Early advanced to Mount Crawford and thence to Newmarket. The Federals retired before him, but his cavalry was soon to suffer another repulse, for Rosser and Lomax having followed up Sheridan closely on the 9th of October with five brigades, the Federal cavalry under Torbert turned upon this body when it reached Tom's Brook (Fisher's Hill) and routed it. Sheridan burnt the bridges behind him as he retired on Winchester, and apparently trusted that Early would trouble him no more and then he would rejoin Grant at Petersburg. But Early determined to go north again, though he had to rely upon Augusta county, south of Harrisonburg, for supplies, for Sheridan had wasted Rockingham and Shenandoah counties in accordance with Grant's order. The Union commander-in-chief, contemplating a longer struggle between the main armies than he had at first reckoned on, had determined that the devastation of the Valley should be thorough and lasting in its effect.

Winchester.

Fisher's Hill.

Sheridan at Winchester was now free to detach troops to aid Grant, or remain quiescent covering the Ohio railroad, or move east of Blue Ridge. He had resisted the demand of the government, which Grant had endorsed, that Early should be driven through the Blue Ridge back on Richmond. Sheridan pointed out that guerrilla forces were always in his rear, that he would need to reopen the Alexandria railroad as a line of supply, that he must detach forces to hold the Valley and protect the railroads, and that on nearing Richmond he might be attacked by a column sent out by Lee to aid Early. Yet in fact Sheridan carried out the government programme at the beginning of 1865, and therefore we may assume that his objections in October were not well-founded. Then he was expected to drive Early out of the Valley, but halted at Harrisonburg and, although in superior force, afterwards retired to Winchester, and his boast of having wasted the Valley seemed ill-timed, since Early was able to follow him down to Strasburg. There was evidently some factor in the case which is not disclosed by Sheridan in his Memoirs.

Early at Newmarket on the 9th of October said that he could depend on only 6000 muskets if he detached Kershaw, and he had discovered that all positions in the Valley could be turned, that the open country favoured the shock tactics of the Federal cavalry, and so placed his own cavalry at a disadvantage, who, he declared, could not by dismounted action withstand attacks by superior numbers with the *arme blanche*. In these circumstances it would appear that Early showed great enterprise in following Sheridan down to Strasburg on the 13th of October "to thwart his purposes if he should contemplate moving across the Ridge or sending troops to Grant." But as his forward position at Fisher's Hill could not be long maintained for want of forage, he resolved to attack Sheridan, and on the night of the 18th of October he sent three divisions under Gordon to gain the enemy's rear, while Kershaw's division attacked his left and Wharton's division and the artillery engaged him in front. The attack was timed to commence at 5 A.M. on the 19th of October, when Rosser's cavalry was to engage Sheridan's cavalry and that of Lomax was to close the Luray Valley. This somewhat complicated disposition of forces was entirely successful, and Early counted his gains as 1300 prisoners and 18 guns after routing the Federal corps VIII. and XIX. and causing Wright's corps (VI.) to retire. Yet before nightfall Early's force was in turn routed and he lost 23 guns. Early's report is that of a disheartened general. He complains that his troops took to plundering, that his regimental officers were incapable; and it is always the Federal cavalry that cause panic by threatening to charge; he has to confess that with a whole day before him he could neither complete his victory nor take up a position for defence, nor even retreat in good order with the spoils of battle. Sheridan had, it seems, actually put Wright's corps in march for Petersburg when news of Early's advance down the Valley reached him; then he recalled Wright and on the 14th of October was holding a defensive line along the north bank of Cedar Creek west of the Valley pike about Middleton. Early had reconnoitred and withdrawn as far as Fisher's Hill near Strasburg. Sheridan at this juncture was called to Washington to consult Halleck, the "chief of staff," on the 16th of October in reference to his future movements: for Halleck claimed to control Sheridan and often modified Grant's instructions to his subordinate. Before Sheridan could rejoin his army on the 19th of October Early had attacked and routed it, but Sheridan met the fugitives and rallied them with the cry: "We must face the other way." He found Getty's division and the cavalry acting as rear-guard, and resolved to attack as soon as his troops could be reorganized. Sheridan was, however, disturbed by reports of Longstreet's coming by the Front Royal road to cut him off at Winchester, and hesitated for some hours; but at 4 p.m. he attacked and drove back the Confederates and so recovered all the ground lost in the morning, and recaptured his abandoned guns and baggage.

Cedar Creek.

After the battle of Cedar Creek, Early again retreated south to Newmarket and Sheridan was in no condition to pursue. The Federal government had agreed to Sheridan's proposal to fortify a defensive line at Kernstown and hold it with a detachment while Sheridan rejoined Grant with the main body. On the 11th of November, Early again advanced to reconnoitre at Cedar Creek, but was driven back to Newmarket. At the beginning

of December the weather threatened to interfere with movement, and both sides began to send back troops to Petersburg. During the winter there were only cavalry raids and guerrilla warfare, and in February 1865 the infantry remaining on each side was less than a strong division. Sheridan seized the opportunity to advance with 10,000 cavalry. Early delayed this advance with his cavalry, while he evacuated Staunton; he called up a brigade to defend Lynchburg and proceeded to Waynesboro to await developments. Sheridan feared to advance on Lynchburg leaving Early on his flank and decided to attack Early at Waynesboro; and on the 2nd of March the Federal commander was rewarded by decisive victory, capturing 1600 Confederates and their baggage and artillery. Early himself escaped and Rosser's cavalry dispersed to their homes in the Valley, but with Early's third defeat all organized resistance in the Shenandoah Valley came to an end. Sheridan moved over Blue Ridge to Charlottesville and began his work of destruction south and east. Lynchburg was too strongly held to be captured, but from Amherst Court House the railway to Charlottesville and the canal to Richmond were destroyed, and thus Lee's army was deprived of these arteries of supply. On the 10th of March at Columbia, on the James river south of Charlottesville, Sheridan sent couriers to advise Grant of his success, and on the 19th of March he rejoined the main army in Eastern Virginia, receiving Grant's warm commendation for having "voluntarily deprived himself of independence." (G. W. R.)

SHENDI, a town in the Anglo-Egyptian Sudan in the *mudiria* (province) of Berber, on the right bank of the Nile in 18° 1′ N., 33° 59′ E., and 104 m. N.N.W. of Khartum by rail. Shendi possesses small manufactories of leather, iron and cotton; extensive railway workshops and a government experimental farm. It is the headquarters of the cavalry of the Egyptian army stationed in the Sudan. Shendi lies within the "Island of Meroë" and is a town of great antiquity. Thirty miles north are the pyramids of Meroë. On the opposite (west) bank of the Nile is the village of Metemma, whence there is a caravan route across the Bayuda Desert to the Merawi (Merowe) by Jebel Barkal; this was the route followed by the desert column under Sir Herbert Stewart in 1884 in the Gordon relief expedition. In 1772 James Bruce stayed some time at Shendi—then governed by a woman—on his way to Egypt after visiting the source of the Blue Nile. When the Egyptians invaded the Sudan in 1820 Shendi, then a place of considerable size, submitted to Ismail Pasha, son of Mehemet Ali, the pasha of Egypt. In 1822, however, Ismail and his chief followers were treacherously burnt to death at Shendi by order of the *mek* (ruler) of the town, in revenge for the cruelties committed by the Egyptians. Later in the same year an Egyptian army from Kordofan razed the town to the ground, most of the inhabitants being massacred. From that period until the establishment of Anglo-Egyptian rule in 1898 Shendi was but a poor village. Its subsequent growth has been comparatively rapid. There is a considerable area of fertile land on either side of the Nile in the neighbourhood.

SHÊNG-KING, SHEN-KING, or LIAO-TUNG, a province of the Chinese empire, in southern Manchuria. It occupies an area of 50,000 sq. m. and contains a population of 4,000,000. Its capital is Mukden, or, as it is otherwise known, Shêng-king, "the Flourishing Capital." The province includes the Liao-tung peninsula, the most southern part of which, including Port Arthur, is leased to Japan.

Shêng-king is largely mountainous. A line drawn from King-chow Fu (41° 12′ N., 121° 10′ E.) N.E. to Mukden, and then south by west through Lêaoi-yang and Hai-chêng to Kai-ping and the sea, would define the level country. A large portion of the plain, being an alluvial deposit, is extremely fertile, but in the neighbourhood of the sea the saline exudation common in the north of China renders futile all attempts at cultivation. North and east of this district run numerous mountain ranges, for the most part in a north-and-south direction. The climate of Shêng-king is marked by extremes of heat and cold. In summer the temperature varies from 70° to 90° F., and in winter from 50° above to 10° below zero. The mountain scenery is extremely picturesque, and the trees and shrubs are such as are common in England, the mountain ash being the only common English tree which is there conspicuous by its absence. The most important rivers are the Liao-ho and the Yalu. The former takes its rise in Mongolia, and after running an easterly course for about 400 m., turns S.W., and empties into the Gulf of Liao-tung, in the neighbourhood of Ying-tsze, up to which town, 20 m. from the bar, the river is navigable for large junks. The Yalu rises in the mountains to the south of the plain, and empties into the Yellow Sea.

The chief cities, Mukden, Liao-yang, Niu-chwang, Port Arthur and Tairen (Dalny) are separately noticed. Niu-chwang is the chief port of the province. Shêng-king is well supplied with railways, Mukden being in direct railway connexion with Peking, Niu-chwang, Port Arthur and Tairen as well as with the Korean railways, and with Europe and Vladivostock by the trans-Siberian line. The Mukden-Peking railway follows the route of the imperial highway from Peking, which passes through the Great Wall at Shan-hai-kwan and along the shores of the Gulf of Chih-li, and after leaving Mukden divides into three branches—one going eastward to Korea, another going by Kirin and A-she-ho to San-sing, while a third diverges N. by W. to Fakumen, thence through Mongolia to Pe-tu-na, and then to Tsi-tsi-har, Mergen, and the Amur. Another road leads east from Niu-chwang to Fung-hwang-chung, now a station on the Mukden-Korea railway. The chief agricultural products are wheat, barley, millet, oats, maize, cotton, indigo and tobacco. Coal, iron and gold are also found in considerable quantities in various localities. (See also MANCHURIA and CHINA.)

SHEN-SI, a northern province of China, bounded N. by the Great Wall, W. by the province of Kan-suh, S. by the province of Sze-ch'uen, and E. by Shan-si, from which it is separated by the Hwang-ho. Area about 75,000 sq. m.; pop. about 8,300,000. Si-gan Fu (*q.v.*), or Sian Fu, is the provincial capital; there are six other prefectural cities. Shen-si is divided into two parts by a barrier of mountains, consisting of the Fu-niu Shan and the Tsing-ling Shan, which attain elevations of over 11,000 ft., and run across the southern portion of the province from east to west. To the north of the mountains lie the basins of the Wei-ho and of several other tributaries to the Hwang-ho. The name Shen-si, "west of the pass," refers to the Tungkwan pass, near the confluence of the Wei and the Hwang-ho. The valley of the Wei, situated between high tableland (the Ordos plateau) on the north and rugged mountains to the south, forms the great channel of communication between Eastern China and Central Asia. Were it in the hands of an enemy the Chinese colonies in Central Asia would be completely severed from the mother country, hence the eagerness evinced by the government throughout all history to retain possession of the region. In this district are the sites of cities used as capitals of China in remote antiquity. Si-gan Fu, founded in the 3rd century B.C., was usually the capital until the time of the Kin dynasty (A.D. 1127), and it was chosen by the dowager empress as the temporary capital during the stress of the Boxer outbreak (1900–1901). It is noted also as containing the celebrated Nestorian tablet, erected A.D. 781, on which is engraved an edict according tolerance to the Nestorian missionaries. Modern Christian (Protestant) mission work in the city dates from 1876. The walls of Si-gan enclose a square space of 6 m. each way, and, unlike most Chinese cities, its fortifications are kept in perfect repair. During the Mahommedan rebellion it was closely invested for two years (1868–1870) by the rebels, who, however, failed to capture it. During a great famine which occurred in 1902 about 2,500,000 persons in the province died of starvation.

From Si-gan Fu radiate a number of roads going east, south and west. The east road is the great Tung-kwan road, which forms the principal means of communication between Peking and the north-eastern provinces of the empire, and Sze-ch'uen, Yun-nan and Tibet. To the south, one road crosses the mountains to Shang Chow, and on to the Tan river, an affluent of the Han-kiang, and is thus connected with the trade of the Yangtsze-kiang; and another leads to Han-chung Fu and Sze-ch'uen. Leaving the west gate of the city two roads lead to Lan-chow Fu, from which town begins the great high road into Central Asia by way of Lian-chow Fu, Kan-chow Fu and Su-chow to Hami, where it forks into two branches which follow respectively the northern and southern foot of the Tian-shan range, and are known as the Tian-shan pei lu and the Tian-shan nan lu. It was along these roads that the fame of China first reached Europe, and it was by the Tian-shan nan lu that Marco Polo entered the empire. To defend this line of communication the Great Wall

was extended beyond Su-chow, and the Kia-yu gate, "the door of the empire," was built. During the reign of Hia-wu Ti of the Han dynasty, Chinese colonies and high roads lined with fortified cities were established along this route, and though at times the government have lost possession of the line beyond the Great Wall, it has always succeeded in re-establishing its supremacy over it. Occupying a position, then, at the confluence of the roads which connect north-eastern China with its western and south-western portions, Si-gan Fu is a city of great commercial importance. It has few manufactures, but does an extensive trade principally in the importation of silk from Cheh-kiang and Sze-ch'uen, tea from Hu-peh and Hu-nan, and sugar from Sze-ch'uen, and in the exportation of these and other articles (such as skins and furs) to Kan-suh, Russia and Central Asia.

Shen-si is purely an agricultural province. Its principal products are cotton, wheat and opium—the anti-opium decrees of 1906 had little effect on the province up to 1910—and these it exchanges with the neighbouring provinces for coal, iron, salt, &c. Kao-liang, pulse, millet, maize, groundnut, barley, beans, pease, lucerne, and rape seed are also grown. The Wei basin being a loess region is unfit for rice, but for the same reason it produces fine crops of the kinds mentioned at a minimum expenditure of labour. The Shen-si opium is much valued by smokers and ranked next to the Shan-si drug, which was second only to that produced in Kan-suh. Coal abounds in the northern part of the province, but owing to difficulty of transit it is not worked to any great extent. The winters are cold, but short, and though fruit trees abound and are most productive, no evergreen trees or shrubs are to be met with within the province. Shen-si is specially noted for the varnish tree. Wolves are numerous in the mountains; the heron, ibis, wild goose and snipe in the valley of the Wei.

See M. Broomhall, *The Chinese Empire* (London, 1907), pp. 198-208; L. Richard, *Comprehensive Geography of the Chinese Empire* (Shanghai, 1908), pp. 39-46, and the authorities there cited.

SHENSTONE, WILLIAM (1714–1763), English poet, son of Thomas Shenstone and Anne, daughter of William Penn of Harborough Hall, Hagley, was born at the Leasowes, a property in the parish of Halesowen, now in Worcestershire, but then included in the county of Shropshire. At school he began a life-long friendship with Richard Jago, and at Pembroke College, Oxford, where he matriculated in 1732, he made another firm friend in Richard Graves, the author of *The Spiritual Quixote*. He took no degree, but, while still at Oxford, he published for private circulation *Poems on various occasions, written for the entertainment of the author* (1737). This edition, containing the first draft of "The Schoolmistress," Shenstone tried hard to suppress, but in 1742 he published anonymously a revised form of *The Schoolmistress, a Poem in imitation of Spenser. . . .* The original was Sarah Lloyd, teacher of the village school where Shenstone received his first education. Isaac D'Israeli pointed out that it should not be classed, as it was by Robert Dodsley, as a moral poem, but that it was intended as a burlesque, to which Shenstone appended in the first instance a "ludicrous index." In 1741 he published *The Judgment of Hercules*. He inherited the Leasowes estate, and retired there in 1745 to undertake what proved the chief work of his life, the beautifying of his property. He embarked on elaborate schemes of landscape gardening which gave the Leasowes a wide celebrity, but sadly impoverished the owner. Shenstone was not a contented recluse. He desired constant admiration of his gardens, and he never ceased to lament his lack of fame as a poet.

Shenstone's poems of nature were written in praise of her most artificial aspects, but the emotions they express were obviously genuine. His *Schoolmistress* was admired by Goldsmith, with whom Shenstone had much in common, and his "Elegies" written at various times and to some extent biographical in character won the praise of Robert Burns who, in the preface to *Poems, chiefly in the Scottish Dialect* (1786), called him "that celebrated poet whose divine elegies do honour to our language, our nation and our species." The best example of purely technical skill in his works is perhaps his success in the management of the anapaestic trimeter in his "Pastoral Ballad in Four Parts" (written in 1743), but first printed in Dodsley's *Collection of Poems* (vol. iv., 1755). Shenstone died unmarried on the 11th of February 1763.

His works were first published by his friend Robert Dodsley (3 vols., 1764–1769). The second volume contains Dodsley's description of the Leasowes. The last, consisting of correspondence with Graves, Jago and others, appeared after Dodsley's death. Other letters of Shenstone's are included in *Select Letters* (ed. Thomas Hill 1778). The letters of Lady Luxborough (*née* Henrietta St John) to Shenstone were printed by T. Dodsley in 1775; much additional correspondence is preserved in the British Museum—letters to Lady Luxborough (Add. MS. 28958), Dodsley's letters to Shenstone (Add. MS. 28959), and correspondence between Shenstone and Bishop Percy from 1757 to 1763—the last being of especial interest. To Shenstone was due the original suggestion of Percy's *Reliques*, a service which would alone entitle him to a place among the precursors of the romantic movement in English literature. See also Richard Graves, *Recollections of some particulars in the Life of the Late William Shenstone* (1788); H. Sydney Grazebrook, *The Family of Shenstone the Poet* (1890); Lennox Morison, "Shenstone," in the *Gentleman's Magazine* (vol. 289, 1900, pp. 196-205); A. Chalmers, *English Poets* (1810, vol. xiii.), with "Life" by Samuel Johnson; his *Poetical Works* (Edinburgh, 1854), with "Life" by G. Gilfillan; T. D'Israeli, "The Domestic Life of a Poet—Shenstone vindicated," in *Curiosities of Literature*; and "Burns and Shenstone," in *Furth in Field* (1894), by "Hugh Haliburton" (J. L. Robertson).

SHEPPARD, JOHN [JACK] (1702–1724), English criminal, was born at Stepney, near London, in December 1702. His father, who, like his grandfather and great-grandfather, was a carpenter, died the following year, and Jack Sheppard was brought up in the Bishopsgate workhouse. One of his father's old employers apprenticed him to the family trade, but young Sheppard fell into bad company at a neighbouring Drury Lane tavern. Here he met Elizabeth Lyon, known as "Edgeworth Bess," a woman of loose character with whom he lived, and to gratify whose tastes he committed many of his crimes. At the end of 1723 he was arrested as a runaway apprentice, and thence-forward, he says, "I fell to robbing almost every one that stood in my way," Joseph Blake, known as "Blueskin," being a frequent confederate. In the first six months of 1724 he twice escaped from gaol, and towards the end of that period he was responsible for an almost daily robbery in or near London. Eventually, however, his independent attitude provoked the bitter enmity of Jonathan Wild, who procured his capture at the end of July. Sheppard was tried at the Old Bailey and condemned to death, but, largely thanks to "Edgeworth Bess," he managed to escape from the condemned cell, and was soon back in his old haunts. In September he was rearrested and imprisoned in the strongest part of Newgate, being actually chained to the floor of his cell, but by a combination of strength and skill he escaped through the chimney to the roof of the prison, whence he lowered himself into the adjoining house. After a few days' concealment he was rash enough to reappear in the Drury Lane quarter. He was captured, hopelessly drunk, in a Clare Market tavern and reimprisoned, his cell being now watched night and day. On the 16th of November 1724 he was hanged at Tyburn. He was then not quite twenty-two.

Sheppard has been made the unworthy hero of much romance, of which Harrison Ainsworth's novel, *Jack Sheppard* (1839), is the most notable instance. In truth he was merely a vulgar scoundrel, who did not hesitate to rob his only real friend.

See *A Narrative of all the Robberies, Escapes, &c., of John Sheppard*, attributed to Daniel Defoe (London, 1724); *Newgate Calendar*, ed. Knapp and Baldwin; Griffiths, *Chronicles of Newgate*; *British Journal* (August, October 1724); *Weekly Journal* (August, September, November 1724); *Celebrated Trials*.

SHEPPEY, an island off the Kentish coast of England, included in the north-eastern parliamentary division of Kent. It is the largest of the several low islands which are separated from the mainland by the ramifying creeks about the mouth of the river Medway. The strait isolating Sheppey is called the Swale; it is about 3 m. broad at its eastern end, but narrows to some 300 yds. at the west, where it is crossed on a bridge by a branch of the South-Eastern & Chatham railway, and by a road. There was formerly a ferry here, as there are at two other points. Sheppey is low-lying, with one small elevation slightly exceeding 200 ft. near the north coast, which presents slight cliffs towards the shallow sea. These are frequently encroached upon by the sea, while the flat shore on the south is protected by embankments. Sheppey is 10½ m. in extreme length from E. to W., while the greatest breadth is about 5 m. On the south, narrow branches of the Swale, formerly wider, divide the isles of Harty and Elmley from the main island, of which, however, they now practically form part. Sheppey is for the most part treeless but very fertile,

bearing much grain and fruit; its name, meaning the "island of sheep," is still appropriate, as great flocks are bred. On the west are the port of Queenborough and the naval station of Sheerness. From here the Sheppey light railway runs east through the island, serving Minster and Leysdown, which are in some favour as seaside resorts. The London clay, of which the island is composed, abounds in fossils.

SHEPSTONE, SIR THEOPHILUS (1817–1893), British South African statesman, was born at Westbury near Bristol, England, on the 8th of January 1817. When he was three years old his father, the Rev. William Shepstone, emigrated to Cape Colony. Young Shepstone was educated at the native mission stations at which his father worked, and the lad acquired great proficiency in the Kaffir languages, a circumstance which determined his career. In the Kaffir War of 1835 he served as headquarters interpreter on the staff of the governor, Sir Benjamin D'Urban, and at the end of the campaign remained on the frontier as clerk to the agent for the native tribes. In 1838 he was one of the party sent from Cape Colony to occupy Port Natal on behalf of Great Britain. This force was recalled in 1839, when Shepstone was appointed British resident among the Fingo and other tribes in Kaffraria. Here he remained until the definite establishment of British rule in Natal and its organization as an administrative entity, when Shepstone was made (1845) agent for the native tribes. In 1848 he became captain-general of the native levies; in 1855 judicial assessor in native causes; and, in 1856, on the remodelling of the Natal government, secretary for native affairs and a member of the executive and legislative councils. This position he held until 1877. Thus for over thirty years he was the director of native policy in Natal. A man of strong will and pronounced views he gained a great influence over the natives, by whom he was called "father," and, in acknowledgment of his hunting exploits, "Somsteu." The main line of his policy was to maintain tribal customs as far as consistent with principles of humanity, and not to attempt to force civilization. The result of his policy is still traceable in the condition and status of the Natal natives. While he remained in charge there was but one serious revolt of the natives—that of Langalibalele in 1873—against white control.

Shepstone's influence with the Zulus was made use of by the Natal government; in 1861 he visited Zululand and obtained from Panda a public recognition of Cetywayo as his successor. Twelve years later Shepstone attended the proclamation of Cetywayo as king, the Zulu chief promising Shepstone to live at peace with his neighbours. In 1874 and again in 1876 Shepstone was in London on South African affairs, and to his absence from Natal Cetywayo's failure to keep his promises is, in part, attributed. When in London in 1876 Shepstone was entrusted by the 4th earl of Carnarvon, then secretary of state for the colonies, with a special commission to confer with the Transvaal executive on the question of the federation of the South African states, and given power, should he deem it necessary, to annex the country, subject to the confirmation of the British government. Shepstone went to Pretoria in January 1877, and on the 12th of April issued a proclamation announcing the establishment of British authority over the Transvaal. Shepstone's force consisted of twenty-five mounted policemen only, but no overt opposition was made to the annexation; the republic at the time was in a condition bordering on anarchy. "Nothing but annexation," wrote Sir Theophilus to the Colonial Office, "will or can save the state, and nothing else can save South Africa from the direst consequences. All the thinking and intelligent people know this, and will be thankful to be delivered from the thraldom of petty factions by which they are perpetually kept in a state of excitement and unrest because the government and everything connected with it is a thorough sham" (Martineau's *Life of Sir Bartle Frere*, ch. 18). Shepstone's action has been condemned as premature. He had, however, reason to believe that if Great Britain remained inactive, Germany would be induced to undertake the protection of the Transvaal.[1] Moreover, had the policy of self-government for the Boers which he outlined in his annexation proclamation been carried out, the revolt of 1880–81 might not have occurred. The annexation also, probably, saved the Transvaal from an attack by the Zulus under Cetywayo. Shepstone remained in Pretoria as administrator of the Transvaal until January 1879; his rule was marked, according to Sir Bartle Frere, who described him as "a singular type of an Africander Talleyrand," by an "apparent absence of all effort to devise or substitute a better system" than that which had characterized the previous régime. Shepstone had been summoned home to advise the Colonial Office on South African affairs and he reached England in May 1879; on his return to Natal he retired (1880) from the public service. In 1883, however, he was commissioned to replace Cetywayo as king in Zululand. He was active in church matters in Natal, and a friend of Bishop Colenso. He opposed the grant of self-government to Natal. He died at Pietermaritzburg on the 23rd of June 1893. Shepstone married in 1833 Maria, daughter of Charles Palmer, commissary-general at Cape Town, and had six sons and three daughters. One of his sons was killed at Isandhlwana; of the other sons H. C. Shepstone (b. 1840) was secretary for native affairs in Natal from 1884 to 1893; Theophilus was adviser to the Swazis (1887–1891); and A. J. Shepstone (b. 1852) served in various native expeditions, as assistant-commissioner in Zululand, in the South African War, 1899–1902, and became in 1909 secretary for native affairs (Natal) and secretary of the Natal native trust. A younger brother of Sir Theophilus, John Wesley Shepstone (b. 1827), filled between 1846 and 1896 various offices in Natal in connexion with the administration of native affairs.

[1] Frere to J. M. Maclean, 22nd of April 1881 (*Life of Sir Bartle Frere*, vol. ii. p. 183).

SHEPTON MALLET, a market town in the eastern parliamentary division of Somersetshire, England, 22 m. S.W. of Bath, on the Somerset & Dorset and the Great Western railways. Pop. of urban district (1901), 5238. The old town extends in a narrow line along the river Sheppey, while the newer town has for its main street a viaduct across the river valley. The church of St Peter and St Paul is especially noteworthy. Consisting of a chancel, clerestoried nave, and aisles, it is Early English and Perpendicular in style, and contains a beautiful 13th-century oak roof of 350 panels, each with a different design; a 15th-century pulpit of carved stone; and some interesting old monuments of the Strode, Mallet and Gournay families. The market cross, over 50 ft. high, and one of the finest in Somerset, was erected by Walter and Agnes Buckland in 1500. Shepton possesses a grammar school of the 17th century, and a science and art school. The once flourishing cloth and woollen trades have declined, but there are large breweries, roperies, potteries, and, in the neighbourhood, marble, granite, asphalt and lime works.

Shepton, before the conquest called Sepeton, was in the possession of the abbots of Glastonbury for four hundred years, and then passed to a Norman, Roger de Courcelle. Afterwards it came into the possession of the Norman barons Malet or Mallet, one of whom was fined for rebellion in the reign of King John. From the Mallets it went to the Gournays, but in 1536 it reverted to the crown, and it is now included in the duchy of Cornwall. The town received the grant of a market from Edward II. Monmouth and the rebel army passed through Shepton twice in 1685, and twelve of the rebels were hanged here by Judge Jeffreys.

SHERANI, or SHIRANI, a Pathan tribe on the Dera Ismail Khan border of the North-west Frontier Province of India. The Sherani Agency occupies an area of 1500 sq. m. and had a population in 1901 of 12,371. The Sheranis occupy the principal portion of the mountain known as the Takht-i-Suliman and the country thence eastward down to the border of Dera Ismail Khan district. They are bounded on the north by the Gomal Pass, and beyond that by the Mahsud Waziris; on the south by the Ustaranas and Zmarais; and on the west by the Haripals, Kakars and Mandu Khels. Between the Sherani country and the British border lie several small mountain ridges, across which the three chief passes are the Zarakni or Sheikh Haidar,

the Draband and the Chandwan. The Sheranis are generally of middling stature, thin, but hardy and active. They have bold features, high cheek-bones, and their general appearance is wild and manly. Their dress consists of a coarse black blanket tied round the waist, and another thrown over the shoulders. Their chief occupation is agriculture, but they carry on an extensive trade in the autumn months in Dera Ismail Khan district. The Sherani tribe and country are divided into two well-defined branches called Bargha and Largha, or the Highlands and the Lowlands, the inhabitants being called respectively Barghawals and Larghawals. The Highlands are on the side of Zhob, the Lowlands on the side of the Derajat, the dividing line being generally the watershed and higher peaks of the Takht-i-Suliman range of mountains. The physical configuration of the country makes the separation so complete that the two tribal divisions act independently of each other. After the Zhob expedition of 1890 the question of boundaries between the Punjab and Baluchistan came up for settlement, and the government decided that Bargha should remain with Baluchistan and Largha with the Punjab. The Gomal river from Kundar-Domandi to Kajuri-Kach is the boundary between Baluchistan and Waziristan, as well as between the respective provinces. In 1901 these frontier districts were transferred from the Punjab to the North-west Frontier Province.

SHERATON, THOMAS (*c.* 1751–1806), next to Chippendale the most famous English furniture-designer and cabinet-maker, was born in humble circumstances at Stockton-on-Tees. His education was rudimentary, but he picked up drawing and geometry. He appears to have been apprenticed to a cabinet-maker, but he was ever a strange blend of mechanic, inventor, artist, mystic and religious controversialist. Indeed, it is as a writer on theological subjects that we first hear of him. Although his parents were church people he was a Baptist, and in 1782 he published at Stockton *A Scriptural Illustration of the Doctrine of Regeneration*, to which was added *A Letter on the Subject of Baptism*, describing himself on the title page as a "mechanic, one who never had the advantage of a collegiate or academical education." Of his career as a maker and designer of furniture nothing is known until he is first heard of in London in 1790, when he was nearly forty. The date of his migration is uncertain, but it probably took place while he was still a young man. In London he did work which, although it has made him illustrious to posterity, never raised him above an almost sordid poverty. Biographical particulars are exceedingly scanty, and we do not know to what extent, if at all, he worked with his own hands, or whether he confined himself to evolving new designs, or modifying and adapting, and occasionally partly copying, those of others. Such evidence as there is points to artistic, rather than mechanical work, after he began to write, and we know that some part of his scanty income was derived from giving drawing lessons. Even the remarkable series of volumes of designs for furniture which he published during the last sixteen years of his life, and upon which his fame depends, were not a commercial success. He was a great artistic genius who lived in chronic poverty. The only trustworthy information we possess regarding his circumstances is found in the *Memoirs of Adam Black*, who when he first arrived in London lodged a week in his house, only two years before Sheraton's death. "Sheraton," he says, "lived in a poor street in London, his house half shop, half dwelling-house, and himself looked like a worn-out Methodist minister, with threadbare black coat. I took tea with them one afternoon. There was a cup and saucer for the host, and another for his wife, and a little porringer for their daughter. The wife's cup and saucer were given to me, and she had to put up with another little porringer. My host seemed a good man, with some talent. He had been a cabinet-maker, and was now author, publisher, and teacher of drawing, and, I believe, occasional preacher." Black shrewdly put his finger upon the causes of Sheraton's failure. "This many-sided worn-out encyclopaedist and preacher is an interesting character. . . . He is a man of talent and, I believe, of genuine piety. He understands the cabinet business—I believe was bred to it. He is a scholar, writes well, and, in my opinion, draws masterly—is an author, bookseller, stationer and teacher. . . . I believe his abilities and resources are his ruin in this respect—by attempting to do everything he does nothing." There is, however, little indication that Sheraton chafed under the tyranny of "those twin jailors of the daring heart, low birth and iron fortune." "I can assure the reader," he writes in one of his books, "though I am thus employed in racking my invention to design fine and pleasing cabinet-work, I can be well content to sit upon a wooden-bottom chair, provided I can but have common food and raiment wherewith to pass through life in peace."

His first book on furniture was published in 1791 with the title of *The Cabinet-Maker and Upholsterer's Drawing Book*. It was issued in parts by T. Bensley, of Bolt Court, Fleet Street; there was a second edition in 1793 and a third in 1802, each with improvements. In the first edition it was stated that copies could be obtained from the author at 41 Davies Street, Grosvenor Square; in the second, that he was living at 106 Wardour Street; the last address we have is 8 Broad Street, Golden Square. There was also an "Accompaniment" and an "Appendix." In this book, which contained 111 copper-plate engravings, Sheraton gives abundant evidence of the arrogance and conceit which marred all his publications. He dismisses Chippendale's designs in a patronizing way as "now wholly antiquated and laid aside, though possessed of great merit according to the times in which they were executed." His lack of practical common sense is suggested by the fact that more than half the book is taken up with a treatise on perspective, needless then and unreadable now. He falls foul of every volume on furniture which had been published before his time, and is abundantly satisfied of the merit of his own work. The designs in the book are exceedingly varied and unequal, ranging from pieces of perfect proportion and the most pleasing simplicity to efforts ruined by too abundant ornament. Some of the chair-backs are delightful in their grace and delicacy, but in them, as in other of his drawings, it is easy to trace the influence of Hepplewhite and Adam—it has even been suggested that he collaborated with the Adams. Sheraton, indeed, like his predecessors, made extensive use not so much perhaps of the works of other men as of the artistic ideas underlying them which were more or less common to the taste of the time. He was sometimes original, sometimes adaptive—what Alexandre Dumas *père* called a "conqueror"—sometimes a copyist. His "conquest" of Hepplewhite was especially unmerciful, for he abused as well as pillaged him. But his slender forms and sweeping curves were his own inspiration, and his extensive use of satinwood differentiated his furniture from most of that which had preceded it.

It must be remembered that Sheraton's books, like those of the other great cabinet-makers of the second half of the 18th century, were intended not for the "general reader" but for the practical use of the trade, which, no doubt, copied their designs extensively, although it is reasonable to suppose that he himself obtained orders by the publication of his books and employed other cabinet-makers to manufacture the work. It seems certain, however, that he himself never possessed anything more than a small shop. Of his own actual manufacture only one piece is known with certainty—a glass-fronted book-case, of somewhat frigid charm, stamped "T.S." on the inside of one of the drawers. It lacks the agreeable swan-necked pediment so closely associated with his style. *The Drawing Book*, of which a German translation appeared at Leipzig in 1794, was followed in 1802 and 1803 by *The Cabinet Dictionary, containing an Explanation of all the Terms used in the Cabinet, Chair and Upholstery branches, containing a display of useful articles of furniture*, illustrated with eighty-eight copperplate engravings. The text is in alphabetical form, and, in addition to a supplement with articles on drawing and painting, the book contained a list of "most of the master-cabinet-makers, upholsterers, and chair makers," 252 in number, then living in and around London. Sheraton told his readers that he had hitherto derived no profit from his publications on account of the cost of producing them.

Some of the designs in this volume show the earlier stages of the tendency to the tortured and the bizarre which disfigured so much of Sheraton's later work. This debased taste reached its culmination in *The Cabinet Maker, Upholsterer and General Artists' Encyclopedia*, the publication of which began in 1804. It was to consist of 125 numbers, but when the author died two years later only a few had been issued. The plates are in colour. The scope of this work was much wider than the title suggests. It dealt not only with furniture and decoration, but with history, geography, biography, astronomy, botany and other sciences. This fragmentary undertaking makes it clear that Sheraton ruined his style, once so graceful and so delicate, by an over-anxious following of the pseudo-classical taste which in France marked the period of the Consulate and the Empire. The harmonious marquetry, the dainty painting of flowers in wreaths and festoons, the lightness and finish were replaced by pieces of furniture which at the best were clumsy and at the worst were hideous. Some of the chairs especially which he designed in this last period are amazingly grotesque, their backs formed of fabulous animals, their "knees" and legs of the heads and claws of crowned beasts. Many charming little work-tables bear Sheraton's attribution, but even these graceful trifles in his later forms lose their delicacy and become squat and heavy. He designed many beautiful sideboards and bookcases, but he finished by drawing pieces that were ruined by insistence upon the characteristics, and often the worst characteristics, of the Empire manner. Sheraton's inventive ingenuity had led him to devise many of the ingenious pieces of combination or "harlequin" furniture which the later 18th century loved. Thus a library table would conceal a step-ladder for reaching the top shelves of bookcases, a dressing table would be also a wash-stand and an escritoire—but this he admitted that he did not introduce—looking-glasses would enclose dressing-cases, writing-tables or work-tables. But his most astonishing fancy was an ottoman with "heating urns" beneath, "that the seat may be kept in a proper temperature in cold weather." How far he was responsible for the introduction of the hideous hall chair, made of mahogany, with the owner's crest painted on the back, which was common for three-quarters of a century after he died, is not clear; but he describes and illustrates it.

That Sheraton can have been personally popular is incredible. His books make it evident that his character was tart, angular and self-assertive, and that he was little disposed to be generous towards the work of predecessors or rivals. Such an attitude towards the world would suffice to explain his lack of substantial success. He appears to have preached occasionally to the end, and even in his furniture books he sometimes falls into improving remarks of a religious character. As we have seen, his first publication was a religious work, and when in 1794 his friend Adam Callender, the landscape painter, wrote a pamphlet entitled *Thoughts on the Peaceable and Spiritual Nature of Christ's Kingdom*, Sheraton contributed to it an exhortation upon *Spiritual Subjection to Civil Government*, which was reprinted separately with additions a year later. In 1805 he issued *A Discourse on the Character of God as Love*. He died on Oct. 22nd, 1806, at No. 8 Broad Street, Golden Square, aged about 55, from, it is said, over-work. An obituary notice of him appeared in the *Gentleman's Magazine* of the following month, which stated that he had been for many years "a journeyman cabinet-maker, but since 1793 supported a wife and two children by authorship." He was described as "a well-disposed man, of an acute and enterprising disposition." The writer added that he had "left his family, it is feared, in distressed circumstances," and that he had travelled to Ireland to obtain subscribers for the *Encyclopedia*, of which at the time of his death nearly 1000 copies had been sold. In 1812 there appeared a folio volume, *Designs for Household Furniture exhibiting a Variety of Elegant and Useful Patterns in the Cabinet, Chair and Upholstery Branches on eighty-four Plates. By the late T. Sheraton, Cabinet-maker*. This was in the main, if not entirely, a collection of plates from the *Cabinet Dictionary* and the *Encyclopedia*.

Thomas Sheraton is unquestionably the most remarkable man in the history of English furniture. His genius was less sane and less balanced than that of Chippendale, but despite his excursions into the Chinese and Louis Quinze manners, Chippendale always produced an impression of English work. Sheraton's greater adaptability, his readiness to receive foreign impressions, his adaptations of Louis Seize ideas, the lightness of his forms and the grace of his conceptions had about them a touch of the exotic which was heightened by his lavish employment of satin-wood and other beautifully grained woods susceptible of a high polish. There are no more charming things outside French furniture than some of the creations of Sheraton in his great period. The severe and balanced forms, the delicate inlay, the occasional slight carving in low relief, the painted enrichments, the variety of the backs and legs of his chairs produce an impression of lightness and grace that has never been surpassed; whether he designed a little knife-case or the body of a long clock, harmony, proportion and a delicate fancy were ever present. It is true that he adapted and even copied extensively, but so did every one else, and it is impossible to be sure that a given conception is rightly attributed to the particular man whose name has become associated with it. Indeed "Sheraton," like "Chippendale," has come to indicate a style rather than a personal attribution. But the volume and the beauty of the designs in his books is such that, when every allowance has been made for adaptation, there remains a mass of beautiful work which cannot be denied to him. In later life his very adaptability was his undoing. The public, always ready to take its mobiliary fashions from France, demanded Empire furniture, and Sheraton may have been, or have believed himself to be, compelled to give them what they wanted. His extravagant creations in that sphere—far worse than anything that was designed in France—had much to do with the development of a fashion of English Empire which finally ruined British furniture design. He rioted in sphinxes and lions and fabulous beasts, he evolved forms that were dull and cumbrous, and added to their heaviness by brass mounts at once massive and uninspired. After his death the eccentricity may have been less, but the heaviness and dullness were greater, and with the disappearance of Sheraton the brief but splendid summer of English furniture ended in gloom. It had lasted little more than half a century, but it was a half-century which only France ever could, or did, rival. It is one of the strangest ironies in the history of art that the last and almost the greatest exponent of the English genius in the sphere of furniture was in the end mainly responsible for a decay from which there has as yet been no renaissance. (J. P.-B.)

SHERBET (the Turkish form of the Arabic *sharbat*, drink, *shariba*, he drank, cf. "shrub," an English derivative), properly the name of an Oriental beverage, consisting of the juice of such fruits as the lemon, citron, &c., dropped upon a cake of sugar and partially frozen with snow or otherwise cooled. The word, and also the French form *sorbet*, are applied in Western usage to a water-ice not frozen as hard as the ordinary ice, and flavoured with fruit juice, spirit, &c. A cheap sweetened effervescing drink is also so styled.

SHERBORNE, a market town in the northern parliamentary division of Dorsetshire, England, 118 m. W.S.W. from London by the London & South-Western railway. Pop. of urban district (1901), 5760. It lies near the border of Somersetshire, on the southern slope of a hill overlooking the river Yeo, in a fertile, well-wooded district. The abbey church of St Mary the Virgin is a stately cruciform building with central tower, the nave and choir having aisles and clerestory. Some pre-Norman work appears in the western wall, the tower arches and south porch are Norman, and there are an Early English chapel and some Decorated windows. The church, however, was almost wholly reconstructed in the Perpendicular period, and is a fine example of that style, the interior gaining in beauty from the scheme of colour-decoration in the choir, while the magnificent stone-vaulted roof with fan tracery, extending throughout the church, excepting the south transept, is unsurpassed. The parish church of All Hallows adjoined the abbey church on the

west, but was taken down after the Dissolution, when the abbey church was sold to the parish. Portions of the abbey buildings, including the Lady chapel of the church, now converted into a dwelling-house, are incorporated in those of Sherborne grammar school, founded (although a school existed previously) by Edward VI. in 1550, and now holding a high rank among English public schools. The almshouse known as the hospital of St John the Baptist and St John the Evangelist was founded in 1437 on the site of an earlier establishment, and retains a Perpendicular chapel, hall and other portions. The abbey conduit, of the middle of the 14th century, is conspicuous in the main street of the town. Of the old castle, the gatehouse and other parts are of Norman construction, but the mansion near it was built by Sir Walter Raleigh.

As there is no evidence of Roman or British settlement, it is probable that Sherborne (Scireburn, Shireburne) grew up after the Saxon conquest of the country from the Corn-Welsh in the middle of the 7th century. It is first mentioned in 705 as the place where St Aldhelm fixed his bishop-stool for the new diocese of Western Wessex, being chosen probably for its central position. Æthelberht, king of Wessex, was buried here by the side of his brother Æthelbald in 866. For the next eighteen years its freedom from Danish attack made Sherborne the capital of Wessex. In 978 Bishop Wulfsey introduced the stricter form of Benedictine rule into his cathedral of Sherborne, and became the first abbot. The see, which was united with that of Ramsbury in 1058, was removed to Old Sarum in 1075. In 1086 the bishop of Sarum and the monks of Sherborne held the place, which seems to have been of fair size and an agricultural centre. On the separation of the offices of bishop and abbot in 1122, the abbot's fee was carved out of the bishop's manor, but did not include the town. Bishop Roger of Caen (1107–1139) built the castle, described by Henry of Huntingdon as scarcely inferior to that of Devizes, "than which there was none greater within the confines of England." Its strength made Stephen force Bishop Roger to surrender it in 1139, but during the civil war in his reign it passed into the hands of the empress Maud. It was later granted to the earls of Salisbury, who seem to have allowed it to fall into disrepair, for in 1315 and in 1319 the abbot of Sherborne was appointed to inquire into its condition. It was recovered by the bishop in 1355, and retained by the see until granted in 1599 to Elizabeth, who gave it to Sir Walter Raleigh. The abbey church was partly burnt in 1437, in a riot due to the monks' refusal to recognize the town's chapel of All Hallowes as the parish church, though they had restricted their use of the abbey church for parochial purposes. Signs of this fire are still visible on the walls, which are in part tinged red by the flames. The town, though frequently the centre for medieval assizes and inquisitions, never became a municipal or parliamentary borough, but was governed by two constables, elected in the manorial court. In 1540 Sir John Horsey, who had bought the manor and church at the Dissolution, sold the abbey to the vicar and parishioners. The Reformation made no break in the continuity of the school, which had probably existed in the abbey since the 11th century. Edward VI. by his charter in 1550 made its governors one of the first purely lay educational corporations founded in England. The town suffered severely during the civil wars, the castle being besieged by the parliamentary forces in 1642 and 1645. The fairs now held on the 8th of May, the 26th of July and the first Monday after the 10th of October were granted to the bishop in 1227, 1240 and 1300. After the decline of the medieval trade in cloth, lace and buttons were the only articles manufactured here until the introduction of silk-weaving in 1740. In June 1905, in commemoration of the 1200th anniversary of "the town, the bishopric and the school," an historical pageant, invented and arranged by Louis N. Parker (at one time music-master at the school), was held in the grounds of Sherborne Castle, and set the model for a succession of pageants held subsequently in other historic English towns.

See William Beauchamp Wildman, *A Short History of Sherborne from A.D. 705* (1902), and *Life of S. Ealdhelm, first Bishop of Sherborne* (Sherborne, 1905).

SHERBROOKE, ROBERT LOWE, VISCOUNT (1811–1892), British statesman, was born on the 4th of December 1811 at Bingham, Notts, where his father was the rector. He was educated at Winchester and University College, Oxford, where he took a first class in classics and a second in mathematics, besides taking a leading part in the Union debates. In 1835 he won a fellowship at Magdalen, but vacated it on marrying, in 1836, Miss Georgina Orred (*d.* 1884). He was for a few years a successful "coach" at Oxford, but in 1838 was bitterly disappointed at not being elected to the professorship of Greek at Glasgow. In 1841 Lowe moved to London, to read for the Bar ("called" 1842); but his eyesight showed signs of serious weakness, and, acting on medical advice, he determined to try his fortune in the colonies rather than in London. He went to Sydney, where he set to work in the law courts. In 1843 he was nominated by Sir George Gipps, the governor, to a seat in the New South Wales Legislative Council; owing to a difference with Gipps he resigned his seat, but was elected shortly afterwards for Sydney. Lowe soon made his mark in the political world by his clever speeches, particularly on finance and education; and besides obtaining a large legal practice, he was one of the principal writers for the *Atlas* newspaper. In 1850 he went back to England, in order to enter political life there. His previous university reputation and connexions, combined with his colonial experience, stood him in good stead. *The Times* was glad to employ his ready pen, and as one of its ablest leader-writers he made his influence widely felt. In 1852 he was returned to Parliament for Kidderminster in the Liberal interest. In the House of Commons his acute reasoning made a considerable impression, and under successive Liberal ministries (1853–1858) he obtained official experience as secretary of the Board of Control and vice-president of the Board of Trade. In 1859 he went to the Education Office as vice-president of the Council in Lord Palmerston's ministry; there he pursued a vigorous policy, insisting on the necessity of payment by results, and bringing in the revised code (1862), which embodied this principle and made an examination in "the three R's" the test for grants of public money. He felt then, and still more after the Reform Act of 1866, that "we must educate our masters,"[1] and he rather scandalized his old university friends by the stress he laid on physical science as opposed to classical studies. Considerable opposition was aroused by the new régime at the Education Office, and in 1864 Lowe was driven to resign by an adverse vote in Parliament with reference to the way in which inspectors' reports were "edited." The result was unjust to Lowe, but a good deal of feeling had been aroused against Lingen's administration of the Education Office (see LINGEN, BARON), and this was the outcome. Lord Palmerston's death in October 1865 was followed by the formation of the Russell-Gladstone ministry and the introduction of the Reform Bill of 1866. Lowe, a Liberal of the school of Canning and Peel, had already made known his objections to the advance of "democracy"—notably in his speech in 1865 on Sir E. Baines's Borough Franchise Bill—and he was not invited to join the new ministry. He retired into what Bright called the "Cave of Adullam," and opposed the bill in a series of brilliant speeches, which raised his reputation as an orator to its highest point and effectually caused the downfall of the government. He remained, nevertheless, a Liberal; and after the franchise question had been settled by what Lowe considered Disraeli's betrayal, and he had been elected the first member for London University, he accepted office again in the Gladstone Cabinet of 1868 as chancellor of the exchequer. Lowe was a rather cut-and-dry economist, who prided himself that during his four years of office he took twelve millions off taxation; but later opinion has hardly accepted his removal of the shilling registration duty on corn (1869) as good statesmanship, and his failures are remembered rather than his successes. His proposed tax of a

[1] This phrase is always ascribed to Lowe, and has become history in association with him. But what he really said in his address to the Edinburgh Philosophical Institution in 1867 was that it was necessary "to induce our future masters to learn their letters."

halfpenny a box on lucifer matches in 1871 (for which he suggested the epigram *ex luce lucellum*, "out of light a little profit") roused a storm of opposition, and had to be dropped. In 1873 he was transferred to the Home Office, but in 1874 the government resigned. When the Liberals returned to power in 1880 he was raised to the peerage as Viscount Sherbrooke, but from 1875 till his death at Warlingham, Surrey, on the 27th of July 1892, his health was constantly failing, and by degrees he figured less and less in public life.

Bobby Lowe, as he was popularly known, was one of the most remarkable personalities of his day, with his tall, striking figure, albino complexion and hair, and faculty for epigram and irony. During the 'seventies the following epitaph was suggested for him by one of the wits of his day:—

"Here lies poor old Robert Lowe;
Where he's gone to I don't know;
If to the realms of peace and love,
Farewell to happiness above;
If, haply, to some lower level,
We can't congratulate the devil."

Lowe was delighted with this, and promptly translated it into Latin, as follows:—

"Continentur hac in fossa
Humilis Roberti ossa;
Si ad coelum evolabit,
Pax in coelo non restabit;
Sin in inferis jacebit,
Diabolum ejus poenitebit."

His literary talent, though mainly employed in journalism, was also shown in a little volume of verses, *Poems of a Life* (1884). He married a second time, in 1885, but left no children.

See *Life and Letters* by A. Patchett Martin (London, 1893).

(H. Ch.)

SHERBROOKE, a city and port of entry of Quebec, Canada, and capital of Sherbrooke county, 101 m. E. of Montreal, at the confluence of the rivers Magog and St Francis, and on the Grand Trunk, Canadian Pacific, Quebec Central and Boston & Maine railways. Pop. (1901) 11,765. It is the seat of a Roman Catholic bishopric and of the district courts, and contains manufactories of woollen and cotton goods and machinery, also saw and grist mills. It derives its name from Sir John Coape Sherbrooke (1764–1830), who from 1816 to 1818 was governor-general of Canada.

SHERE ALI KHAN (1825–1879), Amir of Afghanistan, was born in 1825, one of the younger sons of the amir Dost Mahommed, whom he succeeded in 1863. For some time after his succession Afghanistan was in a state of anarchy, and his rebellious half-brothers overran the country while he remained at Kandahar mourning the loss of a favourite son. At length, however, the capture of Kabul in 1866 roused him to action; but in spite of his own bravery he suffered general defeat until 1868, when he regained Kabul. Supported by the viceroys of India, Lord Lawrence and Lord Mayo, Shere Ali remained on good terms with the British government for some years; but after the rebellion of his son Yakub Khan, 1870–74, he leaned towards Russia, and welcomed a Russian agent at Kabul in 1878, and at the same time refused to receive a British mission. This led to long negotiations, and ultimately to war, when the British forced the Khyber Pass in November 1878, and defeated the amir's forces on every occasion. Shere Ali fled from his capital and, taking refuge in Turkestan, died at Mazar-i-Sharif on the 21st of February 1879.

SHERIDAN, the name of an Anglo-Irish family, made illustrious by the dramatist Richard Brinsley (No. 4 below), but prominently connected with literature in more than one generation before and after his.

1. Thomas Sheridan (1687–1738), grandfather of the dramatist, was born at Cavan in 1687, and was educated at Trinity College, Dublin, taking his B.A. degree in 1711 and that of M.A. in 1714; he became B.D. in 1724 and D.D. in 1726. By a marriage with Elizabeth, heiress of Charles MacFadden, he restored to the Sheridan family Quilcagh House, which they had forfeited by their Jacobite sympathies. Thomas Sheridan is chiefly known as the favourite companion and confidant of Swift during his later residence in Ireland. His correspondence with Swift and his whimsical treatise on the "Art of Punning"[1] make perfectly clear from whom his grandson derived his high spirits and delight in practical joking. The "Art of Punning" might have been written by the author of *The Critic*. Swift had a high opinion of his scholarship, and that it was not contemptible is attested by a translation of the *Satires* of Persius, printed in Dublin in 1728. He also translated the *Satires* of Juvenal and the *Philoctetes* of Sophocles. When Swift came to Dublin as dean of St Patrick's, Sheridan was established there as a schoolmaster of very high repute, and the two men were soon close friends. Sheridan was his confidant in the affair of *Drapier's Letters*; and it was at Quilcagh House that *Gulliver's Travels* was prepared for the press. Through Swift's influence he obtained a living near Cork, but damaged his prospects of further preferment by a feat of unlucky absence of mind. Having to preach at Cork on the anniversary of Queen Anne's death he hurriedly chose a sermon with the text, "Sufficient unto the day is the evil thereof," and was at once struck off the list of chaplains to the lord-lieutenant and forbidden the castle. In spite of this mishap, for which the archdeacon of Cork made amends by the present of a lease worth £250 per annum, he "still remained," said the earl of Orrery (*Remarks on the Life and Writings of Jonathan Swift*, 1751), "a punster, a quibbler, a fiddler and a wit," the only person in whose genial presence Swift relaxed his habitual gloom. His latter days were not prosperous, probably owing to his having "a better knowledge of books than of men or of the value of money." He offended Swift by fulfilling an old promise to tell the dean if he ever saw signs of avarice in him, and the friends parted in anger. He died in poverty on the 10th of October 1738.

The original source of information about Dr Sheridan is his son's *Life of Swift* (vol. i. pp. 309-395), where his scholarship is dwelt upon as much as his improvident conviviality and simple kindliness of nature

2. Thomas Sheridan (1719–1788), son of the above, was born in Dublin in 1719. His father sent him to an English school (Westminster); but he was forced by stress of circumstances to return to Dublin and complete his education at Trinity College, where he took his B.A. degree in 1739. Then he went on the stage, and at once made a local reputation. He even wrote a play, *Captain O'Blunder, or the Brave Irishman*, which became a stock piece, though it was never printed. There is a tradition that on his first appearance in London he was set up as a rival to Garrick, and Moore countenances the idea that Garrick remained jealous of him to the end. For this tradition there is little foundation. Sheridan's first appearance in London was at Covent Garden in March 1744, when, heralded in advance as the brilliant Irish comedian, he acted for three weeks in a succession of leading parts, *Hamlet* being the first. In October he appeared at Drury Lane, playing Horatio in Rowe's *Fair Penitent*, and subsequently as Pierre in Otway's *Venice Preserved*, and in *Hamlet* and other parts. On his return to Dublin he became manager of the Theatre Royal, and married Frances Chamberlaine. He was driven from Dublin as a result of his unpopular efforts to reform the theatre. A young man named Kelly had insulted the actresses, and when Sheridan interfered threatened him. A riot followed, in consequence of which Kelly was imprisoned, but he was released on Sheridan's petition. This disturbance was followed in 1754 by another outbreak, when he refused to allow the actor, West Digges, to repeat a passage reflecting on the government in James Miller's tragedy, *Mahomet the Impostor*. After two seasons in London he tried Dublin again, but two years more of unremunerative management induced him to leave for England in 1758. By this time he had conceived his scheme of British education, and it was to push this rather than his connexion with the stage that he crossed St George's Channel. He lectured at Oxford and Cambridge, and was incorporated M.A. in both universities. But the scheme did not make way, and we find him in 1760 acting under Garrick at Drury Lane. His merits as an actor may be judged from

[1] Published in Nichols's Supplement to the works of Swift (1779).

the description of him in the *Rosciad* (l. 987) at this period. He is placed in the second rank, next to Garrick, but there is no hint of possible rivalry. Churchill describes him as an actor whose conceptions were superior to his powers of execution, whose action was always forcible but too mechanically calculated, and who in spite of all his defects rose to greatness in occasional scenes. Churchill never erred on the side of praising too much, and his description may be accepted as correct, supported as it is by the fact that the actor eked out his income by giving lessons in elocution. Sheridan solicited a pension for Samuel Johnson from Lord Bute through Wedderburn. The pension, £300 a year, was granted, and shortly afterwards Bute was so favourably impressed with a scheme submitted to him by Sheridan of his *Pronouncing Dictionary* that he bestowed a pension of £200 on him also. Some hasty remarks of Johnson's on the matter were repeated to Sheridan, who broke off his acquaintance with the doctor in consequence. Sheridan, however, attracted attention chiefly by his enthusiastic advocacy, in public lectures and books, of his scheme of education, in which elocution was to play a principal part. In the case of his son, Richard Brinsley Sheridan, his instruction was certainly not wasted. Sheridan's indictment of the established system of education was that it did not fit the higher classes for their duties in life, that it was uniform for all and profitable for none; and he urged as a matter of vital national concern that special training should be given for the various professions. Oratory came in as part of the special training of men intended for public affairs, but his main contention was one very familiar now—that more time should be given in schools to the study of the English language. He rode his hobby with great enthusiasm, published an elaborate and eloquent treatise on education, and lectured on the subject in London, Oxford, Cambridge, Edinburgh and other towns. In 1764 he went to live in France, partly for economy, partly for Mrs Sheridan's health, and partly to study the system of education. His wife died in 1766 and soon afterwards he returned to England. In 1769 he published a matured *Plan of Education for the Young Nobility and Gentry* with a letter to the king, in which he offered to devote the rest of his life to the execution of his theories on condition of receiving a pension equivalent to the sacrifice of his professional income. His offer was not accepted; but Sheridan, still enthusiastic, retired to Bath, and prepared his pronouncing *General Dictionary of the English Language* (2 vols., 1780). After his son's brilliant success he assisted in the management of Drury Lane, and occasionally acted. His *Life of Swift*, a very entertaining work in spite of its incompleteness as a biography, was written for the 1784 edition of Swift's works. He died at Margate on the 14th of August 1788.

3. FRANCES SHERIDAN (1724–1766), wife of the above and mother of the dramatist, was the daughter of Dr Philip Chamberlaine of Dublin. When only fifteen years of age she wrote a story, *Eugenia and Adelaide*, published after her death in two volumes. She took Sheridan's part in the so-called Kelly riots, writing some verses and a pamphlet in his defence. This led to her acquaintance, and finally in 1747 to her marriage, with the unpopular manager. It was by Richardson's advice that she wrote the *Memoirs of Miss Sidney Bidulph*. . . . It was issued anonymously in 1761 with a dedication to Richardson, and had great success, both in England and France. A second part (2 vols.) was published in 1767. Two of her plays were produced in 1763 at Drury Lane, *The Discovery* and *The Dupe*. We have it on the authority of Moore that, when *The Rivals* and *The Duenna* were running at Covent Garden, Garrick revived *The Discovery* at Drury Lane, as a counter-attraction, "to play the mother off against the son, taking on himself to act the principal part in it." But the statement, intrinsically absurd, is inaccurate. *The Discovery* was not an old play at the time, but one of Garrick's stock pieces, and Sir Anthony Branville was one of his favourite characters. It was first produced at Drury Lane in 1763. So far from being jealous of the elder Sheridan, Garrick seems to have been a most useful friend to the family, accepting his wife's play—which he declared to be "one of the best comedies he ever read"—and giving the husband several engagements. *The Dupe* was a failure and was only played once. Her last work was an Oriental tale, *Nourjahad*, written at Blois, where she died on the 26th of September 1766. Her third play, *A Journey to Bath*, was refused by Garrick, and R. B. Sheridan made some use of it in *The Rivals*.

4. RICHARD BRINSLEY BUTLER SHERIDAN (1751–1816), third son of Thomas and Frances Sheridan, was born in Dublin on the 30th of October 1751. There is a story, discredited by Mr Fraser Rae, that Mrs Sheridan on placing her sons with their first schoolmaster, Samuel Whyte, said that she had been the only instructor of her children hitherto, and that they would exercise the schoolmaster in the quality of patience, "for two such impenetrable dunces she had never met with." One of the children thus humorously described was Richard Brinsley, then aged seven. At the age of eleven he was sent to Harrow school. Sheridan was extremely popular at school, winning somehow, Dr Parr confesses, "the esteem and even admiration of all his schoolfellows"; and he acquired, according to the same authority, more learning than he is usually given credit for. He left Harrow at the age of seventeen, and was placed under the care of a tutor. He was also trained by his father daily in elocution, and put through a course of English reading. He had fencing and riding lessons at Angelo's.

After leaving Harrow he kept up a correspondence with a school friend who had gone to Oxford. With this youth, N. B. Halhed, he concocted various literary plans, and between them they actually executed and published (1771) metrical translations of Aristaenetus. In conjunction with Halhed he wrote a farce entitled *Jupiter*, which was refused by both Garrick and Foote and remained in MS., but is of interest as containing the same device of a rehearsal which was afterwards worked out with such brilliant effect in *The Critic*. Some of the dialogue is very much in Sheridan's mature manner. Extracts given from papers written in the seven years between his leaving Harrow and the appearance of *The Rivals*—sketches of unfinished plays, poems, political letters and pamphlets—show that he was far from idle. The removal of the family to Bath in 1770–1771 led to an acquaintance with the daughters of the composer Thomas Linley. The eldest daughter, Elizabeth Ann (b. 1754), a girl of sixteen, the *prima donna* of her father's concerts, was exceedingly beautiful,[1] and had many suitors, among them Sheridan, N. B. Halhed and a certain Major Mathews. To protect her from this man's persecutions, Sheridan, who seems to have acted at first only as a confidential friend, carried out the romantic plan of escorting Miss Linley, in March 1772, to a nunnery in France. Sheridan returned and fought two duels with Mathews, which made a considerable sensation at the time. The pair had gone through the ceremony of marriage in the course of their flight, but Sheridan kept the marriage secret, and was sternly denied access to Miss Linley by her father, who did not consider him an eligible suitor. Sheridan was sent to Waltham Abbey, in Essex, to continue his studies, especially in mathematics. He was entered at the Middle Temple on the 6th of April 1773, and a week later he was openly married to Miss Linley.

His daring start in life after this happy marriage showed a confidence in his genius which was justified by its success. Although he had no income, and no capital beyond a few thousand pounds brought by his wife, he took a house in Orchard Street, Portman Square, furnished it "in the most costly style," and proceeded to return on something like an equal footing the hospitalities of the fashionable world. His first comedy, *The Rivals*, was produced at Covent Garden on the 17th January 1775. It is said to have been not so favourably received on its first night, owing to its length and to the bad playing of the part of Sir Lucius O'Trigger. But the defects were remedied before the second performance, which was deferred to the 28th of the month, and the piece at once took that place on the stage which it has never lost. His second piece, *St Patrick's Day, or the Scheming Lieutenant*, a lively farce, was written for the benefit

[1] Her portrait, by Gainsborough, one of the best examples of the artist's work, hangs at Knole, Sevenoaks, Kent.

performance (2nd of May 1775) of Lawrence Clinch, who had succeeded as Sir Lucius. In November 1775, with the assistance of his father-in-law, he produced the comic opera of *The Duenna*, which was played 75 times at Covent Garden during that season. Sheridan now began to negotiate with Garrick for the purchase of his share of Drury Lane, and the bargain was completed in June 1776. The sum paid by Sheridan and his partners, Thomas Linley and Dr Ford, for the half-share was £35,000; of this Sheridan contributed £10,000. The money was raised on mortgage, Sheridan contributing only £1300 in cash.[1] Two years afterwards Sheridan and his friends bought the other half of the property for £35,000.

From the first the direction of the theatre would seem to have been mainly in the hands of Sheridan, who derived very material assistance from his wife. In February 1777 he produced his version of Vanbrugh's *Relapse*, under the title of *A Trip to Scarborough*. This is printed among Sheridan's works, but he has no more title to the authorship than Colley Cibber to that of *Richard III.* His chief task was to remove indecencies; he added very little to the dialogue. *The School for Scandal* was produced on the 8th of May 1777. Mrs Abington, who had played Miss Hoyden in the *Trip*, played Lady Teazle, who may be regarded as a Miss Hoyden developed by six months' experience of marriage and town life. The lord chamberlain refused to license the play, and was only persuaded on grounds of personal friendship with Sheridan to alter his decision. There are tales of the haste with which the conclusion of *The School for Scandal* was written, of a stratagem by which the last act was got out of him by the anxious company, and of the fervent "Amen" written on the last page of the copy by the prompter, in response to the author's "Finished at last, thank God!" But, although the conception was thus hurriedly completed, we know from Sheridan's sister that the idea of a "scandalous college" had occurred to him five years before in connexion with his own experiences at Bath. His difficulty was to find a story sufficiently dramatic in its incidents to form a subject for the machinations of the character-slayers. He seems to have tried more than one plot, and in the end to have desperately forced two separate conceptions together. The dialogue is so brilliant throughout, and the auction scene and the screen scene so effective, that the construction of the comedy meets with little criticism. *The School for Scandal*, though it has not the unity of *The Rivals*, nor the same wealth of broadly humorous incident, is universally regarded as Sheridan's masterpiece. He might have settled the doubts and worries of authorship with Puff's reflection: "What is the use of a good plot except to bring in good things?"

Sheridan's farce, *The Critic*, was produced on the 29th of October 1779, *The School for Scandal* meantime continuing to draw larger houses than any other play every time it was put on the stage. In *The Critic* the laughable infirmities of all classes connected with the stage—authors, actors, patrons and audience—are touched off with the lightest of hands; the fun is directed, not at individuals, but at absurdities that grow out of the circumstances of the stage as naturally and inevitably as weeds in a garden. It seems that he had accumulated notes for another comedy to be called *Affectation*, but his only dramatic composition during the remaining thirty-six years of his life was *Pizarro*, produced in 1799—a tragedy in which he made liberal use of some of the arts ridiculed in the person of Mr Puff. He also revised for the stage Benjamin Thompson's translation, *The Stranger*, of Kotzebue's *Menschenhass und Reue*.

He entered parliament for Stafford in 1780, as the friend and ally of Charles James Fox. Apparently he owed his election for Stafford to substantial arguments. He is said to have paid the burgesses five guineas each for the honour of representing them, beside gifts in dinners and ale to the non-voting part of the community, for their interest and applause. His first speech in parliament was to defend himself against the charge of bribery, and was well received. He spoke little for a time and chiefly on financial questions, but soon took a place among the best speakers in the House. Congress recognized his services in opposing the war in America by offering him a gift of £20,000 which, however, he refused. Under the wing of Fox he filled subordinate offices in the short-lived ministries of 1782 and 1783. He was under-secretary for foreign affairs in the Rockingham ministry, and a secretary of the treasury in the Coalition ministry. In debate he had the keenest of eyes for the weak places in an opponent's argument, and the happy art of putting them in an irresistibly ludicrous light without losing his good temper or his presence of mind. In those heated days of parliamentary strife he was almost the only man of mark that was never called out, and yet he had no match in the weapon of ridicule.

Sheridan found his great opportunity in the impeachment of Warren Hastings. His speeches in that proceeding were by the unanimous acknowledgment of his contemporaries among the greatest delivered in that generation of great orators. The first was on the 7th of February 1787, on the charges brought against Hastings with regard to the begums or princesses of Oude. Sheridan spoke for more than five hours, and the effect of his oratory was such that it was unanimously agreed to adjourn and postpone the final decision till the House should be in a calmer mood. Of this, and of his last great speech on the subject in 1794, only brief abstracts have been preserved; but with the second, the four days' speech delivered in his capacity of manager of the trial, in Westminster Hall, on the occasion so brilliantly described by Macaulay, posterity has been more fortunate. Gurney's verbatim reports of the speeches on both sides at the trial were published at Sir G. Cornewall Lewis's instigation in 1859, and from them we are able to form an idea of Sheridan's power as an orator. There are passages here and there of gaudy rhetoric, loose ornament and declamatory hyperbole; but the strong common sense, close argumentative force and masterly presentation of telling facts enable us to understand the impression produced by the speech at the time.

From the time of the break-up of the Whig party on the secession of Burke he was more or less an "independent member," and his isolation was complete after the death of Fox. When Burke denounced the French Revolution, Sheridan joined with Fox in vindicating the principle of non-intervention. He maintained that the French people should be allowed to settle their constitution and manage their affairs in their own way. But when the republic was succeeded by the empire, and it became apparent that France under Napoleon would interfere with the affairs of its neighbours, he employed his eloquence in denouncing Napoleon and urging the prosecution of the war. One of his most celebrated speeches was delivered in support of strong measures against the mutineers at the Nore. He was one of the few members who actively opposed the union of the English and Irish parliaments. When the Whigs came into power in 1806 Sheridan was appointed treasurer of the navy, and became a member of the Privy Council. After Fox's death he succeeded his chief in the representation of Westminster, and aspired to succeed him as leader of the party, but this claim was not allowed, and thenceforward Sheridan fought for his own hand. When the prince became regent in 1811 Sheridan's private influence with him helped to exclude the Whigs from power. Throughout his parliamentary career Sheridan was one of the boon companions of the prince, and his champion in parliament in some dubious matters of payment of debts. But he always resented any imputation that he was the prince's confidential adviser or mouthpiece. A certain proud and sensitive independence was one of the most marked features in Sheridan's parliamentary career. After a coolness arose between him and his Whig allies he refused a place for his son from the government, lest there should be any suspicion in the public mind that his support had been bought.

His last years were harassed by debt and disappointment. He sat in parliament for Westminster in 1806–1807. At the general election of 1807 he stood again for Westminster and was defeated, but was returned as member for Ilchester, at

[1] For the elucidation of these transactions, see Brander Matthews's edition (1885) of *Sheridan's Comedies* (pp. 29-31).

the expense apparently of the prince of Wales. In 1812 he failed to secure a seat at Stafford. He could not raise money enough to buy the seat. He had quarrelled with the Prince Regent, and seems to have had none but obscu e friends to stand by him. As a member of parliament he had been safe against arrest for debt, but now that this protection was lost his creditors closed in upon him, and the history of his life from this time till his death in 1816 is one of the most painful passages in the biography of great men. It may be regarded as certain, however, that the description of the utter destitution and misery of the last weeks of his life given in the *Croker Papers* (i. pp. 288-312, ed. L. J. Jennings) is untrue. In any attempt to judge of Sheridan as he was apart from his works, it is necessary to make considerable deductions from the mass of floating anecdotes that have gathered round his name. It was not without reason that his grand-daughter Mrs Norton denounced the unfairness of judging of the real man from unauthenticated stories. The real Sheridan was not a pattern of decorous respectability, but we may fairly believe that he was very far from being the Sheridan of vulgar legend. Against the stories about his reckless management of his affairs we must set the broad facts that he had no source of income but Drury Lane theatre, that he bore from it for thirty years all the expenses of a fashionable life, and that the theatre was twice rebuilt during his proprietorship, the first time (1791) on account of its having been pronounced unsafe, and the second (1809) after a disastrous fire. Enough was lost in this way to account ten times over for all his debts. The records of his wild bets in the betting book of Brooks's Club date from the years after the loss, in 1792, of his first wife, to whom he was devotedly attached. He married again in 1795, his second wife being Esther Jane, daughter of Newton Ogle, dean of Winchester. The reminiscences of his son's tutor, Mr Smyth, show anxious and fidgetty family habits, curiously at variance with the accepted tradition of his imperturbable recklessness. He died on the 7th of July 1816, and was buried with great pomp in Westminster Abbey.

Sheridan's only son by his first marriage, THOMAS SHERIDAN (1775–1817), was a poet of some merit. He became colonial treasurer at the Cape of Good Hope. His wife, Caroline Henrietta, *née* Callander (1779–1851), wrote three novels, which had some success at the time. She received, after her husband's death, quarters at Hampton Court, and is described by Fanny Kemble as more beautiful than anybody but her daughters. The eldest child, HELEN SELINA (1807–1867), married Commander Price Blackwood, afterwards Baron Dufferin. Her husband died in 1841, and in 1862 she consented to a ceremony of marriage with George Hay, Earl of Gifford, who died a month later. Her *Songs, Poems and Verses* (1894) were published, with a memoir, by her son, the marquess of Dufferin. The second daughter, CAROLINE, became Mrs Norton (*q.v.*). The youngest, JANE GEORGINA, married Edward Adolphus Seymour, afterwards 12th duke of Somerset.

BIBLIOGRAPHY.—*Memoirs of the . . . Life of . . . R. B. Sheridan, with a Particular Account of his Family and Connexions* (1817), by John Watkins ("who deals," said Byron, "in the life and libel line"), was an altogether inadequate piece of work, and made many false statements. The *Memoirs, &c.* (1825), compiled by Thomas Moore did not make full use of the papers submitted by the family. William Smyth (*Memoir of Mr Sheridan*, 1840), who had been a tutor in Sheridan's house, was responsible for many of the scandalous and sometimes baseless stories connected with Sheridan's name. Accounts of the dramatist's parents and of his grandfather are given by Alicia Lefanu in her *Memoirs of the Life and Writings of Mrs Frances Sheridan, &c.* (1824). There are numerous references to Sheridan in the *Letters and Journals* of Byron, and several anecdotes (see especially vol. v. p. 411 seq., ed. Prothero, 1901). Popular works on the Sheridans are Mrs Oliphant's *Sheridan* (1883) in the "English Men of Letters" series; Mr Percy Fitzgerald's *Lives of the Sheridans* (2 vols., 1886); and the *Life of R. B. Sheridan* (1890) by Lloyd C. Sanders in the "Great Writers" series. An admirable sketch of Sheridan's political career is given in *Wilkes, Sheridan, Fox: the Opposition under George the Third* (1874), by Mr W. Fraser Rae, who reconstructed Sheridan's biography from the original sources and vindicated his reputation from the misstatements of earlier writers, in *Sheridan: a Biography* (2 vols., 1896), which has an introduction by the marquess of Dufferin and Ava, the great-grandson of the dramatist. The *Life of R. B. Sheridan* by Walter Sichel (1909) is, however, the best account now available.

Among the numerous modern editions of Sheridan's plays, of which only *The Rivals* was published by the dramatist himself, may be mentioned: *Sheridan's Plays now printed as he wrote them* (1902), edited by W. Fraser Rae, who quotes at length the criticisms in the contemporary press; *The Plays of R. B. Sheridan* (1900), edited by Mr A. W. Pollard; and *Sheridan's Comedies* (Boston, U.S.A., 1885), with a valuable introduction by Mr Brander Matthews. For further details consult the extensive bibliography by Mr J. P. Anderson in the *Life* by Lloyd C. Sanders

SHERIDAN, PHILIP HENRY (1831–1888), American general, was born at Albany, N.Y., on the 6th of March 1831. His early life was spent in a country district in Perry county, Ohio, and he proceeded to West Point in 1848, graduating in 1853. He was assigned to the infantry and served on the frontier and on the Pacific coast, gaining some experience of war in operations against the Indians. At the outbreak of the Civil War in 1861 he had just become first lieutenant, and soon afterwards he was promoted captain and entrusted with administrative duties in the western theatre of war. Early in 1862 he was commissioned colonel of the 2nd Michigan cavalry, with which he served in Halleck's army on the Tennessee. In June he was placed in command of a cavalry brigade, and a month later he won promotion to the rank of brigadier-general U.S.V. by his skilful conduct of the fight of Booneville on the 1st of July. He took part in General Buell's campaign against Bragg, and led the 11th division of the Army of the Ohio at the hard-fought battle of Perryville (October 8). Sheridan distinguished himself still more at the sanguinary battle of Murfreesboro (Stone river), and on the recommendation of Rosecrans was made major-general of volunteers, to date from the 31st of December 1862. His division took part in Rosecrans's campaign of 1863 and a very distinguished part at Chickamauga and Chattanooga (*q.v.*). Sheridan's leading of his division at the latter battle attracted the notice of General Grant, and when the latter, as general in chief of the U.S. armies, was seeking an "active and energetic man, full of spirit and vigour and life" to command the cavalry of the Army of the Potomac, Sheridan was chosen on the suggestion of General Halleck. The extraordinary activity of the Union cavalry under his command justified the choice. Sheridan's corps took part in the battles of the Wilderness and Spottsylvania Court House (see the article WILDERNESS), incidents of which led to a bitter quarrel between Sheridan and Meade and to Sheridan's being despatched by General Grant on a far-reaching cavalry raid towards Richmond. In the course of this was fought the battle of Yellow Tavern, where the Confederate general J. E. B. Stuart was killed. After rejoining the army Sheridan fought another well-contested action at Hawes' Shop and took and held Cold Harbor. After the battle at that place Sheridan undertook another raid, this time towards Charlottesville (June 7–28), in view of co-operation with the army of General David Hunter in the Valley. In the course of this was fought the action of Trevilian's Station (June 11). A little later came General Sheridan's greatest opportunity for distinction. He was appointed to command a new "Army of the Shenandoah" to oppose the forces of General Early, and conducted the brilliant and decisive campaign which crushed the Confederate army and finally put an end to the war in Northern Virginia (see AMERICAN CIVIL WAR and SHENANDOAH VALLEY CAMPAIGNS). The victories of the Opequan, or Winchester (September 19), Fisher's Hill (September 22) and Cedar Creek (October 19), produced great elation in the North and corresponding depression in the Confederacy, and Sheridan was made successively brigadier-general U.S.A. for Fisher's Hill and major-general U.S.A. for Cedar Creek. "Sheridan's Ride" of 20 m. from Winchester to Cedar Creek to take command of the hard-pressed Union troops is a celebrated incident of the war. His capacity for accepting the gravest responsibilities was shown, not less than by his handling of an army in battle, by his ruthless devastation of the Valley—a severe measure felt to be necessary both by Sheridan himself and by Grant. From the Valley the cavalry rode through the enemy's country to join Grant before Petersburg, fighting the action of Waynesboro', destroying

communications and material of war, and finally reporting to the general-in-chief on the 25th of March 1865. A few days later the indefatigable Sheridan won the last great victory of the war at Five Forks. The operations were conducted entirely by him and were brilliantly successful, leading to the retreat of Lee from the lines of Petersburg and the final catastrophe of Appomattox Court House. In the course of the battle of Five Forks Sheridan once more displayed his utter fearlessness of criticism by summarily dismissing from his command General G. K. Warren, an officer of the highest repute, whose corps was only temporarily under Sheridan's orders. The part played by the cavalry corps in the pursuit of Lee was most conspicuous, and Sheridan himself commanded the large forces of infantry and cavalry which cut off Lee's retreat and compelled the surrender of the famous Army of Northern Virginia (see AMERICAN CIVIL WAR and PETERSBURG).

Soon after the close of the war Sheridan, who by these services had gained his reputation as one of the greatest soldiers of the time, was sent to exercise the military command in the south-west, where a corps of observation, on the Mexican frontier, watched the struggle between Maximilian and the Liberals (see MEXICO: *History*). General Sheridan stated in his memoirs that material assistance was afforded to the Liberals out of the U.S. arsenals, and the moral effect of his presence on the frontier certainly influenced the course of the struggle to a very great extent. Later, in the Reconstruction period, he commanded the Fifth Military District (Louisiana and Texas) at New Orleans, where his administration of the conquered states was most stormy, his differences with President Johnson culminating in his recall in September 1867. He was then placed in charge of the Department of the Missouri, which he commanded for sixteen years, and in 1869, on Grant's election to the presidency and Sherman's consequent promotion to the full rank of general, he was made lieutenant-general. In 1868–1869 he conducted a winter campaign against the Indians, which resulted in their defeat and surrender. During the Franco-German War of 1870 General Sheridan accompanied the great headquarters of the German armies as the guest of the king of Prussia. In 1873, at the time of the "Virginius" incident (see CUBA), when an invasion of Spain was projected, Sheridan was designated to command the United States field army. In 1875 he was sent to New Orleans to deal with grave civil disorder, a duty which he carried out with the same uncompromising severity that he had previously shown in 1867. In 1883 he succeeded Sherman in the chief command of the United States army, which he held until his death at Nonquitt, Mass., on the 5th of August 1888. A few months previously he had been raised to the full rank of general.

As a soldier, Sheridan combined brilliant courage and painstaking skill. As a fighting general he was unsurpassed. Few of the leaders of either side could have stemmed the tide of defeat as he did at Stone river and turned a mere rally into a great victory as he did at Cedar Creek, by the pure force of personal magnetism. His restless energy was that of a Charles XII., to whom in this respect he has justly been compared, while, unlike the king of Sweden, he was as careful and vigilant as the most methodical strategist. He was a devout Roman Catholic, and in his private life he had the esteem and admiration of all who knew him well. General Sheridan was president of the Society of the Army of the Potomac and of the Society of the Army of the Cumberland, the latter for fourteen years. In 1875 he married Irene, daughter of General D. H. Rucker, U.S.A.

His *Personal Memoirs* (2 vols.) were published soon after his death.

SHERIFF, or SHIRE-REEVE (O. Eng. *scir-gerefa* or *scirman*,[1] Latin, *vice-comes*), often called "high sheriff," the English and Irish executive authority in a county, or other place, often called his "bailiwick." The office also exists in about twenty ancient cities and boroughs, among which may be named London, Norwich, York, Bristol, Oxford, Lincoln, Chester and Canterbury in England, and Dublin, Cork, Limerick and other places in Ireland. In most of these the office is of an honorary nature. The office is at present an annual one, though this has not been always the case. Three names are put on the list by the chancellor of the exchequer and the judges of king's bench division on the morrow of St Martin (12th of November), and the first name is usually pricked by the king in council in the February or March following. City and borough sheriffs are usually appointed by the corporations on the 9th of November. London and Middlesex are specially provided for by the act of 1887, s. 33, and the sheriffs of the counties of Cornwall and Lancaster are separately appointed, the act not applying to them.

The shrievalty was at one time a far more important office than it is at present. "The whole history of English justice and police," says Maitland (*Justice and Police*, 69), "might be brought under this rubric, the decline and fall of the sheriff." That the sheriff sometimes abused his power is obvious from the grievances stated in the Inquest of Sheriffs of 1170. But he was necessary to protect the interests of the crown and the people against the powerful local baronage. Besides executing the king's writs, he called out the *posse comitatus* on any emergency needing an armed force. He had the *ferm* of the shire[2] (the rent he paid being called "sheriff-geld") and presided in the county court and the hundred court. For more purely judicial purposes he held as the king's deputy the sheriff's *tourn*,[3] where his jurisdiction had not been ousted by franchise. He might be a peer or a judge, Bracton being an instance of the latter. The appointment seems to have been originally by popular election, a right confirmed by 28 Edw. I. c. 8, but ultimately vested in the crown unless where certain powerful landowners had contrived to make the office hereditary. The hereditary shrievalty of Westmorland was not abolished until 1850 by 13 & 14 Vict. c. 30.[4] The tendency of the hereditary office to become obsolete was no doubt helped by the creation of Viscount Beaumont as an hereditary peer under the new dignity of *vice-comes* in 1440. At one time contributions to the expense of the office were made by the magistrates and others of the county. "Sheriff-tooth" was a tenure on condition of supplying entertainment to the sheriff at the county court. Up to the 19th century "riding with the sheriff" was an incident of the assizes, the riders being some of the principal men of the shire who brought with them wine and victuals in order to assist the sheriff in showing hospitality to the judges.

At the present day the expensive duties of the sheriff depend on numerous statutes beginning with 2 Edw. III. c. 3 (1328). The most important is the Sheriffs Act 1887, mainly a consolidating act applying to England only. The person nominated is usually a magistrate for the county, but anyone is eligible provided that he have land in the county sufficient to answer the king.[5] Exempt are peers, clergy, officers in active service, practising barristers and solicitors and others. Poverty is also a ground of exemption. The sheriff appoints his undersheriff. The duties of the office at the present day are both administrative and judicial. Among the former the most important is attendance on the judges at assizes and election petitions. A certain amount of stately ceremony is required, and any lack of it is punishable by fine either by the judge of assize or by the High Court. Other administrative duties are execution of writs[6] and of the sentence of death, acting as returning officer at parliamentary elections, preparing the panel of jurors for assizes, the keeping prisoners in safe custody, he being liable for their escape, and the—now nominal—duty of summoning the *posse comitatus*. His judicial duties consist in himself or his deputy sitting to assess damages under the Lands Clauses Act 1845, and also in cases set down for trial where the defendant has made default in appearance and the issue resolves itself into one of damages. The expenses of the office are partly met by the

[1] The word occurs as early as the laws of Ine (*c.* 8); about 690.

[2] The ferm is abolished by the act of 1887, s. 19.

[3] Abolished by s. 18 of the same act.

[4] Repealed and re-enacted by the act of 1887, s. 31.

[5] The counties of Cambridge and Huntingdon are combined for the purposes of the shrievalty. See the act of 1887, s. 32.

[6] Where a question arises as to the ownership of goods seized in execution the sheriff may have to undergo the process known as sheriff's interpleader.

Treasury in accordance with the Treasury order of the 2nd of August 1898. The order lays down with somewhat grim humour that the sheriff is not limited to the allowances, but may spend more if he likes. A sheriff cannot during his year of office act as a magistrate for the county of which he is sheriff.

See the works on the history of law by Stubbs, Pollock and Maitland and Holdsworth. Also W. S. McKechnie, *Magna Carta* (1905); Sir M. Hale, *A Short Treatise touching Sheriff's Accompts* (1683); Greenwood, *Bouleuterion* (1685); *The Compleat Sheriff* (1696); *Impey* (1786); *Athinson* (1878); Churchill and Bruce (1882); and Mather (1903).

Scotland.—As far as is known the sheriff did not exist in Scotland before the beginning of the Norman period. In the feudal system he became as in England the centre of the local administration of justice, the representative of the crown in executive as well as judicial business, and was always a royal officer appointed by and directly responsible to the king. The earliest sheriffs on record belong to the reigns of Alexander I. and David I., and the office was common before the death of Alexander III. In many cases it had become hereditary, instances being those of De Sinton in Selkirk and Agnew in Galloway. The ordinance of Edward I. in 1305 rejected the hereditary character of the office, but an act of James II. shows that the office had again become hereditary.

One of the consequences was that sheriffs ignorant of law required deputes to discharge their judicial duties. In the course of succeeding reigns, down to that of James VI., the jurisdiction of the sheriffs came to be much limited by grants of baronies and regalities which gave the grantees the right to hold both civil and criminal courts of less or greater jurisdiction to the exclusion of the sheriff.

The civil jurisdiction of the sheriff was originally of very wide extent, and was deemed specially applicable to questions relating to the land within the shire, but after the institution of the court of session in 1532 it became restricted, and all causes relating to property in land, as well as those requiring the action called declarator for establishing ultimate right, and most of those requiring equitable remedies, were withdrawn from it. Nor did it possess any consistorial jurisdiction. Practically, therefore, the civil jurisdiction of the sheriff fell under the head of actions concluding for payment of money and actions to regulate the possession of land. The criminal jurisdiction of the sheriff was in like manner in its origin of almost universal extent. But this was first limited to cases where the offenders were caught in or shortly after the act, afterwards to cases in which the trial could be held within forty days, and subsequently further restricted as the business of the justiciary court became more organized. The punishment of death, having by long disuse come to be held beyond the power of the sheriff, and the statutory punishments of transportation or penal servitude never having been entrusted to him, his jurisdiction as regards crimes was usually said to be limited to those punishable arbitrarily, that is, by imprisonment, fine or admonition.

As a consequence of the suppression of the Jacobite rising of 1745, after the 1st of March 1748 all heritable sheriffships were extinguished by 20 Geo. II. c. 43. The act declared that there should be but one sheriff-depute or stewart-depute in every shire or stewartry, who was to be an advocate of three years' standing, appointed by the crown. Since 1769 the sheriff-depute has held his office *ad vitam aut culpam*. Power was given to him by 20 Geo. II. c. 43 to appoint one or more sheriffs-substitute. In 1787 the sheriff-substitute was placed on the civil establishment and paid by the crown; in 1825 a qualification of three years' standing (now five years by the Sheriff Courts (Scotland) Act 1877) as an advocate or procurator before a sheriff court was required (6 Geo. IV. c. 23); in 1838 he was made removable by the sheriff-depute only with the consent of the lord president and lord justice clerk, and it was made compulsory that he should reside in the sheriffdom, the provision of 20 Geo. II. c. 43, which required the sheriff-depute so to reside for four months of each year, being repealed (1 & 2 Viet. c. 119). In 1877 the right of appointment of the substitutes was transferred from the sheriff-depute to the crown by the act of 1877.

While the sheriff-depute has still power to hear cases in the first instance, and is required to hold a certain number of sittings in each place where the sheriff-substitute holds courts, and also once a year a small-debt court in every place where a circuit small-debt court is appointed to be held, the ordinary course of civil procedure is that the sheriff-substitute acts as judge of first instance, with an appeal under certain restrictions from his decision to the sheriff-depute, and from him to the court of session in all causes exceeding £25 in value. An appeal direct from the sheriff-substitute to the court of session is competent, but is not often resorted to. By the Interpretation Act 1889, s. 28, the word "sheriff" in any act relating to Scotland is to include a sheriff-substitute.

As regards criminal proceedings, summary trials are usually conducted by the sheriff-substitute; trials with a jury either by him or, in important cases, by the sheriff-depute. The sheriff-substitute also has charge of the preliminary investigation into crime, the evidence in which, called a precognition, is laid before him, and if necessary taken before him on oath at the instance of his procurator-fiscal, the local crown prosecutor.

The duties of the sheriff-depute are now divided into ministerial or administrative and judicial. The ministerial are the supervision of the accounts of the inferior officers of the sheriffdom; the superintendence of parliamentary elections; the holding by himself or his substitutes of the courts for registration of electors; the preparation of the list of persons liable to serve both on criminal and civil juries; the appointment of sheriff officers and supervision of the execution of judicial writs by them; and the striking of the "fiars." He has also to attend the judges of justiciary at the circuit courts for the county or counties over which his jurisdiction extends.

The judicial duties of the sheriff-depute are, as regards crimes, the trial of all causes remitted by the counsel of the crown for the trial by sheriff and jury, as well as summary trials if he chooses to take them. This now means most crimes for which a maximum of two years' imprisonment (in practice eighteen months is the longest sentence imposed) is deemed sufficient, and which are not by statute reserved for the justiciary court. His civil jurisdiction is regulated by several statutes too technical for detail, but may be said generally to extend to all suits which conclude for payment of money, whatever may be the cause of action, with the exception of a few where the payment depends on status, all actions with reference to the possession of land or right in land, and actions relative to the right of succession to movable property. In bankruptcy he has a cumulative and alternative jurisdiction with the court of session, and in the service of heirs with the sheriff of chancery.

The courts which the sheriff holds are (1) the criminal court; (2) the ordinary civil court; (3) the small-debt court for cases under £12 in value (6 Geo. IV. c. 48); (4) the debts recovery court for cases above £12 and under £50 in value (Debts Recovery [Scotland] Act 1867); and (5) the registration court. His judgment in the criminal court is subject to review by the court of justiciary, and in the ordinary civil court and the debts recovery court by the court of session. In the small-debt court it is final, except in certain cases where an appeal lies to the next circuit court of justiciary. The sheriff-substitute may competently exercise all the judicial jurisdiction of the sheriff, subject to appeal in civil cases other than small debt cases. As regards his administrative functions he assists the sheriff generally, and may act for him in the registration and fiars court, and he superintends the preliminary stage of criminal inquiries, consulting with the sheriff if necessary; but the other administrative duties of the office are conducted by the sheriff-depute in person. The executive functions of the sheriff are performed by messengers-at-arms. The civil jurisdiction depends on numerous statutes known as the Sheriff Courts and Small Debts Acts. The salaries of sheriffs-depute vary from £2000 to £500 a year, those of sheriffs-substitute from £1400 to £500.

There is a principal sheriff-clerk appointed by the crown for each county, who has depute clerks under him in the principal towns, and a procurator-fiscal for the conduct of criminal prosecutions for each county and district of a county, who is appointed by the sheriff with the sanction of the home secretary.

Besides the sheriffs of counties, there is a sheriff of chancery appointed by the crown, whose duties are confined to the service of heirs, with a salary of £500.

See the various works on sheriff court practice, such as those of J. D. Wilson (1883) and J. M. Lees (1889), and Green, *Encyc. of Scots. Law, s.v.* "Sheriff."

Ireland.—The sheriff has much the same duties as in England. His position is defined by numerous statutes, beginning with 53 Geo. III. c. 68 (1817). There is no consolidating act such as that of 1887 in England.

United States.—The office of sheriff is generally elective.

The sheriff has administrative and limited judicial authority. He sometimes serves for combined counties, as in England for Cambridge and Huntingdon. (J. W.)

SHERIFFMUIR, a battlefield situated on the verge of the extreme north-western flank of the Ochils, Perthshire, Scotland, watered by Wharry Burn, an affluent of the Allan. It lies within the bounds of the parish of Dunblane, 2¼ m. E. by N. of the town. It was the site of an indecisive battle (13th of November 1715) between the Jacobites, about 12,000 strong, under John Erskine, 6th or 11th earl of Mar, and 4000 Royalists under Archibald Campbell, afterwards 3rd duke of Argyll. Both sides, each of which lost 500 men, claimed the victory, although in point of fact Mar deemed it prudent to retreat. The "battle stone" enclosed by a railing marks the scene of the encounter.

SHERIF PASHA (1818–1887), Egyptian statesman, was a Circassian who filled numerous administrative posts under Said and Ismail pashas. He was of better education than most of his contemporaries, and had married a daughter of Colonel Sèves, the French non-commissioned officer who became Soliman Pasha under Mehemet Ali. As minister of foreign affairs he was useful to Ismail, who used Sherif's bluff *bonhomie* to veil many of his most insidious proposals. Of singularly lazy disposition, he yet possessed considerable tact—he was in fact an Egyptian Lord Melbourne, whose policy was to leave everything alone. His favourite argument against any reform was to appeal to the Pyramids as an immutable proof of the solidity of Egypt financially and politically. His fatal optimism rendered him largely responsible for the collapse of Egyptian credit which brought about the fall of Ismail. Upon the military insurrection of September 1881, Sherif was summoned by the khedive Tewfik to form a new ministry. The impossibility of reconciling the financial requirements of the national party with the demands of the British and French controllers of the public debt, compelled him to resign in the following February. After the suppression of the Arabi rebellion he was again installed in office (September 1882) by Tewfik, but in January 1884 he resigned rather than sanction the evacuation of the Sudan. As to the strength of the mahdist movement he had then no conception. When urged by Sir Evelyn Baring (Lord Cromer) early in 1883 to abandon some of the more distant parts of the Sudan, he replied, with characteristic light-heartedness: "Nous en causerons plus tard; d'abord nous allons donner une bonne raclée à ce monsieur" (*i.e.* the mahdi). Hicks Pasha's expedition was at the time preparing to march on El Obeid. (*Vide Egypt* No. 1 (1907), p. 115). Sherif died at Gratz, on the 20th of April 1887.

SHERLOCK, THOMAS (1678–1761), English divine, the son of William Sherlock (*q.v.*), was born at London in 1678. He was educated at Eton and at St Catharine's Hall, Cambridge, and in 1704 succeeded his father as master of the Temple, where he was very popular. In 1714 he became master of his old college at Cambridge and vice-chancellor of the university, whose privileges he defended against Richard Bentley. In 1715 he was appointed dean of Chichester. He took a prominent part in the Bangorian controversy against Benjamin Hoadly, whom he succeeded as bishop of Bangor in 1728; he was afterwards translated to Salisbury in 1734, and to London in 1748. Sherlock was a capable administrator, and cultivated friendly relations with dissenters. In parliament he was of good service to his old schoolfellow Robert Walpole. He published against Anthony Collins's deistic *Grounds of the Christian Religion* a volume of sermons entitled *The Use and Interest of Prophecy in the Several Ages of the World* (1725); and in reply to Thomas Woolston's *Discourses on the Miracles* he wrote a volume entitled *The Tryal of the Witnesses of the Resurrection of Jesus* (1729), which soon ran through fourteen editions. His *Pastoral Letter* (1750) on "the late earthquakes" had a circulation of many thousands, and four or five volumes of *Sermons* which he published in his later years (1754–1758) were also at one time highly esteemed. He died in July 1761.

A collected edition of his works, with a memoir, in 5 vols. 8vo, by J. S. Hughes, appeared in 1830.

SHERLOCK, WILLIAM (*c.* 1641–1707), English divine, was born at Southwark about 1641, and was educated at Eton and at Peterhouse College, Cambridge. In 1669 he became rector of St George's, Botolph Lane, London, and in 1681 he was appointed a prebendary of St Paul's. In 1674 he showed his controversial bent by an attack on the puritan John Owen, in *The Knowledge of Jesus Christ and Union with Him.* In 1684 he published *The Case of Resistance of the Supreme Powers stated and resolved according to the Doctrine of the Holy Scriptures,* an ably written treatise, in which he drew the distinction between active and passive obedience which was at that time generally accepted by the high church clergy; in the same year he was made master of the Temple. In 1686 he was reproved for his anti-papal preaching, and his pension stopped. After the Revolution he was suspended for refusing the oaths to William and Mary, but before his final deprivation he yielded, justifying his change of attitude in *The Case of the Allegiance due to Sovereign Powers stated and resolved according to Scripture and Reason and the Principles of the Church of England* (1691). During the period of his suspension he wrote a *Practical Discourse concerning Death,* which became very popular. In 1690 and 1693 he published volumes on the doctrine of the Trinity which helped rather than injured the Socinian cause, and involved him in a warm controversy with Robert South and others. He became dean of St Paul's in 1691, and died at Hampstead in June 1707.

His sermons were collected in 2 vols. 8vo (4th ed., 1755).

SHERMAN, JOHN (1823–1900), American financier and statesman, a younger brother of General W. T. Sherman, was born at Lancaster, Ohio, on the 10th of May 1823. He began the study of law at Mansfield, Ohio, and was admitted to the bar in 1844. For ten years he practised his profession with success, and with only casual interest in politics. His associations and predilections were with the Whigs, and he was a delegate to the National Convention that nominated General Zachary Taylor in 1848. Upon the repeal of the Missouri Compromise by the Kansas-Nebraska Bill in 1854, he joined the great popular movement in Ohio against the policy represented by this bill, and was elected to Congress in the autumn of that year as an "Anti-Nebraska" man. In the summer of the next year he took an active part in the formal organization of the Republican party in the State, and at the opening of Congress in December began a long career of public service. As a member of the House (1855–1861), he quickly manifested the qualities which characterized his whole political life. Though a thorough and avowed partisan, he was within the party the counsellor of moderate rather than extreme measures, and thus gained on the whole a position of great influence. He was a member of the committee sent by the House in 1856 to investigate the troubles in Kansas, and drafted the report of the majority. In 1859 he was the Republican candidate for Speaker of the House, but was obliged, after a contest that lasted two months, to withdraw, largely because of the recommendation he had inadvertently given to an anti-slavery book, *The Impending Crisis of the South* (1857), by Hinton Rowan Helper (1829–1909). He became, however, chairman of the Committee on Ways and Means, and was instrumental in the enactment of the Morrill Tariff Act of 1860. In March 1861 he took his seat in the Senate, to which he had been elected to succeed Salmon P. Chase, when the latter became secretary of the treasury. As senator he sat continuously until he became secretary of the treasury in 1877. His interest and efficiency in financial legislation in the House led to his appointment on the Senate Committee of Finance, and after 1867 he was chairman of this influential committee. He thus became associated with the enactment of all the great fiscal laws through which the strain of war and of reconstruction was sustained. He gave earnest support to the Legal Tender Act, and the substitution of the national for the State banking system. When after the end of the war the question of financial readjustment came up, he vigorously opposed Secretary Hugh McCulloch's policy of retiring the legal tenders, and urged a different plan for effecting the resumption of specie payments. On the questions relating to political reconstruction and the

policy of President Johnson, he supported his party, though opposed to its Radical leaders. He warmly advocated the insertion in the Reconstruction Acts of a provision ensuring the early termination of military government; and he opposed the impeachment of President Johnson, though he voted for conviction on the trial. During the administrations of President Grant his leadership in shaping financial policy became generally recognized. The Resumption Act of 1875, which provided for the return of specie payments four years later, was largely his work both in inception and in formulation, and his appointment to the head of the Treasury Department by President Hayes in 1877 enabled him to carry the policy embodied in the law to successful execution. His administration of the department, in circumstances of great difficulty arising out of the "greenback" agitation and the adverse political complexion of Congress, won him high distinction as a financier.

At the end of the Hayes administration he was again elected to the Senate from Ohio and held his seat until 1897. During this period he was largely concerned in the enactment of the Anti-Trust Law of 1890, and of the so-called Sherman Act of the same year, providing for the purchase of silver and the issuing of Treasury notes based upon it. This latter Act he approved only as a means of escaping the free coinage of silver, and he supported its repeal in 1893. In 1880 and 1888 he aspired actively to the Republican nomination for the presidency, but failed to obtain the requisite support in the Convention. During the last years of his senatorial career he was chairman of the Senate Committee on Foreign Affairs. Upon the accession of President McKinley in 1897, he resigned from the Senate and became secretary of state; but under the tension of the war with Spain the duties of the office became too exacting for his strength at his age, and in April 1898 he resigned and withdrew into private life. Infirmities multiplied upon him, until his death at Washington on the 22nd of October 1900.

A selection from the correspondence of John Sherman and his brother Gen. W. T. Sherman was published as *The Sherman Letters* in 1894. Sherman published *Recollections of Forty Years in the House, Senate and Cabinet: an Autobiography* (Chicago and New York, 1895). A volume of *Selected Speeches* was published in 1879. See *Life*, by T. E. Burton (1906). (W. A. D.)

SHERMAN, ROGER (1721–1793), American political leader, a signer of the Declaration of Independence, was born at Newton, Massachusetts, on the 19th of April 1721 (O.S.). He removed with his parents to Stoughton in 1723, attended the country school there, and at an early age learned the cobbler's trade in his father's shop. Removing to New Milford, Connecticut, in 1743, he worked as county surveyor, engaged in mercantile pursuits, studied law, and in 1754 was admitted to the bar. He represented New Milford in the Connecticut Assembly in 1755–1756 and again in 1758–1761. From 1761 until his death New Haven was his home. He was once more a member of the Connecticut Assembly in 1764–1766, was one of the governor's assistants in 1766–1785, a judge of the Connecticut superior court in 1766–1789, treasurer of Yale College in 1765–1776, a delegate to the Continental Congress in 1774–1781 and again in 1783–1784, a member of the Connecticut Committee of Safety in 1777–1779 and in 1782, mayor of New Haven in 1784–1793, a delegate to the Federal Constitutional Convention of 1787 and to the Connecticut Ratification Convention of the same year, and a member of the Federal House of Representatives in 1789–1791 and of the United States Senate in 1791–1793. He was on the committee which drafted the Declaration of Independence, and also on that which drafted the Articles of Confederation. His greatest public service, however, was performed in the Federal Constitutional Convention. In the bitter conflict between the large state party and the small state party he and his colleagues, Oliver Ellsworth and William Samuel Johnson, acted as peacemakers. Their share in bringing about the final settlement, which provided for equal representation in one house and proportional representation in the other, was so important that the settlement itself has come to be called the "Connecticut Compromise." He helped to defeat the proposal to give Congress a veto on state legislation, showing that it was illogical to confer such a power, since the constitution itself is the law of the land and no state act contravening it is legal. In the Federal Congress (1789–1793) he favoured the assumption of the state debts, the establishment of a national bank and the adoption of a protective tariff policy. Although strongly opposed to slavery, he refused to support the Parker resolution of 1789 providing for a duty of ten dollars per head on negroes brought from Africa, on the ground that it emphasized the property element in slavery. He died in New Haven on the 23rd of July 1793. Sherman was not a deep and original thinker like James Wilson, nor was he a brilliant leader like Alexander Hamilton; but owing to his conservative temperament, his sound judgment and his wide experience he was well qualified to lead the compromise cause in the convention of 1787.

Two of Sherman's grandsons, William M. Evarts and George F. Hoar, were prominent in the later history of the country.

Lewis H. Boutell's *Life of Roger Sherman* (Chicago, 1896), based on material collected by Senator Hoar, is a careful and accurate work.

SHERMAN, WILLIAM TECUMSEH (1820–1891), American general, was born on the 8th of February 1820, at Lancaster, Ohio. He was descended from Edmond Sherman, who emigrated from England to the Massachusetts Bay Colony in 1634. His father, Charles R. Sherman, a judge of the Supreme Court of Ohio, died suddenly in 1829, leaving his widow with a family of young children. William was adopted by the Hon. Thomas Ewing, a close friend of the father, sometime a senator of the United States and a member of the national cabinet. In 1836 he entered West Point, and on graduating near the head of his class he was appointed second lieutenant in the 3rd artillery regiment. His first field service was in Florida against the Seminole Indians. The usual changes of station and detached duty made him acquainted with the geography of all the Southern states, and Sherman improved the opportunity by making topographical studies which proved of no small value to him later. He also employed much of his time in the study of law. When the war with Mexico began in 1846 he asked for field duty, and was ordered to join an expedition going to California by sea. He was made adjutant-general to Colonel Mason, military governor, and as such was executive officer in the administration of local government till peace came in the autumn of 1848 and the province was ceded to the United States. In 1847 he served on the staff of the general commanding the division of the Pacific. In 1850 he married Ellen Boyle, daughter of Thomas Ewing, then secretary of the interior. Transferred in the same year to the commissariat department as a captain, he resigned three years later and went back to California to conduct at San Francisco a branch of an important St Louis banking-house. He continued successfully in the management of this business through a financial crisis incident to a wildly speculative time, until in the spring of 1857 the house, by his advice, withdrew from Californian affairs. Afterwards for a short time he was engaged in business at New York and in 1858 practised law at Leavenworth, Kansas. In 1859, the state of Louisiana proposing to establish a military college, Sherman was appointed its superintendent. On the 1st of January 1860 the "State Seminary of Learning and Military Academy" was opened, and here Sherman remained until the spring of 1861, when it was evident that Louisiana would join the states seceding from the Union. He thereupon resigned the superintendency and returned to St Louis, parting with the governor of the state and his colleagues in the school with regret and mutual esteem. Though his brother John Sherman was a leader in the party which had elected Lincoln, William Sherman was very conservative on the slavery question, and his distress at what he thought an unnecessary rupture between the states was extreme. Yet his devotion to the national constitution was unbounded, and he offered his services as soon as volunteers for the three years' enlistments were called out. On the 14th of May 1861 he was appointed colonel of the 13th U.S. Infantry, a new regiment, and was soon assigned to command a brigade in General McDowell's army in front of Washington. He served with it in the first battle of Bull Run, on the 21st of July. Promoted

brigadier-general of volunteers, Sherman was in August sent to Kentucky to serve under General Robert Anderson. In October he succeeded to the command of the department. On the 26th of October he reported that 200,000 men would be required for the Kentucky campaign. He was relieved of his post soon afterwards in consequence, but the event justified Sherman's view. He was soon re-employed in a minor position, and, at the head of a division of new troops, accompanied Grant's army to Pittsburg Landing. At the battle of Shiloh Sherman's gallant conduct gained him promotion to major-general. His appreciation of Grant, and his sympathy with the chagrin he suffered after this battle, cemented the friendship between the two. He took part in Halleck's advance on Corinth, Mississippi, and at the close of 1862 led the Mississippi column in the first Vicksburg campaign. He suffered defeat at Chickasaw Bayou, but the capture of Fort Hindman, near Arkansas Post, compensated to some extent for the Vicksburg failure. In Grant's final Vicksburg campaign Sherman commanded the XV. corps and the right of the investing line, and after the surrender he was sent to oppose General Johnston in the country about Jackson, Miss. In July he was made a brigadier-general in the regular army. When, after Rosecrans's defeat at Chickamauga, Grant was placed in supreme command in the west, Sherman succeeded to the command of the Army of the Tennessee, with which he took part in the great battle of Chattanooga (*q.v.*). He had already prepared for a further advance by making an expedition into the heart of Mississippi as far as Meridian, destroying railways and making impracticable, for a season, the transfer of military operations to that region; and on Grant becoming general-in-chief (March 1864) he was made commander of the military division of the Mississippi, including his Army of the Tennessee, now under McPherson, the Army of the Cumberland, under Thomas, and the Army of the Ohio, under Schofield. Making detachments for garrisons and minor operations in a theatre of war over 500 m. wide, he assembled, near Chattanooga, his three armies, aggregating 100,000 men, and began (May 1864) the invasion of Georgia. After a brilliant and famous campaign of careful manœuvre and heavy combats (see AMERICAN CIVIL WAR), Sherman finally wrested Atlanta (*q.v.*) from the Confederates on the 1st of September. His able opponent Johnston had been removed from his command, and Hood, Johnston's successor, began early in October a vigorous movement designed to carry the war back into Tennessee. After a devious chase of a month Hood moved across Alabama to northern Mississippi. Sherman thereupon, leaving behind Thomas and Schofield to deal with Hood, made the celebrated "March to the Sea" from Atlanta to Savannah with 60,000 picked men. After a march of 300 m. Savannah was reached in December. Railways and material were destroyed, the country cleared of supplies, and the Confederate government severed from its western states. In January 1865 Sherman marched northwards again, once more abandoning his base, towards Petersburg, where Grant and Lee were waging a war of giants. Every mile of his march northwards through the Carolinas diminished the supply region of the enemy, and desperate efforts were made to stop his advance. General Johnston was recalled to active service, and showed his usual skill, but his forces were inadequate. Sherman defeated him and reached Raleigh, the capital of North Carolina, on the 13th of April, having marched nearly 500 m. from Savannah. Lee's position in Virginia was now desperate. Hood had been utterly defeated by Thomas and Schofield, and Schofield (moved 2000 m. by land and sea) rejoined Sherman in North Carolina. With 90,000 men Sherman drove Johnston before him, and when Lee surrendered to Grant Johnston also gave up the struggle. There was much friction between Sherman and the war secretary, Stanton, before the terms were ratified, but with their signature the Civil War came to an end.

Sherman had the good fortune to learn the art of command by degrees. At Bull Run his brigade was wasted in isolated and disconnected regimental attacks, at Shiloh his division was completely surprised owing to want of precaution; but his bravery and energy were beyond question, and these qualities carried him gradually to the front at the same time as he acquired skill and experience. When therefore he was entrusted with an independent command he was in every way fitted to do himself justice. At the head of a hundred thousand men he showed, besides the large grasp of strategy which planned the Carolinas march, besides the patient skill in manœuvre which gained ground day by day towards Atlanta, the strength of will which sent his men to the hopeless assault of Kenesaw to teach them that he was not afraid to fight, and cleared Atlanta of its civil population in the face of a bitter popular outcry. Great as were his responsibilities they never strained him beyond his powers. He has every claim to be regarded as one of the greatest generals of modern history.

When Grant became full general in 1866 Sherman was promoted lieutenant-general, and in 1869, when Grant became president, he succeeded to the full rank. General Sherman retired, after being commanding general of the army for fifteen years, in 1884. He died at New York on the 14th of January 1891. An equestrian statue, by Saint Gaudens, was unveiled at New York in 1903, and another at Washington in the same year.

Sherman's *Memoirs* were published in 1875 (New York). See also Rachel Sherman Thorndike, *The Sherman Letters* (New York, 1894); *Home Letters of Gen. Sherman* (1909), edited by M. A. De Wolfe Howe; S. M. Bowman and R. B. Irwin, *Sherman and his Campaigns: a Military Biography* (New York, 1865); W. Fletcher Johnson, *Life of William Tecumseh Sherman* (Philadelphia, 1891); Manning F. Force, *General Sherman* (Great Commanders series) (New York, 1899).

SHERMAN, a city and the county-seat of Grayson county, Texas, U.S.A., 64 m. by rail N. by E. of Dallas and 9 m. S. of Denison. Pop. (1890) 7335; (1900) 10,243, of whom 2131 were negroes; (1906, estimate), 11,989. Sherman is served by the St Louis & San Francisco (Frisco System), which has car shops here, the St Louis & South-Western, the Gulf, Colorado & Santa Fé, the Missouri, Kansas & Texas, the Texas & Pacific, and the Houston & Texas Central railways, and by electric lines connecting with Denison and Dallas. In the city are Austin College (Presbyterian, 1850; removed from Austin to Sherman in 1876) for men, Carr-Burdette College (Christian, 1894) for girls, North Texas Female College and Conservatory (Methodist Episcopal, 1877) and Saint Joseph's Academy (Roman Catholic) for girls. Sherman is situated on a ridge 720 ft. above sea-level between the Red river and the Trinity river, near a fertile part of the Red River Valley, in which the principal industries are the growing of cotton, Indian corn, wheat, oats, potatoes and alfalfa, and stock raising. The city contains cotton gins and compresses, and has various manufactures; in 1905 the value of factory products was $2,841,066 (94·4 % more than in 1900). The municipality owns and operates the waterworks and the electric lighting plant. Sherman was settled in 1848 and was chartered as a city in 1895.

SHERRY, originally the name of wine coming from Xeres (Jerez de la Frontera), near Cadiz, Spain, and now the general name of the strong white wines, the lower grades excepted, which are made in the south of Spain (see WINE). The early form of the word in English was "sherris" (abbreviated from "sherris-wine" or "sherris-sack"), which was taken to be a plural, and "sherry" was formed as a singular by mistake.

'S HERTOGENBOSCH ('s Bosch, or den Bosch, French *Bois-le-Duc*), the capital of the province of North Brabant, Holland, at the confluence of the rivers Dommel and Aa, which unite to form the Dieze, and a junction station 29½ m. S.S.E. of Utrecht and 27½ m. W.S.W. of Nijmwegen by rail. It is connected by steam tramway with Helmond (21 m. S.E.) and by the Zuid-Willem's canal with Maastricht (60 m. S. by E.). Pop. (1900) 32,345. 's Hertogenbosch is a well-built city and contains several churches. The Roman Catholic cathedral of St John, the Janskerk, with its interior in a state of preservation rare in Holland, is one of the finest architecturally in the country. Occupying the site of a much earlier building, of which there are remains, the present church with its fine choir was built in the middle of the 15th century. The 15th-century font, the pulpit (1570), the organ (1617), and the early Gothic Lady

chapel containing a much venerated 13th-century image of the Virgin, which was annually carried in procession through the town, are all noticeable. The choir-screen was sold to the South Kensington Museum in London for £900, this sum being devoted to the work of modern restoration. The town hall contains an interesting series of decorative panels by a modern artist, A. Derkinderen, describing the founding of the city. It also includes a museum of local antiquities. In the Provincial museum are interesting Roman, German and Frankish antiquities. The principal other buildings are the court house, government buildings (formerly a Jesuit monastery), episcopal palace, grammar school (once attended by Erasmus), a prison, hospitals, arsenal and barracks. 's Hertogenbosch is the market of the fertile Meiery district, and carries on a considerable trade, chiefly by water, with Dordrecht and Rotterdam, Nijmwegen, Arnhem, Maastricht and Liège. The chief industries include distilleries, breweries, glass works, cigar factories and the ancient linen and cutlery manufactures.

SHERWIN, JOHN KEYSE (1751–1790), English engraver and history-painter, was born in 1751 at East Dean in Sussex. His father was a wood-cutter employed in shaping bolts for shipbuilders, and the son followed the same occupation till his seventeenth year, when, having shown an aptitude for art by copying some miniatures with exceptional accuracy, he was befriended by William Mitford, upon whose estate the elder Sherwin worked, and was sent to study in London, first under John Astley, and then for three years under Bartolozzi—for whom he is believed to have executed a large portion of the plate of Clytie, after Annibal Caracci, published as the work of his master. He was entered as a student of the Royal Academy, and gained a silver medal, and in 1772 a gold medal for his painting of "Coriolanus taking Leave of his Family." From 1774 till 1780 he was an exhibitor of chalk drawings and of engravings in the Royal Academy. Establishing himself in St James's Street as a painter, designer and engraver, he speedily attained popularity and began to mix in fashionable society. His drawing of the "Finding of Moses," a work of but slight artistic merit, which introduced portraits of the princess royal of England and other leading ladies of the aristocracy, hit the public taste, and, as reproduced by his burin, sold largely. In 1785 he succeeded Woollett as engraver to the king, and he also held the appointment of engraver to the prince of Wales. His professional income rose to about £12,000 a year; but he was constantly in pecuniary difficulties, for he was shiftless, indolent, and without method, open-handed and even prodigal in his benefactions—and prodigal, too, in less reputable directions, for he became a reckless gambler, and habits of intemperance grew upon him. He died in extreme penury on the 24th of September 1790—according to Steevens, the editor of Shakespeare, at "The Hog in the Pound," an obscure alehouse in Swallow Street, or, as stated by his pupil J. T. Smith, in the house of Robert Wilkinson, a printseller in Cornhill.

It is as an engraver that Sherwin is most esteemed; and it may be noted that he was ambidexterous, working indifferently with either hand upon his plates. His drawing is correct, his line excellent and his textures are varied and intelligent in expression. Such of his plates as the "Holy Family" after Nicholas Poussin, "Christ Bearing the Cross" after Murillo, the portrait of the marquis of Buckingham after Gainsborough and that of Pitt occupy a high place among the productions of the English school of line-engravers. He also worked after Pine, Dance and Kauffman.

SHERWOOD, MARY MARTHA (1775–1851), English author, was born at Stanford, Worcestershire, on the 6th of May 1775, the daughter of the Rev. George Butt, D.D., then rector of Stanford. In 1803 she married her cousin, Captain Henry Sherwood, an officer in the British army, and subsequently accompanied him to India, where she devoted herself to charitable work and to writing. Her Indian story, *Little Henry and his Bearer*, was translated into many languages. Her best-known work, however, is *The History of the Fairchild Family*, written after her return to England, of which the first part appeared in 1818, and the second and third parts in 1842 and 1847 respectively. The sub-title of this tale is *The Child's Manual, being a series of stories calculated to show the importance and effects of a religious education*. The book had a very large sale among the English middle-classes. Mrs Sherwood wrote nearly a hundred stories of a religious type and tracts, mainly for the young. She died on the 22nd of September 1851.

See *The Life and Times of Mrs Sherwood. From the Diaries of Captain and Mrs Sherwood*, edited by F. J. H. Darton (1910).

SHERWOOD FOREST, one of the ancient English forests, in Nottinghamshire. It extended from Nottingham northward to Worksop, being over 20 m. long and from 5 to 9 m. broad. The soil is sandy and poor, and although a considerable portion has been brought under cultivation, the district preserves many traces of its ancient character, especially as a great part of it is covered by the domains included under the modern name of the Dukeries (*q.v.*). Sherwood was a crown forest from the time of Henry II. and a favourite hunting-ground of several kings; the land was divided between various lords of the manor, and its disafforestation was carried out at various times. The forest is traditionally noted as the retreat of Robin Hood, whose cave is seen at Papplewick near Newstead.

SHETLAND, or ZETLAND, a group of islands constituting a county of Scotland, and the most northerly British possession in Europe. It consists of an archipelago of islands and islets, over 100 in number, situated to the north-east of Orkney, between 59° 50′ and 60° 52′ N. and 0° 55′ and 2° 14′ W., and bounded on the W. by the Atlantic and on the E. by the North Sea. The distance from Dennis Head in North Ronaldshay of the Orkneys to Sumburgh Head in Shetland is 50 m., but Fair Isle, which belongs to Shetland, lies midway between the groups. The islands occupy an area of 352,889 acres or 551·4 sq. m. Besides Mainland, the principal member of the group, the more important are Yell, Unst and Fetlar in the north, Whalsay and Bressay in the east, Trondra, East and West Burra, Papa Stour, Muckle Roe and Foula in the west, and Fair Isle in the south. The islands present an irregular surface, frequently rising into hills of considerable elevation (an extreme of 1475 ft. is found in the north-west of Mainland). Most of the inland scenery is bleak and dreary, consisting of treeless and barren tracts of peat and boulders. The coast scenery, especially on the west, is always picturesque and often grand, the cliffs, sheer precipices of brilliant colouring, reaching a height of over 1000 ft. at some places. The shores are so extensively indented with *voes*, or firths—the result partly of denudation and partly caused by glaciers—that no spot in Shetland is more than 3 m. from the sea. There are sheets of fresh water in the larger islands, the most important being Strom Loch (2 m. long), Girlsta (1¼ m. long) and Spiggie (1½ m.) in Mainland, and Loch of Cliff (2 m.) in Unst, and numerous short streams. The principal capes are Sumburgh Head, the most southerly point of Mainland, a bold promontory 300 ft. high; Fitful Head, on the south-west of the same island, a magnificent headland, 2 m. in length and nearly 1000 ft. high, where Norna, the prophetess of Sir Walter Scott's *Pirate*, was supposed to have her abode and which the Norsemen called the White Mountain, in allusion to the colour of the clay slate composing it; and the Noup and Herma Ness, two of the most northerly points in Unst.

Geology.—The geological characters of this group of islands resemble those of the northern part of Scotland. Old Red Sandstone, red grits, sandstones and marls and conglomerate occur in a narrow belt on the east side of Mainland from Sumburgh Head to Rova Head, north of Lerwick; they also form the island of Bressay. In the western portion of Mainland, in Northmavine, there is a considerable tract of rocks of this age which are formed largely of intrusive diabase-porphyrite; similar volcanic rocks occur in Papa Stour. These are penetrated by intrusions of granitic and felsitic character; one of these masses in Papa Stour is a handsome pink felsite. Practically all the remaining area in these islands is occupied by metamorphic schists and gneisses which occur in great variety and with which are associated numerous dikes and masses of intrusive igneous rock. The southern part of Mainland, from Laxfirth Voe to Fitful Head a series of dark schists and slates, is found with subordinate limestones. The metamorphic rocks of the rest of Mainland are principally coarse gneisses, micaceous and chloritic schists, quartzites, &c.; in these rocks at Tingwall and Wiesdale considerable beds of limestone occur, which may be followed across the island in a northerly direction to Yell Sound, and to Dales Voe in Delting.

Gabbro occurs in the peninsula of Fethland; diorite in Northmavine between Rinas Voe and Mavis Grind; and epidote-syenite in Dunrossness. Yell is formed of coarse gneiss and granitic rocks. In Unst the high ground on the west coast consists of gneiss, which is followed eastward by schists of various kinds, then by a belt of serpentine, 2 m. to a quarter of a mile in breadth, which crosses the island from S.W. to N.E.; this is succeeded by a belt of gabbro, and finally the eastern border is again occupied by micaceous and chloritic schists. Similar rocks occur in Fetlar. Whalsay is built of coarse gneisses and schists. During the height of the glacial period the ice must have crossed the islands from E. to W., for many of the rocks belonging to the eastern side are found as boulders scattered over the western districts. Important formations of chromite are found at Hagdale and the Heog Hills; steatite occurs at Kleber Geo, and many interesting minerals have been recorded from these islands.

Climate and Fauna.—The average annual rainfall amounts to 46 in., and the mean temperature for the year is 45° 3 F., for March 39° F. and for August 54° F. The winter, which is very stormy, lasts from November to March; spring begins in April, but it is the middle of June before warmth becomes general, and by the end of August summer is gone. The summer is almost nightless, print being legible at midnight, but in winter the days are only six hours long, though the nights are frequently illuminated with brilliant displays of the *aurora borealis*. The well-known Shetland breed of shaggy ponies are in steady demand for underground work in collieries. The native cattle, also diminutive in size, with small horns and short legs, furnish beef of remarkable tenderness and flavour; while the cows, when well fed, yield a plentiful supply of rich milk. The native sheep possess many of the characteristics of goats. Ewes as well as rams generally have short horns, and the wool is long and very fine. White, black, speckled grey and a peculiar russet brown, called *moorat*, are the prevailing colours. It is customary to pluck the wool by hand rather than shear it, as this is believed to ensure a finer second crop. Black-faced and Cheviots are also found in some places. Large numbers of geese and poultry are kept. The lochs and tarns are well stocked with brown trout, and the voes and *gios*, or narrow inlets of the sea with steep rocks on both sides, abound with sea trout. Hares, for a long period extinct, were reintroduced about 1830, rabbits are very numerous, and the northern limit of the hedgehog is drawn at Lerwick. Whales of various species are frequently captured in the bays and sounds; the grampus, dolphin and porpoise haunt the coasts, and seals occasionally bask on the more outlying islets. Besides the commoner kinds of fishes, sharks, the torsk, opah and sunfish occur. There is an immense variety of water-fowl, including the phalarope, fulmar petrel, kittiwake, Manx shearwater, black guillemot, whimbrel, puffin and white-tailed eagle.

Industries.—There has been no agricultural advance corresponding to that which has taken place in Orkney, mainly owing to the poverty and insufficiency of the soil. Although there are some good arable farms in favoured districts, the vast majority of holdings are small crofts occupied mostly by peasants who combine fishing with farming. Crofting agriculture is conducted on primitive methods, spade tillage being almost universal, and seaweed the principal manure. The cottages are generally grouped in small hamlets called "touns." The size of the crofts varies greatly. There are several hundreds under 5 acres, but the average holding runs from 5 to 20 acres. At one time the land was held on the "runrig" system—that is, different tenants held alternate ridges—but now as a rule each holding is separate. About one-sixth of the total area is under cultivation, oats and barley being the chief grain, and potatoes (introduced in 1730) and turnips (1807) the chief green crops. Cabbage, said to have been introduced by a detachment of Cromwellian soldiers, is also raised, and among fruits black and red currants ripen in sheltered situations. In spite of somewhat adverse climatic conditions, live stock is reared with a fair amount of success.

The distinctive manufacture is knitted goods. The finest work is said to come from Unst, though each parish has its own speciality. The making of gloves was introduced about 1800, of shawls about 1840 and of veils about 1850. So delicate is the workmanship that stockings have been knitted that could pass through a finger-ring. Women do most of the farm work and spend their spare time in knitting. Fishing is the occupation of the men, and the real mainstay of the inhabitants. Formerly the fishery was in the hands of the Dutch, whose supremacy was destroyed, however, by the imposition of the salt tax in 1712. So complete was their control that they are estimated to have derived from it more than 200 millions sterling while it lasted. Then the fishery was neglected by the natives, who were content to use the "sixerns," or six-oared fishing boats, till the last quarter of the 19th century, when boats of modern type were introduced. Since 1890 the herring fishery has advanced rapidly, and the Shetland fishery district is the most important north of Aberdeenshire. The haaf or deep-sea catch principally consists of cod, ling, torsk and saithe. Communication with the islands is maintained by steamers from Leith and Aberdeen to Lerwick, the capital (twice a week), and to Scalloway, the former capital, and other points (once a week).

Population.—In 1891 the population amounted to 28,711 and in 1901 it was 28,166 or 51 persons to the sq. m. The females numbered 15,753, or 127 to every 100 males, considerably the largest proportion in any county in Scotland. In 1901 there were 55 persons speaking Gaelic and English, none who spoke Gaelic only, and 92 foreigners (almost all Scandinavians). Only twenty-seven islands of the group are inhabited, but in the case of some of them the population consists solely of a few lighthouse attendants, shepherds and keepers.

The Inhabited Isles.—The following is a list of the inhabited isles, proceeding from south to north; but it will be understood that they do not lie in a direct line, that several are practically on the same latitude, that the bulk are situated off the east and west coast of Mainland, and that two of them are distinctly outlying members of the group. The figures within brackets indicated the population in 1901. Fair Isle (147) lies 24 m. S.W. of Sumburgh Head, and is 3 m. long by about 2 m. broad. The name is derived from the Norse *faar*, a sheep (a derivation better seen in the Faroe Isles). It is a hilly island, with rocky cliffs; North Haven, on the east coast, being almost the only place where landing can be safely effected. From the survivors of a vessel of the Spanish Armada that went ashore in 1588 the natives are said to have acquired the art of knitting the coloured hosiery for which they are noted. The shipwrecked sailors taught the people how to prepare dyes from the plants and lichens, and many of the patterns still show signs of Moorish origin. Mainland (19,676), the largest and principal island, measures 54 m. from N. to S., and 21 m. from E. to W., though the shores are indented to an extraordinary degree and the bulk of the island is much narrower than the extreme width would indicate. The parish of Walls, in the west, is said to contain more voes, whence its name (an erroneous rendering of the Norse *waas*), than all the rest of Shetland; while the neck of land at Mavis Grind (Norse, *maev*, narrow; *eid*, isthmus; *grind*, gate), forming the boundary between the parishes of Northmavine and Delting, is only 60 yds. wide and about 20 ft. above the sea, almost converting the north-western area of Mainland into an island. In the promontory of Eshaness may be seen some wonderful examples of sea sculpture. The Grind of the Navir ("Gate of the Giants") is a staircase carved by the waves out of the porphyry cliffs. In the rock of Dore Holm is a natural archway, 70 ft. wide, through which the tide constantly surges, and to the south-east of it are the Drougs, stacks of quaint shapes, suggesting a ship in full sail, a ruin, a cowled monk and so forth. Besides Lerwick (*q.v.*) the county town, one of the most interesting places in the island is Scalloway (857), the ancient capital. According to Dr Jakob Jakobsen, the name means the voe (*waa*) of the *skollas*, or booths, occupied by the men who came to attend the meeting of the *ting*, or open-air law court, which assembled in former days on an island in the Loch of Tingwall (hence its name), about 3 m. farther north. Scalloway stands at the head of a bay and has piers, quays, warehouses and cooperages in connexion with the fishing industry. The ruins of the castle built in 1600 by Patrick Stewart, earl of Orkney, stand at the east end of the bay and are in good preservation. An iron ring on one of the chimneys is said to be that on which he hung the victims of his oppression. On the opposite side of the bay is Gallow Hill, the old place of execution of witches and criminals. Off the south-eastern coast of Mainland, separated by a sound 1 m. broad and usually visited from Sandwick, lies the uninhabited island of Mousa (correctly spelled Moosa, the moory isle, from the Norse *mó-r*, moor), famous for the most perfect specimen of a Pictish *broch*, or tower of defence, in the British Isles. The broch, which stands on a rocky promontory at the south-west of the isle, now measures about 45 ft. in height, but as some of the top courses of masonry have fallen down it is supposed to have been 50 ft. high originally. It was entire in 1154, and was partially restored in 1861. It has a diameter at the foot of 50 ft., and at the top of 38 ft. The interior court, open to the sky, is 30 ft. in diameter, the enclosing wall having a thickness, at the base, of 15½ ft. There are three separate beehive-shaped rooms on the ground floor, which were entered from the court, from which also there was an entrance to the stair leading to the galleries, which were lighted by windows facing the court. Hevera

(25) lies off the west coast of Mainland, south of the two Burras. East Burra (203), about 4 m. long by 1 m. broad, is separated from Mainland by Clift Sound, a narrow arm of the sea, 8 m. long. West Burra (612), 6 m. long by 1 m. broad, with a very irregular coast-line, lies alongside of East Burra and contains a church. It is said to be the Burgh Westra of Sir Walter Scott's *Pirate*. Burra is a contraction of *Borgar-öy*, meaning "Broch island." Trondra (151), "Trond's island," Trond being an old Norse personal name, in the mouth of Scalloway Bay. Oxna (36) lies about 4 m. S.W. of Scalloway, and Papa (priest's isle, 16), to the E. of Oxna. Bressay (679) lies 1 m. E. of Lerwick, from which it is separated by the Sound of Bressay, in which Haakon V., king of Norway, anchored his galleys on the expedition that ended so disastrously for him at Largs (1263). The island is 6 m. long by 3 m. broad and has several notable natural features. Ward Hill (742 ft.) is the sailors' landmark for Lerwick harbour. Bard Head (264 ft.), the most southerly point, is a haunt of eagles, at the foot of which is an archway called the Giant's Leg. On the west side of the Bard is the Orkney Man's Cave—a great cavern with fine stalactites and a remarkable echo. Noss (7), to the E. of Bressay, from which it is separated by a channel 220 yds. wide. On the east coast the rocks form a headland (592 ft.) called the Noup of Noss ("the peak of the nose"), once the source from which falcons were obtained for the royal mews. Off the south-east shore lies the Holm (160 ft.), with which communication used to be maintained by means of the Cradle of Noss swing or ropes. Both Noss and Bressay are utilized in connexion with the rearing of Shetland ponies. Holm of Papal, "isle of the priest" (2), belonging to Bressay parish, and Linga, "heather isle" (8), to the parish of Tingwall, lie S.E. of Hildasay. Foula, pronounced Foola (Norse, *fugl-öy*, "bird island") (230), lies 27 m. W. of Scalloway, and 16 m. W. of the nearest point of Mainland. It measures 3½ m. long by 2½ m. broad. The cliffs on the west coast attain in the Sneug (Norse, Snjoog, "hill top") a height of 1272 ft. They are the home of myriads of sea-birds and one of the nesting-places of the bonxie, or great skua (*Lestris cataractes*), which used to be fostered by the islanders to keep down the eagles, and the eggs of which are still strictly preserved. The natives are daring cragsmen. The only landing-place is the village of Ham, on the east coast. Vaila (21), in the mouth of the Bay of Walls, affords good pasturage. Linga (4) lies immediately to the north of Vaila. Papa Stour (272), properly spelt Stoor, "the big [Norse *stor*] island of the priests," lies in the south-west of the great bay of St Magnus. It measures 2 m. in length by about 3 m. in breadth and has a coast-line of 20 m. Christie's Hole and Francie's Hole, two of the caves for which it is noted, are reputed to be among the finest in the United Kingdom. The sword dance described in the *Pirate* may still be seen occasionally. Four miles N.W. are the islets known as the Ve Skerries, where seals are sometimes found. Whalsay, "whale island" (975), measuring 5 m. from N.E. to S.W. by 2½ m. wide, is an important fishing station. Muckle Roe, "great red island" (202), roughly circular in shape and about 3 m. in diameter, lies in the E. of St Magnus Bay. Gruay, "green isle" (10), Housay (68), Bruray (44), Bound (2) are members of the group of Out Skerries, about 4 m. N.E. of Whalsay. There is a lighthouse on Bound, and the rest are fishing stations. Yell (2483), separated from the north-east coast of Mainland by Yell Sound, is the second largest island of the group, having a length of 17 m., and an extreme width of 6½ m., though towards the middle the voes of Mid Yell and Whale Firth almost divide it into two. It contains several *brochs* and ruined chapels and is an important fishing station. Fetlar (347) lies off the east coast of Yell, from which it is divided by Colgrave Sound and the isle of Hascosay and is 5 m. long by 6½ m. broad. It ranks with the most picturesque and most fertile members of the group and contains a breed of ponies, a cross between the native pony and the horse. Uyea, "the isle," from the Old Norse *öy* (3), to the south of Unst, from which it is divided by the narrow sounds of Uyea and Skuda, yields a beautiful green serpentine. Unst (1940), to the N.E. of Yell and separated from it by Bluemull Sound, is 12 m. long and 6 m. wide. It has been called the "garden of Shetland," and offers inducements to sportsmen in its trout and game. The male inhabitants are mostly employed in the fisheries and the women are the most expert knitters of hosiery in the islands. Unst contains several places of historic interest. Near the south-eastern promontory stands Muness Castle, now in ruins, built in 1598—according to an inscription on a tablet above the door- by Laurence Bruce, natural brother to Lord Robert Stewart, 1st earl of Orkney. Buness, near Balta Sound, was the house of Dr Laurence Edmonston (1795–1879), the naturalist. Near Balliasta are the remains of three stone circles. It is supposed the Ting, or old Assembly, met at this spot before it removed to Tingwall. Farther north, at the head of a small bay, lies Haroldswick, where Harold Haarfager is believed to have landed in 872, when he annexed the Orkney and Shetland Islands to Norway. Burra Firth, in the north of Unst, is flanked on both sides by magnificent cliffs, including the Noup of Unst, the hill of Saxavord (934 ft.), the Gord and Herma Ness. Muckle Flugga (3), about 1 m. N. of Unst, is the most northerly point of Shetland, and the site of a lighthouse.

Administration.—Shetland unites with Orkney to return a member to parliament. The island is divided into Mainland district (comprising the parishes of Northmavine, Delting, Nesting, Sandsting, Walls, Tingwall, Bressay, Lerwick and Dunrossness) and North Isles district (the parishes of Unst, Fetlar and Yell). It forms a sheriffdom with Orkney and Caithness, and there is a resident sheriff-substitute at Lerwick, the county town. There are parish poorhouses in Dunrossness and Unst, besides the Shetland combination poorhouse at Lerwick. The county is under school board jurisdiction and Lerwick has a secondary school, and a few of the other schools earn grants for higher education. The "residue" grant is expended on navigation and swimming classes.

History and Antiquities.—The word Shetland is supposed to be simply a modernized rendering of the Old Norse *Hjaltland*, of which the meaning is variously given as "high land," "Hjalti's land"—after Hjalti, a man whose name occurs in ancient Norse literature, but of whom little else is known—and "hilt land," in allusion to an imagined, though not too obvious, resemblance in the configuration of the archipelago to the hilt of a sword. Of the original Pictish inhabitants remains exist in the form of stone circles (three in Unst and two in Fetlar) and *brochs* (of which 75 examples survive). The islanders were converted to Christianity in the 6th and 7th centuries by Irish missionaries, in commemoration of whose zeal several isles bear the name of Papa or "priest." Four stones with Ogam inscriptions have been found at different places. About the end of the 8th century both the Shetlands and Orkneys suffered from the depredations of Norse vikings, or pirates, until Harold Haarfager annexed the islands to Norway in 875. Henceforward the history of Shetland is scarcely separable from that of Orkney (*q.v.*). The people, more remote and less accessible to external influences, retained their Scandinavian characteristics longer than the Orcadians. The Norse language and customs survived in Foula till the end of the 18th century, and words and phrases of Norse origin still colour their speech. George Low (1747–1795), the naturalist and historian of Orkney, who made a tour through Shetland in 1774, described a Runic monument which he saw in the churchyard of Crosskirk, in Northmavine parish (Mainland), and several fragments of Norse swords, shield bosses and brooches have been dug up from time to time.

See George Low, *Tour through the Islands of Orkney and Shetland in 1774* (published in 1879); A. Edmondston, *Zetland Islands* (1809); Samuel Hibbert-Ware, *Description of the Shetland Isles* (1822); C. Rampini, *Shetland and the Islanders* (1884); C. Sinclair, *Shetland and the Shetlanders* (1840); R. S. Cowie, *Shetland* (1896); Dr Jakob Jakobsen, *The Dialect and Place Names of Shetland* (1897).

SHEVAROY HILLS, a detached range in southern India, in the Salem district of Madras, covering an area of 150 sq. m., with plateaus from 4000 to 5000 ft. above sea-level. They include the sanatorium of Yercaud, and several coffee plantations.

SHIBARGHAN, a town and khanate of Afghan Turkestan. The town lies some 60 m. W. of Balkh, and contains 12,000 inhabitants, Uzbegs and Parsiwans. It has a citadel, but is not otherwise fortified, and is surrounded by good gardens and excellent cultivation. The khanate is one of the "four domains," which were long in dispute between Bokhara and Kabul, but were allotted to the Afghans by the Anglo-Russian boundary agreement of 1873.

SHIBBOLETH, a Hebrew word, meaning an ear of corn or a stream or river, from *shābal,* to grow, increase, flow, used by Jephthah, probably in the second sense with reference to the river Jordan, as a test-word to distinguish the Ephraimites, who were unable to pronounce the *sh,* from the men of Gilead (see Judges xii. 6) at the passage of the Jordan. The word *ciceri* was similarly used at the time of the massacre of the French known as the Sicilian Vespers, for they betrayed their nationality by their inability to pronounce it. The term has also come generally to mean a watchword, catch-phrase or cry, to which the members of a party adhere after any significance or meaning which it may have imported has disappeared.

See ALPHABET, i. 725, for a discussion of the sibilant difficulty involved in the test of Judges xii. 6.

SHIEL, LOCH, a lake near the Atlantic seaboard of Scotland, lying between the district of Moidart in Inverness-shire and the districts of Ardgour and Sunart in Argyllshire. The boundary line between the two counties is drawn lengthwise down the centre of the lake and is continued down the river Shiel to the sea. The loch is 17½ m. long and varies in width from 200 yds. to 1 m., and is only 11½ ft. above the sea. The maximum depth is 420 ft. with a mean depth of 81½ ft. The lake has an area of 4840 acres or 7½ sq. m., and drains directly a basin of 72½ sq. m., and with an outflow from Loch Dilate, or Doilake, of 85½ sq. m. Loch Dilate lies 1½ m. E. of Loch Shiel, into which it flows by the Polloch. It is 1½ m. long at its maximum, with a maximum depth of 55 ft., and covers an area of 142 acres. For fully three-fourths of its length Loch Shiel has a south-westerly direction, but at Eilean Fhianain (Finnan's Island) it strikes towards the west. It receives the Finnan and other small streams and discharges by the Shiel to the salt-water Loch Moidart. On the north-west and south-east it is skirted by lofty hills (Sgor Choileam (3164), Sgor nan Coireachan (3133) and others of over 2000 ft.), but the land at the western extremity in Ardnamurchan is low-lying.

SHIELD, WILLIAM (1748–1829), English musical composer, was born at Swalwell, near Newcastle, in 1748. His father began to teach him singing before he had completed his sixth year, but died three years later, leaving him in charge of guardians, who made no provision whatever for continuing his musical education, for which he was thenceforward dependent entirely upon his own aptitude for learning, aided by a few lessons in thoroughbass which he received from Charles Avison. Notwithstanding the difficulties inseparable from this imperfect training, he obtained admission in 1772 to the orchestra at the Italian Opera in London, at first as a second violin, and afterwards as principal viola, and this engagement he retained for eighteen years. In the meantime he turned his serious attention to composition, and in 1778 produced his first English comic opera, *The Flitch of Bacon,* at the Little Theatre in the Haymarket, with so great success that he was immediately engaged as composer to Covent Garden Theatre, for which he continued to produce English operas and other dramatic pieces in quick succession until 1797, when he resigned his office, and devoted himself to compositions of a different class, producing a great number of very beautiful glees, some instrumental chamber music, and other miscellaneous compositions. In 1817 he was made master of the royal music. He died in London on the 25th of January 1829, and was buried in the south cloister at Westminster Abbey.

Shield's most successful dramatic compositions were *Rosina, The Mysteries of the Castle, The Lock and Key* and *The Castle of Andalusia.* As a composer of songs he was in no degree inferior to his great contemporary Charles Dibdin. Indeed *The Arethusa, The Heaving of the Lead* and *The Post Captain* are as little likely to be forgotten as Dibdin's *Tom Bowling* or *Saturday Night at Sea.* His vein of melody was inexhaustible, thoroughly English in character and always conceived in the purest and most delicate taste, and hence it is that many of his airs are still sung at concerts, though the operas for which they were written have long been banished from the stage. His *Introduction to Harmony* (1794 and 1800) contains a great deal of valuable information; and he also published a useful treatise, *The Rudiments of Thoroughbass.*

SHIELD (O. Eng. *scild,* cf. Du. and Ger. *Schild,* Dan. *Skjold*: the origin is doubtful, but may be referred to the root seen in "shell" or "scale"; another suggestion connects it with Icel. *skjalla,* to clash, rattle; it is not connected with the Indo-Ger. root *skeu,* seen in Gr. σκῦτος, κύτος, Lat. *cutis,* skin, *scutum,* shield, O. Eng. *hyd,* hide, and in "sky"), a piece of defensive armour borne upon the left arm or carried in the left hand as a protection against missiles. Varying in shape and form, it was the principal piece of defensive armour from the Bronze and Iron Age to the introduction of fire-arms, and is still borne by savage warriors throughout the world (see ARMS AND ARMOUR, and for the heraldic shield HERALDRY).

In modern times the principle of the shield has been applied to guns of all calibres from 11 and 10 in. calibre downwards. Whereas the turret, barbette, cupola and other heavy-armoured structures are intended to be proof against the heaviest projectiles, the shield is usually only designed to resist rifle and shrapnel bullets or very light shells. For the application of shields to field artillery, &c., see the articles ARTILLERY and ORDNANCE.

SHIELDS, JAMES (1810–1879), American soldier, was born in Dungannon, county Tyrone, Ireland, in 1810. He emigrated to the United States in 1826, and in 1832 began to practice law in Kaskaskia, Illinois. He was prominent in Democratic politics, was a member of the Illinois House of Representatives in 1836–1838, was state auditor in 1841–1843, was judge of the supreme court of the state in 1843–1845, and was commissioner of the U.S. General Land Office in 1845–1847. In the Mexican War he served as a brigadier-general of volunteers under General Zachary Taylor on the Rio Grande, under General John E. Wool in Chihuahua, and under General Winfield Scott in the southern campaign; he was breveted major-general for gallantry at Cerro Gordo, where he was severely wounded, and he was again wounded at Chapultepec. In 1849–1855 he was a United States senator from Illinois; and in 1858–1859 was a senator from Minnesota. In 1860 he removed to California. In August 1861, soon after the outbreak of the Civil War, he was commissioned brigadier-general of volunteers; in March 1862 he succeeded to the command of General Frederick W. Lander's division; he was in command on the Federal side at Winchester (March 23, 1862) and at Port Republic (June 9); and in March 1863 he resigned his commission. He then settled in Carrollton, Missouri, and in 1875 was a member of the State House of Representatives; in 1879 he was United States senator from Missouri for six weeks to fill an unexpired term. He died at Ottumwa, Iowa, on the 1st of June 1879.

SHIFNAL, or SHIFFNAL, a market town in the Newport (N.) parliamentary division of Shropshire, England, 154 m. N.W. from London on the Wolverhampton-Shrewsbury line of the Great Western railway. Pop. (1901) 3321. The church of St Andrew is cruciform and full of fine details of late Norman, Early English and Decorated work. Trade is mainly agricultural, and cattle-fairs are held. There are large iron-works. The name of the town was Idsall when in 1591 a fund was raised by royal favour in Shropshire and neighbouring counties in order to rebuild it after a serious fire.

Within 6 m. E. of Shifnal are Tong, Boscobel and the nunnery of White Ladies. Tong Castle shares with the castle of the same name in Kent the legend of the dealings of the Saxon Hengest with the British chieftain Vortigern. The medieval building was demolished late in the 18th century, and the present castle erected in mingled Gothic and Moorish styles. Tong church, of fine early Perpendicular work, contains a remarkable series of ornate tombs, mainly of the 15th and 16th centuries, to members of the Vernon and Stanley families, former owners of the castle.

The Golden Chapel on the south side is rich late Perpendicular, with a roof of fan-tracery, showing signs of the original decoration in colours. The mansion of Boscobel is famous as the house in which Charles II. was concealed in 1651 after an adventurous journey from Worcester, where his arms had failed before those of Cromwell. The secret chamber which hid him is preserved, but he also found refuge in a tree of the forest which then surrounded Boscobel. A tree close to the house still bears the name of Charles's oak, but tradition goes no further than to assert that it grew from an acorn of the original tree. White Ladies was a Cistercian nunnery; and the slight remains are Norman. The pleasant wooded district was formerly part of Brewood Forest, which extended into Staffordshire.

SHIGATSE, one of the largest towns in Tibet, next in importance to Lhasa, the capital. The town, which is at the confluence of the Nyang chu with the Tsangpo, contains about 9000 inhabitants (exclusive of priests), and is about ¾ m. long by a ½ m. broad. About 1 m. to the north-east is situated a monastery called Konkaling, whilst to the south-west is the far-famed Tashilhunpo monastery, the residence of one of the great high priests of Tibet, co-equal with the Dalai-Lama of Lhasa. Between the Tashilhunpo monastery and the city is the Thom or open market, where all the business of the place is daily transacted. A wall about 1 m. in circumference surrounds the Tashilhunpo monastery, within which are numerous temples and houses, four of the larger temples being decorated with gilded spires. A great wealth of jewels and precious metal is said to enrich the numerous idols of Tashilhunpo. The monastery maintains 3300 priests. The city is protected by a fort which stands on a low hill to the north-west, and a garrison of 1000 Tibetan soldiers is quartered here. The municipal government is in the hands of two dēpen assisted by resident Jongpons. The soil around Shigatse is rich and productive, the elevation being between 11,000 and 12,000 ft. Shigatse lay to the west of the British route of advance on Lhasa in 1904, but it was visited by Captain Rawling on his way to open the market at Gartok.

SHIGNAN and **ROSHAN,** two small hill states E. of the Badakshan province of Afghanistan. They extend eastwards from the Panja, where it forms the eastern boundary of Badakshan to the Pamirs. The native rulers of Roshan and Shignan claim descent from Alexander the Great, of whom legends are still current in the country about the upper Oxus. The two states were conquered by Abdur Rahman in 1882, but were assigned to Russia by the Durand agreement of 1893. Since that agreement Russia has retired from all districts previously occupied by her on the left bank of the Panja, or upper Oxus.

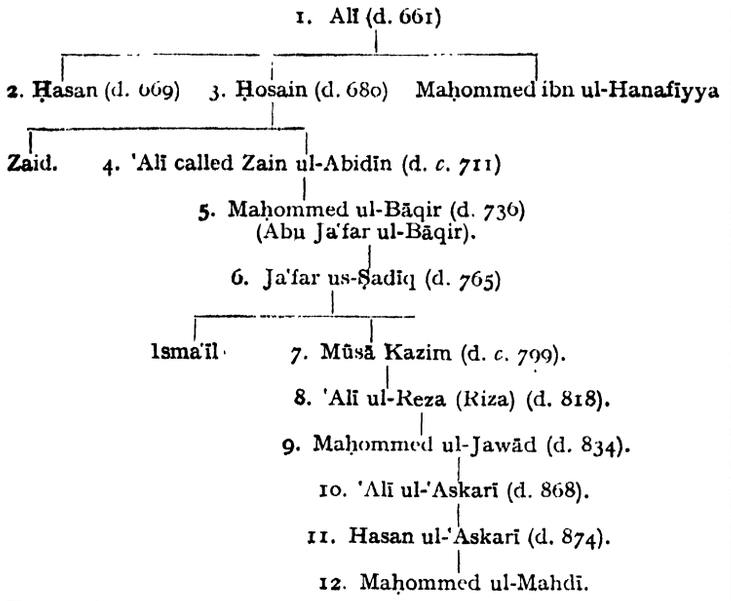
SHIʿITES (from Arab. *shiʿa*, a party, and then a sect), the name of one of the two great religious divisions of Islam. The Shiites hold that the imāmate and caliphate belong to the house of Mahomet (Muḥammad) alone, and so to ʿAlī, Mahomet's son-in-law, and his successors. After the arbitration on the claims of ʿAlī and Moawīyā to the caliphate (A.D. 658), two great parties emerged from the strife of feeling caused in the East by the deposition of ʿAlī.[1] Those who were known as the Khārijites, being mainly country Arabs, were democratic, and claimed that the office of caliph was elective, and that the caliph might be chosen from any Arab Moslem family. In strong opposition to these stood the party afterwards called the Shiites, who regarded ʿAlī and his descendants as the only rightful caliphs. For them the caliphate was a God-given office, and not one to be given by human appointment. Belief in this was an ordinance of God, an article of the faith. He who did not accept it as such was an unbeliever. Moreover, the party consisted largely of Persians who on their conversion to Islam brought with them many of the doctrines of their old faith, religious and political. Among these was the belief in the divinity of the sovereign and the duty of worshipping him. Gnostic elements, which may have come from the old religion of Babylonia, were also introduced. The idea of an absolute personal and hereditary monarchy was thus developed among the subjects of ʿAlī. But in Islam there is no separation between politics and theology. The theological position of the Shiites was that the superhuman power of Mahomet descended to the members of his house (ʿAlī and his children), so that they could interpret the will of God and tell future events. The imām was infallible and a mahdi or guide for life. What the imām gained the Koran lost, and many of the Shiites held the Muʿtazilite or rationalistic opinion of the created nature of the sacred book.

The growth of the Shiites was fostered by the great discontent of the eastern half of the caliphate with Omayyad rule (see CALIPHATE, and PERSIA: *History*). Before long an active propaganda was started, and leaders (often adventurers) arose who formed parties and founded sects of their own in the ranks of the Shiites. One of the earliest of these was ʿAbdallah ibn Ṣabā (founder of the Ṣabāʿīyya), who in the caliphate of Othman had preached the return of Mahomet (founded on Koran xxviii. 84), had been concerned in the assassination of Othman, and had proclaimed the divinity of ʿAlī, but had been disowned and punished by him. On ʿAlī's death he declared the thunder to be the voice, and the lightning the scourge of the translated caliph, and announced that his divine power had passed to his successors, the imāms.

Another sect, the Kaisānīyya, followed Kaisān, a freedman of ʿAlī, in believing in the superhuman knowledge of Mahommed ibn Hanafīyya, a son of ʿAlī but not by Fatima. Religion for these was obedience not to law but to a person. When the doctrine of a hidden imām arose, they differed from the Ṣabāʿīyya in expecting his return from his place of concealment on earth, not from heaven. Among them an adventurer Mokhtar (Mukhtār) had a large following for a time. He taught the mutability both of the knowledge and of the will of God—a development of Mahomet's own teaching. He claimed to fight to avenge the death of Hosain (see HASAN AND HOSAIN) and to serve Mahommed ibn Hanafīyya, who, however, disowned him. He was killed in 687. Some of the Shiite leaders, as Abu Moslim, when renounced by the members of the house of ʿAlī, transferred their allegiance to the house of ʿAbbās (see RĀWENDIS). The success of the Abbasids in supplanting the Omayyads was largely due to the help of the Shiites, and the early Abbasid caliphs, to the time of Motawakkil, were half-Shiites of a lax order. Shahrastānī (*q.v.*) in his Book on the Sects (*Kitāb Milal wan-Niḥal*, ed. Cureton, pp. 109 ff.; Haarbrücker's translation, vol. i. pp. 164 ff.) divides the Shiites into five main divisions: the Kaisānīyya, the Zaidīyya, the Imāmīyya, the Ghālīyya and the Ismaʿīlīyya. Of these the Ghālīyya are represented by the followers of Ibn Ṣāba (see above), and the Kaisānīyya have been already described. These parties as such have now ceased to exist, the others still remain. The Zaidites or Zaidīyya are the followers of Zaid, a grandson of Hosain, and are the most moderate of the Shiites, for though holding that the imāmate belongs only to the descendants of ʿAlī by Fatima, and that any of these might be imām (even though two or three should be in existence at the same time), they allow that circumstances might justify the appointment of another caliph for the time. Thus they acknowledge the imāmate of Abu Bekr and Omar, though ʿAlī was more entitled to the office. One branch of the Zaidites held Tabaristan from 864 until overturned by the Samanids in 928; another branch, arising about 893 in Yemen, has remained there until the present day. The Ismaʿilites or Ismaʿīlīyya are the followers of Ismaʿil, the elder son of Jaʿfar us-Sadīq, the sixth imām (see table below). He was rejected as successor by his father for drinking wine, and his party might soon have disappeared if he had not served as imām for the adventurous sceptic ʿAbdallah ibn Maimūn (for his propaganda see CARMATHIANS). Owing to the success of this man the Ismaʿilites have given rise to the Carmathians (*q.v.*), the Fātimites (*q.v.*), the Assassins (*q.v.*) and the Druses (*q.v.*).

At the present time the Ismaʿilīyya still exist in small numbers, chiefly about Surat and Bombay. The Imāmīyya believe that each imām has been definitely named by his predecessor. This party broke up into numerous divisions, and imāms manifest or hidden secured each his own following. The most important of these parties is that of the Twelve (the Ithnaʿasharīyya), who accept and follow the twelve descendants of ʿAlī numbered in the accompanying table.

[1] For these and following events see CALIPHATE.



The twelfth imām Maḥommed is said to have vanished and to be in hiding, but will be restored by God to his people, when it pleases Him. The creed of this party was introduced into Persia in 1502, when the Safāwids conquered the country, and still remains its official creed. The shah is thus only the temporary substitute for the hidden imām; and authoritative decisions in religious matters are pronounced by *Mujtahids*, *i.e.* theologians who can form their own opinions and require obedience to their decisions.

Other points in which Shiites differ from Sunnites depend on their legitimistic opinions, or are accommodations of the rites of Islam to the Persian nationality, or else are petty matters affecting ceremonial. The rejection of all the Sunnite books of tradition goes with the repudiation of the caliphs under whose protection these were handed down, The Shiites, however, have their own collections of traditions. An allegorical and mystical interpretation reconciles the words of the Koran with the inordinate respect paid to 'Alī; the Sunnite doctrine of the uncreated Koran is denied. To the Mahommedan confession "There is no god but God and Mahomet is His ambassador" they add "and 'Alī is the viceregent of God" (*walī*, properly "confidant"). There are some modifications in detail as to the four main religious duties of Islam—the prescriptions of ritual purity, in particular, being made the main duty of the faithful. The prayers are almost exactly the same, but to take part in public worship is not obligatory, as there is at present no legitimate imām whose authority can direct the prayer of the congregation. Pilgrimage to Mecca may be performed by a hired substitute, or its place can be taken by a visit to the tombs of Shiite saints, *e.g.* that of 'Alī at Nejef, of Ḥosain at Kerbelā, of Rezā at Meshed, or of the "unstained Fāṭima" at Ḳum (Fāṭima-i-ma'aṣūm, daughter of Mūsā, the 7th imām). The Shiites are much the most zealous of Moslems in the worship of saints (real or supposed descendants of 'Alī) and in pilgrimages to their graves, and they have a characteristic eagerness to be buried in those holy places. The Persians have an hereditary love for pomps and festivities, and so the Shiites have devised many religious feasts. Of these the great sacrificial feast (*'id-i-Qurbān*; Turkish *Qurbān Bairām*) is also Sunnite; the first ten days of the month Moḥarram are dedicated to the mourning for the death of Ḥosain at Kerbelā (*q.v.*), which is celebrated by passion-plays (*ta'zīya*), while the universal joy of the Nauroz, or the New Year of the Old Persian calendar, receives a Mahommedan sanction by the tradition that on this day the prophet conferred the caliphate on 'Alī.

Shiite tenets.

While they naturally reject the four Sunnite schools of jurisprudence, the Shiites also derive all law from the Koran, and their trained clergy (*mollahs*) are the only class that can give legitimate legal responses. The training of the *mollah* resembles that of the Sunnite *'ālim*. The course at the *madrasa* (*medresse*) embraces grammar, with some rhetoric and prosody, logic, dogmatic Koran exegesis, tradition and jurisprudence, and finally some arithmetic and algebra. The best *madrasa* is at Kerbelā. The scholar discharged from his studies becomes first a simple mollah, *i.e.* local judge and notary. A small place has one such judge, larger towns a college of judges under a head called the *sheikh ul-Islām*. The place of the Sunnite muftis is filled by certain of the *imām-jum'a*, *i.e.* presidents of the chief mosques in the leading towns, who in respect of this function bear the title of *imām mujtahid*. This is a dignity conferred by the tacit consent of people and clergy, and is held at one time only by a very few distinguished men. In Persia, the cadi (*ḳāẓi*) is an inferior judge who acts for the sheikh u 'l-Islām in special cases, and a mufti is a solicitor acting under the judge to prepare cases for court.

Under the Safawids, when the clergy had great influence, they had at their head the *ṣadru 'ṣ-ṣodūr*, who administered all pious foundations and was the highest judicial authority. But so great a power was found dangerous; 'Abbās the Great (1586–1628) abstained from filling up a vacancy which occurred in it, and, though Shāh Safī (1628–1641) restored the office, he placed it in commission. Nādir Shāh abolished it in his attempt to get rid of the Shiite hierarchy (1736), and since then it has not been restored. Yet the imām-jum'a of Isfāhān, the old Safawi capital, is tacitly regarded as representative of the invisible imām of the house of 'Alī, who is the true head of the church. Various vain attempts were made in the 19th century to subordinate the authority of the clergy to the government. Outside the clergy the greatest influence in religious matters is that exercised by the dervishes (*q.v.*). As it was long necessary to profess orthodoxy for fear of the Arabs, it came to be an established Shiite doctrine that it is lawful to deny one's faith in case of danger. This "caution" (*taqīya*) or "concealment" (*ketmān*) has become a second nature with the Persians. Another mischievous thing is the permission of temporary marriages—marriages for a few hours on a money payment. This legitimized harlotry (*mot'a*) is forbidden by the Sunna, but the Shiites allow it, and the mollahs adjust the contract and share the women's profits. There is still mental life and vigour among the Shiites, as appears among the sects, which, allowance being made for "taqīya," play no inconsiderable part. The Akhbārīs (traditionalists), who adopt a semi-philosophical way of explaining away the plainest doctrines (such as the resurrection of the flesh) on the authority of false traditions of 'Alī, are not so much a sect as a school of theology within the same pale as the orthodox Shia or Mujtahids. A real dissenting sect, however, is the Sheikhīs, of whose doctrines we have but imperfect and discrepant accounts. Representatives of the old extreme Shiites, who held 'Alī for a divine incarnation, are found all over Persia in the 'Alī-Ilāhī or 'Alī-Allāhī sect ("'Alī deifiers"). Finally, in the 19th century arose the remarkable attempt at reform known as Bābiism (*q.v.*).

BIBLIOGRAPHY.—The work of Shahrastānī (*q.v.*) on the Sects of Islam; R. Dozy, *Essai sur l'histoire de l'islamisme* (Leiden and Paris, 1879); G. van Vloten, *Recherches sur la domination arabe, le Chiitisme, &c.* (Amsterdam, 1894); various works of A. von Kremer and I. Goldziher; J. E. Polak, *Persien. Das Land und seine Bewohner* (2 vols., Leipzig, 1865); E. G. Browne, *A Year among the Persians* (London, 1893). (G. W. T.)

SHIKAR, the Hindostani term for sport, in the sense of shooting and hunting. The word is in universal use by Anglo-Indians for the pursuit of large game, such as tiger-shooting and pig-sticking. The shikari is either the native expert, who marks the game for the sportsman, or else the European sportsman himself.

SHIKARPUR, a town of British India, in the Sukkur district of Sind, Bombay. It is situated about 18 m. from the right bank of the Indus, with a station on the North-Western railway, 23 m. N.W. of Sukkur. Pop. (1901) 49,491. Shikarpur has always been an important place as commanding the trade route through the Bolan Pass, and its merchants have dealings with many towns in Central Asia. It has a large market and manufactures of carpets, cotton cloth and pottery. Shikarpur was formerly the headquarters of a district of the same name. In 1901 two subdivisions of this district were detached to form the new district of Larkana, and the two other subdivisions were then constituted the district of Sukkur.

SHILDON, a market town in the Bishop Auckland parliamentary division of Durham, England, 9 m. N.W. from Darlington by a branch of the North Eastern railway. Pop. of urban district of Shildon and East Thickley (1901) 11,759. At New Shildon or East Thickley are extensive railway engine and wagon works belonging to the railway company. A large coal traffic is handled here, as there are collieries and foundries in the vicinity.

SHILLETO, RICHARD (1809–1876), English classical scholar, was born at Ulleskelf in Yorkshire on the 25th of November 1809. He was educated at Repton and Shrewsbury schools, and Trinity College, Cambridge, and in 1867 was elected a fellow of Peterhouse. His whole life was spent in Cambridge, where he died on the 24th of September 1876. Shilleto was one of the greatest Greek scholars that England has produced; in addition, he had an intimate acquaintance with the Latin and English languages and literature. He published little, being obliged to devote the best years of his life to private tuition. He was the most famous classical "coach" of his day, and almost all the best men passed through his hands. His edition of the *De falsa legatione* of Demosthenes will always remain a standard work, but his first two books of Thucydides (an instalment of a long-contemplated edition) hardly came up to expectation. His pamphlet *Thucydides or Grote?* excited a considerable amount of feeling. While it undoubtedly damaged Grote's reputation as a scholar, it was felt that it showed a want of ppreciation of the special greatness of the historian. Shilleto's powers as a translator from English into Greek (especially prose) and Latin were unrivalled; a selection of his versions was published in 1901.

See B. H. Kennedy in Cambridge *Journal of Philology* (1877).

SHILLING, an English silver coin of the value of twelve pence. The origin of the word is somewhat obscure. There was an Anglo-Saxon coin termed *scilling*, or *scylling*, worth about fivepence, which is said to be derived from a Teutonic root, *skil*, to divide, +*ling* on the analogy of farthing (*q.v.*). The silver shilling was first struck in 1504, in the reign of Henry VII. In Charles II.'s reign shillings were first issued with milled edges. In George IV.'s reign were issued the so-called "lion shillings," bearing the royal crest, a crowned lion on a crown, a design reverted to in the coinage of Edward VII. A shilling is token money merely, it is nominally in value the one-twentieth of a pound, but one troy pound of silver is coined into sixty-six shillings, the standard weight of each shilling being 87·27 grains.

SHILLONG, a town of British India, in the Khasi Hills district of Eastern Bengal and Assam. It is situated in 25° 34′ N. and 91° 53′ E., on a plateau 4978 ft. above the sea, 63 m. by cart-road S. of Gauhati, on the Brahmaputra. Pop. (1901) 8384. Shillong practically dates from 1864, when the district headquarters were transferred from Cherrapunji. It was chosen as the seat of government in 1874, when the province of Assam was constituted. Every one of the public buildings and houses that quickly grew up was levelled to the ground by the great earthquake of the 12th of June 1897, but they have since been rebuilt. Cantonments are provided for a battalion of Gurkhas with two guns, and Shillong is the headquarters of the Assam brigade of the 8th division of the Northern army. There are a government high school and a training school for masters. The Welsh Presbyterian mission is active in promoting education. Since 1905, when Dacca became the capital of the new province of Eastern Bengal and Assam, Shillong has declined in importance; but it is still the summer residence of the government and the headquarters of the district.

SHILLUH, or SHLŪH ("vagabonds"), the name given by the Arabized Moors to the Berber peoples of southern Morocco. They occupy chiefly the province of Sus. The name is said to be a corruption of *áshlūh* (pl. *ishláh*), a camel-hair tent. They are of fine physique, strong and wiry, and true Berbers in features and fairness. They are as a rule shorter than the Berbers of Algeria (see BERBERS and MOROCCO).

SHILLUK, a Negro race of the upper Nile valley, occupying the lands west of the White Nile from the Sobat northward for about 360 m., and stretching westward to the territory of the Baggara tribes. They are the most numerous of the Negro tribes of the Anglo-Egyptian Sudan, and form one great family with the Alur and Acholi (*q.v.*) and others in the south. Formerly extending as far north as Khartum and constituting a powerful Negro kingdom, they are now decadent. They are the only race on the upper Nile recognizing one chief as ruler of all the tribes, the chiefship passing invariably to the sister's child or some other relative on the female side. The Shilluk towns on the Nile bank are usually placed near to one another. They own large herds of cattle. In physique the Shilluks are typical Negroes and jet black. The men used to wear nothing, the women a calf-skin attached to their girdle, but with the establishment of Anglo-Egyptian control, *c.* 1900, they gradually adopted clothes. The poorer people smear themselves with ashes. They ornament the hair with grass and feathers in fantastic forms such as a halo, helmet, or even a broad-brimmed hat. When they saw Schweinfurth wearing a broad felt hat they thought him one of them, and were amazed when he took it off. They are skilful as hunters, and especially as fishermen, spearing fish while wading or from ambach rafts. Their arms are spears, shields and clubs. Their religion is a kind of ancestor and nature worship.

See G. A. Schweinfurth, *Heart of Africa* (1874); W. Junker, *Travels in Africa*, Eng. ed. (London, 1890–1892); *The Anglo-Egyptian Sudan*, edited by Count Gleichen (London, 1905).

SHILOH, BATTLE OF. This, the second great battle in the American Civil War, also called the battle of Pittsburg Landing, was fought on the 6th-7th of April 1862 between the Union forces under Grant and Buell and the Confederates under A. S. Johnston and Beauregard. In view of operations against Corinth, Mississippi, Grant's army had ascended the Tennessee to Pittsburg Landing and there disembarked, while the co-operating army under Buell moved across country from Nashville to join it. The Confederates concentrated above 40,000 men at Corinth and advanced on Pittsburg Landing with a view to beating Grant before Buell's arrival, but their concentration had left them only a narrow margin of time, and the advance was further delayed by the wretched condition of the roads. Beauregard advised Johnston to give up the enterprise, but on account of the bad effect a retreat would have on his raw troops Johnston resolved to continue his advance. Grant meantime had disposed his divisions in camps around the Landing rather with a view to their comfort than in accordance with any tactical scheme. No entrenchments were made; Halleck, the Union commanding general in the west, was equally over-confident, and allowed Buell to march in leisurely fashion. Even so, more by chance than intentionally, Buell's leading division was opposite the Landing, awaiting only a ferry, on the evening before the battle; Grant, however, declined to allow it to cross, as he thought that there would be no fighting for some days. At 6 A.M. on the 6th of April, near Shiloh Church (2 m. from Pittsburg Landing), the Confederate army deployed in line of battle, and advancing directly on the Landing, surprised and broke up a brigade of the most advanced Union division (Prentiss's) which had been sent forward from camp to reconnoitre. The various Union divisions hurriedly prepared to defend themselves, but they were dispersed in several camps which were out of sight of one another, and thus the Confederate army lapped round the flanks of each local defence as it encountered it. The two advanced divisions were swiftly driven in on the others, who were given a little time to prepare themselves by the fact that in the woods the Confederate leaders were unable to control or manœuvre their excited troops. But the rear Union divisions, though ready, were not connected, and each in turn was isolated and forced back, fighting hard, towards the Landing. The remnant of Prentiss's division was cut off and forced to surrender. Another division had its commander, W. H. L. Wallace, killed. But on the other side the disorder became greater and greater, many regiments were used up, and Johnston himself killed in vainly attacking on a point of Wallace's line called the Hornet's Nest. The day passed in confused and savage scuffles between the raw enthusiasts of either side, but by 5.30 P.M. Grant had formed a last (and now a connected) line of defence with Buell's leading division (Nelson's)

and all of his own infantry that he could rally. This line was hardly 600 yds. from the Landing, but it was in a naturally strong position, and Beauregard suspended the attack at sunset. There was a last fruitless assault, delivered by some of the Confederate brigades on the right that had not received Beauregard's order against Nelson's intact troops, who were supported by the fire of the gunboats on the Tennessee. During the night Grant's detached division (Lew Wallace's) and Buell's army came up, totalling 25,000 fresh troops, and at 5 A.M. on the 7th Grant took the offensive. Beauregard thereupon decided to extricate his sorely-tried troops from the misadventure, and retired fighting on Corinth. About Shiloh Church, a strong rearguard under Bragg repulsed the attacks of Grant and Buell for six hours before withdrawing, and all that Grant and Buell achieved was the reoccupation of the abandoned camps. It was a Confederate failure, but not a Union victory, and, each side being weakened by about 10,000 men, neither made any movements for the next three weeks.

SHILOH, a town of Ephraim, where the sanctuary of the ark was, under the priesthood of the house of Eli. According to 1 Sam. iii. 3, 15, this sanctuary was not a tabernacle but a temple, with doors. But the priestly narrator of Josh. xviii. 1 has it that the tabernacle was set up there by Joshua after the conquest. In Judges xxi. 19 seq. the yearly feast at Shiloh appears as of merely local character. The sanctuary at Shiloh seems to have been destroyed, probably by the Philistines after the battle of Ebenezer; cf. Jeremiah vii. 12 seq. The position described in Judges, *loc. cit.*, gives certainty to the identification with the modern Seilun lying some 2 m. E.S.E. of Khan Labban (Lebonah), on the road from Bethel to Shechem. Here there is a ruined village, on an elevation protected by lofty hills on three sides, and open only towards the south, offering a strong position, which suggests that the place was a stronghold as well as a sanctuary. Fertile land surrounds the hill. The name Seilun corresponds to Σιλοῦν in Josephus. LXX. has Σηλω, Σηλωμ. The forms given in the Hebrew Bible (שילה, שילו) have dropped the final consonant, which reappears in the adjective שילוני.

SHIMOGA, or SHEEMOGA, a town and district in the state of Mysore, southern India. The town is situated on the Tunga river, and is the terminus of a branch railway. Pop. (1901) 6240. The area of the district is 4025 sq. m. Its river system is twofold; in the east the Tunga, Bhadra and Varada unite to form the Tungabhadra, which ultimately falls into the Kistna and so into the Bay of Bengal, while in the west a few minor streams flow to the Sharavati, which near the north-western frontier bursts through the Western Ghats by the celebrated Falls of Gersoppa (*q.v.*).

The western half of the district is mountainous and covered with magnificent forest, and is known as the Malnad or hill country, some of the peaks being 4000 ft. above sea-level. The general elevation of Shimoga is about 2000 ft.; and towards the east it opens out into the Maidan or plain country, which forms part of the general plateau of Mysore. The Malnad region is very picturesque, its scenery abounding with every charm of tropical forests and mountain wilds; on the other hand, the features of the Maidan country are for the most part comparatively tame. The mineral products of the district include iron-ore and laterite. The soil is loose and sandy in the valleys of the Malnad, and in the north-east the black cotton soil prevails. Bison are common in the *taluk* of Saugor, where also wild elephants are occasionally seen; while tigers, leopards, bears, wild hog, *sambhar* and *chital* deer are numerous in the wooded tracts of the west. Shimoga presents much variety of climate. The south-west monsoon is felt in full force for about 25 m. from the Ghats, bringing an annual rainfall of more than 150 in., but the rainfall gradually diminishes to 31 in. at Shimoga station and to 25 in. or less at Chennagiri. The population in 1901 was 531,736. Rice is the staple crop; next in importance is sugar-cane; areca nuts are also extensively grown; and miscellaneous crops include vegetables, fruits and pepper. The chief manufactures are coarse cotton cloths, rough country blankets, iron implements, brass and copper wares, pottery and jaggery. The district is noted for its beautiful sandal-wood carving.

During the Mahommedan usurpation of Mysore from 1761 to 1799, unceasing warfare kept the whole country in constant turmoil. After the restoration of the Hindu dynasty Shimoga became the scene of disturbances caused by the mal-administration of the Deshast Brahmans, who had seized upon every office and made themselves obnoxious. These disturbances culminated in the insurrection of 1830, which led to the direct assumption of the administration by the British.

SHINGLE. (1) A Middle English corruption of *schindle*, from Lat. *scindula* or *scandula*, a wooden tile, from *scandere*, to cut—a kind of wooden tile, generally of oak, used in places where timber is plentiful, for covering roofs, spires, &c. In England they are generally plain, but on the continent of Europe the ends are sometimes rounded, pointed or cut into ornamental form. (2) Water-worn detritus, of larger and coarser form than gravel, chiefly used of the pebbly detritus of a sea-beach. This word is of Norwegian origin, from *singl* or *singling*, coarse gravel. It is apparently derived from *singla*, to make a ringing sound, a form of "to sing," with allusion to the peculiar noise made when walking over shingle. (3) The word "shingles," the common name of *herpes zoster*, a particular form of the inflammatory eruption of the skin known as herpes (*q.v.*), is the plural of an obsolete word for a girdle, *sengle*, taken through O. Fr. *cengle* from Lat. *cingulum*, *cingere*, to gird.

SHINWARI, a Durani Afghan tribe occupying the northern slopes of the Safed Kob below Jalalabad. One clan, the Ali Sher Khel, fall within the British sphere in the North-West Frontier Province of India. They live on the Loargai border of Peshawar district, and number some 3000 fighting men. The remaining three clans are Afghan subjects.

SHIO-GHI, the Japanese game of chess. Like *Go-bang*, the game of the middle classes, and Sugorochu (double-six), that of the common people, it was introduced from China many centuries ago and is still popular with the educated classes. It is played on a board divided into 81 squares, nine on a side, with 20 pieces on each side, arranged on the three outer rows. The pieces which are flat and punt-shaped with the smaller end towards the front, represent, by means of different inscriptions, the *O*, or *Sho*, King-General, with whose checkmate the game ends, his two chief aids, the *Kin* and *Ghin*, Gold and Silver Generals (two of each), *Ka-Ma*, horse or knight (two), *Yari*, spearman (two), one *Hisha*, or flying chariot (rook), one *Kaku* (bishop), and nine *Hio* or *Fu*, soldiers or pawns. All these pieces, like those in chess, possess different functions. The chief difference between chess and *Shio-ghi* is that in the Japanese game a piece does not cease to be a factor in the game when it is captured by the opponent, but may be returned by him to the board at any time as a reserve; and, secondly, all pieces, except the King and Gold General, are promoted to higher powers upon entering the last three rows of the enemy's territory. This possibility of utilizing captured forces against their former masters and the altering values of the different men render *shio-ghi* a very difficult and complicated game.

See *Games Ancient and Oriental*, by E. Falkener (London, 1892); the *Field* (Sept. 1904).

SHIP, the generic name (O. Eng. *scip*, Ger. *Schiff*, Gr. σκάφος, from the root *skap*, cf. "scoop") for the invention by which man has contrived to convey himself and his goods upon water. The derivation of the word points to the fundamental conception by which, when realized, a means of flotation was obtained superior to the raft, which we may consider the earliest and most elementary form of vessel. The trunk of a tree hollowed out, whether by fire, or by such primitive tools as are fashioned and used with singular patience and dexterity by savage races, represents the first effort to obtain flotation depending on something other than the mere buoyancy of the material. The poets, with characteristic insight, have fastened upon these points. Homer's hero Ulysses is instructed to make a raft with a raised platform upon it, and selects trees "withered of old, exceeding dry, that might float lightly for him" (*Od.* v. 240). Virgil, glorifying the dawn and early progress of the arts, tells us, "Rivers then first the hollowed alders felt" (*Georg.* i. 136, ii. 451). Alder is a heavy wood and not fit for rafts. But to make for the first time a dug-out canoe of alder, and so to secure its flotation, would be a triumph of primitive art, and thus the poet's expression represents a great step in the history of the invention of the ship.

Primitive efforts in this direction may be classified in the

following order: (1) rafts—floating logs, or bundles of brushwood or reeds or rushes tied together; (2) dug-outs—hollowed trees; (3) canoes of bark, or of skin stretched on framework or inflated skins (balsas); (4) canoes or boats of pieces of wood stitched or fastened together with sinews or thongs or fibres of vegetable growth; (5) vessels of planks, stitched or bolted together with inserted ribs and decks or half decks; (6) vessels of which the framework is first set up, and the planking of the hull nailed on to them subsequently. All these in their primitive forms have survived, in various parts of the world, with different modifications marking progress in civilization. Climatic influences and racial peculiarities have imparted to them their specific characteristics, and, combined with the available choice of materials, have determined the particular type in use in each locality. Thus on the north-west coast of Australia is found the single log of buoyant wood, not hollowed out but pointed at the ends. Rafts of reeds are also found on the Australian coast. In New Guinea catamarans of three or more logs lashed together with rattan are the commonest vessel, and similar forms appear on the Madras coast and throughout the Asiatic islands. On the coast of Peru rafts made of a very buoyant wood are in use, some of them as much as 70 ft. long and 20 ft. broad; these are navigated with a sail, and, by an ingenious system of centre boards, let down either fore or aft between the lines of the timbers, can be made to tack. The sea-going raft is often fitted with a platform so as to protect the goods and persons carried from the wash of the sea. Upright timbers fixed upon the logs forming the raft support a kind of deck, which in turn is itself fenced in and covered over.[1] Thus the idea of a deck, and that of side planking to raise the freight above the level of the water and to save it from getting wet, are among the earliest typical expedients which have found their development in the progress of the art of shipbuilding.

I. History to the Invention of Steamships

Whether the observation of shells floating on the water, or of split reeds, or, as some have fancied, the nautilus, first suggested the idea of hollowing out the trunk of a tree, the practice ascends to a very remote antiquity in the history of man. Dug-out canoes of a single tree have been found associated with objects of the Stone Age among the ancient Swiss lake dwellings; nor are specimens of the same class wanting from the bogs of Ireland and the estuaries of England and Scotland, some obtained from the depth of 25 ft. below the surface of the soil. The hollowed trunk itself may have suggested the use of the bark as a means of flotation. But, whatever may have been the origin of the bark canoe, its construction is a step onwards in the art of shipbuilding. For the lightness and pliability of the material necessitated the invention of some internal framework, so as to keep the sides apart, and to give the stiffness required both for purposes of propulsion and the carrying of its freight. Similarly, in countries where suitable timber was not to be found, the use of skins or other water-tight material, such as felt or canvas, covered with pitch, giving flotation, demanded also a framework to keep them distended and to bear the weight they had to carry. In the framework we have the rudimentary ship, with longitudinal bottom timbers, and ribs, and cross-pieces, imparting the requisite stiffness to the covering material. Bark canoes are found in Australia, but the American continent is their true home. In northern regions skin or woven material made water-tight supplies the place of bark.

The next step in the construction of vessels was the building up of canoes or boats by fastening pieces of wood together in a suitable form. Some of these canoes, and probably the earliest in type, are tied or stitched together with thongs or cords. The Madras surf boats are perhaps the most familiar example of this type, which, however, is found in the Straits of Magellan and in Central Africa (on the Victoria Nyanza), in the Malay Archipelago and in many islands of the Pacific. Some of these canoes show a great advance in the art of construction, being built up of pieces fitted together with ridges on their inner sides, through which the fastenings are passed.[2] These canoes have the advantage of elasticity, which gives them ease in a seaway, and a comparative immunity where ordinary boats would not hold together. In these cases the body of the canoe is constructed first and built to the shape intended, the ribs being inserted afterwards, and attached to the sides, and having for their main function the uniting of the deck and cross-pieces with the body of the canoe. Vessels thus stitched together, and with an inserted framework, have from a very early time been constructed in the Eastern seas far exceeding in size anything that would be called a canoe, and in some cases attaining to 200 tons burthen.

From the stitched form the next step onwards is to fasten the materials out of which the hull is built up by pegs or treenails; and of this system early types appear among the Polynesian islands and in the Nile boats described by Herodotus (ii. 96), the prototype of the modern "nuggur." The raft of Ulysses described by Homer presents the same detail of construction. It is remarkable that some of the early types of boats belonging to the North Sea present an intermediate method, in which the planks are fastened together with pins or treenails, but are attached to the ribs by cords passing through holes in the ribs and corresponding holes bored through ledges cut on the inner side of each plank.

We thus arrive, in tracing primitive efforts in the art of ship construction, at a stage from which the transition to the practice of setting up the framework of ribs fastened to a timber keel laid lengthwise, and subsequently attaching the planking of the hull, was comparatively simple. The keel of the modern vessel may be said to have its prototype in the single log which was the parent of the dug-out. The side planking of the vessel, which has an earlier parentage than the ribs, may be traced to the attempt to fence in the platforms upon the sea-going rafts, and to the planks fastened on to the sides of dug-out canoes so as to give them a raised gunwale.[3] The ribs of the modern vessel are the development of the framework originally inserted after the completion of the hull of the canoe or built-up boat, but with the difference that they are now prior in the order of fabrication. In a word, the skeleton of the hull is now first built up, and the skin, &c., adjusted to it; whereas in the earlier types of wooden vessels the outside hull was first constructed, and the ribs, &c., added afterwards.[4] It is noticeable that the invention of the outrigger and weather platform, the use of which is at the present time distributed from the Andaman Islands eastward throughout the whole of the South Pacific, has never made its way into the Western seas. It is strange that Egyptian enterprise, which seems at a very early period to have penetrated eastward down the Red Sea and round the coasts of Arabia towards India, should not have brought it to the Nile, and that the Phoenicians, who, if the legend of their migration from the shores of the Persian Gulf to the coast of Canaan be accepted, would in all probability, in their maritime expeditions, have had opportunities of seeing it, did not introduce it to the Mediterranean. That they did not do so, if they saw it at all, would tend to prove that even in that remote antiquity both nations possessed the art of constructing vessels of a type superior to the outrigger canoes, both in speed and in carrying power.

The earliest representations that we have as yet of Egyptian vessels carry us back, according to the best authorities, to a period little short of 3000 years before Christ. Some of these are of considerable size, as is shown by the number of rowers, and by the cargo consisting in many cases of cattle. The earliest of all presents us with the peculiar mast of two pieces, stepped apart but joined at the top. In some the masts are shown lowered

[1] The raft of Ulysses described in Homer (*Od.* v.) must have been of this class.

[2] See Captain Cook's account of the Friendly Islands, La Pérouse on Easter Island, and Williams on the Fiji Islands.

[3] Compare the planks upon the Egyptian war galleys, added so as to protect the rowers from the missiles of the enemy.

[4] It is curious that these two methods should still survive, and be in use, in the construction of light racing 8-oared boats. Some of these are built ribs first, and skin laid on afterwards; others, skin laid on moulds and framework first, and ribs inserted in the shell when turned over.

and laid along a high spar-deck. The larger vessels show on one side as many as twenty-one or twenty-two and in one case twenty-six oars, besides four or five steering. They show considerable camber, the two ends rising in a curved line which in some instances ends in a point, and in others is curved back and over at the stern and terminates in an ornamentation, very frequently of the familiar lotus pattern. At the bow the stem is sometimes seen to rise perpendicularly, forming a kind of forecastle, sometimes to curve backward and then forward again like a neck, which is often finished into a figure-head representing some bird or beast or Egyptian god. On the war galleys there is frequently shown a projecting bow with a metal head attached, but well above the water. This, though no doubt used as a ram, is not identical with the beak *à fleur d'eau*, which we shall meet with in Phoenician and Greek galleys. It is more on a level with the proembolion of the latter.

The impression as regards the build created by the drawings of the larger galleys is that of a long and somewhat wall-sided vessel with the stem and stern highly raised. The tendencies of the vessel to "hog," or rise amidships, owing to the great weight fore and aft unsupported by the water, is corrected by a strong truss passing from stem to stern over crutches. The double mast of the earlier period seems in time to have given place to the single mast furnished with bars or rollers at the upper part, for the purpose apparently of raising or lowering the yard according to the amount of sail required. The sail in some of the galleys is shown with a bottom as well as a top yard. In the war galleys during action it is shown rolled up like a curtain with loops to the upper yard. The steering was effected by paddles, sometimes four or five in number, but generally one or two fastened either at the end of the stern or at the side, and above attached to an upright post in such a way as to allow the paddle to be worked by a tiller.

There are many remarkable details to be observed in the Egyptian vessels figured in Duemichen's *Fleet of an Egyptian Queen*, and in Lepsius's *Denkmäler*. The Egyptian ship, as represented from time to time in the period between 3000 and 1000 B.C., presents to us a ship proper as distinct from a large canoe or boat. It is the earliest ship of which we have cognizance. But there is a noticeable fact in connexion with Egypt which we gather from the tomb paintings to which we owe our knowledge of the Egyptian ship. It is evident from these records that there were at that same early period, inhabiting the littoral of the Mediterranean, nations who were possessed of sea-going vessels which visited the coasts of Egypt for plunder as well as for commerce, and that sea-fights were even then not uncommon. Occasionally the combination of these peoples for the purpose of attack assumed serious proportions, and we find the Pharaohs recording naval victories over combined Dardanians, Teucrians and Mysians, and, if we accept the explanations of Egyptologists, over Pelasgians, Daunians, Oscans and Sicilians. The Greeks, as they became familiar with the sea, followed in the same track. The legend of Helen in Egypt, as well as the numerous references in the *Odyssey*, point not only to the attraction that Egypt had for the maritime peoples, but also to long-established habits of navigation and the possession of an art of shipbuilding equal to the construction of sea-going craft capable of carrying a large number of men and a considerable cargo besides.

But the development of the ship and of the art of navigation clearly belongs to the Phoenicians. It is tantalizing to find that the earliest and almost the only evidence that we have of this development is to be gathered from Assyrian representations. The Assyrians were an inland people, and the navigation with which they were familiar was that of the two great rivers, Tigris and Euphrates. After the conquest of Phoenicia, they had knowledge of Phoenician naval enterprise, and accordingly we find the war galley of the Phoenicians represented on the walls of the palaces unearthed by Layard and his followers in Assyrian discovery. But the date does not carry us to an earlier period than 700 B.C. The vessel represented is a bireme war galley which is "aphract," that is to say, has the upper tier of rowers unprotected and exposed to view. The apertures for the lower oars are of the same character as those which appear in Egyptian ships of a much earlier date, but without oars. The artist has shown the characteristic details, though somewhat conventionally. The fish-like snout of the beak, the line of the parodus or outside gangway, the wickerwork cancelli,[1] the shields ranged in order along the side of the bulwark, and the heads of a typical crew on deck (the πρωρεύς looking out in front in the forecastle, an ἐπιβάτης, two chiefs by the mast, and, aft, the κελευστής and κυβερνήτης). The supporting timbers of the deck are just indicated. The mast and yard and fore and back stays, with the double steering paddle, complete the picture.

But, although there can be little doubt that the Phoenicians, after the Egyptians, led the way in the development of the shipwright's art, yet the information that we can gather concerning them is so meagre that we must go to other sources for the description of the ancient ship. The Phoenicians at an early date constructed merchant vessels capable of carrying large cargoes, and of traversing the length and breadth of the Mediterranean, perhaps even of trading to the far Cassiterides and of circumnavigating Africa. They in all probability (if not the Egyptians) invented the bireme and trireme, solving the problem by which increased oar-power and consequently speed could be obtained without any great increase in the length of the vessel.

It is, however, to the Greeks that we must turn for any detailed account of these inventions. The Homeric vessels were aphract and not even decked throughout their entire length. They carried crews averaging from fifty to a hundred and twenty men, who, we are expressly told by Thucydides, all took part in the labour of rowing, except perhaps the chiefs. The galleys do not appear to have been armed as yet with the beak, though later poets attribute this feature to the Homeric vessel. But they had great poles used in fighting, and the term employed to describe these (ναύμαχα) implies a knowledge of naval warfare. The general characteristics are indicated by the epithets in use throughout the *Iliad* and the *Odyssey*. The Homeric ship is sharp (θοή) and swift (ὠκεῖα); it is hollow (κοίλη, γλαφυρή, μεγακήτης), black, vermilion-cheeked (μιλτοπάρῃος), dark-prowed (κυανόπρῳρος), curved (κορωνίς, ἀμφιέλισσα), well-timbered (εὖσσελμος), with many thwarts (πολύζυγος, ἑκατόζυγος). The stems and sterns are high, upraised, and resemble the horns of oxen (ὀρθοκραίραι). They present in the history of the shipping of the Mediterranean a type parallel with that of the Vikings' vessels of the North Sea.

On the vases, the earliest of which may date between 700 and 600 B.C., we find the bireme with the bows finished off into a beak shaped as the head of some sea monster, and an elevated forecastle with a bulwark evidently as a means of defence. The craft portrayed in some instances are evidently pirate vessels, and exhibit a striking contrast to the trader, the broad ship of burden (φορτὶς εὐρεῖα), which they are overhauling. The trireme, which was developed from the bireme and became the Greek ship of war (the long ship, ναῦς μακρά, *navis longa*, *par excellence*), dates, so far as Greek use is concerned, from about 700 B.C. according to Thucydides, having been first built at Corinth. The earliest sea-fight that the same author knew of he places at a somewhat later date—664 B.C., more than ten centuries later than some of those portrayed in the Egyptian tomb paintings.

The trireme was the war ship of Athens during her prime, and, though succeeded and in a measure superseded by the larger rates,—quadrireme, quinquereme, and so on, up to vessels of sixteen banks of oars (*inhabilis prope magnitudinis*),—yet, as containing in itself the principle of which the larger rates merely exhibited an expansion, a difference in degree and not in kind, has, ever since the revival of letters, concentrated upon itself the attention of the learned who were interested in such matters. The literature connected with the question of ancient ships, if collected, would fill a small library, and the greater part of it turns upon the construction of the trireme and the disposition of the rowers therein.

[1] See Rawlinson, *Ancient Monarchies*, vol. ii. p. 176.

During the 19th century a fresh light was thrown upon the subject by the discovery (1834) at the Peiraeus of some records of the Athenian dockyard superintendents, belonging to several years between 373–324 B.C. These were published and admirably elucidated by Boeckh. Further researches were carried out by his pupil Dr Graser. Since the publication of Graser's notable work, *De re navali veterum*, the subject has been copiously treated by A. Cartauld, Breusing, C. Torr and others. The references to ancient writers, and the illustrations from vases, coins, &c., have been multiplied, and, though the vexed question of the seating of the rowers cannot be regarded as settled, yet, notwithstanding some objections raised, it seems probable that something like Graser's solution, with modifications, will eventually hold the field, especially as practical experiment has shown the possibility of a set of men, seated very nearly according to his system, using their oars with effect, and without any interference of one bank with another.

On one point it is necessary to insist, because upon it depends the right understanding of the problem. The ancients *did not employ more than one man to an oar*. The method employed on medieval galleys was alien to the ancient system. A. Jal, Admiral Fincati, Admiral Jurien de la Gravière and a host of other writers on the subject, some as recently as 1900, have been led to advocate erroneous, if ingenious, solutions of the problem, by neglect of, and in contradiction to, the testimony of ancient texts and representations, which overwhelmingly establish as an axiom of the ancient marine the principle of "one oar, one man."

The distinction between "aphract" and "cataphract" vessels must not be overlooked in a description of the ancient vessels. The words, meaning "unfenced" and "fenced," refer to the bulwarks which covered the upper tier of rowers from attack. In the aphract vessels these side plankings were absent and the upper tier of rowers was exposed to view from the side. Both classes of vessels had upper and lower decks, but the aphract class carried their decks on a lower level than the cataphract. The system of side planking with a view to the protection of the rowers dates from a very early period, as may be seen in some of the Egyptian representations, but among the Greeks it does not seem to have been adopted till long after the Homeric period. The Thasians are credited with the introduction of the improvement.

In our account of the trireme, both as regards the disposition of the rowers and the construction of the vessel, we have mainly, though not entirely, followed Graser. Any such scheme must at the best be hypothetical, based upon inference from the ancient texts, or upon necessities of construction, and in every case plenty of room will be left for the critic, along with the Horatian invitation, "si quid novisti rectius istis, Candidus imperti."

In the ancient vessels the object of arranging the oars in banks was to economize horizontal space, and to obtain an increase in the number of oars without having to lengthen the vessel. It has been reasonably inferred from a passage in Vitruvius[1] that the "interscalmium," or space horizontally measured from oar to oar, was 2 cubits. This is exactly borne out by the proportions of an Attic aphract trireme, as shown on a fragment of a bas-relief found in the Acropolis. The rowers in all classes of banked vessels sat in the same vertical plane, and seats ascending in a line obliquely towards the stern of the vessel. Thus in a trireme the thranite, or oarsman of the highest bank, was nearest the stern of the set of three to which he belonged. Next behind him and somewhat below him sat his zygite, or oarsman of the second bank; and next below and behind the zygite sat the thalamite, or oarsman of the lowest bank. The vertical distance between these seats was probably 2 ft., the horizontal distance about 1 ft. The horizontal distance, it is well to repeat, between each seat in the same bank was 3 ft. (the seat itself about 9 in. broad). Each man had a resting place for his feet, somewhat wide apart, fixed to the bench of the man on the row next below and in front of him. In rowing, the upper hand, as is shown in most of the representations which remain, was held with the palm turned inwards towards the body. This is accounted for by the angle at which the oar was worked. The lowest rank used the shortest oars, and the difference of the length of the oars on board was caused by the curvature of the ship's side. Thus, looked at from within, the rowers amidship seemed to be using the longest oars, but outside the vessel, as we are expressly told, all the oar-blades of the same bank took the water in the same longitudinal line. The lowest or thalamite oar-ports were 3 ft., the zygite 4½ ft., the thranite 5½ ft. above the water. Each oar-port was protected by an *ascoma* or leather bag, which fitted over the oar, closing the aperture against the wash of the sea without impeding the action of the oar. The oar was attached by a thong (τροπός, τροπωτήρ) to a thowl (σκαλμός). The port-hole was probably oval in shape (the Egyptian and Assyrian pictures show an oblong). We know that it was large enough for a man's head to be thrust through it.

The benches on which the rowers sat ran from the vessel's side to timbers, which, inclined at an angle of about 64° towards the ship's stern, reached from the lower to the upper deck. These timbers were, according to Graser, called the diaphragmata. In the trireme each diaphragma supported three, in the quinquereme five, in the octireme eight, and in the famous tesseraconteres forty seats of rowers, who all belonged to the same "complexus," though each to a different bank. In effect, when once the principle of construction had been established in the trireme, the increase to larger rates was effected, so far as the motive power was concerned, by lengthening the diaphragmata upwards, while the increase in the length of the vessel gave a greater number of rowers to each bank. The upper tiers of oarsmen exceeded in number those below, as the contraction of the sides of the vessel left less available space towards the bows.

Of the length of the oars in the trireme we have an indication in the fact that the length of supernumerary oars (περίνεως) rowed from the gangway above the thranites, and, therefore, probably slightly exceeding the thranitic oars in length, is given in the Attic tables as 14 ft. 3 in. The thranites were probably about 14 ft. The zygite, in proportion to the measurement, must have been 10½, the thalamite 7½ ft. long. Comparing modern oars with these, we find that the longest oars used in the British navy are 18 ft. The university boat race has been rowed with oars 12 ft. 6 in. The proportion of the loom inboard was about one third, but the oars of the rowers amidship must have been somewhat longer inboard. The size of the loom inboard preserved the necessary equilibrium. The long oars of the larger rates were weighted inboard with lead. Thus the topmost oars of the tesseraconteres, of which the length is given as 53 ft., were exactly balanced at the rowlock. (See OAR.)

Let us now consider the construction of the vessel itself. In the cataphract class the lower deck was 1 ft. above the water-line. Below this deck was the hold, which contained a certain amount of ballast, and through an aperture in this deck the buckets for baling were worked, entailing a labour which was constant and severe on board an ancient ship at sea. The keel (τρόπις) appears to have had considerable camber. Under it was a strong false keel (χέλυσμα), very necessary for vessels that were constantly drawn up on the shore. Above the keel was the kelson, under which the ribs were fastened. These were so arranged as to give the necessary intervals for the oar-ports above. Above the kelson lay the upper false keel, into which the mast was stepped. The stem (στεῖρα) rose from the keel at an angle of about 70° to the water. Within was an apron (φάλκης), which was a strong piece of timber curved and fitting to the end of the keel and beginning of the stern-post and firmly bolted into both, thus giving solidity to the bows, which had to bear the beak and sustain the shock of ramming. The stem was carried upwards and curved generally backwards towards the forecastle and rising above it, and then curving forwards again terminated in an ornament which was called the acrostolion. The stern-post was carried up at a similar angle to the bow, and, rising high over the poop, was curved round into an ornament which was called "aplustre" (ἄφλαστον). But, inasmuch as the steering was effected by means of two rudders (πηδάλια), one on either side, there was no need to carry out the stern into a rudder post as with modern ships, and the stern was left, therefore, much more free, an advantage in respect of the manœuvring of the ancient Greek man-of-war, the weapon being the beak or rostrum, and the power of turning quickly being of the highest importance.

Behind the "aplustre," and curving backwards, was the "cheniscus" (χηνίσκος), or goose-head, symbolizing the floating powers of the vessel. After the ribs had been set up and covered in on both sides with planking, the sides of the vessel were further strengthened by waling-pieces carried from stern to stem and meeting in front of the stern-post. These were further strengthened with additional balks of timber, the lower waling-pieces meeting about the water-level and prolonged into a sharp three-toothed spur, of which the middle tooth was the longest. This was covered with hard metal (generally bronze) and formed the beak. The whole structure of the beak projected about 10 ft. beyond the stern-post. Above it, but projecting much less beyond the stern-post, was the "proembolion" (προεμβόλιον), or second beak, in which the prolongation of the upper set of waling-pieces met. This was generally fashioned into the figure of a ram's head, also covered with metal; and sometimes again between this and the beak the second line of waling-pieces met in another metal boss called the προεμβολίς. These bosses, when a vessel was rammed, completed the work of destruction begun by the sharp beak at the water-level, giving a racking blow which caused it to heel over and so eased it off the beak, and releasing the latter before the weight of the sinking vessel could come upon it. At the point where the prolongation of the second and third waling-pieces began to converge inwards towards the stem on either side of the vessel stout catheads (ἐπωτίδες) projected, which were of use, not only as supports for the anchors, but also as a means of inflicting damage on the upper part of an enemy's vessel, while protecting the side gangways of its own and the banks of oars that worked under them. The catheads were strengthened by strong balks of timber, which were firmly

[1] In Vitruvius 1, 2, 4 the MSS. give DIPHECIACA (or DIFECIACA), which is an unknown word. Many of the editions read ΔΙΠΗΧΑΙΚΗ, an emendation which commends itself as consonant with probability, though in itself conjectural. (We may suggest the reading ΔΙΠΗΧΙΑΚΑ, by which the scribe's error would be reduced to EC for X.)

bolted to them under either extremity and both within and without, and ran to the ship's side. Above the curvature of the upper waling-pieces into the προεμβόλιον were the cheeks of the vessel, generally painted red, and in the upper part of these the eyes (ὀφθαλμοί), answering to our hawse holes, through which ran the cables for the anchors. On either side the trireme, at about the level of the thranitic benches, projected a gangway (πάροδος) resting against the ribs of the vessel. This projection was of about 18 to 24 in., which gave a space, increased to about 3 ft. by the inward curve of the prolongation of the ribs to form supports for the deck, for a passage on either side of the vessel. This gangway was planked in along its outer side so as to afford protection to the seamen and marines, who could pass along its whole length without impeding the rowers. Here, in action, the sailors were posted as light-armed troops, and when needed could use the long supernumerary oars (περίνεφ) mentioned above. The ribs, prolonged upwards upon an inward curve, supported on their upper ends the cross beams (στρωτῆρες) which tied the two sides of the vessel together and carried the deck. In the cataphract class these took the place of the thwarts (ζύγα) which in the earlier vessels, at a lower level, yoked together the sides of the vessel, and formed also benches for the rowers to sit on, from which the latter had their name (ζυγῖται), having been the uppermost tier of oarsmen in the bireme; while those who sat behind and below them in the hold of the vessel were called θαλαμῖται or θαλάμακες (from θάλαμος). In the trireme the additional upper tier was named from the elevated bench (θρᾶνος) on which they were placed (θρανῖται). On the deck were stationed the marines (ἐπιβάται), fighting men in heavy armour, few in number in the Attic trireme in its palmy days, but many in the Roman quinquereme, when the ramming tactics were antiquated, and wherever, as in the great battles in the harbour at Syracuse, land tactics took the place of the maritime skill which gave victory to the ram in the open sea. The space occupied by the rowers was termed ἔγκωπον. Beyond this, fore and aft, were the παρεξειρέσιαι, or parts outside the rowers. These occupied about 12 ft. of the bows and 15 ft. in the stern. In the fore part was the forecastle, with its raised deck. In the stern the decks (ὕκρια) rose in two or three gradations, upon which was a kind of deck-house for the captain and a seat for the steerer (κυβερνήτης), who steered by means of ropes attached to the tillers fixed in the upper part of the paddles, which, in later times at least, ran over wheels (τροχιλίαι), giving him the power of changing his vessel's course with great rapidity. Behind the deck-house rose the flagstaff, on which was hoisted the pennant, and from which probably signals were given in the case of an admiral's ship. On either side of the deck ran a balustrade (*cancelli*), which was covered for protection during action with felt (*cilicium*, παραρρύματα τριχινά) or canvas (π. λευκά). Above was stretched a strong awning of hide (κατάβλημα), as a protection against grappling irons and missiles of all kinds. In Roman vessels towers were carried up fore and aft from which darts could be showered on the enemy's deck; the heavy corvus or boarding bridge swung suspended by a chain near the bows; and the ponderous δελφίς hung at the ends of the yards ready to fall on a vessel that came near enough alongside. But these were later inventions and for larger ships. The Attic trireme was built light for speed and for ramming purposes.

The dimensions of some dry docks discovered at Munychium and Zea, "ship-houses" as the ancients called them, afford some indications as to limitations of length and breadth in the Attic ships that used them. The measurements indicate for these houses about 150 ft. in length and 20 ft. in breadth. We may infer, therefore, that the ships housed in them did not exceed 150 by 20 ft. But there must necessarily have been some spare room in the dock houses, on either side and at both ends. Allowing 2 ft. on either side for passage room, and 10 ft. at either end, we should have room for a vessel of about 130 ft. in length including the beak, and of about 16 ft. beam. Adopting the 2 cubit "interscalmium," the rowing space in the trireme (31 by 3) for the upper tier would equal 93 ft. Allowing 12 ft. for bows and 15 for stern and 10 ft. for beak, we have 130 ft. as the aggregate length of the war vessel of three banks of oars. This of course is conjectural, but we submit that it is a reasonable conjecture from the evidence which we possess. There was indeed every reason for keeping the vessel as short as was compatible with the necessary requirements, and it is to be remembered that it was constantly being hauled up on shore for the night and launched again in the morning. As to the "interscalmium," it does not appear to exceed 3 ft. even in the largest boats now used in the royal navy. In the Chinese dragon boats, which are 73 ft. long and under 5 ft. beam, and have each 54 rowers or paddlers, it does not exceed 2 ft. 6 in. An oarsman whose feet are nearly on a level with his seat, as in a modern racing eight, requires more room for the swing forward of the handle of his oar in the recovery, than a man whose feet rest on a level well below that of his seat. It is not likely that the ancient oarsman swung forward more than blue-jackets do now-a-days in a man-of-war's cutter. All the Attic triremes appear to have been built upon the same model, and their gear was interchangeable. The Athenians had a peculiar system of girding the ships with long cables (ὑποζώματα), each trireme having two or more, which, passing through eyeholes in front of the stern-post, ran all round the vessel lengthwise immediately under the waling-pieces. They were fastened at the stern and tightened up with levers. These cables, by shrinking as soon as they were wet, tightened the whole fabric of the vessel, and in action, in all probability, relieved the hull from part of the shock of ramming, the strain of which would be sustained by the waling-pieces convergent in the beaks. These rope-girdles are not to be confused with the process of undergirding or frapping, such as is narrated of the vessel in which St Paul was being carried to Italy. The trireme appears to have had two masts. In action the Greeks did not use sails, and everything that could be lowered was stowed below. The mainmasts and larger sails were often left ashore if a conflict was expected.

The crew of the Attic trireme consisted of from 200 to 225 men in all. Of these 170 were rowers—54 on the lower bank (thalamites), 54 on the middle bank (zygites), and 62 on the upper bank (thranites), —the upper oars being more numerous because of the contraction of the space available for the lower tiers near the bow and stern. Besides the rowers were about 10 marines (ἐπιβάται) and 20 seamen. The officers were the trierarch and next to him the helmsman (κυβερνήτης), who was the navigating officer of the trireme. The rowers descended into the seven-foot space between the diaphragmata and took their places in regular order, beginning with the thalamites. The economy of space was such that, as Cicero remarks, there was not room for one man more.

The improvement made in the build of their vessels by the Corinthian and Syracusan shipwrights, by which the bows were so much strengthened that they were able to meet the Athenian attack stem on (προσβολή), caused a change of tactics, and gave an impetus to the building of larger vessels—quadriremes and quinqueremes—in which increased oar-power was available for the propulsion of the heavier weights.

In principle these vessels were only expansions of the trireme, so far as the disposition of the rowers was concerned, but the speed could not have increased in proportion to the weight, and hence arose the variety of contrivances which superseded the ramming tactics of the days of Phormio. In the century that succeeded the close of the Peloponnesian War the fashion of building big vessels became prevalent. We hear of various numbers of banks of oars up to sixteen (ἐκκαιδεκήρης)—the big vessel of Demetrius Poliorcetes. The famous tesseraconteres or forty-banked vessel of Ptolemy Philopator, if it ever existed except in the imagination of Callixenus, was in reality nothing more than a costly and ingenious toy, and never of any practical use. The story, however, of its construction indicates the perfection to which the shipwright's art had been carried among the ancients.

The Romans, who developed their naval power during the First Punic War, though it is clear from the treaty with Carthage, 509 B.C., that they had had some maritime interests and adventurings before that great struggle began, were deficient in the art of naval construction. A Carthaginian quinquereme, which had drifted ashore, served them for a model, and with crews taught to row in a framework set up on dry land they manned a fleet which was launched in sixty days from the time that the trees were felled. Their first attempt was, as might have been expected, a failure. But they persevered, and the invention of the "corvus," by means of which boarding were opposed to ramming tactics, gave them under Duilius (260 B.C.) victory at Mylae, and eventually the command of the sea. From that time onwards they continued to build ships of many banks, and seem to have maintained their predilection for fighting at close quarters. The larger vessels with their "turres," or castles, fore and aft, deserved Horace's description as "alta navium propugnacula." The "corvus" and the "dolphin" were ready in action to fall on the enemy's decks, and in Caesar's battle with the Veneti off the coast of Gaul the "falces," great spars with curved steel heads like a sickle, mowed through the rigging and let down the sails on which alone the foe depended for movement.

But the fashion of building big ships received a severe shock at the battle of Actium (31 B.C.), when the light Liburnian "biremes," eluding the heavy missiles of the larger vessels, swept away their banks of oars, leaving them crippled and unable to move, till one by one they were burnt down to the water's edge and sank.[1] After this experience the Romans adopted the Liburnians as their principal model, and though the building of vessels with many banks continued for some centuries, yet the Liburnian type was so far dominant that

[1] Merivale, *Hist. of Romans under the Empire*, c. 28.

the name was used generically, just as the name of trireme had been used before, to signify a man-of-war, without reference to the size of vessel or the number of banks of oars.

Meanwhile, with the peace of the Mediterranean ensured, for piracy was kept in abeyance by the imperial power, and with increased commercial activity, the building of large merchant vessels naturally followed. These were propelled by sails and not by oars, which, however, continued to furnish the principal motive power for the ship of war until the necessity for increasing its carrying power began to make it too unwieldy for propulsion by rowing.

The great corn ships, which brought supplies from Egypt to the capital, were, if we may take the vessel described by Lucian as a typical instance, 120 cubits long by 30 broad and 29 deep. The ship in which St Paul and his companions were wrecked carried 276 souls besides cargo. Even larger vessels than these were constructed by the Romans for the transport of marbles and great obelisks to Italy. These huge vessels carried three masts, with square sails, and on the main mast a topsail, which the corn ships from Alexandria alone were allowed to keep set when coming into the Italian port. All other merchant vessels were compelled to strike the *supparum*.

But while the construction of large vessels for commercial purposes was thus developed, the policy of keeping the war-vessel light and handy for manœuvring purposes prevailed, and, though vessels of three, four or even five banks were still built, the great majority did not rise above two banks. In the war with the Vandals (A.D. 440–470) we hear of ships of a single bank, with decks above the rowers. These, we are told, were of the type which at a later date were called Dromons (δρόμωνες) in allusion to their speedy qualities, a name which gradually superseded the Liburnian, as indicating a man-of-war. During the following centuries the Mediterranean was the scene of constant naval activity. The rise of the Mussulman power, which by A.D. 825 had mastered Crete and Sicily, made the maintenance of their fleet a matter of first importance to the emperors of the East, and as the Arab inroads became more threatening, and piracy more rife, so the necessity of improving their galleys as regards speed and armament became more and more pressing. It was during this period, and that very largely by the Arabs, that a great advance was made in the employment of what we should call artillery. The use of Greek fire and of other detonating and combustible mixtures, launched by siphons or in the form of bombs thrown by hand or machinery, led to various devices by way of protective armour, such as leather or felt casing, or woollen stuffs soaked in vinegar, and all such contrivances tended gradually to alter the character as well as the equipment of the war vessel.

During the same period the rise and growth of the Venetian republic mark the entrance on the scene of a new seafaring and shipbuilding power.

Meanwhile, the northern seas were breeding a new terror. In the 5th century the Roman fleet which guarded the narrow entrance into the British Channel had disappeared. The Frankish power gradually established itself in Gaul. But behind the Franks still fiercer races, born to the use of oar and sail, were gathering for the invasion of the west and south. For a while it seemed as if the empire consolidated by Charlemagne would be able to withstand their inroads. Yet even in the year of his coronation (A.D. 800) the piratical Northmen had carried their ravages as far as Aquitaine. Charlemagne organized a naval force at Boulogne and at Ghent. But, though in alliance with the kings of Mercia and Wessex, he had not that control of the Channel which the possession of both shores had given to the Romans. The ships of the Vikings, propelled by oar and sail, were seagoing vessels of an excellent type. They were of various sizes, ranging from the *skuta* of about 30 oars to *ask* or *skeid* with 64 oars and a crew of 240, and to the still larger *dreki* or dragon boats, and the famous *snekkjur* or serpents, said to be represented on the Bayeux tapestry. Of these vessels we have fortunately, though of the smaller class, a typical instance in the well-known Viking ship discovered in 1880 in a tomb-mound at Gokstad near Christiania, of which the dimensions are given as: length 78 ft., beam 16 ft. 7 in., depth 5 ft. 9 in., with high stem and stern; clinker-built of oak throughout, with 16 oars on either side. Of this type were the vessels large and small which had by the 9th century or even earlier found their way into the Mediterranean. Such were the fleets which continually infested the northern and western coasts of Gaul, carrying swarms of the fierce Northmen who eventually came to stay, and gave their name to the portion of Neustria which they had wrested from the Frankish king (912). If, as is probable, the Danes who invaded England used the same class of vessel, Alfred the Great must, according to the *Saxon Chronicle*, be credited with improvements in construction, which enabled him to defeat them at sea (897). He built, we are told, vessels twice as long as those of the Danes, swifter, steadier and higher, some of them for 60 oars, and after his own design, not following either the Danish or Frisian types.

While the northern seas were thus full of activity and conflict, there was little repose in the Mediterranean. The emperors of the West do not seem to have maintained their fleets or naval stations as they had been of old. Ravenna and Misenum were shorn of their ancient glories. But in the East things were different. There, as we have said, it was fully perceived that the maintenance of the empire depended upon sea power. The *Tactica* of the Emperor Leo (886–911), followed by Constantine Porphyrogenitus (911–959), give us full details as to the composition of a Byzantine fleet and its units. *Dromons* of two sizes and of two banks of oars are described, and, besides these, smaller Dromons of great speed are referred to as "galleys or single-banked ships." In all these the rule was still "one oar, one man," but the way was being prepared for improvements by which the medieval galley, still preserving a comparatively low freeboard, was enabled to equal or to surpass the many-banked vessel in speed, while it was gradually adapted to carry greater weight and more powerful means of offence.

The medieval man-of-war was essentially a one-banked vessel (μονόκροτον), but the use of longer oars or sweeps took the place of the smaller paddling oars of the ancient vessel, and altered greatly the angle at which the oars reached the water. It was the increase in the length and weight of the oar, requiring for its efficiency greater power than that of one man, which led to the employment of more than one man to an oar. With the longer oar the necessity arose of placing the weight at a greater distance from the power applying the lever. This was gained by the invention of the *apostis*, which was practically a framework standing out on each side of the hull and running parallel to it; a strong external timber, in which the thowls, against which the oars were rowed, were set. By this means it became possible not only to arrange the oars horizontally, in sets of three or more of different lengths (*alla zenzile*), instead of in banks one above the other obliquely, but still further to make an innovation, unknown to the ancients, which, while greatly increasing the length and substance of the oar, and its leverage, applied the strength of three or four men (or even up to seven with the larger galleys and galleasses) for the motive power of each blade. As time went on oars of from 30 to 50 ft. came into vogue, the inboard portion of which was about one-third of the length, and furnished with handles (*manettes*) attached to the loom, while the men for each oar were arranged in steps (*alla scaloccio*).

It must not be imagined that these developments took place all at once, or that any improvements in building, or in the method of propulsion, were generally adopted but by slow degrees. Moreover, as commerce increased and merchant vessels gained in size, the necessity of being able to defend themselves against piratical attacks became more and more cogent, a necessity which ultimately led the way to the supersession of the galley by the sailing vessel. Yet the galley for centuries, especially in the Mediterranean, maintained its place as the ship of war *par excellence*, even when mixed fleets of galleys and sailing vessels were not uncommon. In the Atlantic and northern seas it was less *en évidence*, though even with the Spanish Armada some galleys and galleasses were included in the invading fleet.

The period of the Crusades was one of great activity in shipbuilding, in which the Venetians and the Genoese were the leaders in the Mediterranean, but the enterprise of England under Richard Cœur de Lion (1189–1199) shows that in the northern seas great efforts were being made in the same direction, with the undoubted result that the English nation became more familiarized with the sea, and more eager for maritime adventure. Richard's fleet which sailed from Dartmouth consisted of 110 vessels, and its total in the Mediterranean after reinforcement amounted to 230 vessels. Among these were Busses, or Dromons of large size, with masts and sails, ships of burden and triremes. Nor were the Saracens without great vessels, if the story of Richard's destruction of a three-masted vessel, carrying reinforcements to Acre, on board of which there were no less than 1500 men, be true. The attack of a swarm of galleys upon the great ship as she lay becalmed reads almost like the attack of a swarm of torpedo boats upon a disabled battleship to-day.

The whole period of the Crusades was, as regards naval matters, one of mixed fleets, in which the sailing vessels were mostly merchant vessels armed for fighting purposes. The effect of the Crusades upon the seafaring races of northern Europe was that the revelation of the East and its traffic quickened their desire for adventure in that and other directions. Hence rivalries between them and the Mediterranean sea powers, and consequent improvement in sea-going vessels and in seamanship. The steering side-paddle gradually disappears, and the rudder slung at the stern becomes the usual means of directing the vessel's course. The merchant vessels when prepared for war have fore-castles and stern-castles (compare the Roman *turres*) erected on them, of which the one survives in name, and the other in the quarter-deck of modern times. But a change was at hand which was destined to affect all classes, from the galley with its low freeboard to the *alta propugnacula* of the great sailing vessels.

The invention of gunpowder, and the consequent use of cannon on board ship, was the cause of many new departures in building and armaments. In the galleys we find guns mounted in the bows, and broadside on the upper deck, *en barbette*, firing over the bulwarks. Soon, however, the need of cover suggested portholes cut for the guns, just as in the ancient galleys they had been cut for the oars. The desire to carry many guns led to many alterations in build, such as the tumble-home of the sides, and the desire for speed to many improvements in rig, as well as to an increase in the number of masts and consequently larger spread of sail. About 1370–1380 French, Venetians and Spaniards are using the new artillery in action, and the policy of maintaining a navy composed of sailing vessels built for the purposes of war, and not merely of armed merchant ships impressed for the emergency, soon began to take effect.

In England Henry V. (1413) built large vessels for his fleet, "great ships, cogs, carracks, ships, barges and ballingers," some of which were of nearly 1000 tons, but the generality from 420 to 520 tons. In the list of his fleet no galleys seem to be included. Meanwhile in the south the type of vessel called "caravel" was being developed, in which Portuguese and Spaniards dared the Atlantic and made their great discoveries. It was in a vessel of this kind that Columbus (1492) sought to reach the Indies by a western route.[1] She was but little over 230 tons when fully laden. Her forecastle overhung the stem by nearly 12 ft. Aft she had a half deck and a quarter deck. Her total length was 128 ft., her beam nearly 26 ft. She had three masts and a bowsprit. Her fore and main masts were square-rigged, but the mizzen had a lateen sail. The vessels in which Vasco da Gama first doubled the Cape of Good Hope (1497) were of the same type but larger. The ship of John Cabot (1497) in which he discovered Newfoundland must have been much smaller, as he had a crew of only eighteen men.

Among the results of these world-famous voyages and discoveries was naturally a great increase in maritime adventure.

[1] See Sir G. V. Holmes, *Ancient and Modern Ships*, i. 87, to which the writer is indebted for many of the details concerning modern vessels.

In England during the Tudor times a great advance in shipbuilding is observable. Henry VII. with his new ships, the "Regent" and the "Sovereign," and Henry VIII. with his "Henry Grace à Dieu," or "Great Harry," both came abreast of their times, but it is worthy of notice that the French then, as well as at a later period, were providing the best models for naval architecture. These big ships were armed at first with "serpentines," and later with cannon and culverins. The representations of them show several tiers of guns, four or even five masts, and enormous structures by way of forecastles and deck-houses aft. As regards merchant vessels, the Genoese and the Venetians during the 15th and 16th centuries carried out great improvements. The "carracks" of the 16th century often reached as much as 1600 tons burden. There is a record of a Portuguese carrack captured by the English, of which the dimensions reached 165 ft. in length and 47 ft. in beam. She carried 32 pieces of brass ordnance and between 600 and 700 passengers. The Spanish Armada (1588) was composed of 132 vessels, of which the largest was about 1300 tons and 30 under 100 tons. Four galleys and four galleasses accompanied the fleet. The opposing fleet consisted of 197 vessels of which only 34 belonged to the royal navy. Of these the largest was the "Triumph" of about 1000 tons. The "Ark," the flagship of the English admiral, was of 800 tons, carrying 55 guns. Among the armed merchant vessels employed with the fleet was the "Buonaventure," the first English vessel that made a successful voyage to the Cape and India. The result to England of the defeat of the Spaniards was a great increase of mercantile activity. Merchants, instead of hiring Genoese or Venetian carracks, began to prefer building and owning home-built ships, and though the foreign merchant vessels appear to have been on a larger scale, yet, as sea-going craft, the English-built ships certainly held their own. We hear also during this period of many improvements in details, such as striking topmasts, the use of chain pumps, the introduction of studding, topgallant, sprit and top sails, also of the weighing of anchors by means of the capstan, and the use of long cables. In the men-of-war the lower tier of guns, which, as in the galleys, had been carried dangerously near the water-line, began to be raised. This improvement, however, does not seem to have been adopted in the English ships till after the Restoration. Meanwhile, in the Mediterranean the galley was still in vogue, being only partially superseded by the great galleasses, six of which are recorded to have taken part in the battle of Lepanto (1571), in which the Venetians and their allies employed no less than 208 galleys with single banks and long sweeping oars. The contrast between the conditions and the character of the vessels used in this battle and those engaged in the case of the Spanish Armada is interesting and instructive as typical of the different development of naval power in the inland and the open seas.

During the 17th century the expansion of trade and the increase of mercantile enterprise were incessant. The East India Company organized its fleet of armed vessels of about 600 tons, and fought its way through Portuguese obstruction to the Indian coast. The Dutch were also competing for the trade of the East and the West, and formed similar companies with this object in view. Conflicts owing to commercial rivalry and international jealousies were inevitable. Hence in the British navy the construction of large vessels such as the "Prince Royal" and the "Sovereign of the Seas" (see RIGGING), which may be considered as among the earliest types of the modern wooden man-of-war. English oak afforded the best timber for shipbuilding, and skilful naval architects, such as Phineas Pett, succeeded in constructing the kind of sea-going war vessel which eventually gave England the superiority in its struggle with other naval powers in this and the following century. This, however, was by no means easily gained. The Dutch and the French were not slack in the building of merchant vessels and men-of-war. The capture of vessels from time to time on either side served to enlarge the area of improvement and to assist in the progress of the art of construction. The French navy especially, under the fostering care of Colbert, was greatly strengthened. During

the 18th century it was constantly found that the dimensions of French ships exceeded those of British ships of the same date, and that French vessels were superior in speed. This led from time to time to an increase of the measurements of the various classes of vessels in the British navy. These were now rated according to the number of guns which they were constructed to carry.

A 90-gun ship of the line at the beginning of the 18th century averaged 164 ft. in length of gun deck, 47 ft. beam, and about 1570 tons, while the frigates now ran to 120 ft. with 34 ft. beam and from 600 to 700 tons. These dimensions, however, were not always maintained, and towards the middle of the century the Admiralty seem to have recognized the consequent inferiority of their ships. The famous and ill-fated "Royal George," launched in 1756, was the result of an effort to improve the line-of-battle ship of the period. She was 178 ft. in length, 52 ft. in beam, was of over 2000 tons, and carried 100 guns and a crew of 750 men. The "Victory," Nelson's flagship, was built nearly ten years later. Her dimensions were 186 ft., 52 ft., 2162 tons, and she carried 100 guns. During the same period frigates, which were cruisers carrying their armament on one deck, were built to carry 32 or 36 guns, but in this class also the French cruisers were superior in speed and of larger dimensions. The remainder of the 18th century and the beginning of the 19th witnessed a continuous rivalry in naval architecture, the French and Spanish models being constantly ahead of the British in dimensions and armament. In the American war (1812) the same disparity as regards dimensions became apparent, and the English frigates, and sloops used as cruisers, were generally outclassed, and in some instances captured, by American vessels of their own rate. This as usual led to the construction of larger vessels with greater speed, and though, after the conclusion of the long war, the activity of the royal dockyards slackened, yet the great three-deckers of the last period, before the adoption of steam power, had reached a length of over 200 ft., with more than 55 ft. beam, and over 3000 tons.

Meanwhile the mercantile navies of the world, but more especially of England, had largely increased. The East Indiaman, as the armed vessels of the East India Company were called, really performed the functions of merchant vessel, passenger ship, and man-of-war. But, where there was no monopoly, competition soon quickened the development of trading vessels. The Americans with their fast-sailing "clippers" again taught the English builders a lesson, showing that increased length in proportion to beam gave greater speed, while admitting of lighter rigging in proportion to tonnage, and of economy as regards the number of men required to work the ship. The English shipyards were for a long time unequal to the task of producing vessels capable of competing with those of their American rivals, and their trade suffered accordingly. But after the repeal of the Navigation Laws in 1850 things improved, and we find clippers from Aberdeen and from the Clyde beginning to hold their own on the long voyages to China and elsewhere.

At this epoch steam power appears in use on the scene, and the period of great wooden vessels closes with iron and steel taking their place in the construction of the hulls, while the sail gives way to the paddle and the screw.

LITERATURE.—1. For Ancient Ships:—Duemichen, *Fleet of an Egyptian Queen*; Chabas, *Études sur l'antiquité historique*; Rawlinson, *Ancient Monarchies*; Scheffer, *De militia navali veterum*; Boeckh, *Urkunden über das Seewesen des attischen Staates*; B. Graser, *De re navali veterum*; Idem, *Das Model eines athenischen Fünfreihenschiffes (Pentere) aus der Zeit Alexanders des Grossen im Königlichen Museum zu Berlin*; Idem, *Die Gemmen des Königlichen Museums zu Berlin mit Darstellungen antiker Schiffe*; Idem, *Die ältesten Schiffsdarstellungen auf antiken Münzen*; A. Cartauld, *La Trière athénienne*; Breusing, *Die Nautik der Alten*; Smith, *Voyage and Shipwreck of St Paul*; C. Torr, *Ancient Ships*. 2. For medieval and modern shipping:—A. Jal, *Archéologie navale* and *Glossaire nautique*; Jurien de la Gravière, *Derniers Jours de la marine à rames* (Paris, 1885); Fincati, *Le Triremi*; C. de la Roncière, *Histoire de la marine française*; Marquis de Folin, *Bateaux et navires*; W. Laird Clowes, *The Royal Navy*; W. S. Lindsay, *History of Merchant Shipping and Ancient Commerce*; Sir G. C. V. Holmes, *Ancient and Modern Ships*. (E. WA.)

II. HISTORY SINCE THE INTRODUCTION OF STEAMSHIPS

Before steam was applied to the propulsion of ships, the voyage from Great Britain to America lasted for some weeks; at the beginning of the 20th century the time had been reduced to about six days, and in 1910 the fastest vessels could do it in four and a half days. Similarly, the voyage to Australia, which took about thirteen weeks, had been reduced to thirty days or less. The fastest of the sailing tea-clippers required about three months to bring the early teas from China to Great Britain; in 1910 they were brought to London by the ordinary P. & O. service in five weeks. Atlantic liners now run between England and America which maintain speeds of 25 and 26 knots over the whole course, as compared with about 12 knots before the introduction of steam. The accommodation in the modern passenger ships is palatial compared with that in the corresponding wooden sailing ships of the middle of the 19th century.

The changes from sail power to steam power for propulsion, and from wood to iron and steel for constructional purposes, proceeded together, though at first very slowly. The marine steam engine was at first a very imperfect motor, and the services upon which steamships could be used to advantage were, in consequence, much restricted. There was, moreover, a national prejudice against the substitution of iron for "the Wooden Walls of Old England."

Introduction of iron.

It is recorded that an iron boat, intended apparently for passenger service, was built and launched on the river Foss, in Yorkshire, in 1777, and shortly afterwards iron was used for the shell plating of lighters for canal service. One of these, having its shell constructed of plates five-sixteenths of an inch thick, was built near Birmingham in 1787. About the same time parts of wooden ships began to be replaced by iron, the first being beam knees. Early in the 19th century iron "diagonal riders" for providing the longitudinal strength were introduced by Sir Robert Seppings, and from this period down to the present day iron strengthenings for resisting both transverse and longitudinal strains have been generally used in wooden ships. The introduction of iron as a recognized material for ship construction is often given as dating from 1818, when the lighter "Vulcan" was built on the Monkland canal, near Glasgow.

Among the early objections were: (1) from its weight iron could not be expected to float, and was therefore unsuitable for the construction of a floating body; (2) when a ship constructed of this material grounded and was exposed to bumping on a shore, the bottom would be easily perforated; (3) the bottom could not be preserved from fouling by weeds and barnacles; and (4) the iron affected the compass, making it untrustworthy, if not useless. Gradually, however, the material made its way, and the objections to it proved to be for the most part untenable. Objection (1), although often repeated, was proved to involve a fallacy. With regard to objection (2) it was found that iron ships might ground and be subjected to a great deal of bumping and rough usage without being destroyed, and that, on the whole, they were better off in this respect than wooden ships. On more than one occasion when iron and wooden ships were stranded together by the same gale and in approximately the same circumstances, the iron ships were got off, and, apart from local injury, were found to be little the worse for the grounding, while the wooden ships were either totally wrecked, or, if got off, were strained to such an extent as to be beyond repair. The power of resistance of iron ships to the strains produced by grounding received, in 1846–1847, a remarkable confirmation in connexion with the grounding of the "Great Britain," the first large screw steamer built of iron. This ship had been initiated by, and built under the supervision of, Mr I. K. Brunel, who had bestowed much attention upon the details of her construction. In 1846 she ran ashore in Dundrum Bay, in Ireland, and settled on two detached rocks; and although she remained aground for eleven months, including a whole winter, she was subsequently got off and repaired, and afterwards did good service. As regards (3), the fouling of the bottom, this evil, although not preventable,

can be lessened materially by frequent cleaning and repainting, provided, of course, that docks are available. The fourth objection, the effect of iron on the compass, was very serious. After experimenting with the "Rainbow" at Deptford and the "Ironsides" at Liverpool, Sir G. B. Airy in 1839 read a paper on the subject before the Royal Society, and the rules which he gave for the correction of the error caused by the iron at once became the guide for future practice. Besides the above, a further objection was raised which applied only to warships, namely, the nature of the damage which would be done to an iron ship by the enemy's shot: this also was found to be less serious, when proper appliances were supplied, than the damage done in the same circumstances to a wooden ship. Thus during the Chinese War in 1842 the "Nemesis," an iron vessel, was able to repair her damage from shot in twenty-four hours at the scene of the fight, while some wooden ships had to go to Bombay, the nearest port at which repairs could be carried out.

Steel, as a material for shipbuilding, was introduced under modern conditions of manufacture during the years 1870–1875. It is a homogeneous metal, stronger than iron, and of a more uniform and more trustworthy character. Its quality is to a considerable extent independent of the skill of those employed in its manufacture, whereas iron is produced by a laborious and unhealthy process, and is largely dependent for its quality on the skill of the workmen. Among the advantages which experience has proved iron and steel to possess over wood for the purposes of ship construction are: (1) the structure of the ship has less weight; (2) it has greater durability; (3) the requisite general and local strengths are much more easily obtained.

Introduction of steel.

The importance of the first of these advantages can scarcely be overstated. The primary object of a particular ship is to carry cargo or passengers, or both, from place to place, at a given speed (in the case of a warship, the armament, ammunition, armour, &c., constitute the weight to be carried); and since at the maximum draught at which the vessel can properly and safely proceed on her passage the total weight of vessel, cargo, &c., complete, must be a definite quantity, namely, the weight of the water displaced by the ship, it follows that the less the weight required for the structure of the ship, the greater is that available for the cargo, &c.

As to durability, in wooden ships the chief source of deterioration is dry-rot, in iron or steel ships the wasting of the surfaces, especially of such portions of the outer surfaces of the bottom plating as are frequently left bare of paint and exposed to the sea, and of the inner surfaces of the bottom in machinery spaces, &c. If dry-rot can be prevented, the life of the wooden ship will be lengthened; so also will the life of the iron or steel ship if the surfaces can be kept covered with paint, to prevent the corrosive action of air and water. With both wood and iron or steel ships, if the parts which have become deteriorated can be removed and replaced, this is usually worth doing when the deterioration is only local. At the end of the 18th century the preservation of wood was not so well understood as it is at the present day, and teak, one of the most durable of woods, was, in Great Britain at least, little known. The ships for the Royal Navy as then constructed were only expected to be available for service some fifteen or twenty years. The ships built for the East India Company made, on an average, four voyages, which occupied eight years. This at one time was considered the vessel's life, so far as the Company's service was concerned; but subsequently, if on examination at the expiration of that time they appeared worth repairing, this was done, and they were allowed to make two more voyages. It was unusual for one of these ships to make more than six voyages; after this they were sold or broken up.

In certain cases, however, ships lasted a considerable length of time; a number of vessels built in the 17th century continued in the service of the Royal Navy until the middle of the 18th century, though with a reduced number of guns, and specimens of the old wooden battleships which served in the fleet in the earlier part of the last century are still to be found in the naval and other ports as training vessels, hospital ships, &c. The best-known example is Nelson's "Victory" (fig. 1, Plate XIII.). Laid down in 1759, she had been afloat 40 years before she took part in the battle of Trafalgar, and to-day flies the flag of the commander-in-chief at Portsmouth. Of small wooden merchant vessels there are instances of the attainment of very remarkable ages. Lloyd's Register for 1909–1910 shows one sailing vessel, the "Olivia" of 94 tons, as having been built as early as in 1819, two vessels built in the 'twenties, and twelve built between 1830 and 1840. The collier brig "Brotherly Love," of South Shields, was over one hundred years old when she was broken up; and the schooner "Polly," built in 1805, was still sailing in 1902; as also was the brig "Hvalfisken," built at Calmar in Sweden in 1801. The dimensions of the last vessel are: length, 88 ft. 8 in.; breadth, 21 ft. 2 in.; depth of hold, 14 ft. 7 in.; and her gross tonnage, 211. The oldest vessel afloat in 1910 was said to be the Danish sloop "Constance"—a small wooden sailing vessel built in 1723 and still employed in the coasting trade of Denmark. This vessel is 52 ft. 6 in. long, 14 ft. 8 in. beam, 6 ft. 8 in. depth in hold and of 35 tons gross.

In the cases of these very old wooden vessels it should be remembered that many portions of the original structures have been replaced by continual repairs. We have less experience concerning the life of iron and steel ships when taken care of, and in most instances ships have been condemned and broken up only because they were obsolete; but after twenty or even forty years' service, those parts which by accident or intention had remained properly covered and protected were found very little the worse for wear. Thus the inner surface of the outside plating of such vessels, coated with cement, have been found to be in as good condition as when the ships were first built. The hulls of many of the early iron vessels still afloat are known to be in excellent condition. The "Himalaya," an iron vessel of 3453 tons and 700 h.p., 6 guns, length 340 ft. 5 in., breadth 46 ft. 2 in., depth 24 ft., built by Mare of Blackwall in 1853 for the P. & O. Steam Packet Co., and purchased by the Admiralty, was actively employed, chiefly as a troop-ship, until 1896, when she was converted into a coal depot, it being found that her plating and framing were almost as good as new. Known as "C. 60," she seemed likely in 1910 to survive for many years in her new service. The "Warrior"—the first British iron battleship, built in 1861, was converted into a floating workshop forty years later at Portsmouth, where in 1910 she was known as "Vernon III." The hull and framing of the vessel were then practically as sound as when first put together. Experience up to 1910 with vessels built of mild steel indicates that this is more liable to surface corrosion than iron, especially where exposed to the action of bilge water and coal ashes in boiler rooms. Some owners on this account require the plating for the tank tops under the boilers to be of iron in vessels otherwise built of mild steel, although the iron is inferior in strength and costs more than the mild steel.

That general and local strength are more easily obtained in an iron or steel ship than in a wooden one follows partly from the fact that the weight required for the structure is less in the former than in the latter, and also from the fact that iron and steel are more suitable materials for the purpose. They can be obtained in almost any desired shape, the parts can be readily united to one another with comparatively little loss of strength, and great local strength can be provided in very little space.

For some purposes, and in some markets, wood is still in favour. In scientific expeditions to the Polar regions, it is of the highest importance to avoid any disturbance of the compass, and this can be ensured by constructing the vessel of wood, with metal fastenings. The "Fram," built in 1892 for Nansen's Arctic expedition, was of wood, her outside planking, in three thicknesses, amounting in the aggregate to from 24 in. up to 28 in.; she was 117 ft. long, rigged as a three-masted schooner, and provided with auxiliary machinery working a screw propeller. The "America," fitted out for the Ziegler expedition to the North Pole, was an old Dundee whaler (the "Esquimaux"), and was reported to be still a "stout" ship with timbers as sound as on the day they were put in thirty-six years before. She is 157 ft. long, 29½ ft. beam, 19½ ft. deep, net tonnage 466; her engines have a nominal horse-power of 100, and she has a lifting screw. In 1901 the "Discovery," a wooden vessel, 172 ft. in length, was built at Dundee for Antarctic exploration, under Captain Robert Scott, R.N.,[1] and a wooden vessel for similar service was constructed in Germany, and in 1910 the "Terra Nova" (Plate I., fig. 2), a wooden Dundee whaler, 187 ft. long, barque-rigged and fitted with auxiliary steam power, which had already seen service in the Far South, carried to the Antarctic regions an expedition also led by Captain Scott. Some wooden sailing vessels are still built in the United States and employed in the coasting and other trades. One of these, the "Wyoming," the largest wooden sailing vessel ever built, was launched in December 1909 at Bath. She was a six-masted schooner 350 ft. long, 50 ft. wide and 30 ft. deep. Wood is also in favour for most of the large and palatial river steamers of the western states of America.

Some progress had been made in the introduction of steam propulsion before the end of the 18th century, but the advance became more rapid in the 19th. In the early steam vessels paddle-wheels only were used for propulsion.

Steam propulsion.

In 1801–1802 the "Charlotte Dundas," one of the earliest steam vessels, was constructed by Symington in Scotland. She proved her capability for towing purposes on the Forth and Clyde canal. Fulton now made his experiments in France, and after visiting Scotland and witnessing the success of the "Charlotte Dundas," constructed the "Clermont" on the East Hudson river in America in 1807. The engines for this vessel were obtained from Boulton & Watt,

[1] A very complete account of this vessel was given by her designer, Mr W. E. Smith, C.B., in the *Transactions of the Institution of Naval Architects* (1905).

of England. She ran as a passenger boat between New York and Albany, and at the end of her second season proved too small for the crowd that thronged to take passage in her. In 1809 the "Phoenix" made the passage from Hoboken, in New Jersey, to Philadelphia, and was thus the first steamer to make a sea voyage. In 1812 Bell began running his steamer "Comet," with passengers, between Glasgow, Greenock and Helensburgh: she was 42 ft. long, 11 ft. broad, 5½ ft. deep, and her engine had one cylinder 11 in. in diameter, with a 16-in. stroke. Owing to the success achieved by these and other vessels in America and Great Britain, steamers soon began to make their appearance on many of the principal rivers of the world. Early in 1814 there were five steamboats on the Thames, and the steamboat "Margery," built on the Clyde, was brought through the Forth and Clyde canal and round by the east coast to the Thames. In the same year a writer in the *Gentleman's Magazine* was able to say: "Most of the principal rivers in North America are navigated by steamboats; one of them passes 2000 m. on the great river Mississippi in twenty-one days, at the rate of 5 m. an hour against the descending current." In 1816 the first steam passenger-boat ran across the English Channel from Brighton to Havre, and a line of steamers was started to run between New York and New London. All of these vessels were built of wood; but in 1820 the first iron steamship, the "Aaron Manby," was constructed and employed in a direct service between London and Paris. In 1822 a return was made to the House of Commons showing the times occupied by steamers as compared with sailing vessels on some thirty coasting routes; the average speed given for steamers in the best of these was from eight to nine knots, while the average time taken varied from one-half to one-sixth (or even less) of the time taken by the sailing vessels.

Steam vessels were employed at a very early date upon the mail services, for besides being very much quicker than the sailing vessels, they were practically independent of the direction of the wind, and to a considerable extent of the weather; consequently the regularity of their passages contrasted very favourably with the irregular times kept by the sailing vessels. The mail service across the Irish Channel, between Holyhead and Dublin, was especially uncertain in the days of the sailing packets, frequently occupying three or four days, and occasionally as much as seven and nine days. All this was altered when in 1821 the steamers "Royal-Sovereign" and "Meteor" were placed on the service. The advantages were so apparent that steam mail packets between Great Britain and the Continent, and on many other services, were soon established. The mail boats had been for many years owned by the crown, but in 1833 the carrying of the mails to and from the Isle of Man, and between England and Holland and Hamburg, was entrusted to private companies. Marked improvement in the services, and especially in the boats employed, resulted from the competition to secure the distinction and other advantages of carrying His Majesty's mails. An intermediate stage followed, extending over a comparatively short period, during which the crown still held many of the mail boats, while in a considerable number of cases the mail services were let to private companies. After this the British government abandoned altogether the policy of being the owners of the boats, and the mail services have since been competed for by private companies.

The "Savannah" was the first steamship to cross the Atlantic. She ran from Savannah to Liverpool in 1819 in twenty-five days, under steam, however, only for a portion of the time. She was built at New York as a sailing ship, but before launching was fitted with steam power, the paddle-wheels being arranged to be removed and placed on deck when not required. She was 130 ft. long, 26 ft. broad, 16½ ft. deep and of about 380 tons. The success of the "Enterprise," of 470 tons, which made the voyage from London to Calcutta by the Cape of Good Hope in 1825 in 103 sailing days, is noteworthy. The distance is 11,450 nautical miles, and the vessel was under steam for 64 days and under sail for 39 days. The steamer afterwards (1829–1830) made the trip between Bombay and Suez in 54 days, in furtherance of a scheme to reach the former place from London by the Red Sea route. The year 1838 witnessed the successful transatlantic voyages of the steamers "Sirius" and "Great Western." The latter vessel, built under the advice of I. K. Brunel, the engineer of the Great Western Railway Company, was the first steamer actually constructed for the transatlantic service. She was built of wood, her dimensions being—length 212 ft., breadth 35½ ft., depth 23½ ft. and tonnage 1340 B.O.M.; and her total displacement on a draught of 16 ft. 8 in. was 2300 tons. Although not originally built for the service, the "Sirius" was subsequently placed on it at the recommendation of Mr M'Gregor Laird of Birkenhead. This vessel also was built of wood, and was 178 ft. long, 25½ ft. broad, 18½ ft. deep and her tonnage was 703. Mr Laird's arguments in favour of placing the vessel on the transatlantic service throw light on the steaming capabilities of vessels of that day. He pointed to the steamers "Dundee" and "Perth" making 11 m. per hour, "in all weathers, winter and summer, fair and foul"; and to the other vessels making from 10 to 10½ m. per hour. He based his estimate for the coal required on the voyage on a speed of 10 m. per hour and a coal consumption of 30 tons per day, which gave 525 tons for the whole voyage. Finally, he allowed 800 tons, corresponding to the difference of the displacement at 15 ft. load draught and at 11 ft. light draught, so that he had a margin of 275 tons for contingencies.

All the vessels just named were propelled by paddle-wheels. The screw propeller had been advocated as a means of propulsion by many inventors in England, France and America during the latter half of the 18th and the early part of the 19th century; a number of experiments had been made, but these had not been brought to a successful issue, as no suitable steam engine was available for driving the propeller. Benjamin Franklin, in 1775, drew attention to the inefficiency of side paddle-wheels as a means of propulsion, and proposed as an alternative to set the steam engine to pump water in at the bow and force it out at the stern, the water passing along a trunk. In 1782 a boat 80 ft. long, fitted with this means of propulsion by James Rumsey, was driven at 4 m. an hour on the river Potomac, and a number of other vessels similarly fitted followed. In 1839 Dr Ruthven took out a patent for this method of propulsion in which the piston pump was replaced by a centrifugal pump; and, in 1865 the "Nautilus," a vessel of this type, so impressed the British Admiralty of the day that an armoured gunboat—the "Waterwitch"—was provided with this system of propulsion. She was built of iron, 162 ft. long, 32 ft. broad, 13 ft. 9 in. deep, was double-ended and fitted with bow and stern rudders, but was otherwise similar to the armoured gunboat "Viper" built at the same time and fitted with a screw propeller. Many trials were carried out with the "Waterwitch" and "Viper," but the system adopted in the former was not repeated because of the great advances made in connexion with the screw propeller.

Jet propulsion.

Many useful experiments appear to have been carried out by Colonel John Stevens in the United States in the early years of the 19th century, but, although some beautiful models of propellers made by him still remain, the system was not generally adopted until its commercial possibilities were more successfully demonstrated by Captain John Ericsson—formerly an officer in the Swedish army—and F. P. Smith of England. Smith took out his patent for the propulsion of ships by means of a screw fitted in a recess formed in the deadwood, in May 1836, and in July of the same year Ericsson, then practising as a civil engineer in London, took out his patent. Small vessels were built and fitted by both inventors and both were tested in the Thames. In 1838 Captain Robert F. Stockton, on behalf of the U.S. Navy, ordered two iron boats of Messrs Lairds of Birkenhead, to be supplied with steam engines and screw propellers of Ericsson's design. The first boat was named the "Robert F. Stockton," and arrived at New York under sail early in 1839, with her machinery on board. The machinery was fitted in her at Bordentown, and under the name of "New Jersey" the boat afterwards served as a tow boat on the river Delaware. She was 70 ft. long, 10 ft. beam and 6 ft. 9 in. draught, and could steam about 10 m. an hour. Ericsson had the satisfaction of seeing his plans very largely adopted in the American Navy, but the mercantile marine adhered with great pertinacity to the paddle-wheel.

The screw propeller.

Fincham, writing in 1851, says that in England engineers were reluctant to admit the success of the screw propeller, and adds: "A striking instance of prevailing disinclination to the screw propeller was shown on the issue of a new edition of the *Encyclopaedia Britannica*, in which the article on steam navigation contained no notice whatever of the subject."

Smith, however, persevered, and with the assistance of some influential people of the day—notably Messrs Rennie & Co.—formed the *Ship Propeller Company*, and in 1838 built the "Archimedes," a vessel of 237 tons burthen, to illustrate the value of the plan. The length of the vessel was 106 ft. 8 in., breadth 21 ft. 10 in., depth in hold 13 ft., draught of water 9 ft. 6 in., h.p. 80 nominal, but only 66 could be developed. A speed of about 7½ knots could usually be maintained, but on one run of 30 m. under very favourable circumstances a speed of 10·9 m. was reported. In 1840 she was placed at the disposal of the Admiralty for experiment, and the trials were favourably reported on. She afterwards passed into the hands of Brunel, who was so satisfied with the results of further trials that he modified the design of the "Great Britain" steamship then

in hand (1843), and fitted her with a screw propeller instead of paddle-wheels as originally intended. The success of this and other vessels was sufficient to largely influence public opinion in favour of the propeller, and the Admiralty took the important step of building the "Rattler," a vessel of 888 tons and 200 H.P., to test the system. She was practically a repeat of the "Alecto," as far as her hull and the power of her machinery were concerned, but she was propelled by a screw propeller, whereas the "Alecto" was propelled by paddle-wheels. These vessels were tested together at sea in March 1845, when the "Rattler" proved the faster vessel; but the great test took place on Thursday, 3rd April following, when the two vessels were secured stern to stern, and it was found that with the engines of both ships working at full power the "Rattler" towed the "Alecto" astern at a speed of 2½ knots.[1] In a few years the screw almost entirely superseded the paddle-wheel for war vessels, and in 1854, during the war with Russia, Great Britain possessed a screw steam fleet, including all classes of ships, built of wood.

The performances of the *Great Western* and other vessels had demonstrated that ships could traverse the oceans of the world by steam power alone, but great advance had to be made in the marine engine before the ordinary trade could be carried on by its means with economy. In the early marine engines only one cylinder was provided, and various means were employed for transmitting the power to the paddle shaft; later came the oscillating cylinder engine and the diagonal engine, the latter being the type of paddle engine now most frequently adopted in Great Britain. With the introduction of the screw propeller the arrangements became much modified. At first the engines were run at comparatively low speeds, as in paddle-boats, gearing being supplied to give the screw shaft the number of revolutions required, but direct-acting two-cylinder engines gradually replaced the geared engines. The compound engine was first adapted successfully to marine work by John Elder in 1854, and in time direct-acting vertical engines, with one high and one low pressure cylinder, became the common type for all ships. The boiler pressure, moreover, in 1854, had been raised to 42 lb per sq. in. The further change, accompanying still higher pressures of steam, from compound to triple-expansion engines was, like many other changes, foreseen and in some measure adopted by various workers at about the same time, but the first successful application of the principle was due to Dr A. C. Kirk. In 1874 he fitted a three-crank triple-expansion engine in the *Propontis*. The boiler used proved a failure, but in 1882 he fitted a similar set of engines in the *Aberdeen*, with a boiler pressure of 125 lb, and the result was entirely successful.

Improvements in machinery.

Continuous improvements have enabled engineers to produce machinery of less and less weight for the same power, and at the same time to reduce the spaces required for its accommodation, the vibration due to the working of the engines, and the consumption of fuel per horse power. For engines of high power, quadruple expansion has sometimes been adopted, while scientific methods of balancing have been employed, improved qualities of steel and bronze have been introduced, the rate of revolution has been increased, and forced lubrication fitted. In the boilers higher steam pressures have been used, superheating in some cases being resorted to; the rate of combustion has been accelerated by supplying air under pressure in the stokehold or in the furnaces, and in some cases by placing fans in the exhaust to draw the air and products of combustion more rapidly through the fires; the former being known as *forced draught* and the latter as *induced draught*. In the Navy, with the view of saving weight, water-tube boilers have been adopted, but boilers of this type have not yet been generally fitted in the mercantile marine. Steam pressures now in common use vary from 100 to 180 lb per sq. in. in cargo ships; from 140 to 220 lb in passenger ships, including the large Atlantic liners; from 210 to 300 lb in large warships where water-tube boilers are used; while in destroyers and other classes of warships in which small tube water-tube boilers are used it varies from 180 to 250 lb per sq. in.

A century ago the reciprocating steam engine was slowly making its way as a means of propulsion as an auxiliary to, or as a substitute for sail power—the steam being obtained by burning wood or coal. In 1815 nine small steam vessels, having an aggregate tonnage of 786 tons, were built and registered in the United Kingdom; in 1825 24 steam vessels were built, having an aggregate of 3003 tons; in 1835 86 vessels were built, having an aggregate of 10,924 tons. In 1910 the reciprocating steam engine, after reaching a very high degree of perfection and universal adoption, was being largely replaced by the turbine, coal was being replaced to a considerable extent by oil as a fuel for raising steam, and steam itself was being challenged as a motive agent by the development of the internal combustion engine.

III. Statistics

For some years before 1870 the total tonnage of sailing ships built each year in the United Kingdom had been about equal to that of steam ships, but then a great change took place; 541 sailing vessels, amounting to 123,910 tons, were added to the register of the United Kingdom, while 433 steam ships, amounting to 364,800 tons, were added; the steam tonnage thus added being nearly three times that of sailing vessels. A uniform rate of increase of production of steam vessels was on the whole maintained after 1870, but, as will be seen by referring to Table I. and fig. 3, considerable fluctuations have occurred, the falling off in steam tonnage being simultaneous with increases of sailing tonnage and vice versa down to 1895. The dotted lines on fig. 3 show approximately the average output for 50 years of sailing and steam tonnage separately and combined. Roughly speaking, it may be said that from 1860 to 1895 the output of sailing tonnage fell from about 200,000 tons per annum to 100,000 tons; during the later 'nineties the falling off was more rapid, and between 1900 and 1910 the output varied between 15,000 and 30,000 tons.

Decrease of sailing tonnage.

The average tonnage of the sailing vessels built in the United Kingdom in 1860 was 206 tons; this increased with a fair degree of regularity to 532 tons in 1890, 749 tons in 1891 and 963 tons in 1892, after which a rapid decrease took place, and by 1898 the average size had fallen to 75 tons; there were fluctuations after this date, but the average never rose above 103 tons; and these vessels are practically restricted to the coasting trade and pleasure purposes.

Average size of sailing vessels.

Although the building of large sailing vessels of wood and steel has almost ceased in the United Kingdom, the sizes of the largest of such vessels built abroad have continued to increase. Under the influence of the shipbuilding bounties granted in France between 1895 and 1902 something like 150 sailing vessels of from 2000 to 3500 tons each were built, but few since. In Germany and in America a few large sailing vessels continue to be built.

Lloyd's Register for 1841 gives a table of "the Steam Vessels belonging to England, Scotland and Ireland in the years 1814 to 1839," which shows that in 1839 there were 720 vessels of a total tonnage of 79,240 tons owned in the United Kingdom. Between 1839 and 1860 considerable numbers of steam ships were built for various services, and the production from 1860 is shown by fig. 3 and Table I. The tonnage added to the Register in 1860 amounted to 93,590 tons, rising over four years to 293,140 tons in 1865; after a gradual decline extending over three years to 100,000 tons it again rose till 1872, when nearly 500,000 tons were added. In 1876 it had fallen to about 200,000 tons; then came the great rise extending to 1883, when it reached a maximum of 885,495 tons. A rapid decrease followed, and in 1886 it had fallen practically to what it had been ten years before. In another three years the figure was again what it had been in 1883; and for a period of seventeen years, with much smaller fluctuations than previously, great increases were maintained. In 1906 a maximum of 1,428,793 tons was reached, when another rapid fall occurred—over two years—the minimum reached being 600,837 tons in 1908.

Growth of steam tonnage.

The fluctuations in output, shown by fig. 3, synchronize approximately with the improvements and depressions in trade.

The average tonnage of British steam vessels rose slowly from 80 tons in 1815 to 102 tons in 1830, and to 473 tons in 1860, reaching a maximum of 1442 tons in 1882. During the next four years it fell gradually to 896 tons, rising again to 1515 tons in 1890, and the average tonnage built since 1890 has remained, with a certain amount of fluctuation, nearly 1500 tons. These figures may be taken as roughly representing the average tonnage of the ships produced throughout the world; but as in these averages large numbers of comparatively small vessels are included, the vast increase in the numbers of large-sized vessels which have been built, especially during recent years, is not adequately represented. Of the vessels built in 1890 only 1 % exceeded 8000 tons in displacement, whereas the vessels of over 8000

Average size of steam ships.

[1] The original propeller used by the "Rattler" is now to be seen in the Victoria and Albert Museum.

TABLE I.—*Showing the Number, Tonnage (Gross and Average), and Description of all Vessels (excluding Warships) built in and added to the Register of the United Kingdom during each year enumerated.*

Year.	Mode of Propulsion.	Wood and Composite. No.	Wood and Composite. Gross Tonnage [1]	Iron. No	Iron. Gross Tonnage.	Steel. No	Steel. Gross Tonnage	Totals. No	Totals. Gross Tonnage.	Average Gross Tonnage.
1860	Sail	786	154,130	32	14,290	.	.	818	168,420	206
	Steam	49	7,050	149	86,540	..	..	198	93,590	473
1865	Sail	806	160,430	116	88,970	..	..	922	249,400	270
	Steam	38	5,780	344	287,360	..	.	382	293,140	767
1870	Sail	478	72,970	63	50,940	.	..	541	123,910	229
	Steam	51	7,290	382	357,570	..		433	364,860	843
1875	Sail	373	46,000	193	206,110	..	.	566	252,170	446
	Steam	66	8,740	291	281,390	..	..	357	200,130	813
1880	Sail	273	18,159	39	40,015	4	1,671	316	59,845	189
	Steam	20	1,779	362	447,389	26	30,493	408	485,661	1190
1885	Sail	266	17,841	144	160,034	27	30,569	437	208,444	477
	Steam	37	2,751	177	148,508	122	154,249	336	305,508	909
1890	Sail	142	7,704	6	5 911	59	96,374	207	109,989	532
	Steam	26	1,326	110	40,144	432	817,010	568	858,480	1515
1891	Sail	156	8,541	3	1,544	93	178,503	252	188,678	749
	Steam	25	1,212	167	31,381	388	730,051	580	762,644	1315
1892	Sail	151	8,372	6	5,121	128	260,874	285	274,367	963
	Steam	19	1,026	86	18,937	365	660,847	470	680,810	1449
1893	Sail	154	7,980	4	418	66	113,097	224	121,495	542
	Steam	27	1,551	64	12,458	328	622,099	419	636,108	1518
1894	Sail	155	7,570	3	207	67	83,167	225	90,944	404
	Steam	26	1,183	65	12,400	389	751,668	480	765,251	1594
1895	Sail	150	7,529	9	782	32	41,313	191	49,624	260
	Steam	35	1,579	66	9,879	379	736,412	480	747,888	1558
1896	Sail	161	7,519	5	792	36	37,709	202	46,020	228
	Steam	17	591	79	11,593	398	750,106	494	762,290	1543
1897	Sail	183	8,317	2	232	34	28,481	219	37,030	169
	Steam	33	1,581	63	9,974	366	658,646	462	670,201	1451
1898	Sail	196	8,813	6	798	40	8,456	242	18,067	75
	Steam	20	765	80	13,654	546	996,814	646	1,011,233	1565
1899	Sail	165	7,342	2	182	60	11,757	227	19,281	85
	Steam	29	1,497	64	12,184	534	1,152,999	627	1,166,680	1861
1900	Sail	159	8,718	5	420	46	8,598	210	17,736	84
	Steam	64	3,809	86	16,375	476	1,102,890	626	1,123,074	1794
1901	Sail	146	7,826	2	174	54	22,118	202	30,118	149
	Steam	83	5,479	14	2,474	469	1,115,227	566	1,123,180	1984
1902	Sail	142	7,479	..	..	63	25,985	205	33,464	163
	Steam	71	4,098	32	5,870	476	1,109,511	579	1,119,479	1933
1903	Sail	139	7,637	..	..	60	15,077	199	22,714	114
	Steam	68	4,034	3	537	538	943,333	609	947,904	1556
1904	Sail	161	8,626		..	51	15,166	212	23,792	112
	Steam	52	2,961	5	827	519	1,016,324	576	1,020,112	1771
1905	Sail	130	7,962	..	..	36	7,125	166	15,087	91
	Steam	45	1,840	2	147	567	1,204,293	614	1,206,280	1964
1906	Sail	104	5,731	2	330	42	8,810	148	14,871	100
	Steam	110	6,242	1	79	660	1,422,472	771	1,428,793	1853
1907	Sail	121	7,017	..	..	45	8,228	166	15,245	92
	Steam	196	15,069	..	..	629	1,182,566	825	1,197,635	1452
1908	Sail	108	4,931	1	97	58	18,468	167	23,496	141
	Steam	142	9,056	1	483	415	591,298	558	600,837	1077
1909	Sail	75	3,362	..	..	44	11,020	119	14,382	121
	Steam	92	3,880	..	..	383	752,424	475	756,304	1592

The above table is based upon information supplied to Lloyd's Registry by the Registrar-General of Shipping.

[1] As no actual returns are available for the gross tonnages for the years from 1860 to 1879 inclusive (only net tonnages having been recorded), the gross for these years are only approximate, and are based on the relation of gross to net for the years 1883 and 1900.

TABLE II —*Shipping owned in each Country in the World (extracted from Lloyd's Register of British and Foreign Shipping for 1910–1911)*
Number, Tonnage and Description of all Vessels (exclusive of War Vessels) of 100 Tons and upwards

Flag	Steam Vessels															Sailing										Grand Total	
	Wood			Composite			Iron			Steel			Total			Wood		Composite		Iron		Steel		Total			
	No.	Net Tonnage	Gross Tonnage	No	Net Tonnage	Gross Tonnage	No	Net Tonnage	Gross Tonnage	No	Net Tonnage	Gross Tonnage	No	Net Tonnage	Gross Tonnage	No	Net Tonnage	No	Net Tonnage	No	Net Tonnage	No	Net Tonnage	No	Net Tonnage	No	Tonnage. (Net Tonnage of Sailing Vessels and Gross Tonnage of Steamers.)
British { United Kingdom	81	6,597	12,153	11	1 031	3,735	1536	503,396	900,300	6,832	9 692,618	15,851 495	8 460	10 203 042	16,767 683	389	63 427	4	801	202	209 317	352	473 256	957	748,796	9,417	17,516,479
British { *Colonies	357	52,919	91,650	25	6 084	10,637	262	113,555	189 447	728	584,329	999,620	1,377	756 887	1,291 354	613	149 481	10	3 746	46	27,356	2	21 878	701	204,461	2 078	1,495,815
Total	438	59,516	103,803	36	7 115	14,372	1803	616 951	1 089,747	7,560	10,276,947	16 851,115	9,857	10,960 329	18,059,037	1012	212 908	14	0 547	248	236 068	384	497,154	1658	953,257	11,495	19,012,294
American (United States) { Sea	402	131,292	201,055	2	848	953	168	189,999	278 881	501	749,506	1 161 030	1 073	1 071 645	1 641 919	1605	984 858			30	38 010	64	96 818	1701	1,119,686	2 774	2,761,605
American (United States) { *Northern Lakes				9	12 926	17 464	2	19 394	24,564	533	1,591,030	2,104,741	563	1 623 330	2,146 769							43	100 850	43	109,850	606	2,256,619
American (United States) { Philippine Islands	28	3,386	5,788	1	130	251	22	11,420	17,484	20	8,964	14,80	76	23 900	38 326	1	2 128							13	2,128	89	40,454
Total	430	134,678	206,843	12	13,904	18,668	216	220 813	320,929	1 054	2 349 500	3,280,274	1,712	2,718 893	3,807,014	1618	986 986			32	38 010	107	206 668	1757	1,231,664	3,469	5,058,678
German				1	89	171	209	83 890	143 985	1 612	3 330 471	3 813 162	1 822	2,416 459	3 959,318	30	13,537	3	484	37	43 950	286	315,897	356	373 868	2,178	4,333,186
Norwegian	77	17,623	30 627	21	3 685	5 748	312	139 617	248,365	907	698,703	1 137,266	1,312	859 628	1,422 006	395	173 592		1 870	252	283 228	103	129,828	753	592,527	2,065	2,014,533
French	16	1,370	2 750				229	101 338	273 735	630	673 678	1 171 687	875	836 386	1,448,177	400	72,421			18	17 918	172	343,769	590	434,108	1,465	1 882,280
Italian	13	564	1,843				211	172 339	287 461	226	423 301	698,235	450	598 204	987 539	434	123 787			18	149 409	58	57,808	630	333,094	1,080	1,320 653
‡Japanese	306	47,513	78,033	8	3 265	4 755	124	136 330	208,692	408	539,644	850 477	846	726 761	1,146,977	3	2,245							5	2 245	851	1 149,222
†Dutch	7	536	943				59	21 616	35,955	466	585,670	946 149	532	607 822	983,049	14	2,420	2	2 264	7	4 062	73	23,398	96	32 144	628	1,015,193
Swedish	27	3 068	4 937	106	11,523	20 662	373	109 585	179 985	458	280 287	476,924	964	464 463	782 508	473	119 613	8	2 179	7	6 840	18	6 937	508	135,571	1 472	918 079
*†Russian	13	1 164	2 011	6	691	1 286	238	78 870	135 205	385	321 891	552 026	642	402 616	690 528	556	141,750	3	3, 72	25	4 624	13	17 001	599	196 797	1,241	887 325
Austro-Hungarian	2	133	241	1	146	248	46	23 362	38 359	316	462,313	738 881	65	485 934	777 729	2	250			1	702	1	258	4	1,300	369	779,029
Danish	8	1,430	2,431	3	346	561	113	36 740	79,139	429	355,030	589 697	55	393,564	671,828	282	47 242			3	4,164	21	1 528	310	64,734	863	736,562
Spanish	4	211	481	1	144	220	206	105 243	171,985	300	353 953	574,062	511	459 533	746 748	62	14 484	1	343		2,944	2	741	68	18,712	579	765,460
†Greek	7	502	903				114	56 958	96,049	177	235 338	402 232	298	312 798	499,184	109	27 970			1	427			115	28,397	408	527 581
Belgian							24	11 315	20,037	135	183 021	275 876	159	194 336	295,913	3	556			1	874	2	2,295	6	3 725	165	299,638
Brazilian	4	622	933				59	23 681	53 434	250	108 901	178,991	313	143,204	232,358	66	14 959	1	338	2	2 249	1	849	70	18,395	383	251,753
†Turkish	11	685	1,436				77	34 243	85 098	54	14 510	25,672	142	69 438	112,206	190	63,663							190	63,663	332	175,869
Argentine	2	217	359				31	9 991	15 749	162	72 827	123 597	19	82 635	139 705	27	7 213			8	5 169	37	11,334	72	23,716	267	163,421
Chilean	7	468	820				24	15,370	24 224	67	57 238	89 843	98	73 076	114,887	22	12,994			18	22 003	1	1,332	41	36,331	139	151,218
Portuguese	1	116	178	1	60	102	16	7 387	11,909	50	41 700	66 920	77	48 853	79 109	101	23,208	2	2 042	3	4 904	5	830	113	31,074	190	110,183
Chinese	9	2,030	3,290	1	1 468	2,330	29	17 170	25,920	38	37,356	58 880	68	58 024	90 420											68	90,420
Uruguayan	1	206	374				5	1 394	2 503	30	28 721	45 834	36	30 321	48 711	8	5 196	1	793	6	5 744	3	2 968	18	14,701	54	63,412
Cuban	13	3,973	5,916				15	5 569	9,484	26	26 596	43 010	54	36,138	58 410	6	1 035							6	1,035	60	59,445
Mexican	5	967	1,413				6	1,976	3 067	30	14 587	24 257	41	17 480	28 737	14	3 405					2	473	16	3,878	57	32,615
Rumanian							3	144	404	19	16 546	31 284	22	16 690	31 688	1	285							1	285	23	31,973
Peruvian	1	10	210				1	810	1,249	11	4,344	9 127	13	5,364	10,581	33	10,243		2 288	7	7 276	1	1 199	44	21,006	57	31,587
Siamese										11	7 702	12 607	11	7 792	12 607										11	12,607
Sarawak	1	46	120				1	189	300	4	2 191	3 653	6	2 426	4,073										6	4 073
Venezuelan							6	1 750	2 006	1	106	160	7	1 856	3 166	5	602							5	692	12	3,858
Haytian										5	2 017	2 387	5	2 017	3 387										5	3,387
Other countries — Bulgaria, Colombia, Costa Rica, Ecuador, Egypt, Honduras, Liberia, Montenegro, Nicaragua, Oman, Panama, Persia, Salvador, Samos, Zanzibar, &c	4	420	667	1	551	756	13	6 509	9 265	24	5 60	11 392	42	12 840	22 080	22	6 580					2	71	24	7,151	66	29,231
Total	1407	278,068	451,584	198	42,987	69,879	4554	2,192,729	3,675,240	15,849	20,532,338	33,093,992	22 008	23,046,122	37,290,695	5892	2,093 274	43	72 729	821	873 359	1204	1,634,708	8050	4,624,070	30,058	41,914,765

* Excluding Vessels trading on the Caspian Sea, and Wooden Vessels trading on the Great Lakes of North America.

† In the absence of satisfactory information numerous small sailing vessels (belonging chiefly to Greece, Turkey Southern Russia and the Dutch East Indies) are not included

‡ Excluding Japanese sailing vessels of under 300 tons net

tons built in 1900 made up 12 % of the whole tonnage. In 1890 there were no vessels built whose displacement exceeded 9000 tons; in 1900 such vessels constituted 11½ % of the whole, and about ¾ % of the whole were over 16,000 tons. The year 1908 was notable for the number of large vessels launched; 10 British and 4 German vessels were launched whose tonnage averaged about 15,000 tons each, their tons displacement being about 50 % greater. In 1910 there were afloat more than 80 vessels exceeding 12,000 tons, and having an average tonnage of more than 15,500 tons each (see Table XI. page 885). Six of these vessels were over 20,000 tons and had an average gross tonnage of 25,640 tons each. The tonnage of the largest vessels has almost continuously increased, and vessels with a tonnage of 45,000 tons are now being built, the fully loaded displacement of the vessels being more than 50,000 tons.

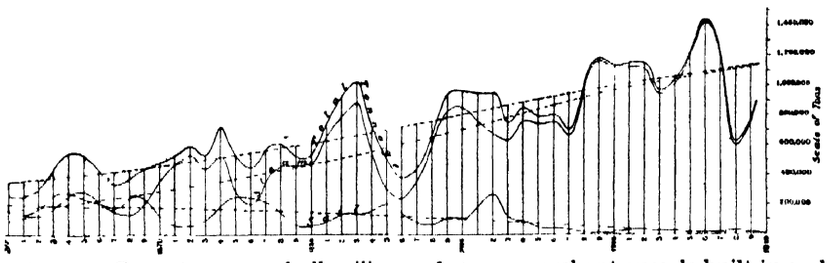


FIG. 3.—Gross tonnage of all sailing and steam merchant vessels built in and added to the register of the United Kingdom during each year from 1860 to 1910. The dotted lines may be taken as representing the average production from year to year.

Fig. 4 shows the tonnage of wood, composite, iron and steel vessels added to the Register year by year since 1860, and figures for a number of the years are given in Table I. The tonnage of *wood and composite* vessels added in 1860 was 161,180, increasing to 166,210 tons in 1865 and then falling away at a fairly uniform rate until in 1880 only 19,938 tons were reported, and since that date practically no increase in output of this class of tonnage has taken place. The tonnage of *iron* ships produced in 1860 was about 03 % of that of wood ships; while wood shipbuilding fell off, iron shipbuilding increased, and in 1870 the tonnage of iron ships was more than five times that of wood and composite ships. The out put of iron ships increased until 1883, when a maximum of 850,990 tons was reached. Steel had now come into use, and iron shipbuilding fell away rapidly, amounting only to 50,579 tons in 1888; this figure fell to 10,679 tons in 1895, and since then very few vessels have been built of iron. *Steel*, which had been used in shipbuilding to a limited extent for special purposes for some eight years, came into use for the hulls of merchant ships in the later 'seventies. In 1880 the tonnage built—38,164 tons—was 4½ % of that of iron ships, by 1885 the ratio was 60 %, and in 1890 the tonnage of steel ships, 913,484 tons, was just 20 times that of iron ships. From that date the statistics of steel shipbuilding are practically those of steam vessels above given.

Tonnage built of wood, iron and steel.

From Table II., which gives the distribution of ownership of existing merchant vessels and other vessels, excepting warships, it appears that the total tonnage of the world's shipping, excluding vessels under 100 tons and the wood vessels on the Great Lakes of America, is about 42 millions. Of this total, rather less than one-ninth is in sailing vessels, and the remainder in steam vessels. Taking the number of ships instead of their aggregate tonnage, the sailing vessels are 27 % of the whole. Out of the 42 million tons, Great Britain and her colonies own about 19 millions, or 45⅛ % of the whole, 18 millions being steamers and 1 million sailing vessels.

The world's shipping: tonnage and distribution of.

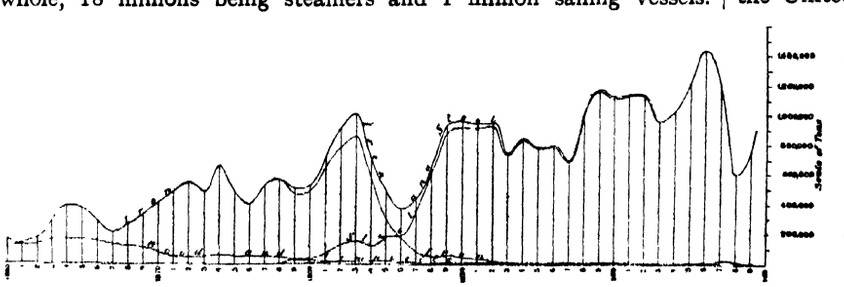


FIG. 4.—Gross tonnage of all wood, composite, iron and steel merchant vessels built in and added to the register of the United Kingdom during each year from 1860 to 1910.

Next to Great Britain, the largest shipowning country in the world is the United States of America, with 5 million tons of shipping, 12 % of the total. Then come in order Germany, with nearly 4½ millions, 10¾ % of the total; Norway, with 4·8 %; France, with 4·5 %; Italy, with 3·2 %; Japan, with 2·7 %; Holland, Sweden and Russia with 2·4 to 2·1 %; and Austria-Hungary, Spain and Denmark each with about 1·8 %. The leading particulars as to the distribution of ownership of the merchant shipping throughout the world for 1873, 1890, 1900 and 1910 respectively are represented graphically in the block diagrams given in fig. 5, which have been constructed from particulars given in Table II. and similar tables for the other years named. The total tonnage owned in these years, excluding vessels under 100 tons and wood vessels on the Great Lakes of America, is represented by squares drawn to scale, in duplicate, and divided up amongst the countries owning shipping in proportion to their ownership. Parts of each holding are shaded in the squares on the right so as to show what portion is sailing tonnage and what steam tonnage, and in the squares on the left so as to show the distribution of the total as regards materials of construction in each country. The total tonnage owned is given for each year named, and the percentages owned by various countries are tabulated between the pairs of squares.

The tonnage of the shipping of the world has advanced at an increasing rate for many years; the character of this advance may be gathered from the data given in fig. 5. In 1873 Great Britain and her colonies owned 43·25 %, and in 1890 52·35 %; but although the advance in the shipping of Great Britain and her colonies has continued approximately at the same uniform rate, such has been the increasing rate of the advance of the world's shipping that the percentage owned by the British Empire fell to 49·1 % in 1900 and to 45·36 in 1910. This increasing rate of advance of the tonnage of the world's shipping is shown by Table III. The remarkable rate at which the shipping of the United States and Germany has advanced will also be seen.

TABLE III.— *Rate of Increase of the World's Shipping.*

Year.	1873.	1890.	1900.	1910.
World's tonnage (tons) . . .	17,545,503	22,151,651	29,043,728	41,914,705
World's tonnage taking 1873 as 100	100	126	165	240
Average rate of increase per annum from 1873	..	1·5 %	2·4 %	3·8 %
Proportion owned by Britain . .	43·25 %	52·35 %	49·1 %	45·36 %
Proportion owned by United States . . .	14·27 %	8·23 %	9·47 %	12·06 %
Proportion owned by Germany .	5·88 %	7·08 %	9·13 %	10·34 %

Table IV. gives the output, for the year 1909, of merchant and other vessels throughout the world, excluding warships, all ships of less than 100 tons and the wood vessels of the Great Lakes of North America. The block diagrams in fig. 6 are constructed in the same way as the diagrams in fig. 5, and are arranged to show the output of the principal shipbuilding countries of the world in 1900 and in 1909, the reference square for scale representing one-tenth the amount of that of fig. 5. The total output for the year 1900 was 2,343,854 tons, of which 1,509,837 tons, or 65 % of the whole, was built in the United Kingdom; 303,339 tons or 13 % was built by the United States of America; 9·4 % by Germany and 5·4 % by France. In 1909 the total output was 1,551,532 tons, of which 971,113 tons or 63·5 % was built in the United Kingdom; 178,402 or 11·5 % was built in the United States of America; Germany built 8·1 %; France only 3 %; the output of Holland and Belgium has risen from 1·38 % in 1900 to 4·34 % in 1909; and Japan appears with 2·98 % instead of about ·6 % in 1900.

World's output of ships.

American Shipping.—Under the Registration Laws of the United States vessels may be (*a*) registered; (*b*) enrolled; or (*c*) licensed. The proportion of vessels coming under these three headings as given by the United States Commissioner of Navigation, 30th June 1909, is shown in Table V.

It will be seen that the *Registered Tonnage* includes only vessels engaged in the Foreign Trade and in Whale Fisheries, which amount in the total to 1633 vessels of 887,505 tons and include the smallest vessels crossing the St Lawrence equally with ocean liners. Two hundred and twenty-seven of the registered vessels are less than 100 tons, and only nine are over 10,000 tons, namely the "Minnesota," "Manchuria," "Mongolia," "Siberia" and "Korea" on the Pacific, and the "St Louis" and "St Paul," "New York" and "Philadelphia" on the Atlantic routes. The *Enrolled Tonnage* includes vessels engaged in the coasting trade and local fisheries which are over 20 tons; and the *Licensed Tonnage* vessels similarly engaged, but of a size not exceeding 20 tons. The whole of the tonnage included is officially described as tonnage

TABLE IV.—*Number, Gross Tonnage and Description of all Sailing Vessels of 100 Tons net and Steamers of 100 Tons gross and upwards built in each of the several Countries of the World during the Year 1909 according to Lloyd's Register for 1910–1911.*

Country in which Built.	Whether Sail or Steam.	Wood and Composite.									Steel.														Grand Total.	
		100 to 199.	200 to 399.	400 to 599.	600 to 799.	800 to 999.	1000 to 1999.	2000 and above.	Total. No.	Total. Tonnage.	100 to 199.	200 to 399.	400 to 599.	600 to 799.	800 to 999.	1000 to 1499.	1500 to 1999.	2000 to 2999.	3000 to 3999.	4000 to 4999.	5000 to 6999	7000 to 9999	10,000 to 14,999.	Total. No.	Total. Tonnage.	No.	Tonnage.
United Kingdom	Sail	1	..	.	..	..	..	..	1	120	1	8	1	..	..	..	..	.	..	..	..	..	.	10	2,790	11	2,910
	Steam	..	..	.	..	..	..	..	.		47	86	23	17	24	44	35	44	37	62	17	7	9	452	968,203	452	968,203
	Total	1	..	..	..	..	..	..	1	120	48	94	24	17	24	44	35	44	37	62	17	7	9	462	970,993	463	971,113
* British Colonies	Sail	18	5	1	..	..	..	..	24	4,656	.	..	.	.	.	.	.	..	..	..	..	..	..	..	..	24	4,656
	Steam	14	5	..	.		..	..	19	3,347	3	..	1	1	.	.	.	..	..	..	1	..	..	6	6,871	25	10,218
	Total	32	10	1	..	..	..	..	43	8,003	3	..	1	1	..	..	..	..	..	.	1	..	..	6	6,871	49	14,874
* America (United States)	Sail	2	2	4	4	1	..	1	14	9,293	..	..	1	1	4	2		..	..	..	..	..	..	8	6,860	22	16,153
	Steam	2	3	..	..	1	..	..	6	2,048	4	7	2	1	1	3	1	5	6	3	10	5	..	48	160,201	54	162,249
	Total	4	5	4	4	2	..	1	20	11,341	4	7	3	2	5	5	1	5	6	3	10	5	..	56	167,061	76	178,402
Germany	Sail	..	..	..	..	..	..	..	..	.	5	5	..	..	.	..	1	..	.	.	..	..	..	11	3,870	11	3,870
	Steam	..	..	..	..	..	..	..	.	.	11	4	2	6	5	4	4	11	3	6	6	..	..	62	121,438	62	121,438
	Total	..	..	..	..	..	..	..	.	.	16	9	2	6	5	4	5	11	3	6	6	..	..	73	125,308	73	125,308
Holland and Belgium	Sail	..	..	..	..	..	..	..	..	..	27	..	.	..	.	3	..	..	..	..	..	..	..	30	6,877	30	6,877
	Steam	..	..	..	..	..	..	..	..	..	7	6	2	3	..	5	2	6	3	..	2	1	..	37	60,507	37	60,507
	Total	..	..	..	..	..	.	..	..	..	34	6	2	3		8	2	6	3	.	2	1	..	67	67,384	67	67,384
† Japan	Sail	..	..	..	.	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Steam	4	..	1	..	..	..	..	5	1,023	5	..	3	1	1	..	..	.	1	.	2	3	..	10	45,246	21	46,269
	Total	4	..	1	..	..	..	..	5	1,023	5	..	3	1	1	..	.	..	1	..	2	3	..	16	45,246	21	46,269
France	Sail	12	2	..	..	..	.	..	14	2,174	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	14	2,174
	Steam	1	..	..	..	..	..	.	1	143	2	1	5	1	1	..	2	3	1	1	1	.	1	19	43,748	20	43,891
	Total	13	2	..	..	..	..	..	15	2,317	2	1	5	1	1	..	2	3	1	1	1	..	1	19	43,748	34	46,065
Norway	Sail	2	1	..	..	..	..	..	3	549	..	.	.	..		..	..	..	..	.	..	..	..	..	..	3	549
	Steam	..	..	..	..	..	..	..	..	.	11	7	4	8	2	12	..	..	1	.	..	..	..	45	30,741	45	30,741
	Total	2	1	..	..	..	..	..	3	549	11	7	4	8	2	12	..	..	1		..	..	..	45	30,741	48	31,290
Italy	Sail	9	1	..	..	..	..	..	10	1,605	2	.	.	..	..	..	..	..	.	..	..	..	..	2	305	12	1,910
	Steam	1	..	..	..	..	..	..	1	107	..	..	..	..	2	..	..	..	..	..	..	3	..	5	26,569	6	26,676
	Total	10	1	.	..	..	..	..	11	1,712	2	..	..	.	2	..	.	.	..	..	..	3	..	7	26,874	18	28,586
Austria-Hungary	Sail	..	..	..	..	..	..	..	..	.	..	..	..	.	..	.	.	.	..	..	.	..	..	..	.	..	..
	Steam	..	..	..	..	..	.	..	.	..	4	2	.	.	4	2	.	..	4	.	..	..	..	16	22,235	16	22,235
	Total	..	..	..	..	..	..	..	.	..	4	2	..	..	4	2	..	..	4	.	..	..	..	16	22,235	16	22,235
Denmark	Sail	4	..	..	..	..	..	..	4	668	..	..	..	.	..	.	..	..	..	..	..	..	..	..	..	4	668
	Steam	..	..	..	..	..	..	..	.	..	..	1	.	1	1	1	2	.		..	..	..	..	6	6,548	6	6,548
	Total	4	..	..	..	..	..	..	4	668	..	1	.	1	1	1	2		.	..	..	..	..	6	6,548	10	7,216
Sweden	Sail	3	..	..	..	..	..	..	3	345	..	..	..	.	.	.		.		..	..	..	..	..	..	3	345
	Steam	1	..	..	..	..	.	..	1	189	..	4	1	1	1	..	..	.	1	..	..	..	..	8	6,233	9	6,422
	Total	4	..	..	..	..	..	..	4	534	..	4	1	1	1	.	.	.	1	..	..	..	..	8	6,233	12	6,767
Russia	Sail	5	1	..	..	.	..	.	6	1,040	..	.	..	..	.	..	..		.	..	..	..	..	..	..	6	1,040
	Steam	..	..	..	..	..	.	..	.	..	..	..	..	..	..	.	..		..	..	..	..	..	..	..	..	..
	Total	5	1	..	..	..	..	..	6	1,040	..	..	.	..	..	..	..		..	..	..	..	..	..	..	6	1,040
Other Countries	Sail	..	1	..	..	..	..	..	1	310	..	..	..	..	..	.	.	..	.	.	..	..	..	..	.	1	310
	Steam	2	..	..	..	..	..	..	2	228	1	.	..	.	..	..	.	2	..	.	..	..	..	3	4,445	5	4,673
	Total	2	1	..	..	..	..	..	3	538	1	..	..	..	..	..	.	2	..	..	..	.	..	3	4,445	6	4,983
Totals	Sail	56	13	5	4	1	.	1	80	20,760	35	13	2	1	4	5	1							61	20,702	141	41,462
	Steam	25	8	1	.	1	..	..	35	7,085	95	118	43	40	42	71	46	71	57	72	39	19	10	723	1,502,985	758	1,510,070
	Total	81	21	6	4	2	..	1	115	27,845	130	131	45	41	46	76	47	71	57	72	30	19	10	784	1,523,687	899	1,551,532

* Excluding wood vessels built on the North American lakes.

† Excluding Japanese sailing vessels under 300 tons net (if any) built in Japan.

Note.—The above figures for sailing vessels are based on *net* tonnage, and those for steam vessels on *gross* tonnage.

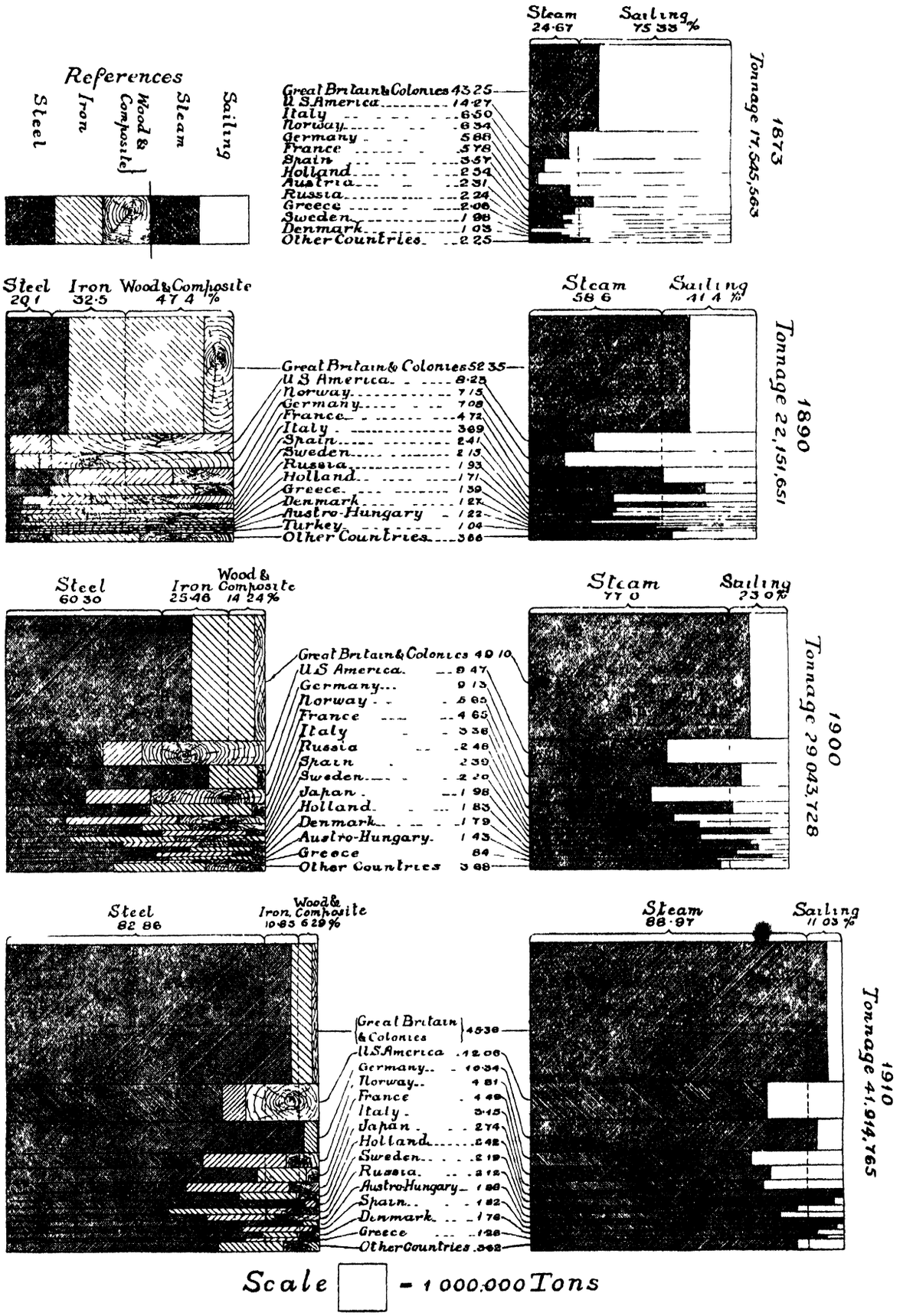


FIG. 5.—Distribution of ownership of merchant shipping throughout the world. The tonnages are gross steam and net sailing as given in Table II. for 1910. The tonnages for 1900 and 1890 are prepared on the same basis, while those for 1873 are gross steam and gross sailing.

limits of any harbour; canal boats and barges without sails or motive power employed entirely within any State; barges and boats on the rivers and lakes of the United States which do not carry passengers and do not trade to any foreign territory. None of these vessels are registered, enrolled or licensed. A census of shipping taken in 1889 revealed the fact that at that date the tonnage of these undocumented vessels amounted to just half the total shipping of the United States; since then their numbers have greatly decreased because of the improved means of transport by rail.

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Porto Rico	83	8,740
Pacific	3,378	915,357
Hawaii	43	19,120
Northern Lakes	3,199	2,782,481
Western Rivers	1,782	162,663
Total	25,688	7,388,755

Coasts employ 67 % of the number and 47 % of the tonnage; the Great Lakes 12 % of the number and nearly 38 % of the tonnage. The total includes a great number of wooden sailing vessels as shown by Table VII., which also shows that the coasting trade employs over 1,000,000 tons of wooden steamships and over 3,000,000 tons of steel steamships (Enrolled and Licensed vessels), while the steel

TABLE VII.—*Details of Ships documented in United States in 1909.*

	Steam.		Sailing.		Barges.	
	No.	Tons.	No.	Tons.	No.	Tons.
Registered—						
Wood	349	71,474	448	185,728	644	72,277
Metal	149	507,052	22	45,330	21	5,644
Enrolled and Licensed—						
Wood	9,431	1,084,690	9135	1,281,064	2804	687,924
Metal	1,712	3,086,008	107	198,954	121	81,659
Total Documented Vessels	11,641	4,749,224	9717	1,711,076	3590	847,504
Grand Total	25,688 Vessels.			7,388,755 Tons.		

steamships in the Foreign Trade only reach a total of just over 500,000 tons (Registered Vessels).

Though the American Mercantile Marine has greatly varied in the rate of its growth (see Table VIII.), very great increases have taken place from time to time, and after 1880 the average rate of increase was very considerable, the increase in thirty years amounting to 3,300,000 tons or over 80 %. In the nine years 1900–1909 the increase was 2,220,000 tons, which is more than 40 % of the total in

TABLE VIII. —*Growth of United States Shipping.*

Year.	Total Tons.	Increase in Ten Years.	
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1800	972,492	+494,115	+103·3
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1850	3,535,454	+1,354,690	+62·1
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1870	4,246,507	−1,107,361	−20·6
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From 1895 to 1908 very great progress was made in the output of ships in the United States; in 1901 a maximum of 483,489 tons was reached; decreases occurred until 1905, when a minimum of 330,316 tons was reported, but a rapid recovery took place; and in 1908 the unprecedented American total of 614,216 tons was made. In 1909 the output fell off. Out of a total of 1247 vessels of 238,090 tons, built and documented during the year ending June 30, 1909,

TABLE IX.—*Additions to and Employment of United States Shipping.*

Period.	Average Tonnage of Ships built per Annum in the United States.	Average percentage of United States Commerce carried in United States Ships.	Average percentage of United States tonnage trading in United States Ports.
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1860–1870	299,690	38·1	50·4
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1880–1890	220,197	15·2	21·0
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1907	471,332	10·6	22·0
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[1] Maximum recorded. [2] Lowest for ten years.

61,000 tons consisted of barges and canal boats, nearly 30,000 tons consisted of sailing vessels, 798 vessels of 47,353 tons are classed as river steamers, 17 steamers of 84,428 tons were built in the Great Lakes, and only 6 steam vessels of 10,427 tons were built for ocean trade, while no vessel was registered as built for the foreign trade.

Canadian Shipping.—A steamboat service between Montreal and Quebec was commenced in November 1809, two years before the "Comet" was set to work on the Clyde, and in 1816 the steamer "Frontenac" commenced running on the Lakes and a number of other vessels followed. During the middle of the 19th century Canada turned out large numbers of wooden ships, the output in 1874 being 487 ships of 183,010 tons. As wood shipbuilding diminished the output fell off. In 1900 only 29 steam and sailing ships of over 100 tons were built, amounting in the aggregate to 7751 tons. Afterwards improvements took place, and in 1907 59 vessels of 38,288 tons were launched. Among the largest ships built in Canada are the passenger and freight vessel "Harmonic" of 5240 tons gross, and the "Midland Prince," a cargo vessel of 6636 tons gross—both built at Ontario. Smaller vessels are built to pass through the canals from the lakes to the sea, such as the "Haddington" of 1603 tons built at Toronto.

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German Shipping.—For many years the mercantile marine of Germany has progressed at a very great rate, large numbers of vessels being built in Germany and in the United Kingdom for German owners. The average output in Germany per annum from 1895 to 1899 was 84 ships of a total tonnage of 139,000 tons; from 1900 to 1904, 114 ships of 204,600 tons; and from 1905 to 1909, 149 ships of 241,000 tons. The total net tonnage owned in 1870 was about 982,000 tons, and this was doubled by 1900, *i.e.* in thirty years. The total tonnage of Germany in 1900 was 2,905,782 tons, taking gross steam and net sailing tonnage; in 1910 the total on the same basis was 4,333,186 tons, an increase of nearly 50 % in the ten years.

IV. MERCHANT VESSELS

Sailing Ships.—Generally speaking, so far as the distribution of sails is concerned, except as regards the abolition of studding-sails, the sailing ships of to-day differ little from those which existed in the middle of the 19th century, and in the case of many types at a much earlier period. The change from wood to iron and steel resulted, of course, in some changes

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in rig, to suit the longer and larger vessels; and steel masts, with wire rope standing rigging and various labour-saving appliances, have been introduced. The larger ships also carry steam winches for various purposes, steam windlasses, and steam steering gear, but the general appearance of the vessels has changed very little.

Barges.—Rivers and canals abound with barges of various types, such as the Thames barge, the Tyne wherry or keel, and the Dutch galliot or pink. The Thames barge, which may be taken as a representative vessel of this class, has a length of from 70 to 80 ft., and a carrying capacity of from 100 to 120 tons on about 6 ft. draught. Like the Dutch galliot, she is provided with lee-boards, and is fore-and-aft rigged with sprit-sail and jigger.

In recent years the use of barges or lighters has been extended beyond river and canal service, and rapidly increasing numbers are now used, in addition, for sea transport. For example, on the east coast of England lighters of about 500 tons carrying capacity are used in the coal trade. The system has been carried much farther on the Great Lakes of North America, where cargo barges are in use of over 350 ft. in length, and approaching 5000 tons displacement when loaded. On the east coast of the United States barges, built sometimes of wood and sometimes of steel, are employed, carrying from 2000 to 4000 tons of coal, oil, grain, &c.

Smacks or Cutters.—This type of rig is still largely adopted in the merchant service for small vessels, usually called smacks, of a length, say, from 60 to 90 ft., and a displacement from 150 to 200 tons. They are single-masted, sharp-built vessels, provided with fore-and-aft sails only, and fitted with a running bowsprit; they have no standing jib stay. Such vessels were at one time generally used for coasting passenger traffic. The term "cutter" is also applied to an open sailing boat carried on board ship.

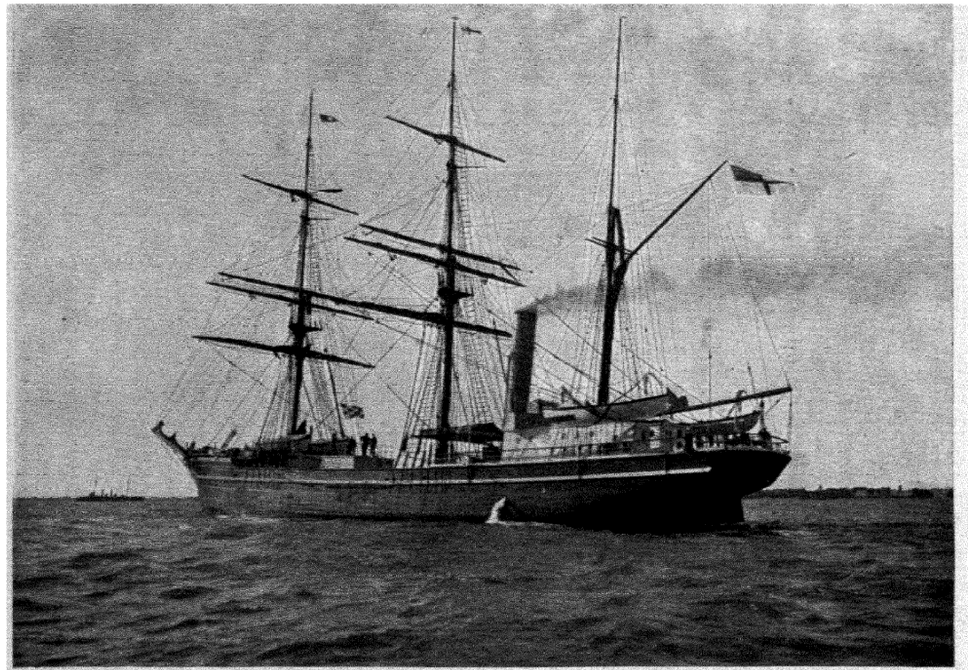
Schooners, Brigs and Brigantines.—A schooner (fig. 7, Plate I.) is usually a two-masted vessel, with yards only on the foremast and fore-and-aft sails on the main. The foresail is not bent to the yard, but is set flying. In some cases there are no yards at all and the schooner is then called a fore-and-aft schooner, a schooner with yards being sometimes called a square-rigged schooner. Before the days of steam, two- and three-masted schooners, known as "Fruiterers," were extensively employed in the fruit trade from the Western Islands, Italy, Malta and other orange-growing countries to London. In the 'fifties as many as three hundred were thus employed; they kept their place till the 'eighties, and some even yet survive the introduction of steam as a motive power. They were beautifully modelled craft, and very fast under canvas. A brig is a two-masted vessel having yards, or square-rigged on both masts. A brigantine is a two-masted vessel having the foremast square-rigged, as in a brig, the main mast being rigged as in a schooner. Much of the coasting trade of the world is carried on by schooners, brigs and brigantines. These vessels were formerly employed in the Baltic, and to some extent in the West Indies and the Mediterranean. Schooners such as the above are usually from 80 to 100 ft. long, 20 to 25 ft. broad, 10 to 15 ft. deep, and have a gross tonnage of 130 to 200 tons. Brigs are generally larger, varying in tonnage from 200 to 350 tons; they are from 90 to 115 ft. long, from 24 to 30 ft. broad, and from 12 to 18 ft. in depth of hold. Brigantines usually occupy, as to size, a position intermediate between schooners and brigs.

Vessels somewhat larger than two-masted schooners and brigs, but of a similar form, are often rigged as three-masted schooners and as the so-called barquentines. The former is like a schooner with a third or mizzen mast added, this being rigged fore and aft, as is the main mast. The latter resembles a brigantine with a third mast added, which is also fore-and-aft rigged. The two rigs thus very nearly resemble each other: both types are square-rigged on the foremast, and fore-and-aft rigged on the main and mizzen; but while in the former the foresail is set flying, in the latter it is bent to the yard.

Larger vessels than these are sometimes fitted with four, five, six and even seven masts, as fore-and-aft schooners. A large number of vessels fitted in this manner are much in favour for the coasting trade of America. Fig. 8 (Plate I.) shows the "Helen W. Martin," a five-masted wooden schooner, built in 1900 in the United States; she is 280 ft. 6 in. long, 44 ft. 9 in. broad and 21 ft. depth of hold, and her gross tonnage is 2265. Another vessel built at the same time, also of wood, and named the "Eleanor A. Percy," is 323 ft. 5 in. long, 50 ft. broad and 24 ft. 8 in. depth of hold, with a gross tonnage of 3402; she is rigged as a six-masted schooner. An interesting vessel of this class was the seven-masted schooner, "Thomas W. Lawson," built in 1902 by the Fore River Ship and Engine Co., Quincy, Massachusetts, of steel, 368 ft. long, 50 ft. beam, 34½ ft. depth of hold, and on a draught of 26 ft. 6 in. of 10,000 tons displacement, thus being the largest vessel yet constructed for sailing only. She was recently wrecked on the Scilly Isles.

Barques and Ships.—Vessels intended to sail to all quarters of the globe are usually rigged as barques or ships; but, as indicated above, these rigs are very far from embracing all those in use; many others are very common. A barque is a three-masted vessel, square-rigged on the two foremost masts (the fore and main masts) and fore-and-aft rigged on the mizzen mast. A ship (a ship-rigged vessel) has three masts, each of which is square-rigged. These were the rigs employed in types of vessels now fast passing away, if indeed they must not be considered as already obsolete, in which great speed was the quality chiefly aimed at, and carrying power was of secondary importance. For instance, the "Phoenician," built in 1852, had a length of 150 ft. and a net tonnage of 478; the "Shannon," built in 1862, was 217 ft. long and her tonnage 1292. The former made the quickest run on record, up to 1852, from Sydney to London, accomplishing the distance in 83 days; and the latter made a round voyage from Melbourne to London and back from thence to Sandbridge Pier in 5 months and 27 days, handling two full cargoes in the time. The American ship "Witch of the Wave," built in 1852, and the British ship "Cairngorm," built in 1853, were engaged in the keen competition carried on between Great Britain and the United States for the rapid conveyance of early teas from China to London. The American builders had for some years been more successful than the British builders, and the "Cairngorm" was the first ship which equalled the American ships in speed, and it was, moreover, claimed for her that she delivered her cargo in better condition than the American ships. She was 215 ft. long, and her tonnage was 1250 old measurement, or 938 new measurement. The "Witch of the Wave" on her best voyage made the passage from Whampoa to Dungeness in 90 days, the best day's run being 338 knots in 24 hours, a very remarkable performance. Later, in 1856, the "Lord of the Isles" beat the two fastest American clippers then existing in a race from China to Great Britain, one of them only by a few minutes; her length was 183 ft., and her tonnage, new measurement, 630. It is noteworthy that the competition in bringing the early teas home from China, started between British and American ships, was carried on subsequently between British ships alone. In the memorable race of 1866 from Foo-Chow to London, five ships, the "Ariel," "Taeping," "Serica," "Fiery Cross" and "Taitsing" took part. The first three left Foo-Chow the same day—the "Ariel" first, followed 20 minutes later by the "Taeping" and "Serica" together. The vessels separated, and lost one another till they reached the English Channel, when the "Ariel" and "Taeping" got abreast, and raced to the Downs, the former arriving some ten minutes before the latter, the "Serica" reaching the Downs a few hours later. These three occupied 99 days on the voyage; the "Fiery Cross" and "Taitsing" took two days longer, making the passage from Foo-Chow to the Downs in 101 days. The best day's run on the passage for all these ships differed but little, the "Fiery Cross" showing a slight superiority in this respect, having run 328 knots in the 24 hours. The time occupied in the above voyages was beaten in 1869 by the "Thermopylae" and "Sir Lancelot," both British ships and of composite build; the times occupied by their passages were respectively 90 days from Foo-Chow to Dungeness for the former, and 88 days from Foo-Chow to Deal for the latter, each taking one day more to get into the docks. The dimensions of the "Thermopylae" were 212 ft. by 36 ft. by 21 ft. depth of hold, and of the "Sir Lancelot" 197½ ft. by 33⅝ ft. by 21 ft. The best day's run of the "Sir Lancelot" was 354 knots in 24 hours. Shortly before the above voyage the "Thermopylae" made the passage from London to Melbourne in an unprecedentedly short time, namely, 62 days from Gravesend to Port Phillip harbour. With the opening of the Suez Canal and the general introduction of steam, the demand for exceptionally fast sailing vessels of these types has very considerably diminished, and, indeed, almost ceased to exist. The type of cargo sailing ship usually met with to-day is better illustrated by fig. 9 (Plate I.), which represents the "Victoria Regina," built of iron in 1881 at Southampton; she is 270 ft. long and has a gross tonnage of 2006.

Ships with four and five masts were employed by several countries during the 19th century. Sometimes, in the case of four-masted ships, these were square-rigged on the fourth or mizzen mast, and sometimes fore-and-aft rigged; in the latter case they were called four-masted barques in Great Britain and shipentines in America. Five-masted ships are sometimes square-rigged on the fourth mast and fore-and-aft rigged on the fifth mast, and sometimes fore-and-aft rigged on both of these masts. The *Naval Chronicle*, vol. vii. (1802), contains particulars of the French privateer "L'Invention," which was captured by the British ship "Immortalité"; she was rigged as a four-masted ship, carried 26 guns, and had a complement of 220 men. It is remarkable how little her rig differs from that of modern vessels. A five-masted vessel is described in the same number of the *Naval Chronicle* which was square-rigged on the foremast and fore-and-aft rigged on the other four masts; she was apparently a forerunner of the American five-masted schooner of the present day. The shipentine clipper "Great Republic," built in 1853, is noteworthy as being the first ship fitted with double topsails, now so generally adopted. She was 305 ft. long and her tonnage was 3400; she could spread 40,500 square ft. of canvas, excluding stay-sails; she had four decks and was built of wood, though her framing was diagonally braced with iron. The shipentine "Madeleine," built in France in 1896, is almost identical in rig to the "Great Republic"; her length is 321 ft. and her gross tonnage 2892. A five-masted barque "France," built in Glasgow in 1890, is 361 ft. long and has a gross tonnage of 3942. As further examples of the large sailing ships built in recent years may be mentioned the "Astral" and "Potosi." The "Astral" was built by Arthur Sewall & Co. at Bath, Maine, in 1900, for the oil trade.



(Hopkins.)

FIG. 2.—Antartic Vessel *Terra Nova*.

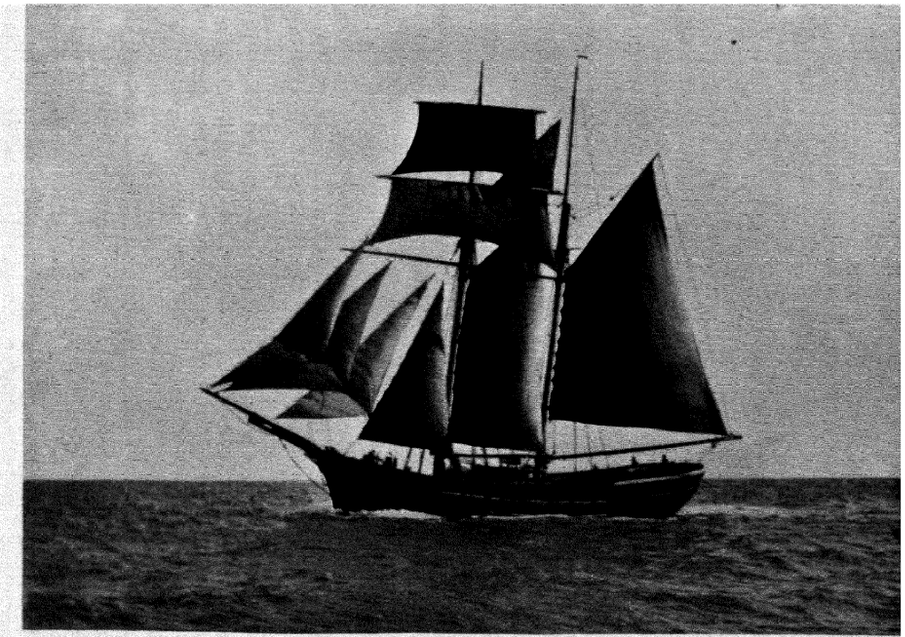


FIG. 7.—Coasting Schooner.

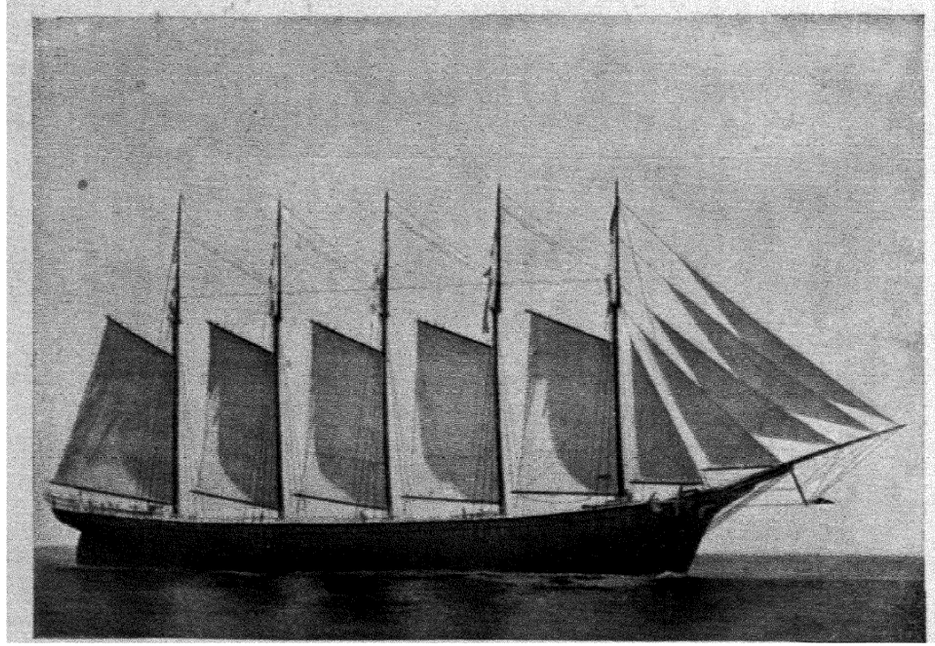
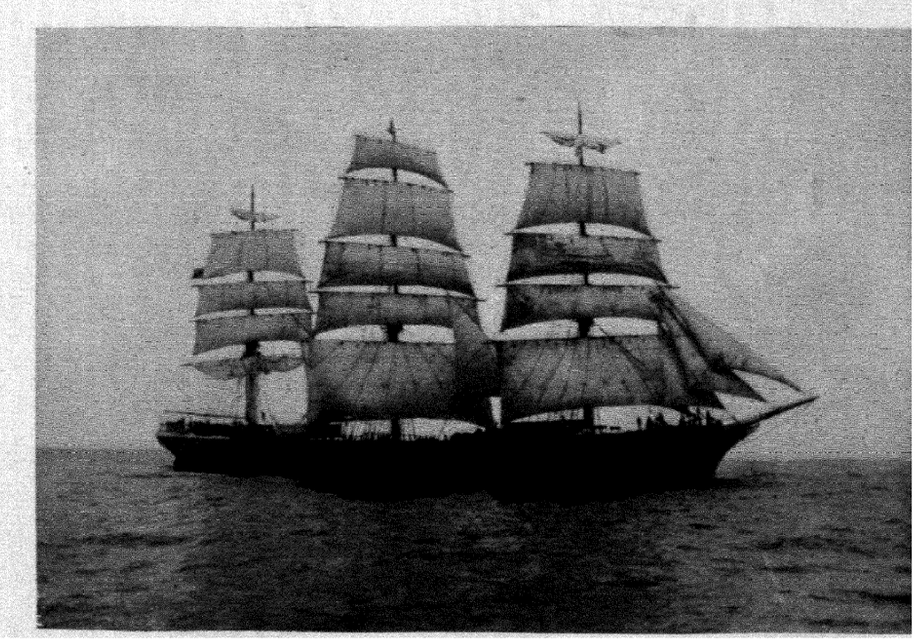


FIG. 8.—Schooner *He[illegible]*



9.—Ship *Victoria Regina*

FIG. 13.—Well-Decked Vessel.

FIG. 14.—Vessel with top-gallant forecastle bridge house and poop

FIG. 10 - Turret Steamer *Tultoch Moor*.

FIG. 15.—American Lake Steamer.

She is a full-rigged four-masted ship, 332 ft. long, 45½ ft. beam, 26 ft. moulded depth, gross tonnage 3292, and intended to carry 1,500,000 gallons of oil in cases of 10 gallons each from the United States to Shanghai, returning with cargoes of sugar, hemp, &c. The masts and yards of this vessel, as well as the hull, are of steel. The five-masted German barque "Potosi," built in 1895, which is 366 ft. long, has a gross tonnage of 4027 and a dead-weight capacity of 6200 tons; she has a splendid record of quick passages, one reducing the record from Portland Bill to Iquique to 62 days. In 1902 the five-masted ship-rigged vessel "Preussen," of 5081 tons gross, was built in Germany (wrecked at Dover in November 1910), followed in 1906 by the five-masted barque "R. C. Rickmers" of 5548 tons gross, 441 ft. long over all, 53 ft. 8 in. beam, 30 ft. 5 in. depth of hold; her displacement when loaded is about 11,400 tons, of which 8000 tons are cargo. She carries 50,000 sq. ft. of canvas, and on her first voyage reached a speed of 15¾ knots for a short time under sail alone, maintaining 13 knots for long periods. Although fitted with auxiliary steam power the "R. C. Rickmers" usually trusts wholly to canvas on her ocean voyages, and may thus be considered the largest sailing vessel afloat in 1910.

As instances of the times occupied on the voyages of modern sailing ships the following may be given: 66 days from Iquique in Chile to the English Channel by the British ship "Maxwell," gross tonnage 1856; 29 days from Newcastle, New South Wales, to Valparaiso by the British four-masted ship "Wendur," 2046 gross tonnage; 30 days from the Lizard to Rio de Janeiro by the British ship "Salamanca," of gross tonnage 1233; and 78 days from Dover to Sydney for the same ship; 153 sailing days for a voyage round the world, made up of 50 days from Cardiff to Algoa Bay, 28 days from Algoa Bay to Lyttleton, and 74 days from Lyttleton to the Lizard, by the British ship "Talavera," gross tonnage 1796; 59 days from Cape Town to Iquique by the British ship "Edenballymore," of gross tonnage 1726; 88 days from San Francisco to Queenstown by the British four-masted barque "Falls of Garry," of gross tonnage 2102; and 69 days from Scilly to Calcutta by the "Coriolanus," gross tonnage 1074. Amongst the voyages recorded recently by German ships the following may be enumerated: 58 days from the English Channel to Valparaiso by the four-masted barque "Placilla," gross tonnage 2845; 71 days from the English Channel to Melbourne by the barque "Selene," gross tonnage 1319; and 69 days from the English Channel to Adelaide by the four-masted barque "Hebe," of gross tonnage 2722.

Although alterations in the rigs of ships have not caused much difference in their appearance over a very long period, a number of changes have been made, mostly for the purpose of saving labour. The mechanical reefing of topsails and top-gallant sails was introduced about 1858, but only remained in favour for a few years; double topsails, on the other hand, first used in the four-masted American shipentine clipper "Great Republic," have held their own, and double top-gallant sails have since been adopted. Until about 1875 almost all ships carried studding-sails, but since this date they have been gradually discontinued, and at present are usually only to be found in training vessels, and now and again in square-rigged yachts. As already stated, wire rope has been adopted for standing rigging, and deadeyes and lanyards have given place almost universally to rigging screws. Masts and the heavier yards have been made of iron for many years, and more recently of steel, and the lower masts and top masts have in a number of cases been made in one length; when constructed in this manner the mast is termed a pole mast. This arrangement is very common in America, where the latest steel sailing ships are so fitted. Most large sailing ships carry a steam boiler or boilers, and engines are provided for all sorts of purposes, for which hand labour used to be commonly employed. The result of this and other labour-saving arrangements has been to effect a very considerable reduction in the number of hands carried. As indicating the nature of the change which has taken place, it may be mentioned that whereas a 1000-ton ship of the East India Company in the middle of last century had a crew of 80 all told, a modern four-masted barque of 2500 tons has a total complement of 33 only.

As to the employment of sailing ships, there can at the present day be seen at most large shipping ports a number of sailing ships of various types and sizes. Some of the largest ships are employed in the jute trade of India, the grain trade of California, British Columbia, &c., the nickel ore trade from New Caledonia and the nitrate trade of Chile. From Great Britain they usually take out coal, which, however low freights may be, may in nearly all cases be relied on.

Sailing ships are sometimes provided with *auxiliary steam propelling machinery* of low power to save cost of tugs in getting in and out of harbour, to make headway when becalmed, and to increase the safety of the vessel. In the early days of steam, all sea-going vessels retained their rig, and the machinery fitted was only regarded as auxiliary. In the "Savannah"—the first steam vessel to cross the Atlantic—the paddle wheels were portable; they were removed and packed up on board in case of bad weather or when attempting a long voyage, but were replaced and used for getting into port after crossing the Atlantic. The screw propeller was found preferable in such cases, as it offered less obstruction than paddle wheels when the sails were set and the engines stationary; but the resistance offered by the screw when not in use led to various devices for either lifting it completely out of the water, or for "feathering" the blades and fixing them fore and aft, so as to offer less obstruction in going through the water. Auxiliary power is of great advantage to vessels engaged in seal or whale fishing as it enables them to avoid ice floes, and to proceed through open channels in the ice as opportunity offers. In 1902, six such vessels—all barque rigged, and one fitted with a lifting propeller—hailed from Dundee, and a few others hailed from Norway, from Newfoundland and from New Bedford, U.S.A. Several navies have employed vessels fitted with auxiliary steam power for training purposes, such as the Chilean training ship "General Baquendo" built in 1899 of steel, sheathed with teak and coppered; she is 240 ft. long, 45¾ ft. broad, and of 2500 tons displacement on a mean draught of 18 ft.; she has a large spread of canvas, and under steam alone is equal to a speed of 13 knots. In recent years the *internal combustion motor* has been adopted in some cases in place of the steam engine as a source of auxiliary power, especially in the smaller classes of sailing ships, and in many cases it has made the employment of such vessels remunerative once more. Should the heavy oil engines introduced in 1910 prove sufficiently simple and reliable for auxiliary power in the larger vessels, vessels so fitted might compete successfully with tramp steamers in certain trades.

Sailing ships with auxiliary power.

Steamships.—Of merchant steamships, vessels of all sizes are to be met with, from a small launch to the stately Atlantic liner of over 30,000 tons gross and 25 to 26 knots speed, and the huge cargo ship of over 20,000 tons gross and 15 knots speed. They are employed on every service for which sailing ships are used, and upon others for which sailing ships are not employed, and they monopolize nearly the whole of the passenger traffic of the world. The passenger vessel is provided with airy and spacious accommodation for her living freight above water, while the upper part of the cargo vessel is cut down as much as possible consistent with due provision for safe navigation at sea. The passenger ship thus becomes a lofty vessel, especially amidships, while the cargo ship appears long and low lying. Apart from this broad difference, the various sizes of merchant steamships have in general no bold characteristic features like sailing ships; they possess different deck structures and certain differences in form, but, to the ordinary eye, a photograph of a vessel of, say, 1000 tons, apart from details of known size that may serve to fix the scale, may often be taken to represent a vessel of even *ten* or *twenty* times the size.

Types of Steamships.—A steam vessel may be little more than an open boat with the boiler and engines placed amidships if intended for river use, and may be of any shape necessary to suit local conditions and fulfil the services required. Vessels which proceed to sea must be decked over to prevent them from being "swamped" and built of a suitable form to make them otherwise seaworthy; the height of the deck above water, or the *freeboard*, will be increased, and the sides carried up above the deck; these *topsides* meet at the extremity of the vessel, and as the size of the vessel increases or larger seas have to be encountered the topsides are covered in forward and aft to further improve the sea-keeping qualities of the vessel. If only a short portion is so covered in, the covering is often rounded off along its sides and is then termed a *turtle back*, or *monkey forecastle*, when fitted forward, and a *turtle back*, or *hood*, when fitted aft; if made larger and of sufficient height above the upper deck to be serviceable for accommodation forward it is called a *top gallant forecastle*, and aft a *poop*. It is frequently desirable to build up cabins or other accommodation across the middle of the ship beneath the bridge, forming

what is called a *bridge house*. Instead of fitting a turtle back or hood aft, a break is sometimes made in the upper deck and the after portion is raised a step higher than the midship portion, the after portion is then called a *raised quarter deck*. If a poop be extended forward to join the bridge house it is called a *long poop*. In very many cases when a top gallant forecastle is fitted, the gap which occurs between this forecastle and the bridge house is partly shut in at the sides by the ship's topside plating; the space so formed is then called a *well*, and the ship a *well-decked* ship.

Vessels arranged as above described are illustrated by figs. 10, 13, 14, on Plate II.; they include most of the vessels in the coasting trades of Europe, and many of the smaller and medium sized ocean-going cargo vessels. In larger vessels the forecastle, bridge and poop decks are frequently joined to form a light continuous structure. The vessel is then termed a *shade-decked vessel*—if the ship's sides up to this level are not completely closed in. In still larger ships the sides are completely built in, the deck made stronger, other decks or deck houses are fitted above it, and the ship is called an *awning decked, spar decked, shelter decked* or *three decked vessel*—according to the details of her construction. Above these strong steel decks light *promenade decks, sun decks* and *boat decks* are built according to the requirements of the accommodation for passengers, &c.

Barges.—The simplest cargo steamer is the *steam barge* or *lighter*, often merely a long narrow box of wood or steel made small enough in section to pass through locks and canals, with the ends fashioned more or less abruptly, and spaces allotted aft for the machinery and forward for the crew. For service on rivers and estuaries they are made larger and wider as the circumstances of draught and dock or wharf accommodation permit, the bottoms being generally flat in order that they may ground safely in tidal waters; they are used for transferring cargoes of sea-going vessels to or from warehouses, and are frequently fitted so that they can tow one or more *dumb* barges.

Cargo-ships.

Many sea-going vessels are built to carry a particular cargo on one voyage and a general cargo on the return voyage. This usually results in their having certain features which adapt them for the special cargo, and do not interfere materially with their carrying a general cargo at remunerative rates. Ordinary cargo ships, or "Ocean Tramps" as they are called, do a very large portion of the world's cargo-carrying. They are mostly built of steel, and their usual speed is from 10 to 11 knots. In the early 'nineties well-decked vessels formed a large proportion of the total number; but ten years later comparatively few of this type were being built, and these were principally intended for the coal trade, or were comparatively small vessels for coasting purposes. Partial awning-decked steamers, again, which were much in favour at the same period, gave place, a decade later, to other types; and vessels having a raised fore-deck went entirely out of fashion, the tendency being to revert to flush-deck vessels, having short poop, bridge house and forecastle.

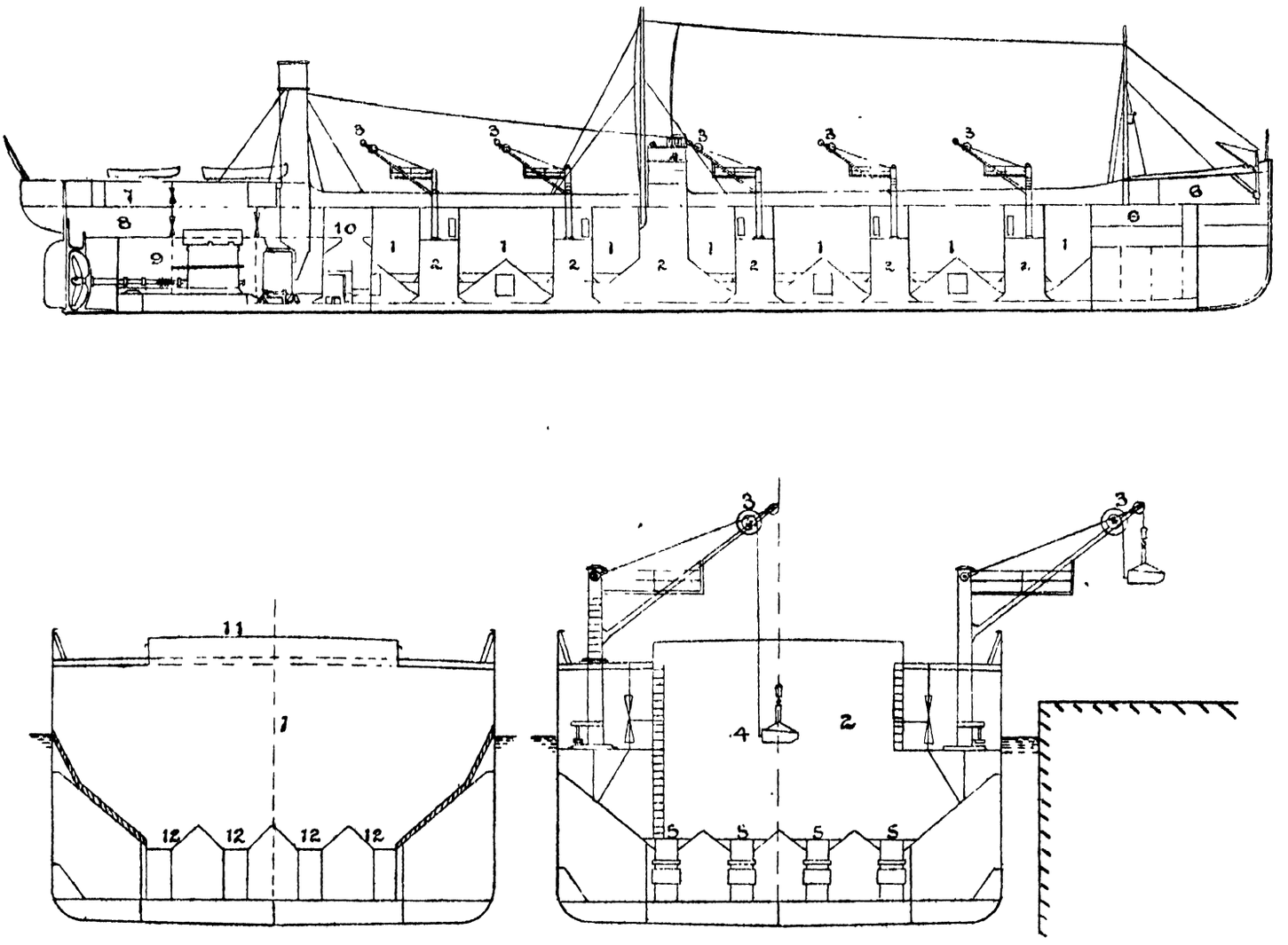


FIG. 11.—General arrangement of ore-carrying steamer "Volkrath Tham."

1. Hold.
2. Discharging trunk.
3. Electric crane.
4. Skip, or bucket.
5. Discharging doors.
6. Crew's space.
7. Officers' quarters.
8. Stores.
9. Engine and boiler room.
10. Coal bunker.
11. Loading hatch.
12. Slopes to discharging doors.

Modern Developments.—The last few years have been remarkable for great development in special types of cargo vessels. While the vessels have frequently been specially designed to meet the requirements of the particular trades on which they are to be employed, certain general features apply to the lines of their development:—

1. In order to accommodate the maximum cargo possible in vessels of convenient size, the lines of the vessels have been filled out, giving block co-efficients which are frequently over 80 % and in some of the Great Lake freighters have reached 88 %.

2. Such portions of the ship above the water as do not contribute usefully to carrying cargo, but would be measured for registered tonnage, are cut down to the smallest amount consistent with the provision of sufficient reserve of buoyancy and stability.

3. To provide for a return journey without a cargo, in addition to the double bottom and peak tanks, large water ballast tanks are provided abreast of and above the cargo spaces, and arranged so that when ballasted down the metacentric height of the vessel is not excessive. Much of the ballast is carried in side or wing tanks extending to the upper or main deck, or in triangular tanks beneath the main deck, ballast discharge valves or pipes being arranged so that the tanks may be emptied by gravity when practicable.

4. The holds have been cleared of obstructions—such as pillars, hold beams and web frames—so that the stowage space for the cargo is unbroken, the necessary strength being given by a heavier system of framing of the ship and by the construction of the wing or side tank bulkheads.

5. To facilitate rapid handling of cargo, hatches have been increased in size and number, and special appliances fitted for rapidly loading and unloading the vessel—particularly, large numbers of derricks or cranes, with convenient steam or electric winches.

Several well-known types of cargo vessels have thus been produced, such as the "Mancunia" built by Messrs W. Gray & Co. at West Hartlepool in 1898, with *side-ballast tanks* on McGlashan's patent; *cantilever-framed* vessels by Messrs Raylton Dixon & Co. on Harrowby and Dixon's patents; *trunk-deck* vessels by Messrs Rayner & Co., and *turret-deck* vessels by Messrs Doxford & Co. of Sunderland. Fig. 10 (Plate II.) is a photo of a turret-deck steamer. Her dimensions are: length 439 ft. 8 in., beam 51 ft. 7 in., gross tonnage 5995 and net tonnage 3794 tons. Many such vessels have been built; they have the reputation of being good dead-weight carriers, and the shelf on each side of the central trunking can very conveniently be used for carrying timber and for other purposes. The "Echunga," built by Sir Raylton Dixon & Co. in 1907, is an example of a modern cantilever-framed flush-decked vessel,—she is 404 ft. long over all, 56 ft. beam, 23·6 ft. moulded depth. On a draught of 23 ft. 9 in. her displacement is about 12,000 tons and dead-weight capacity over 8000 tons, while as regards space she has a stowage capacity of more than 400,000 cub. ft. These results are obtained on the low net register tonnage of 2245 tons, the gross tonnage being 4590 tons. The vessel has continuous upper and main decks, and the underside of the wing tanks carried by the cantilever frames is at such a slope that coal will naturally stow close up on being dumped into the hold. The triangular wing tanks take 1350 tons of water ballast and the double bottoms and the fore- and after-peaks take 1850 tons.

The "Herman Frasch," a modern American cargo vessel of 3804 tons, gross, built in 1909 by the Fore River Shipbuilding Co., Quincy, Massachusetts, for the sulphur trade, is a single-decked vessel, with triangular side ballast tanks and fitted with a short forecastle which carries the windlass gear, a bridge-house well forward to accommodate captain and navigating officers, a poop for firemen and crew, and cabins above the poop for the engineer officers. Her dimensions are: length 345 ft., breadth 48 ft. 3 in., depth of hold 27·1 ft. At a draught of 23 ft. 6 in. her displacement is 8770 tons, of which 6125 tons may be dead-weight carried. Her engines are of 2100 I.H.P., are fitted right aft, and give her a speed of 10·5 knots.

An interesting cargo vessel of a different type is the "Vollrath Tham," recently completed by Messrs Hawthorn, Leslie & Co. for the Swedish ore trade. She is 387 ft. long, 56 ft. 6 in. beam, depth 30·9 ft., tonnage 5826 tons, gross, and dead-weight capacity 8000 tons. Instead of the usual open hold arrangement she has been divided into a series of hoppers and automatic discharging holds, and fitted with 10 electric discharging cranes. Trunks are provided in each hold, through which buckets or skips of two tons capacity can be lowered into position beneath discharging doors under the cargo hold. (Fig. 11 shows the general arrangement of this vessel.)

Great Lake Freighters.—The greatest development of cargo handling the world has yet seen is, however, to be found in North America, where the Great Lake freighters have been built to meet the rapidly growing trade in iron ore, coal and grain. Some of these vessels are 600 ft. or upwards in length, 60 ft. beam, and 32 ft. moulded depth, and on a draught of 20 ft. can carry 12,500 tons of coal or ore or 450,000 bushels of grain. The hatches of these vessels are 12 ft. apart, and are so wide that the holds are self-stowing. The holds are quite unobstructed fore and aft, and built with flat bottoms and vertical sides, so that practically the whole of the ore can be removed by clam shell grabs. For loading, the vessels are brought alongside huge stacks of ore stored on long lofty piers called ore docks; these docks are provided with shoots from which the cargo is run into the ships by gravity, thus loading large vessels in two hours. When unloading at the Cleveland end of the voyage the cranes and transporters fitted ashore can hoist out the cargo of 12,500 tons in ten hours, using grabs of 5 to 15 tons capacity. The propelling machinery is placed right aft and develops from 1800 to 2200 H.P., giving a speed of from 10 to 12 knots. They are well equipped with auxiliary machinery including steam steering gear, steam winches and hoists, pumps and electric light. The wheel-house and bridge are fitted at the after end of a short forecastle; the officers are accommodated forward and the crew aft, both being provided with excellent quarters (see fig. 15, Plate II., and fig. 16).

Colliers.—In a number of cases vessels are built to carry special cargoes; coal carrying vessels, *colliers*, are well-known examples of this class. One of the first colliers to be fitted with steam-engines was the sailing vessel "Q.E.D.," built at Wallsend in 1844, and fitted by Messrs R. & W. Hawthorn with auxiliary machinery of 20 N.H.P. driving a screw propeller. She was constructed of iron, had an over-all length of 150 ft. with a breadth of 27½ ft. In certain respects she was a remarkable vessel, for she was fitted with a double bottom, the space between the bottoms being divided into tanks and arranged for water ballast, a system which has since been re-invented and is now common in colliers and in most cargo ships. The advantage of the arrangement in colliers is especially great, as they usually carry a full cargo one way and return empty; in their light condition sufficient water ballast can be at once added to make them seaworthy, and this at the end of the voyage can be pumped out at a small cost. It was not until about 1852 that steam alone began to be relied on for propelling colliers; in that year the iron screw collier, "John Bowes," was built by Messrs Palmer of Jarrow; she was 152 ft. long, 26 ft. 4 in. beam, had a dead-weight capacity of about 540 tons, was fitted with temporary tanks for water ballast; had machinery of 70 N.H.P. placed right aft; and she took her cargo to London in 48 hours. The saving in time and cost, as compared with the transport of coals to London by the sailing colliers then in vogue, was very great, and this led to the building of many other such vessels.

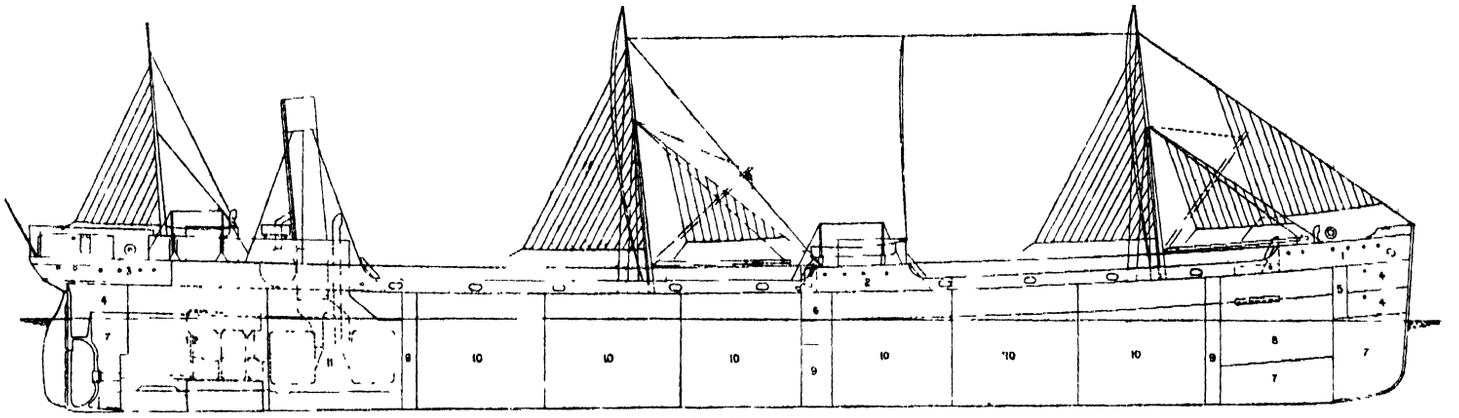
In 1880 the ordinary steam collier carried 600 or 700 tons of cargo; a steady increase in size has been in progress, and the popular collier of to-day carries about 3000 tons, while for long voyages vessels of from 8000 to 10,000 tons capacity are used. While improvements have been made in hull and machinery, so also have improvements been made to enable the colliers' cargoes to be handled more rapidly. Appliances have been adopted for emptying truckloads of coal into the vessels when loading, and many arrangements have been devised for discharging rapidly, but derricks and winches supplemented in some cases by Temperley transporters are still generally relied on. An interesting vessel in which special appliances have been fitted to reduce the amount of hand labour in discharging is the "Palhon," built by Messrs Doxford & Sons in 1909. She is of the following dimensions: length 269 ft., breadth 44½ ft., depth 22 ft.; tonnage 2474 tons gross, 1307 tons net, and can carry 3100 tons on a draught of 17 ft. 10 in. She is a single screw ship fitted with three cylinder compound engines of 217 N.H.P. and 1200 I.H.P. fitted aft. Systems of conveyor-belts are fitted so that the cargo can be delivered direct into trucks ashore or into barges or other vessels alongside by steam power, and under trial conditions at Sunderland the rate of discharge was found to be 1000 tons per hour.

Oil Tank Steamers.—These form another class of vessels built for a particular cargo, and their construction and the character of the material carried are such that they cannot ordinarily be used for other purposes. In 1863 two sailing tank vessels were built on the Tyne. In 1872 Messrs Palmer built the "Vaderland," which appears to have been the first oil tank steamer. The oil carrying steamer "Zoroaster" was built in 1877 in Sweden and in 1910 was still on service. She was built of steel of length 184 ft., breadth 27 ft., draught 9 ft., and had a loading capacity of 250 tons. The oil tanks in the "Zoroaster" were separate from the hull, but after successful trials other vessels were built for Messrs Nobel Bros. in which the skin plating itself formed the tank. In 1886 Messrs Armstrong, Whitworth & Co. built the "Baku," and since that date large numbers of steamers have been built for this trade, the majority of them having been built by the Armstrong firm. Many of these steamers are of large dimensions while some are comparatively small. On the Caspian Sea, for instance, numerous small steamers are employed conveying oil from the Baku district to other ports, and to towns along the Volga; and in other places small steamers are used for the local distribution of oil brought across the ocean and stored in large depots. Such a small steamer is the "Chira," built by Smith's Dock Company in 1909; in size and appearance this vessel resembles a steam trawler, she is 95 ft. long, 19 ft. 3 in. beam, depth moulded 7 ft. 9 in., 108 tons gross, 46 tons net tonnage. The fish hold is in this vessel replaced by a tank for carrying oil in bulk and a hold for case oil. Vessels of 6000 to 12,000 tons carrying capacity are now preferred by the large companies for transporting oil over very great distances on account of their relatively great economy. Fig. 12 shows the general arrangements of a typical modern oil tank steamer. As an example of a large oil vessel, the "Pinna," engaged in carrying petroleum from Russian ports to the East, may also be mentioned. She is 420 ft. long, 52 ft. broad, and 32 ft. deep, and can carry 9000 tons of oil in her fully-laden condition. The machinery is placed well aft, and the cargo space is divided up into twelve large tanks, extending to the height of the main deck, by seven transverse bulkheads and a longitudinal middle-line bulkhead. The spaces between the transverse bulkheads are called Nos. 1, 2, 3, 4, 5 and 6 holds respectively, and each hold has a port and a starboard tank. Each tank is provided with an expansion trunk, in order that the free surface of the oil may always be small, however much the bulk of the latter may expand or contract with changes of temperature.

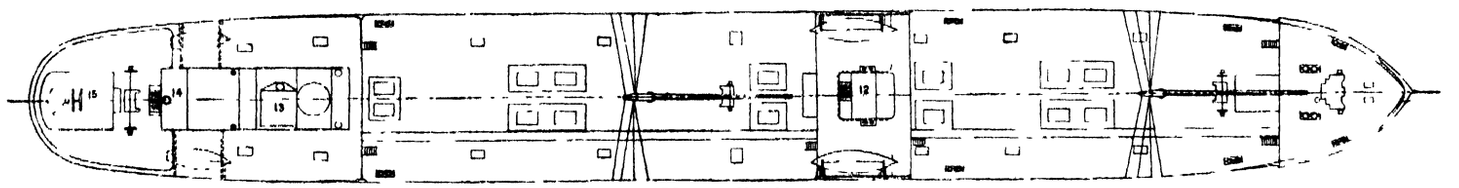
Motor Tank Vessels.—Several oil tank vessels have been fitted with internal combustion engines instead of steam propelling machinery. In 1903 the "Vandale" and "Sarmat," capable of carrying 750 tons of refined petroleum each, were built for Messrs Nobel Bros., and

fitted with Diesel motors of 360 H.P. More recently the "Emanuel Nobel" and "Karl Hagelin" have been built for the same firm; they are fitted with Diesel motors of 1200 H.P., are 380 ft. long, 46 ft. beam, 16½ ft. draught and carry 4600 tons of kerosene oil. The large motor-driven vessels are arranged somewhat similarly to the steam-driven oil-tank vessels, but with the machinery fitted in a comparatively shorter space, no boiler room being then required.

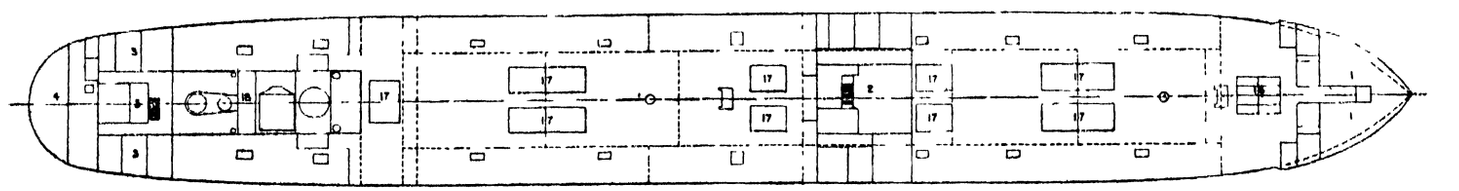
Table X. gives the dimensions, carrying capacity and other leading particulars of four cargo steamers of different types, combined, and is fitted with one deck, but has two tiers of beams. B (fig. 14, Plate II.) is a vessel with a top-gallant forecastle, bridge-house and poop, and a single deck. C is an awning-decked vessel, with two decks, but three tiers of beams. D is a shelter-decked vessel of the highest class fitted with three decks and four tiers of beams and having machinery of high power. E is an American lake steamer in which the draught was limited to 20 ft., similar in many respects to the smaller vessels shown in fig. 15 (Plate II.) and in fig. 16 below. Besides the principal dimensions and light and load displacements,



Profile.



Upper Deck.



Hold.

FIG. 12.—General Arrangement of a Modern Oil-Tank Steamer.

1, Crew space.
2, Cabins.
3, Engineers' cabins.
4, Store.
5, Chain locker.
6, Pump-room.
7, Water-ballast tank.
8, Fore-hold.
9, Coffer dam.
10, Oil-tank.
11, Boiler-room.
12, Engine-room.
13, Donkey boiler.
14, Galley.
15, Steering engine house.
16, Cargo hatch.
17, Oil and cargo hatch.
18, Coal shoot.

TABLE X.—*Types of Cargo-Carrying Steamers.*

When built	A. Built in 1881.	B. Built in 1894.	C. Built in 1897.	D. Built in 1909.	E. Built in 1909.
Type of Vessel	Well-decked.	With Top-gallant Forecastle, Bridge House and Poop.	Awning-decked.	Shelter-decked.	American Lake Steamer.
Length	263′ 6″	300′ 0″	470′ 0″	535′ 0″	580′ 0″
Breadth	35′ 8″	40′ 0″	50′ 0″	63′ 0″	58′ 0″
Depth (moulded)	20′ 6″	23′ 6″	34′ 10″	38′ 0″	32′ 0″
Draught (without keel)	19′ 3″	19′ 2″	27′ 5″	28′ 0″	19′ 0″
Weight of steel or iron in hull	820 tons	..	3676 tons	7650 tons	4145 tons
,, wood, outfit, &c.	166 ,,	..	509 ,,		300 ,,
,, propelling machinery	184 ,,	..	615 ,,	2200 tons	350 ,,
Total light displacement	1170 ,,	1620 tons	4800 ,,	9850 ,,	4795 ,,
Load displacement	3740 ,,	5530 ,,	16,710 ,,	18,350 ,,	15,795 ,,
,, block coefficient	·72	·80	·81	·68	·886
Ratio of light to load displacement	·313	·293	·287	·537	·304
Dead-weight carried	2570 tons	3910 tons	11,910 tons	8500 tons	11,000 tons
Ratio of dead-weight carried to load displacement	·687	·707	·713	·463	·696
Cargo capacity in cubic feet	115,000	170,000	680,000	..	650,000
Tonnage under deck	1436	2150	7038	8480	7100
,, gross	1816	2385	7296	12,100	7268
,, net	1167	1500	4770	6780	5484
Water-ballast capacity	357 tons	500 tons	3346 tons	..	9464 tons

and one steamer carrying mails and passengers as well as a large cargo. A is a well-decked vessel (fig. 13, Plate II.), having a top-gallant forecastle with a long raised quarter-deck and bridge-house

the block "coefficients" corresponding to the load conditions are given in Table IV., in order to show the fullness of form commonly adopted in these vessels. The *block coefficient* is the ratio of the

volume of the immersed portion of the ship to the volume of the parallelepiped, whose length, breadth and depth are the same as the length, breadth and mean draught (without keel) of the vessel itself; and it will be seen that in three cases out of the five given, the immersed volume, *i.e.* the displacement, is 80, or upwards of 80 % of this circumscribing parallelepiped. The low speed, which is found economical for the "ocean tramp," admits of this fullness, and provides that capability for large stowage accommodation for cargo which has brought it into existence. In vessels whose speed is of great importance the block coefficient varies from ·5 to ·68, the lower limit being reached on the smaller vessels on cross-channel services, and the higher limit on very long vessels, such as Atlantic liners. In the moderately fast vessel D shown in table the block coefficient is ·68. The total weight of material in the hull, *i.e.* the iron or steel and woodwork, outfit, &c. and the propelling machinery, is called the vessel's *light displacement*. The *load displacement* is made up of the light displacement, together with the weight of the cargo, &c., or the dead-weight carried; this, it will be seen from Table X., varies from two to two and a half times the amount of the light displacement, except in case D in which the machinery and the passenger accommodation absorb much weight. British vessels may not be loaded deeper than a certain mark, known for many years as the Plimsoll mark, which has to be placed on the sides of all merchant vessels. The mode of measuring tonnage is based on the Act of 1894, which embodies preceding legislation and subsequent Acts (see TONNAGE).

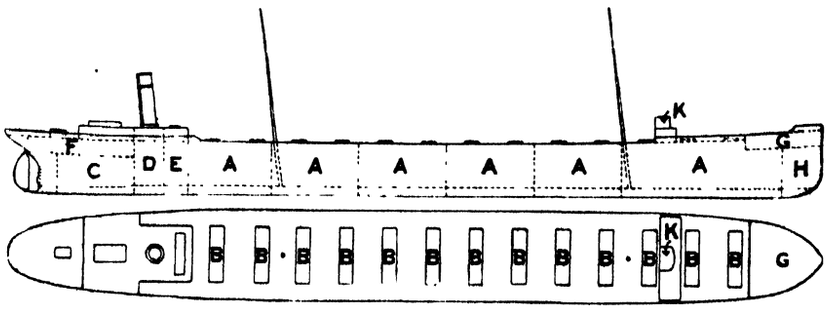


FIG. 16.—Plan of Great Lake Cargo Steamer.

A, Cargo hold. B, Hatches. C, Engine-room. D, Boiler-room. E, Coal-bunker. F, Officers' Quarters. G, Crew's space. H, Water ballast. K, Pilot-house.

The numerous varieties of passenger steamers may for convenience be taken in the following order:—Ferry; River and Sound; Cross Channel; and Ocean Steamers; although it must be understood that in many cases a hard and fast line cannot be drawn between steamers for the several services.

Passenger steamers.

Ferry Steamers.—Ferry steamers are found on many rivers and harbours in the United Kingdom; they perform important services in transporting passengers and road traffic across sheltered waters where bridges are not available; and others are built in the United Kingdom for service in all parts of the world. The "Guanabacoa," a double-ended steel vessel built by Messrs Cammell, Laird & Co., for ferry service on Havana Bay, is 140 ft. long overall, breadth moulded 38 ft., depth moulded amidships 13 ft. 2½ in. Well-decorated saloons 12 ft. high extend along the sides of the vessel, and between them are wood-paved tracks for 30 to 40 carts and horses. One thousand passengers can be carried, and a fine promenade deck for them extends over the saloons, &c. Above all a light sun deck extends right fore and aft. Compound surface-condensing engines are fitted with a screw propeller at each end of the vessel, which drive her either way at from 10 to 11 knots. She made the passage to Havana under her own steam. A number of ferry-boats have been built by Messrs Thornycroft for service in India; they are 105 ft. long overall, of 20 ft. beam, 10 ft. moulded depth and 5 ft. draught; their machinery of 500 I.H.P. is placed amidships and gives a speed of 12 knots; two saloons are arranged forward and two aft with access to a promenade deck from each, accommodation for 200 passengers with luggage being provided. A light wooden awning extends over all. These vessels are built of steel and divided into eight water-tight compartments; they were built and put together at Southampton, then taken to pieces, packed and shipped abroad, re-erected and completed at Calcutta.

The largest ferry-boats are to be found in America, and an interesting example is the "Hammonton" built in 1906 by the New York Shipbuilding Company. She is 168 ft. long overall, 38 ft. beam, 8 ft. 6 in. draught, 625 tons displacement. A feature of this vessel is that all details are arranged with the view to making the vessel practically fireproof, wood fittings being reduced to a minimum. The vessel is double-ended, carries over a thousand passengers and a large number of horses and vehicles on one deck. As in many American river vessels, the upper works extend to a considerable width beyond the body of the hull beneath to give large deck areas; the main deck being about 6 ft. above water and 55 ft. wide. Cart tracks are arranged along the midship portions of the deck with passenger saloons, &c., at the sides. A light shade deck extends forward and aft and carries a pilot house near each end. Water-tube boilers and three cylinder compound engines of 600 H.P. are fitted beneath the deck amidships and drive a propeller at each end of the boat. The "Oakland," "Berkeley" and "Newark" running at San Francisco are much larger than the "Hammonton," and have a seating capacity for 2000 people each, with a fine promenade deck above the upper deck. The first two are fitted with beam engines driving side paddle-wheels, while the third has a screw propeller at each end of the vessel driven by vertical triple expansion engines. Each of them burns oil fuel only.

River and Sound Steamers.—For service on rivers, harbours and estuaries where the traffic is considerable, paddle-wheel vessels of limited speed are usually preferred, as possessing great manœuvring power, and therefore the capability of being brought alongside the landing-places with rapidity and safety. The paddle-wheel steamer

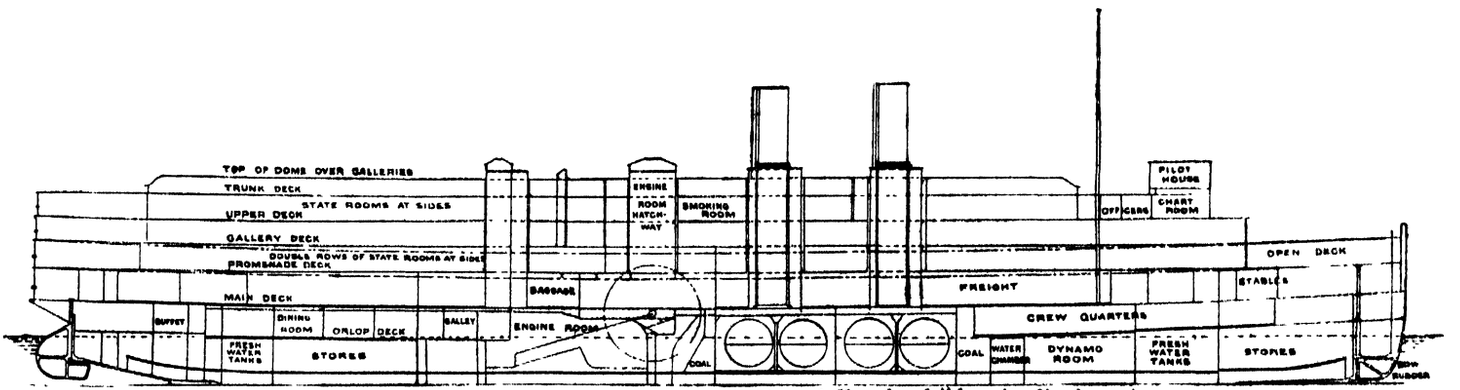
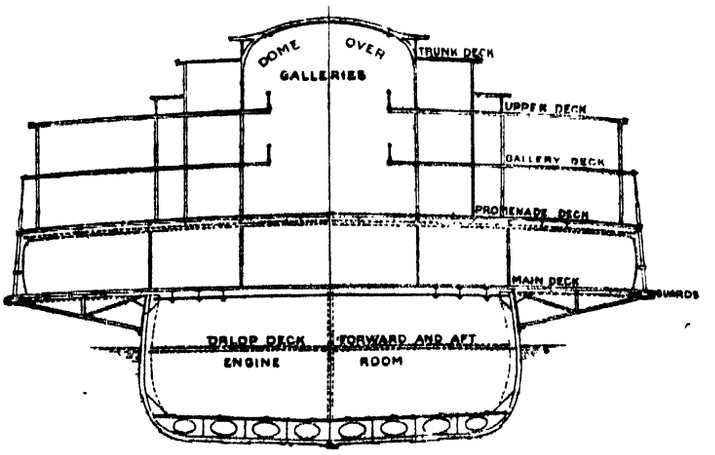


FIG. 19.—Great Lake Passenger Steamer "City of Cleveland," longitudinal section.



"City of Cleveland," midship section.

"La Marguerite," which formerly in the summer months made trips from London to the coast of Kent and to France, now conducts service between Liverpool and North Wales. She is 330 ft. long, has accommodation for a large number of passengers, and obtained 22 knots with 7500 I.H.P. on trial. Another well-known Thames steamer is the "Royal Sovereign," of length 300 ft., breadth 33 ft., depth moulded 10 ft. 6 in., draught 6 ft. 6 in., tonnage 891 tons gross, 190 tons net; carrying 2320 passengers at a speed of 21 knots.

Excursion steamers working round the coast are frequently of similar type to this vessel, but of less length and less extensive open promenade decks. A popular south coast pleasure steamer, built in 1909, is the paddle boat "Bournemouth Queen," shown in fig. 17 (Plate X.). She is 200 ft. long, 24 ft. breadth moulded and 48 ft. 6 in. outside guards, 8 ft. moulded depth, tonnage 353 tons gross, 139 tons net; she can carry 610 passengers on a No. 3 certificate and 704 on a No. 4 certificate. Her displacement at 5 ft. 2 in. load draught is 406 tons and her speed 15½ knots. The "King Edward," a steamer which began to ply on the Clyde in 1901, is 250 ft. long, 30 ft. wide, 10 ft. 6 in. deep to the main deck, and 17 ft. 9 in. to the promenade deck. She was the first passenger steamer to be driven by Parsons steam turbine. Her speed is 20 knots. A second turbine steamer, the "Queen Alexandra," began to run on the Clyde in 1902; she is generally similar to the "King Edward," but larger and faster.

These vessels are popular because of their great speed and the absence of vibration. They have been followed by others such as the "Kingfisher" on the Thames and the "Atalanta" on the Clyde. The latter being 227 ft. long, 27 ft. beam, depth 10 ft. 6 in., draught 5 ft. 6 in., displacement 520 tons and gross tonnage 400; the machinery of 2500 H.P. gives a speed of 18 knots, and is of interest as it was utilized for very extensive shop experiments to obtain data for the construction of the turbines of the great Cunarders. Numerous steamers of this class are to be found on the rivers and coasts of the Continent, but the finest are employed on the rivers and harbours of America, together with large numbers of a smaller class. Most of the light-draught river steamers of the United States are built of wood, but those employed elsewhere are usually built of steel. The "Hendrick Hudson" (fig. 18, Plate III.), built of steel in 1906, one of the most famous river boats of America, carries 5000 passengers, for whom five decks, which have a breadth of 82 ft.—the full width over the paddle-boxes—are set apart. She is 380 ft. long, 45 ft. breadth moulded, 13 ft. 5 in. moulded depth, draught 8 ft., freeboard amidships 6 ft. 3 in., tonnage gross 2847 tons. The old walking-beam arrangement of engines, for many years a distinctive feature of American river steamers, is in this vessel replaced by inclined, three-cylinder, compound, direct acting engines; her feathering paddle wheels are 24 ft. in diameter and 16 ft. 6 in. wide, and her speed is 22 knots.

Some of the boats of the Fall River Line are larger than the "Hendrick Hudson"; the "Puritan" is 420 ft. long, of 7500 I.H.P. and 4650 tons gross; the "Priscilla," built in 1904, is very similar to the "Puritan," but is 440 ft. long and 20½ ft. depth moulded; her moulded breadth is 52½ ft. and her decks extend to an extreme breadth of 93 ft.; her tonnage is 5292 tons gross; the side wheels are 35 ft. in diameter and 14 ft. wide, driven by inclined engines of 8500 I.H.P., and running at about 24 revolutions per minute maintain a speed of about 15 knots on service. A still larger vessel of the same type is the "Commonwealth," which is 456 ft. overall; breadth of hull 55 ft., breadth of decks outside guards 96 ft., horse power 11,000. The "Puritan," "Priscilla" and "Commonwealth" run on night service only to Fall River through Long Island Sound, and the accommodation provided is very large; the "Priscilla," for instance, can sleep 1500 persons besides her crew of over 200. In these vessels the freeboard is carried to one deck higher than in the "Hendrick Hudson," to enable them to accomplish the exposed ocean portion of their passage with safety; and they form a link between the fast river steamer and the fast cross-channel steamer. Similar passenger vessels are employed on the Great Lakes, an example being the "City of Cleveland" (fig. 19), built in 1908, of the following dimensions: length overall 404 ft., breadth hull proper 54 ft., width over paddle-boxes 92 ft. 6 in., depth 22 ft.; tonnage 4568 tons gross, 2403 tons net. She is built of mild steel, divided into 10 principal water-tight compartments and fitted with a cellular double bottom, and has a water chamber of 100 tons capacity to check rolling in a sea way. The engines are compound, three-cylinder, inclined, connected directly to cranks on the paddle-wheel shaft, the diameters of the cylinders being one of 54 in. and two of 82 in., and the stroke 8 ft.; eight single-ended cylindrical boilers fitted with Howden forced draught supply steam at 160 lb, and on service the vessel can maintain 20 m. or 17·5 knots per hour without difficulty, developing about 6000 I.H.P. at 28 revolutions per minute.

Cross-Channel Steamers.—Cross-channel steamers are of a heavier type than those just considered and require higher freeboard and better sea-keeping qualities to be able to make passages across more exposed waters in all weathers. Over 200 such vessels are employed carrying mails, passengers, luggage, cattle and merchandise between Great Britain and Ireland, the Isle of Man, and continental ports. The mail service between Holyhead and Kingstown has for many years employed a number of splendid vessels of this class. The four paddle-steamers, "Ulster," "Munster," "Leinster" and "Connaught," built in 1860, were 337 ft. long, 35 ft. broad and 19 ft. deep; their speed was 18 knots with 6000 I.H.P. A vessel of the same type, but larger, named the "Ireland," was added to the fleet in 1885. In 1896 and 1897 four new twin-screw steamers were built, and received the same names as the four vessels built in 1860, which they have replaced. Their length is 360 ft., breadth 41 ft. 6 in., depth 29½ ft., tonnage 2633 tons gross, 733 tons net, and displacement 2230 tons at 14 ft. 6 in. load draught. Their engines are of 9000 I.H.P. and sea-going speed 23 knots, over 24 knots having been reached on trial. They have sleeping-berths for 238 first-class and 124 second-class passengers, and large dining and other public rooms for general accommodation.

In recent years large numbers of very fine vessels of the cross-channel type have been built for other services. In 1903 the "Queen," the first turbine vessel for the Dover-Calais service, was built by Messrs Denny of Dumbarton; she is 310 ft. long and obtained 21¾ knots. In 1905 the "Invicta" was built of the same dimensions and boiler power, and by means of improved turbines the speed was increased to 23 knots. In the same year the Midland Railway Company ordered three vessels each 330 ft. long, 42 ft. beam and 25 ft. 6 in. moulded depth; and a fourth similar but a foot wider. Two of these vessels, the "Antrim" and "Donegal," were fitted with four-cylinder triple-expansion engines driving twin screws; the third and fourth, the "Londonderry" and "Manxman," were fitted with turbines of 6000 and 8000 H.P. respectively. All had cylindrical boilers of the same dimensions. The "Antrim" did better than the "Donegal" and obtained a speed of 21·86 knots with very remarkable economy; of the turbine vessels, the "Manxman" did better than the "Londonderry," reaching 23·12 knots, and proving more economical than the "Antrim" at all speeds above 14 knots.

Other successful vessels of this class are the "St George" and three sister vessels, 350 ft. long, 2500 tons displacement, 11,000 H.P. and 22½ knots speed, built for the Great Western Railway Company for service from Fishguard to Rosslare; and the "Princesse Elisabeth," of 24 knots, employed on the Dover-Ostend service. But all these vessels were surpassed by the "Ben-my-Chree," built at Barrow

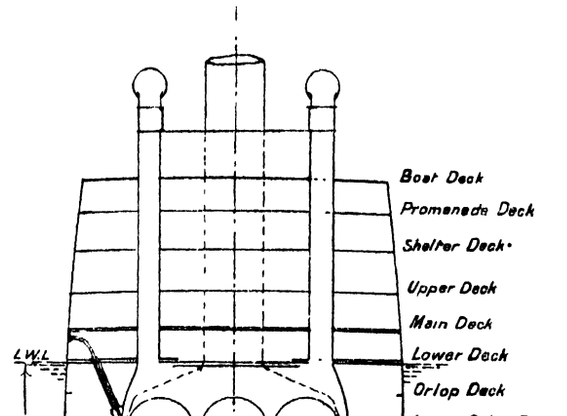


FIG. 29.—Section of "Mauretania."

for the Isle of Man Steam Packet Company. She is 375 ft. long, 46 ft. beam, 18 ft. 6 in. moulded depth, carries 2549 passengers on a No. 2 certificate, and displaces 3353 tons at 13 ft. 5 in. draught. On trial she attained 25½ knots on the measured mile, and maintained 24½ knots for over 6 hours; on service she averages 24 knots at sea and 23 knots between the Liverpool landing stage and Douglas pier. Numbers of cross-channel steamers are owned by continental companies, among which the "Prinses Juliana" (fig. 20, Plate III.) and her two sister vessels, belonging to the Zeeland Steamship Company of Holland, run on the night service between Queenboro' and Flushing. They are 350 ft. long, 42 ft. 6 in. beam, 16 ft. 4 in. depth, gross tonnage 2885 tons; they have four-cylinder triple-expansion engines of 10,000 H.P., and attained 22½ knots on the mile, and 22 knots on a six hours' run; they have excellent accommodation for 350 passengers.

For services on which relatively large cargoes and fewer passengers are carried smaller vessels of less speed are built, such as the "Rowan," built by Messrs D. & W. Henderson & Co. for the Laird Line service between Glasgow and Dublin. She is 292 ft. long, 38 ft. beam, 17 ft. 6 in. depth moulded, has sleeping accommodation for 200 passengers, triple-expansion engines, and a speed of 16 knots.

In America a number of vessels of the cross-channel type have recently been built. One of these, the "Governor Cobb," 290 ft. long, 54 ft. beam, 20 ft. 6 in. moulded depth, 14 ft. draught loaded, was the first merchant vessel in America to be driven by turbines. She was followed by the "Harvard" and "Yale" of the same type, 407 ft. overall, 63 ft. extreme breadth, 16 ft. draught loaded; they carry 800 passengers and 600 tons freight on a night service between New York and Boston; turbines of 10,000 H.P. give them a speed of 20 knots, making them at the time the fastest sea-going vessels on the American coast.

The "Prince Rupert," "Princess Charlotte," &c., recently built for service on the western coast of Canada, also belong to this section. The first-named (fig. 21, Plate III.) is 306 ft. long, 42 ft. beam, 24 ft. moulded depth. At 15 ft. draught her displacement is 3150 tons, of which 1000 tons is cargo; she is of 3379 tons gross, 6000 I.H.P. and her speed 18¼ knots. The "Prince George" is similar to the "Prince Rupert" and obtained 19·2 knots on trial at 13 ft. 3 in. draught and 2622 tons displacement; both vessels can carry 220 first-class and a

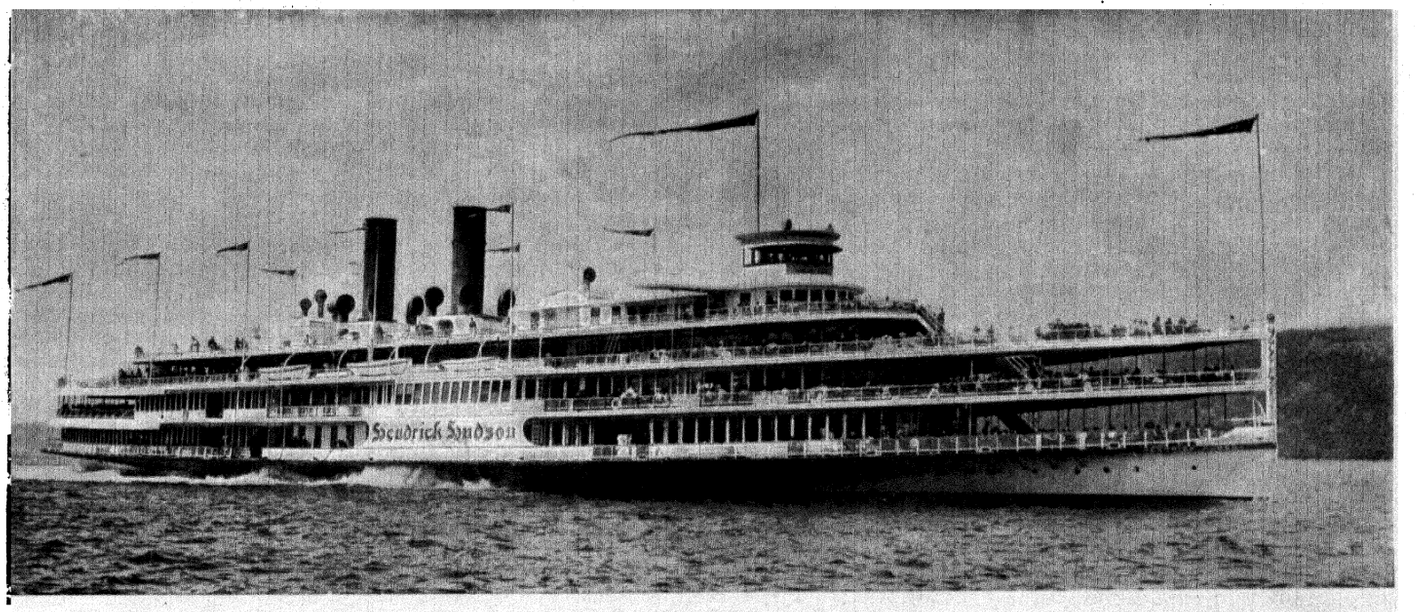
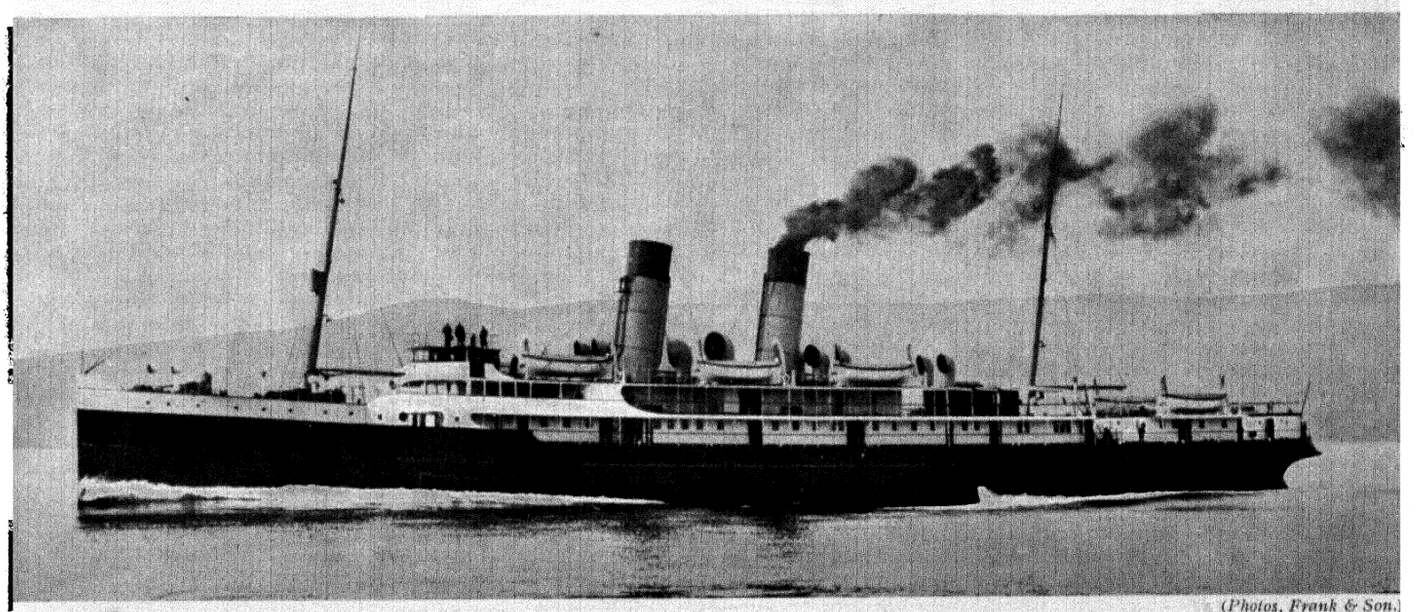


FIG. 18.—American River Steamer *Hendrick Hudson.*



(*Photos, Frank & Son.*)

FIG. 20.—Cross-Channel Steamer *Prinses Juliana.*

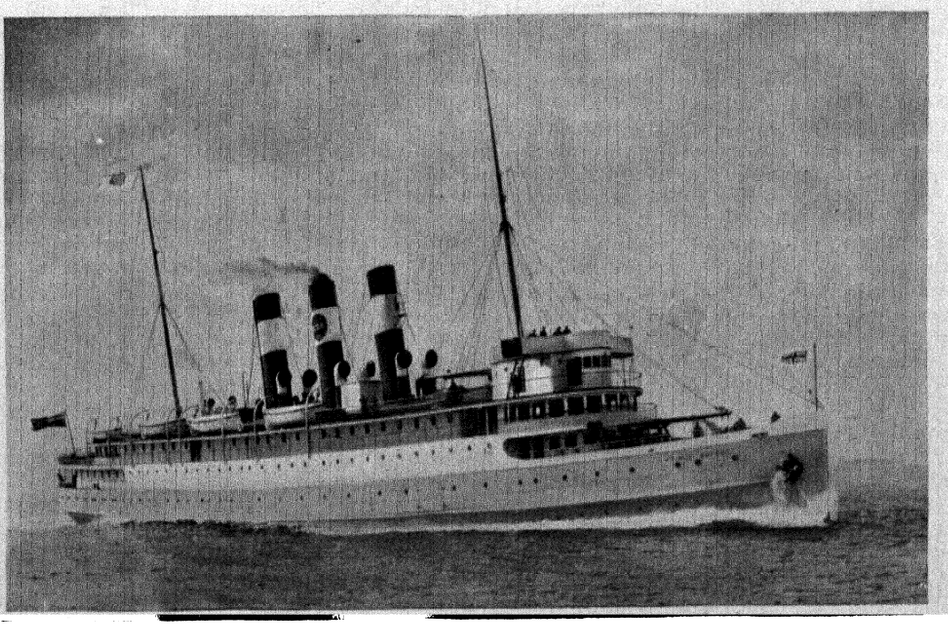


FIG. 21.—Canadian Coasting Steamer *Prince Rupert.*

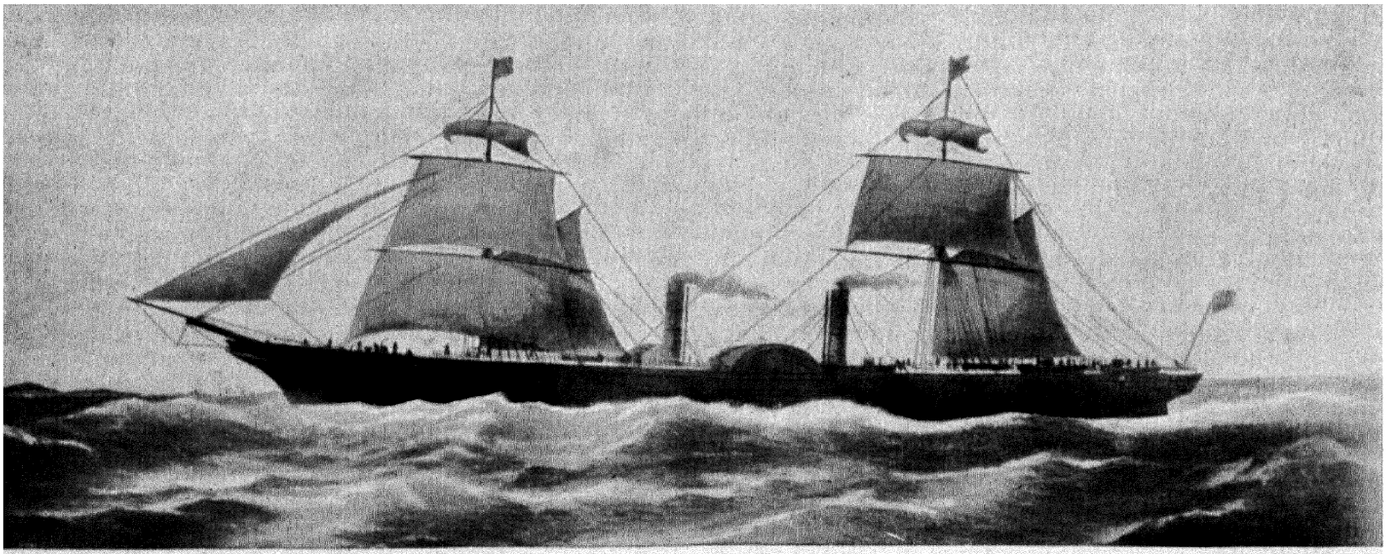


FIG. 22.—Early Cunard Steamer *Persia*.

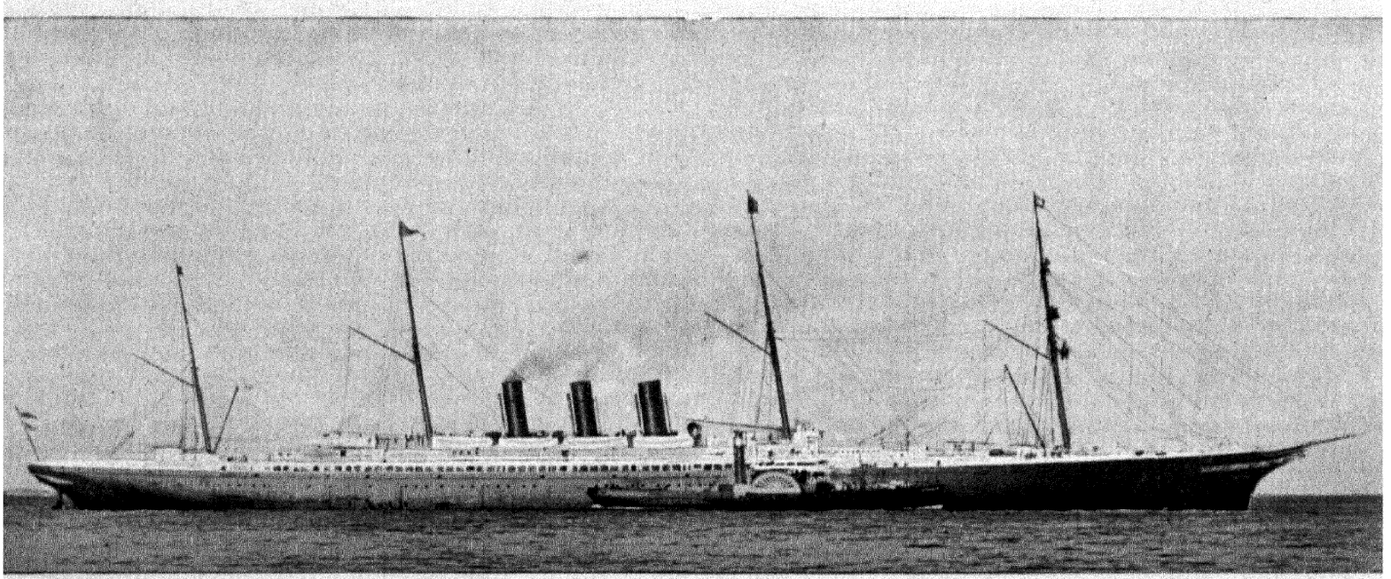


FIG. 23.—Inman Liner *City of Rome*.

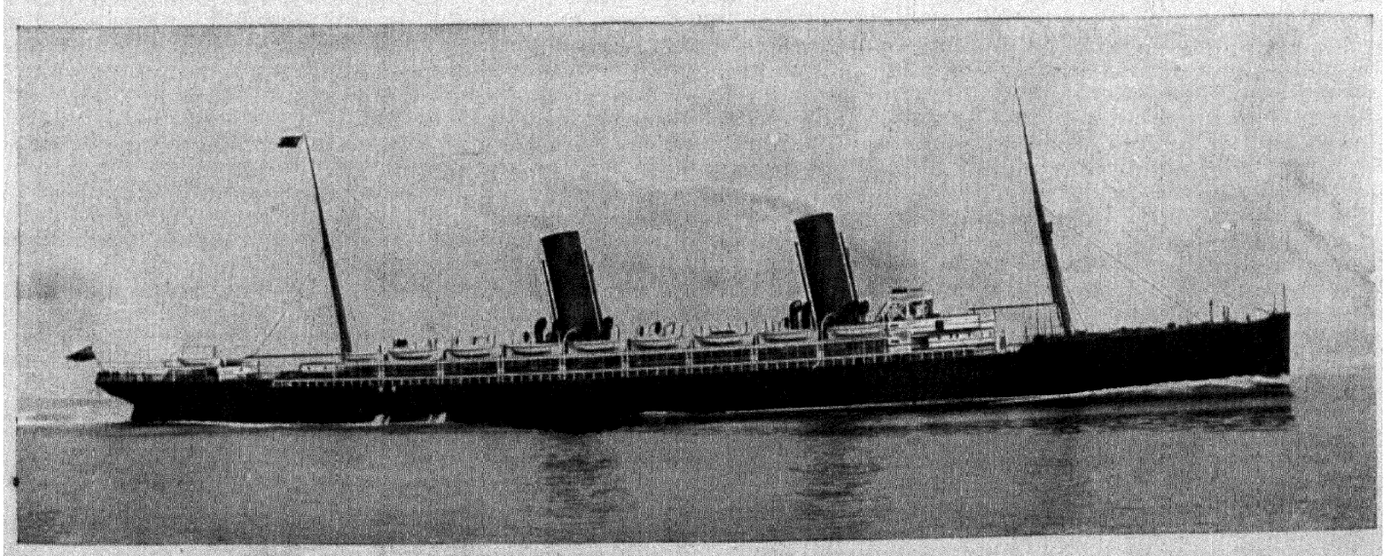


FIG. 24.—Cunard Liner *Campania*.

large number of second-class passengers. The "Princess Charlotte" is of 3600 tons and 20 knots speed.

Japan has built and engined two cross-channel steamers, which maintain a service between Japan and Korea. They are 335 ft. long, 43 ft. beam, gross tonnage 3200, displacement, at 17 ft. draught, 3880 tons. Parsons turbines of 8500 H.P., made in Japan, are fitted and give a speed of 21 knots.

Ocean Liners.—The article on STEAMSHIP LINES gives an account of the rise of the great shipping companies. The steamships of 12,000 tons and upwards, referred to on page 873, are shown in Table XI.:—

TABLE XI.—*Vessels of 12,000 Tons and upwards afloat June 1910.*

Name.	Gross Tonnage.
British.[1]	
Mauretania	31,938
Lusitania	31,550
Adriatic	24,541
Baltic	23,876
Cedric	21,035
Celtic	20,904
Caronia	19,687
Carmania	19,524
Oceanic	17,274
Arabic	15,801
Laurentic	14,892
Megantic	14,878
Minnewaska	14,317
Saxonia	14,281
Empress of Ireland	14,191
Empress of Britain	14,189
Ivernia	14,067
	326,945
25 other vessels of 12,000-14,000 tons	317,358
42 vessels. Total	644,303
Dutch.	
Rotterdam	24,149
New Amsterdam	16,967
Noordam	12,531
Rijndam	12,527
Potsdam	12,522
5 ships. Total	78,696
American.	
Minnesota[2]	20,718
Manchuria	13,639
Mongolia	13,639
3 ships. Total	47,996

Name.	Gross Tonnage.
German.	
George Washington	25,570
Kaiserin Auguste Victoria	24,581
Amerika	22,622
Kronprinzessin Cecilie	19,503
Kaiser Wilhelm II.	19,301
President Lincoln	18,168
President Grant	18,072
Berlin	17,324
Prinz Friedrich Wilhelm	17,082
Cleveland	16,960
Deutschland	16,502
Cincinnati	16,339
Kronprinz Wilhelm	14,908
Kaiser Wilhelm der Grosse	14,349
	261,341
8 other vessels of 12,000-14,000 tons	103,435
22 ships. Total	364,776
Belgian.	
Lapland	17,540
Finland	12,185
Kroonland	12,185
Vaderland	12,018
4 ships. Total	53,928
French.	
La Provence	13,753
Espagne	13,600
2 ships. Total	27,353
Japanese.	
Tenyo Maru[3]	13,454
Chiyo Maru	13,426
2 ships. Total	26,880

Summary.

Country.	Ships in No.	Gross Tonnage.	Average (Tons).
British	42	644,303	15,341
German	22	364,776	16,581
Dutch	5	78,696	15,739
Belgian	4	53,928	13,482
American	3	47,996	15,999
French	2	27,353	13,676
Japanese	2	26,880	13,440
Grand Total	80	1,243,932	15,549

Atlantic Liners.—The Atlantic liners running between Europe and the United States of America are the best known of all ocean liners; they exhibit the highest attainment of excellence in merchant-ship building, and their great size and speed, and continuous rivalry, excite universal interest.

Particulars of the famous liners which have had a share in the development of the trans-Atlantic service from 1819 to 1900 are given in Table XII., some of which is taken from *The Atlantic Ferry* by A. J. Maginnis. The "Persia" (fig. 22, Plate IV.) was the first iron steamer to be placed on the Atlantic service by the Cunard Company (1856). She was followed two years later by the "Great Eastern," 688 ft. long, 82·8 ft. broad, 48·2 ft. depth and 32,160 tons displacement with a gross tonnage of 18,915 tons and 11,000 H.P., giving her a speed of 13 knots by paddle-wheels and screw. She was built from designs by I. K. Brunel, and remained the largest vessel afloat until the "Cedric" was built 45 years later. Fig. 23 is the "City of Rome," built in 1881 at Barrow for the Inman Line, one of the most graceful vessels placed on the Atlantic. The "Campania" (fig. 24) and her sister-ship the "Lucania," each 600 ft. long and built in 1893 for the Cunard Company by the Fairfield Shipbuilding Company, held the record for fast passages across the Atlantic for several years. With twin screws and triple-expansion engines they attained a speed of 23⅛ knots on trial with 31,050 I.H.P. On her best runs the "Lucania" crossed the Atlantic, 2823 nautical miles, in 5 days 8 hours 38 minutes, the mean speed being 22 knots for the run, maintained with a consumption of coal amounting to 20⅛ tons an hour.

In the 'fifties the Collins Line took the record for speed to America, but, apart from that, the competition was chiefly between British companies until 1897, when the "Kaiser Wilhelm der Grosse" made a better record than the "Campania" or "Lucania," and for ten years from that date the fastest vessels were in German hands. The "Deutschland" (fig. 25, Plate V.), built at Stettin for the Hamburg-American Line, took the record in 1900, traversing the Atlantic from New York to the Eddystone in 5 days 17 hours 28 minutes, at a mean speed of 23·36 knots. The North German Lloyd Co. added three splendid vessels: the "Kronprinz Wilhelm" in 1901, the "Kaiser Wilhelm II." in 1902, and the "Kronprinzessin Cecilie" in 1906, the machinery being respectively of 35,000, 42,000 and 45,000 I.H.P. and forming the finest series of reciprocating engines ever built for ships. The "Kaiser Wilhelm II." raised the record on the homeward run to 23·71 knots, and made practically the same speed as the "Deutschland" on the outward run, viz. 23·12 knots. The "Kronprinzessin Cecilie" (fig. 26, Plate VI.) raised the outward record to 23·21 knots, and homeward her best passage was at 23·58 knots.

In 1903 the British government made an agreement with the Cunard Company under which two vessels of 24 to 25 knots speed across the Atlantic were to be built for mail and passenger service, and to be available for the use of the Admiralty in time of war. In accordance with this agreement the "Mauretania" (fig. 27, Plate VI.) was built by Swan, Hunter, Wigham Richardson & Co., and the "Lusitania" by John Brown & Co., and both were supplied with Parsons turbines of 70,000 H.P. driving four screws. The latter vessel was the first on service in 1907, and at once regained for Great Britain the Atlantic record, the "Mauretania" following a little later and doing still better. Both vessels maintained very high speeds, and steadily improved their records, until the "Mauretania" averaged 26·06 knots and the "Lusitania" 25·85 knots on the passage. They are 790 ft. long overall, of 88 ft. beam, 57 ft. moulded depth, 42,000 tons displacement on a draught of 33½ ft. and of 32,000 tons gross tonnage. They are thus 100 ft. longer, 5 ft. wider, 6000 tons more displacement and of 70 % greater gross tonnage than the "Great Eastern." Figure 28 is a section of the "Mauretania," which shows clearly the great height of the decks.

The French liner "La Provence" was built in 1905, of 13,753 tons gross, and 22 knots speed. On her displacement of 19,160 tons she must carry about 3500 tons of coal for the voyage, which leaves a margin of about 900 tons for passengers and cargo. The "France," launched September 10, is of 23,000 tons, 45,000 H.P. and 23½ knots.

A notable tendency in recent years is to build vessels of great size to run at more moderate speeds. The American liners "St Louis" and "St Paul" (fig. 29, Plate VII.), built in 1895, are of 11,630 tons gross and 21 knots; while the "Finland" and "Kroonland," built in America in 1902, are of 12,185 tons and only 16 knots. The last-named vessels are now running under the Belgian flag (see Table XII.). The "Caronia" and "Carmania," built by the Cunard Company in 1905, furnished evidence of the advantage of the turbine for Atlantic liners, and also illustrate the gain due to a lower speed. Their dimensions are given in Table XII.; as compared with "La Provence" it will be seen that they are of 12,000 tons greater displacement, 2 knots less speed and 10,000 less H.P. Allowing for the voyage two-thirds the quantity of coal carried by "La Provence," these vessels thus have a margin of about 10,000 tons compared with the 900 tons of that vessel, so that a much larger quantity of cargo may be taken when required. The "Rotterdam," of 24,170 tons gross tonnage, can load to a displacement of 37,200 tons. Her speed is 17 knots; the reduction of engine-power gives space and weight for no less than 3585 passengers and nearly 13,000 tons of cargo after allowing for accommodation of crew and for coal, water and stores for the voyage. The second "Oceanic," of 17,274 tons (fig. 30, Plate V.), built in 1899 for the White Star Company, was the largest vessel then built and had 21·5 knots speed; she was followed by the "Celtic," "Cedric," "Baltic" and "Adriatic" for the same company, of 16 to 18 knots speed and size increasing up to nearly 25,000 tons gross. These vessels each carry about 3000 passengers as well as a crew of 350 and upwards, and very large cargoes. The "Adriatic" (fig. 31, Plate VII.) is of 24,541 tons gross, 30 % greater tonnage than the "Great Eastern." The "Titanic" and "Olympic," which in 1910 were in course of building by Harland & Wolff for the White Star Line, are not only much larger than the "Adriatic," but they are 90 ft. longer, of 13,000 tons greater tonnage and of 18,000 tons greater displacement than the "Mauretania"; a combination of reciprocating and turbine machinery of 50,000 H.P. is provided for driving the vessels at a speed of 21 knots.

[1] "Titanic," launched October 10, 43,500 tons.
[2] Sister vessel "Dakota" was lost on Japan coast March 1907.
[3] A third vessel of same size was being completed.

TABLE XII.—*Showing Dimensions, &c., of Famous Atlantic Liners, 1819–1910.*

Name of Ship.	Owners.	When Built.	Where Built.	Material.	Length between Perpendiculars.	Breadth.	Depth.	Displacement.	Gross Tonnage.	Speed.	How Propelled.	Steam Pressure per Square Inch.	Indicated Horse-Power.
					Feet.	Feet.	Feet.	Tons.		Knts.		Lb.	
Savannah	Colonel Stevens	1819	New York	Wood	130	26	16.5	1,850	320	6	Paddles	10	90
Royal William	City of Dublin Co.	1838	Liverpool	,,	145	27	17.5	1,980	720	7.5	,,	5	400
Sirius	Brit. & Amer. St. Nav. Co.	1838	Leith	,,	178	25.5	18.25	1,995	703	8.5	,,	15	600
Great Western	Great Western S.S. Co.	1838	Bristol	,,	212	35.3	23.25	2,300	1,340	8.5	,,	15	750
British Queen	Brit. & Amer. St. Nav. Co.	1839	London	,,	275	37.5	27.0	2,970	1,863	8	,,	15	700
Britannia	Cunard	1840	Greenock	,,	207	34.5	22.5	2,050	1,150	8.5	,,	12	740
Great Britain	Great Western	1843	Bristol	Iron	274	48.2	31.5	5,780	3,270	11	Single Screw	25	1,500
America	Cunard	1848	Greenock	Wood	251	38	25.3	4,250	1,825	10.25	Paddles	13	1,400
Asia	Cunard	1850	,,	,,	268	45	24	3,620	2,227	12	,,	15	2,000
Arctic	Collins	1850	New York	,,	282	45	31.5	6,200	2,860	12.5	,,	17	2,000
Persia	Cunard	1856	Glasgow	Iron	360	45	29.9	7,130	3,300	12.5	,,	20	3,600
Adriatic	Collins	1857	New York	Wood	355	50	35.0	7,564	3,670	13.5	,,	25	4,000
Great Eastern	Great Eastern S.S. Co.	1858	Millwall	Iron	680	82.8	48.2	32,160	18,915	13	S. Screw and Paddles	30	11,000
Scotia	Cunard	1862	Glasgow	,,	379	47.8	30.5	7,600	3,871	13.5	Paddles	25	4,000
City of Paris	Inman	1866	,,	,,	346	40.4	26.2	6,411	2,651	13.5	Single Screw	30	2,600
Russia	Cunard	1867	,,	,,	358	43	28.8	6,770	2,959	13.5	,, ,,	25	2,500
City of Brussels	Inman	1869	,,	,,	390	40.3	27.1	6,900	3,081	14.5	,, ,,	30	3,000
Oceanic	White Star	1871	Belfast	,,	420	41	31	7,240	3,707	14.75	,, ,,	65	3,000
City of Richmond	Inman	1874	Glasgow	,,	441	43.5	34	9,320	4,623	15	,, ,,	70	4,000
Britannic	White Star	1874	Belfast	,,	455	45.2	33.7	9,600	5,000	10	,, ,,	75	5,100
City of Berlin	Inman	1875	Greenock	,,	488.5	44.2	35	10,100	5,491	16	,, ,,	75	5,200
Arizona	Guion	1879	Glasgow	,,	450.2	45.4	35.7	9,000	5,147	16.25	,, ,,	90	6,300
Servia	Cunard	1881	,,	Steel	515	52.1	37.9	12,300	7,392	10.5	,, ,,	90	12,000
City of Rome	Inman	1881	Barrow	Iron	560.2	52.3	37	13,500	8,144	17.5	,, ,,	90	11,500
Alaska	Guion	1881	Glasgow	,,	500	50	38	9,500	7,142	17.75	,, ,,	100	11,000
Notting-Hill	Notting-Hill S.S. Co.	1881	,,	Steel	420	45.1	26.5	6,210	3,920	12	Twin Screw	100	2,800
Aurania	Cunard	1882	,,	,,	470	57.2	37.3	13,300	7,269	17	Single Screw	90	8,500
Oregon	Guion and Cunard	1883	,,	Iron	501	54.2	40	12,500	7,375	19	,, ,,	110	13,000
America	National	1884	,,	Steel	432	51.3	38.6	9,550	5,528	18.75	,, ,,	95	8,300
Etruria	Cunard	1885	,,	,,	501	57.3	38.2	13,300	8,120	19.5	,, ,,	110	14,500
Aller	North German Lloyd	1886	,,	,,	438	48	34.6	10,460	5,400	16.5	,, ,,	150	8,200
City of Paris (second of name)	Inman	1889	,,	,,	527.6	63.2	39.2	17,050	10,670	21	Twin Screw	150	18,500
Teutonic	White Star	1889	Belfast	,,	566	57.8	39.2	16,740	9,984	20	,, ,,	180	17,500
Fürst Bismarck	Hamburg-American	1890	Stettin	,,	502.6	57.6	38	15,200	8,874	19.5	,, ,,	160	17,000
Campania	Cunard	1893	Glasgow	,,	598	65	43	21,000	12,950	22	,, ,,	165	30,000
St Louis	American	1895	Philadelphia	,,	535.7	63	42	16,000	11,630	21	,, ,,	200	20,500
Kaiser Wilhelm der Grosse	North German Lloyd	1897	Stettin	,,	625	66	43	23,760	14,350	23	,, ,,	178	32,000
Kaiser Friedrich	North German Lloyd	1898	Danzig	,,	584	64	41	20,100	12,000	21.5	,, ,,	226	27,000
Oceanic (second of name)	White Star	1899	Belfast	,,	685	68	44.5	26,100	17,274	21.5	,, ,,	192	29,000
Deutschland (second of name)	Hamburg-American	1890	Stettin	,,	666	65.5	45.5	24,400	14,500	23.25	,, ,,	225	36,000
Kronprinz Wilhelm	North German Lloyd	1901	,,	,,	637.3	66.3	39.3	22,300	14,908	23.47	,, ,,	213	35,000
Celtic	White Star	1901	Belfast	,,	680.9	75.3	44.1	37,900	20,904	17.0	,, ,,	210	13,000
Kaiser Wilhelm II	North German Lloyd	1902	Stettin	,,	684.3	72.3	40.2	26,000	19,361	23.71	,, ,,	213	42,000
Finland	Red Star	1902	Philadelphia	,,	560.0	60.2	38.4	.	12,185	16.0	,, ,,	170	10,000
Cedric	White Star	1903	Belfast	,,	680.9	75.3	44.1	38,000	21,035	16.0	,, ,,	210	13,000
Baltic	White Star	1904	,,	,,	709.2	75.6	52.6	40,700	23,876	16.0	,, ,,	210	13,000
Kaiserin Auguste Victoria	Hamburg-American	1905	Stettin	,,	677.5	77.3	50.2	43,000	24,581	17.5	,, ,,	213	16,700
La Provence	Cie Generale Transatlantique	1905	St Nazaire	,,	602.3	65.0	38.3	19,160	13,753	22.0	,, ,,	198	30,000
Carmania	Cunard	1905	Glasgow	,,	650.4	72.2	40	31,000	19,524	20.0	Parsons Turbines 3 Screws	195	21,000
Caronia	Cunard	1905	,,	,,	650.0	72.2	40.2	31,000	19,687	19.0	Twin Screw	210	21,000
Amerika	Hamburg-American	1905	Belfast	,,	669.0	74.3	47.8	42,000	22,622	17.5	,, ,,	210	15,800
Kronprinzessin Cecilie	North German Lloyd	1906	Stettin	,,	685.4	72.2	40.5	27,000	19,503	23.58	,, ,,	213	45,000
Nieuw Amsterdam	Holland Amerika	1906	Belfast	,,	600.3	68.9	35.6	31,000	16,967	16.0	,, ,,	215	10,000
Adriatic	White Star	1906	,,	,,	709.2	75.5	52.6	40,800	24,541	18.0	,, ,,	210	16,000
Mauretania	Cunard	1907	Newcastle	,,	762.2	88.0	57.1	42,000	31,938	26.06	Parsons Turbines 4 Screws	195	70,000
Lusitania	Cunard	1907	Glasgow	,,	762.2	87.8	56.6	42,000	31,550	25.85	Parsons Turbines 4 Screws	195	70,000
Rotterdam	Holland Amerika	1908	Belfast	,,	650.5	77.4	43.5	37,200	24,149	17.0	Twin Screw	215	15,000
Lapland	Red Star	1908	,,	,,	605.8	70.4	37.4	30,500	17,540	17.5	,, ,,	..	13,000
George Washington	North German Lloyd	1908	Stettin	,,	699.1	78.2	50.1	37,000	25,570	19.0	,, ,,	213	20,000
Minnewaska	Atlantic Transport Co.	1909	Belfast	,,	600.3	65.4	39.6	26,530	14,317	16.0	,, ,,	214	11,000
Titanic	White Star	1910	,,	,,	850.0	92.5	64.5	52,300	43,500	21.0	Combination of Parsons Turbines and Reciprocating Engines, 3 Screws	215	50,000
Olympic	White Star	.	,,	,,	850.0	92.5	64.5	52,300	43,500	21.0	Combination of Parsons Turbines and Reciprocating Engines, 3 Screws	215	50,000

The Hamburg-American Company followed a similar course to the White Star Line and added two large vessels of 17½ knots speed —the "Amerika" of 22,622 tons gross, built by Messrs Harland & Wolff, and the "Kaiserin Auguste Victoria" (fig. 32, Plate VII.), of 24,581 tons gross, built at Stettin. The largest German vessel afloat in 1910 was the "George Washington," built in 1908 at Stettin for the North German Lloyd.

The Hamburg-American Company ordered in 1910 two vessels, not only much larger than the "George Washington," but exceeding even the "Olympic" in dimensions. They were said to be over 900 ft. long over all, 94 to 95 ft. beam, 20,000 tons gross greater tonnage than the "George Washington," 13,000 tons more than "Mauretania" and 2000 tons more than "Titanic" and "Olympic"; turbines of 60,000 to 70,000 H.P. being provided to maintain a speed of 22 knots across the Atlantic.. The Cunard Company ordered in Dec. 1910 a 50,000-ton turbine-driven ship from John Brown & Co., to steam at 23 knots on service.

The "Minnewaska" of the Atlantic Transport Company is typical of vessels on the Atlantic route carrying a large cargo together with a limited number of passengers of one class. Three hundred and twenty-six first-class passengers are carried and provided with excellent accommodation. When fully loaded the displacement is over 26,000 tons and the speed 16 knots; the horse-power required being only a sixth that of the fast Cunarders. To large numbers of passengers the additional period on the voyage is no disadvantage, while the transport of a large cargo at the relatively high speed of 16 knots is a great advantage.

Canadian Liners.—With the increasing trade between Europe and Canada the direct Canadian liners increased in numbers and importance, and now bear favourable comparison with the great liners running between Europe and the United States. The "Victorian" and "Virginian" of the Allan line, built in 1904 and 1905 and plying between Liverpool and Montreal, were the first ocean liners to be fitted with Parsons turbines; they are 520 ft. long, 60 ft. 5 in. beam, 38 ft. moulded depth and 10,629 tons gross; and they can carry 1500 passengers and a large cargo at a speed of 17 knots. They were followed in 1906 by the "Empress of Britain" and "Empress of Ireland," built by the Fairfield Company for the Canadian Pacific Railway Company; they are 570 ft. long over all, 549 ft. between perpendiculars, 65 ft. 6 in. beam, 36 ft. 8 in. depth moulded, tonnage 14,189 gross tons, displacement 20,000 tons at 28 ft. draught; quadruple-expansion engines of 18,000 I.H.P. are fitted and a speed of over 20 knots was obtained on trial. Excellent accommodation is provided for 1580 passengers; and a considerable quantity of meat can be carried in insulated holds provided with refrigerating arrangements, besides a large general cargo, a total of 6500 tons

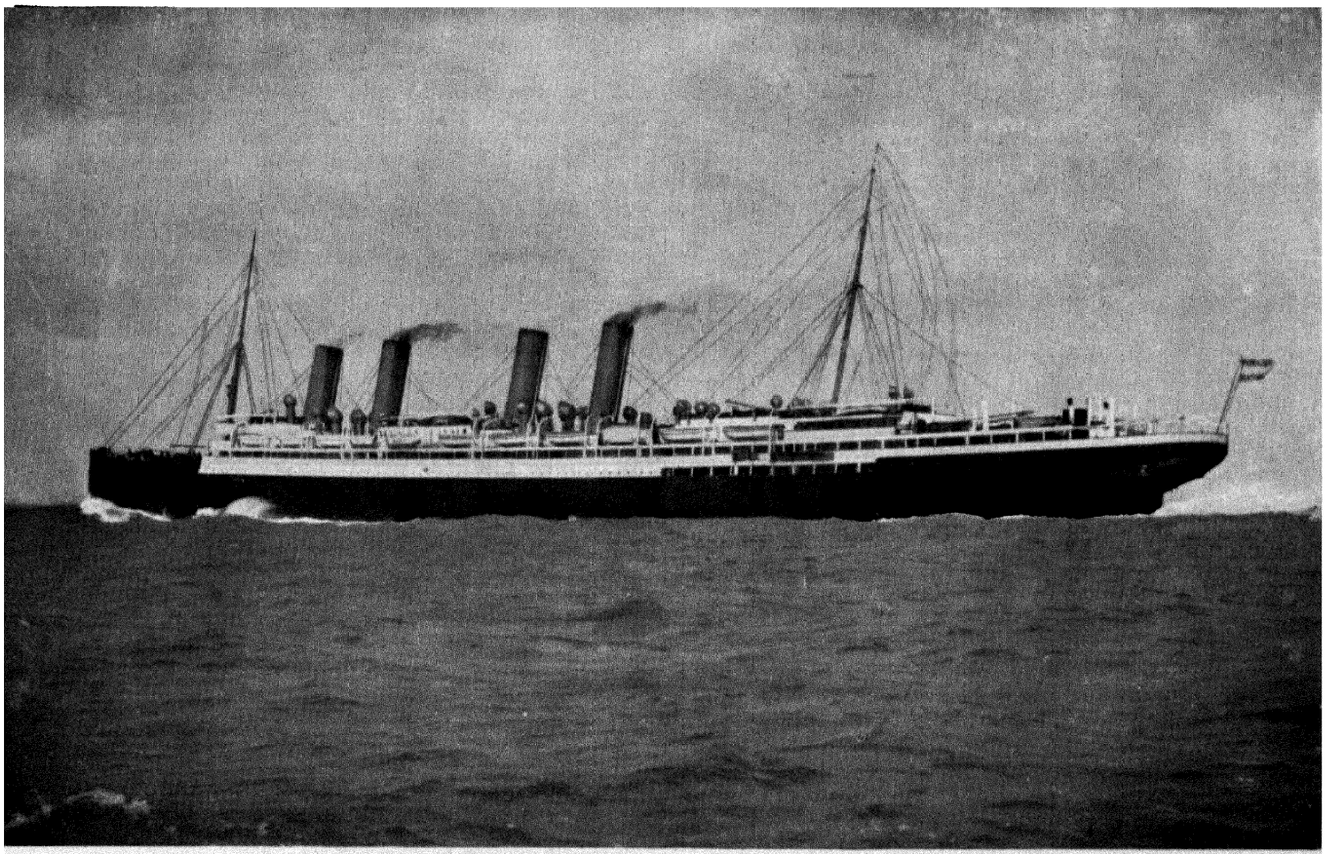


FIG. 25.—Hamburg-American Liner *Deutschland*.

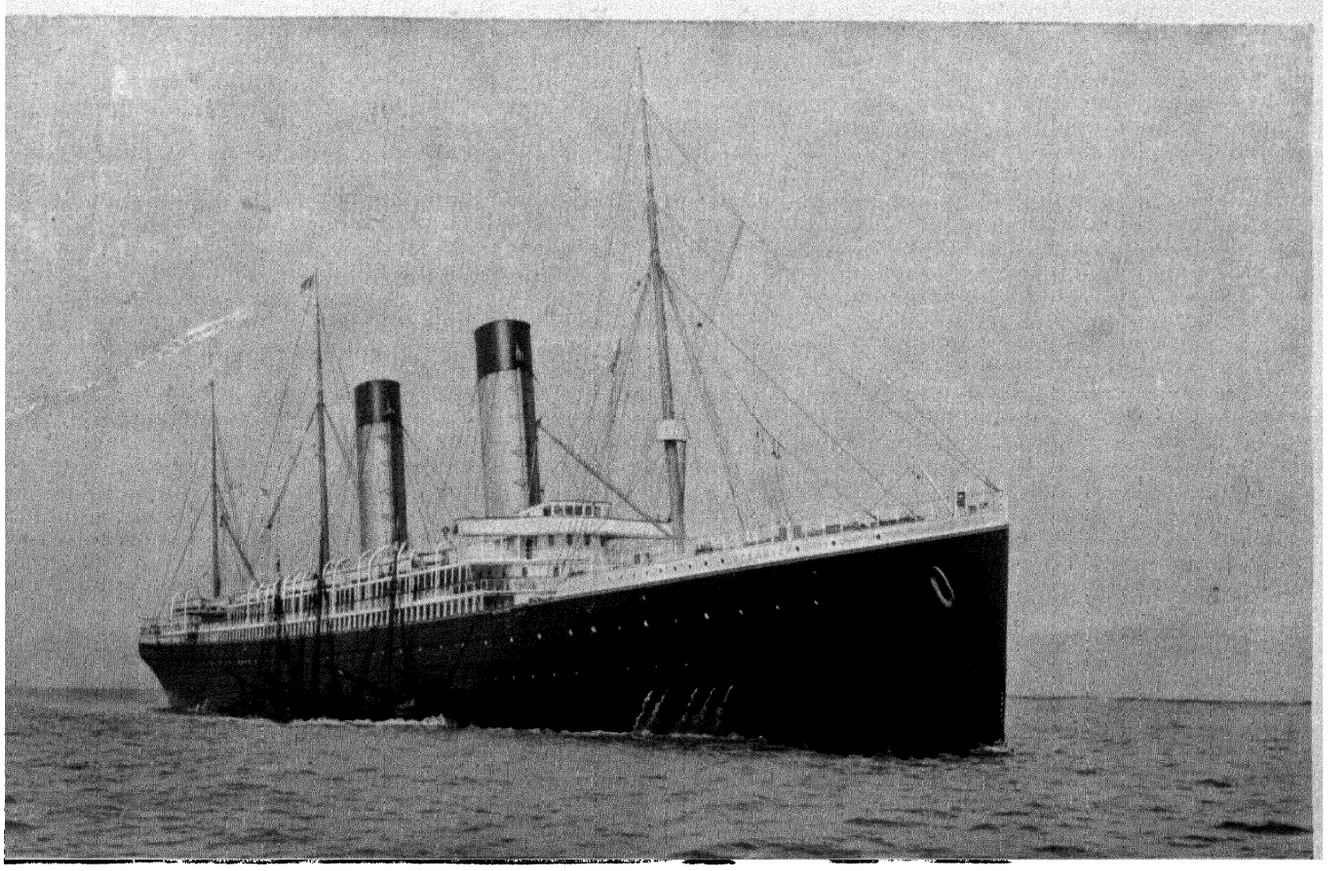


FIG. 30.—White Star Liner *Oceanic*.

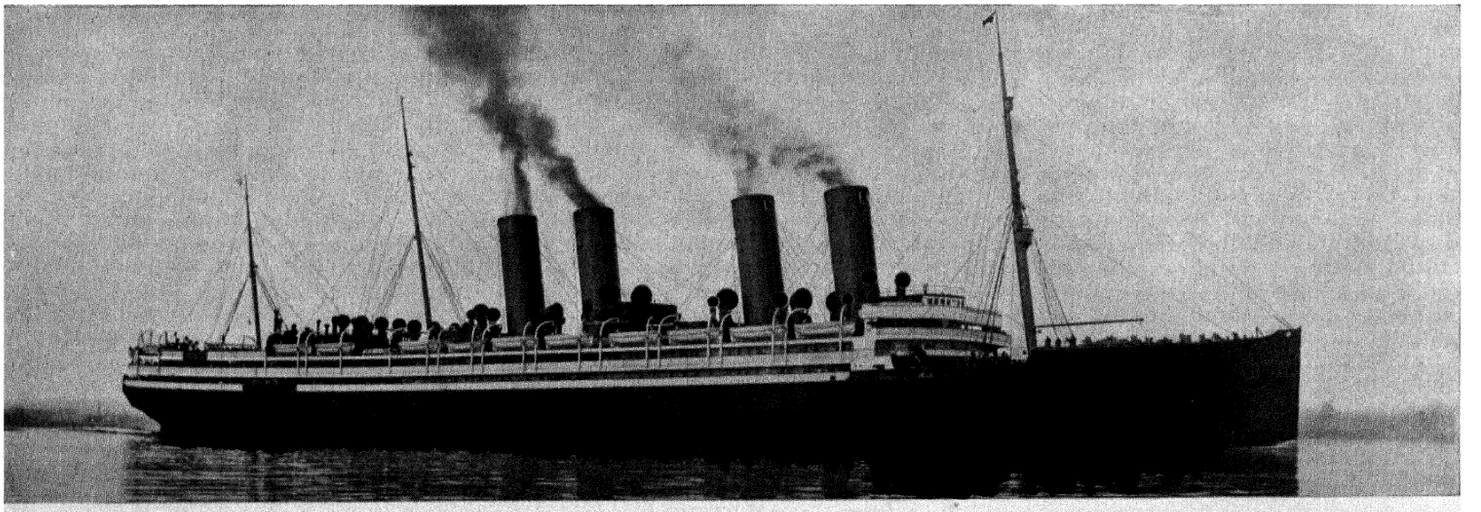


FIG. 26.—North German Lloyd Liner *Kronprinzessin Cecilie.* (*Stuart, Southampton.*)

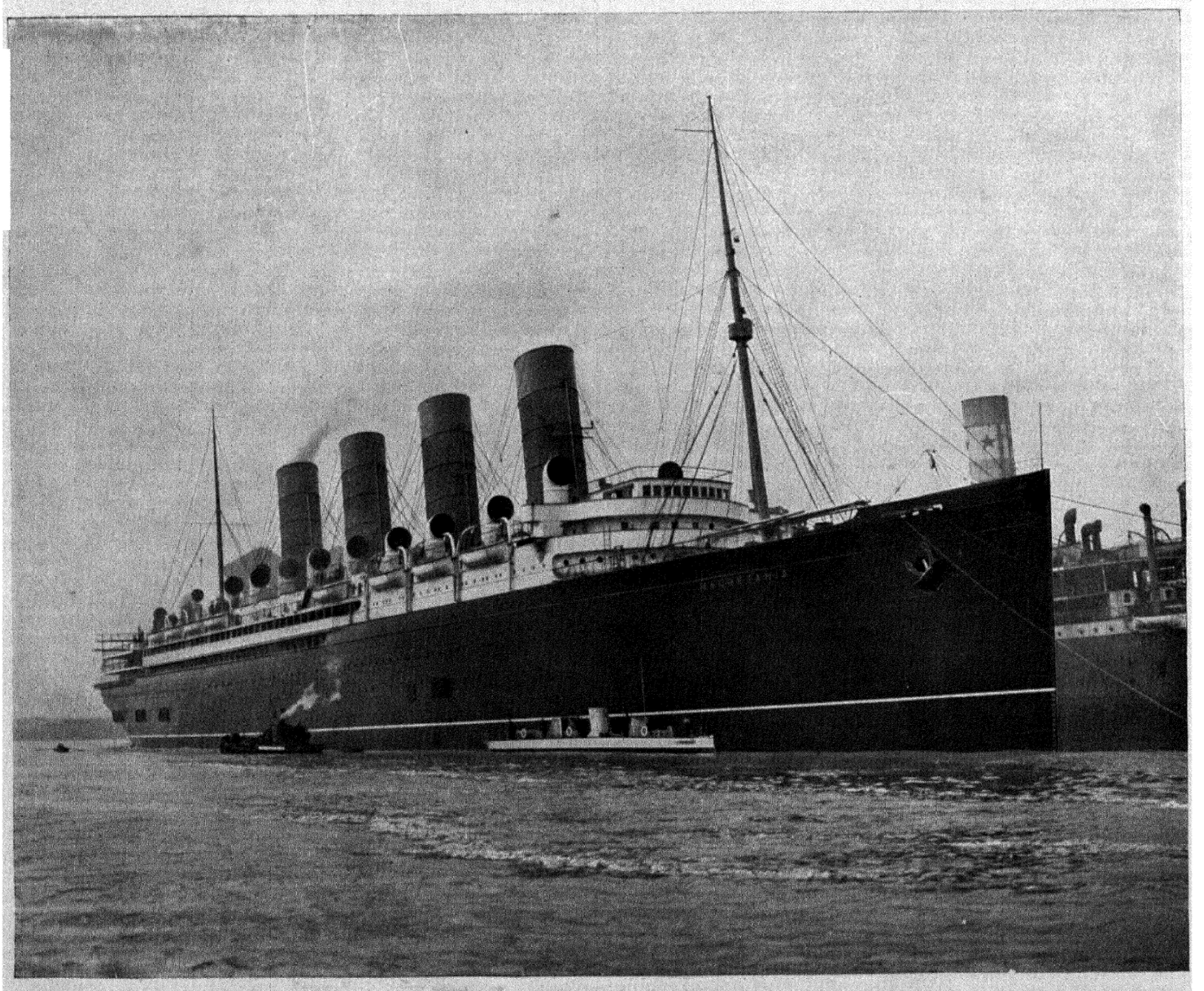


FIG. 27.—Cunard Liner *Mauretania*, with *Turbinia* alongside.

of cargo being carried in addition to the coals, water and stores required for the passage across the Atlantic.

In 1908 the "Laurentic" and "Megantic" were built by Messrs Harland & Wolff for the White Star Canadian Service; they are 550 ft. long, 67 ft. 4 in. beam, 41 ft. 2 in. depth moulded and 14,890 tons gross; they can carry 1660 passengers and a very large cargo. The "Laurentic" is provided with reciprocating engines of 6500 I.H.P. in combination with Parsons turbines of 3500 H.P., while the "Megantic" is fitted with reciprocating engines only. On trial the "Laurentic" developed 12,000 H.P. with a speed of 17½ knots, and on service her coal consumption is 12 to 15 % less than that of the "Megantic." A service from Bristol to Quebec and Montreal was opened in 1910 by the "Royal George" and the "Royal Edward," which ran for some time in a fast mail service from Marseilles to Alexandria under the names of "Heliopolis" and "Cairo" respectively. They were built in 1908 and are 545 ft. long, breadth 60 ft., depth 38 ft., tonnage 11,150 tons gross, displacement 15,000 tons at 22 ft. 6 in. draught. Parsons turbines of 18,000 H.P. are fitted, driving three screws at 370 revolutions per minute and giving a maximum speed of 20¾ knots, while 19·1 knots has been maintained by the "Royal Edward" from Bristol to Quebec. Accommodation is provided for over 1000 passengers. Still larger and faster vessels were being arranged for in 1910.

Emigrant Vessels.— Many vessels on the Atlantic Service are fitted up for carrying emigrants either with or without other passengers; they are always arranged to carry as much cargo as possible. Ships built for such services include the "Gerania," built by the Northumberland Shipbuilding Company in 1909 for Austrian owners. Her dimensions are: length 402 ft., beam 52 ft. 6 in., moulded depth 27 ft. 1 in., 4900 tons gross. She can carry 8000 tons dead-weight on 24 ft. draught at a speed of 11 knots, but her 'tween decks are arranged so that they can be used to carry cattle, troops or emigrants as required. The "Tortona," built in 1909 by Messrs Swan & Hunter for the Italian emigrant trade to Canada, is 464 ft. long over all, beam 54 ft., depth 29 ft., she is 7900 tons gross and can carry 8600 tons dead-weight as well as over 1000 emigrants. The "Ancona," built in 1908 by Messrs Workman, Clark & Co. for the Italian emigrant trade to the United States, is 500 ft. long, 8188 tons gross, 7500 I.H.P.; she can carry 2500 emigrants and a large cargo, and in addition 60 first-class passengers in spacious cabins on a promenade deck amidships. Some of the finest vessels carrying emigrants are the ships of the "Cleveland" type belonging to the Hamburg-American Company. The "Cleveland" is 587 ft. long, 65 ft. breadth moulded, 46·7 ft. depth, 27,000 tons displacement on a draught of 32 ft. 8 in., 13,000 tons dead-weight capacity, about 17,000 tons gross and 10,000 tons net, with machinery of 9300 I.H.P. and 16 knots speed. She can carry 250 first-class, 392 second-class, 494 third-class and 2064 fourth-class or emigrant passengers, making with a crew of 360 a total of 3560 persons, and has cold storage spaces of 10,000 cub. ft. for provisions, and 30,000 cub. ft. for cargo.

Liners on other Routes.—Only a few typical vessels engaged on other routes can be mentioned here. The Royal Mail Company's "Avon" (fig. 33, Plate VIII.), trading to the West Indies and round South America to the Pacific coasts, is 520 ft. long, 62 ft. 4 in. beam, 31 ft. 9 in. depth moulded and 11,073 tons gross tonnage. The "Kenilworth Castle" (fig. 34, Plate VIII.), in 1910 one of the latest additions to the Union-Castle Line Fleet trading to South Africa, is 570 ft. long, 64 ft. 8 in. beam, 38 ft. 8 in. moulded depth, 12,975 tons gross tonnage, 12,500 I.H.P. and 17½ knots speed. The "Osterley" (fig. 35, Plate VIII.) is typical of the splendid ships running via the Suez Canal to the Eastern ports, Australia and New Zealand; she was built in 1909 by the London & Glasgow Shipbuilding Company for the new fleet of the Orient Line. She is 535 ft. long, 63 ft. beam, 38 ft. depth to upper deck, 18,360 tons displacement at 28 ft. draught, 12,129 tons gross, and obtained 18·76 knots on trial with 13,790 I.H.P.; 1150 passengers can be carried as well as some 7000 tons of cargo. The "Maloja," which in 1910 was being built for the P. & O. Company, is a little larger than the "Osterley," being 550 ft. long, 62½ ft. broad, 12,500 tons gross, of 15,000 I.H.P. and 19 knots speed.

Many vessels carrying very large cargoes and comparatively few passengers are engaged in the meat and fruit trades, and are fitted up with refrigerating machinery, insulated holds and cooling appliances so as to keep the fruit, vegetables or meat at the required temperature, and at the same time maintain a proper degree of humidity or of dryness of the atmosphere. The number and size of vessels engaged in these trades continue to increase, and the enormous volume of the trade may be indicated by the fact that thirteen million carcases of mutton would be required to fill the holds of the vessels fitted for that particular trade. A typical vessel is the "Highland Laddie," built for the Argentine trade in 1909, 420 ft. long, 56 ft. beam, 37 ft. 6 in. moulded depth to shelter deck, 7500 tons gross, 4600 H.P. and speed 15¼ knots on trial. She can carry over 500 passengers in well-fitted and comfortable apartments amidships, and has insulated cargo-holds of 343,000 cub. ft. capacity. To control the temperature of the chilled beef or frozen mutton in these holds she is fitted with powerful refrigerating machinery, and cooled brine is circulated through tubes lining the sides and ceilings of the holds, some 20 miles of brine pipes being so used. The "Ruahine," built in 1909 for the New Zealand trade, is similarly fitted; she is 480 ft. long, 60 ft. broad, 44 ft. depth moulded, speed on trial 15·9 knots. The "Port Royal" of the Elder Dempster Line has insulated holds capable of transporting 3,000,000 bananas, besides pineapples, oranges and other tropical and semi-tropical fruits. The fruit is kept at the desired temperature by means of large volumes of cold dry air circulated through the holds, and the air is cooled by contact with nests of pipes through which brine of a low temperature is circulated. The "Tortuguero," a vessel 390 ft. long, 48 ft. beam, 29 ft. 6 in. depth, 4200 tons gross, built for Messrs Elders & Fyffes, has a storage capacity of 2½ times that of the "Port Royal."

Pacific Liners.—The "Empress" vessels of the Canadian Pacific Railway Company were the first liners built specially for the transpacific ocean service. The railway reached the Pacific seaboard in 1885, and in 1891 these vessels began running. They reached a maximum speed of 19·75 knots on trial, and in 1910 could still maintain 17 knots across the Pacific. In 1901 the "Korea" and "Siberia" were built for the service; they were in their day the largest American-built vessels, each being 552 ft. long, 63 ft. beam and 41 ft. depth, of tonnage 11,270 gross, and displacement 18,000 tons when loaded to 27 ft. draught. Quadruple-expansion engines of 18,000 I.H.P. gave them a speed of 20 knots on trial and 18 knots sea-going speed. Two hundred and twenty first-class passengers are carried in cabins and saloons above the upper deck, and provision is made for 60 third-class, and for 1200 Chinese steerage passengers. In 1904 these were joined by the American-built vessels the "Manchuria" and "Mongolia," of 2000 tons greater tonnage. They are 616 ft. long, 65 ft. beam, depth 31 ft. 1 in., 13,639 tons gross, 27,000 tons displacement and 20 knots maximum speed, and can each carry 1920 passengers and a large cargo. These were again outstripped in size by the "Minnesota" and "Dakota," which arrived shortly afterwards. They were 622 ft. long, of 20,718 tons gross, 33,000 tons displacement, 14 knots speed, and had capacity for 2850 passengers and 20,000 tons of cargo. The "Dakota" was lost off the coast of Japan in March 1907, but the "Minnesota" was in 1910 still on service, and was the largest merchant vessel yet built in the United States. These American vessels carry on the transpacific service from San Francisco and Seattle, and replace the older vessels with which the American Pacific Mail Company carried on the service for many years. The American and British vessels were all outstripped by the Japanese vessels "Tenyo Maru" and "Chiyo Maru" of the Toyo Kaisen Kaisha (Japanese Oriental S.S. Co.). They were built in Japan, of the following dimensions: length over all 575 ft., between perpendiculars 558 ft., breadth 63 ft., depth to shelter deck 46 ft. 6 in., to upper deck 38 ft. 6 in., gross tonnage 14,700 tons; displacement 21,500 tons at 31 ft. 8 in. draught. They are driven by three sets of Parsons turbines of a total H.P. of 17,000 at 270 revolutions per minute, and have attained 21·6 knots on trial and 20 knots on ocean service. Steam is supplied by 13 cylindrical boilers, working at 180 lb pressure and fired by oil fuel only. They have accommodation for 275 first-class, 54 second-class and 800 steerage passengers, and over 8000 tons of cargo.

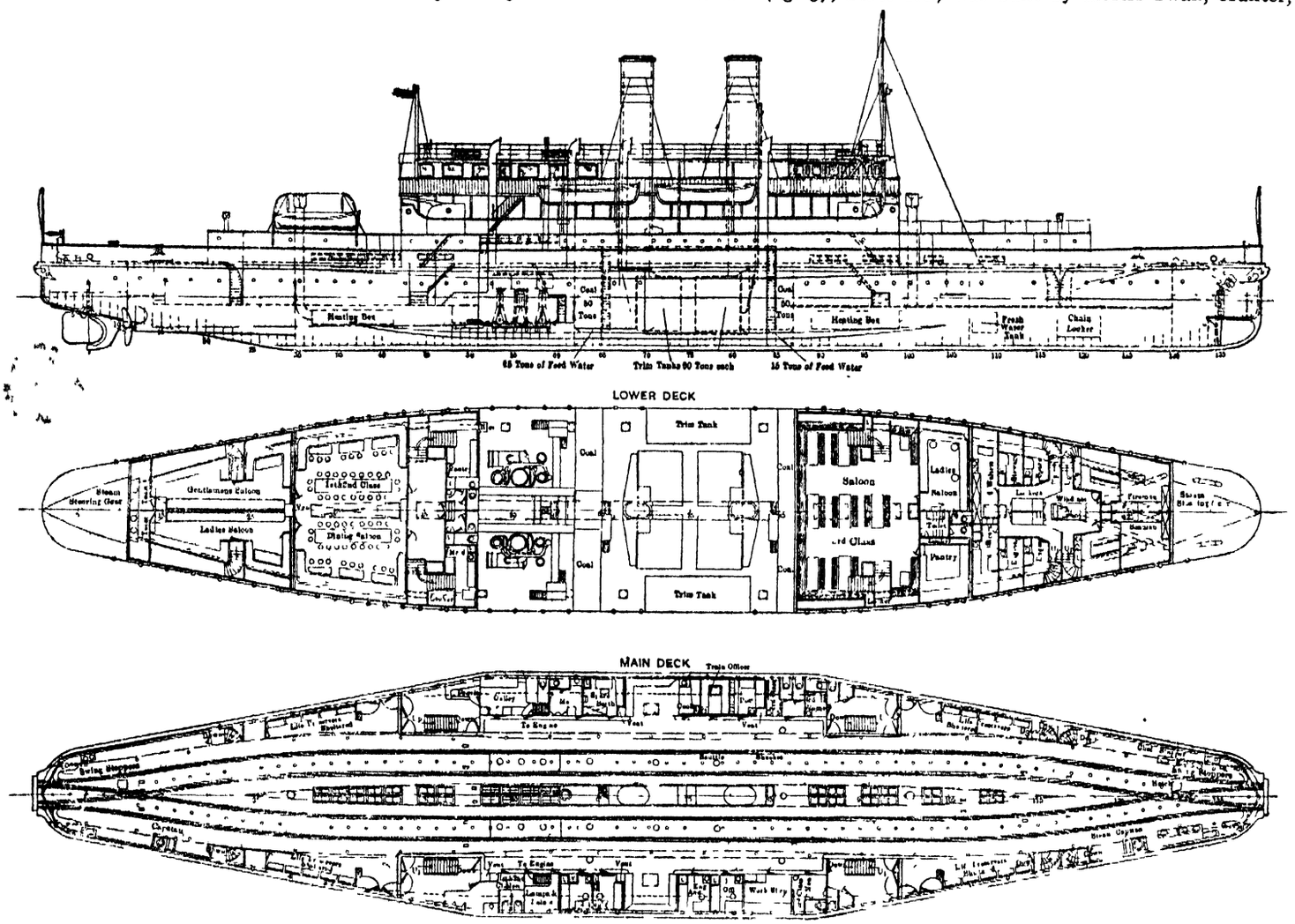
Special Vessels.—Many vessels are built for special and exceptional purposes, and cannot be classed with either ordinary cargo or passenger vessels. Amongst these may be included dredgers, train-carrying ferry-boats, ice-breakers, surveying vessels, lightships, fishing vessels, coastguard and fishery cruisers, salvage and fire vessels, lifeboats and tugs. To DREDGERS a special article is devoted (see DREDGE).

Train Ferries.—In 1869 Mr Scott Russell described (*Trans. Inst. Nav. Arch.*) a train ferry-boat of special construction in use on the Lake of Constance, having a length of 220 ft., a breadth over the paddle-boxes of 60 ft., and a displacement of 1600 tons; the horse-power of her machinery was 200, divided between two paddle-wheels, each of which was driven by a pair of independent oscillating engines. The object of this steamer was to convey trains between Romanshorn, on the one side of the lake, and Friedrichshafen, on the other; she was built of iron, and was designed to have great strength combined with light draught.

In 1872 train ferry-boats were introduced into Denmark to carry trains between the mainland and the islands and, later, between Denmark and Sweden. The first was a single track iron paddle vessel, the "Lille Baelt," built by Richardson of Newcastle for the service from Fredericia to Strib (2 m.); her dimensions were: length 139 ft., breadth moulded 26 ft., extreme 44 ft. 6 in., draught 8 ft., tonnage 306, I.H.P. 280, and speed 8 knots. A similar boat, the "Fredericia," was afterwards built by Schichau of Elbing for the same service; in 1883 this firm built two very similar but longer vessels for ferries of 2–2½ m. across, which proved very successful; and others of various types followed for ferries of 16, 18½ and 48 m. across. The Danish government in 1910 employed 22 vessels of a total of about 16,000 tons on eight ferries for railroad cars, as well as separate vessels for other traffic. These services have to be maintained all the year round, and several of the vessels are specially strengthened for passage through ice; in addition, four other vessels of 497 to 553 tons gross and 600 to 800 I.H.P. are employed wholly as ice-breakers. The latest of these vessels in 1910 was the "Christian IX." employed on the ferry across the Great Belt,

a distance of 10 m. Fig. 36 shows the profile and deck plans of this vessel, for which, with other particulars of the Danish ferries, we are indebted to *International Marine Engineering*. Particulars of the most important Danish train-carrying vessels are given in Table XIII.

The longest ferry, from Gjedser to Warnemunde, traverses a distance of 48 m. across the lower part of the Baltic Sea, and on this ferry the "Prinsesse Alexandrine" and "Prins Christian" are employed. Two other vessels belonging to the Russian government also work on this ferry, and the great success of the service led to the Swedish and German governments undertaking a direct ferry service between Sweden and Germany from Trelleborg to Sassnitz, a distance of 65 m. For this service the "Drottning-Victoria" (fig. 37, Plate IX.) was built by Messrs Swan, Hunter, Wigham Richardson & Co. Her dimensions are: length 370 ft. over all, 350 ft. between perpendiculars, breadth extreme 53 ft. 6 in., 3050 tons gross, displacement 4270 tons dead-weight capacity, 600 tons at a draught of 16 ft. 6 in., 5400 I.H.P. and speed 16½ knots. Two rail tracks are provided, the trains are shipped at the stern and are completely protected from the weather when on board, the bow of the ship being completed as usual for a sea-going vessel; ten full-sized passenger or sleeping carriages can be taken, or eighteen


LOWER DECK
MAIN DECK
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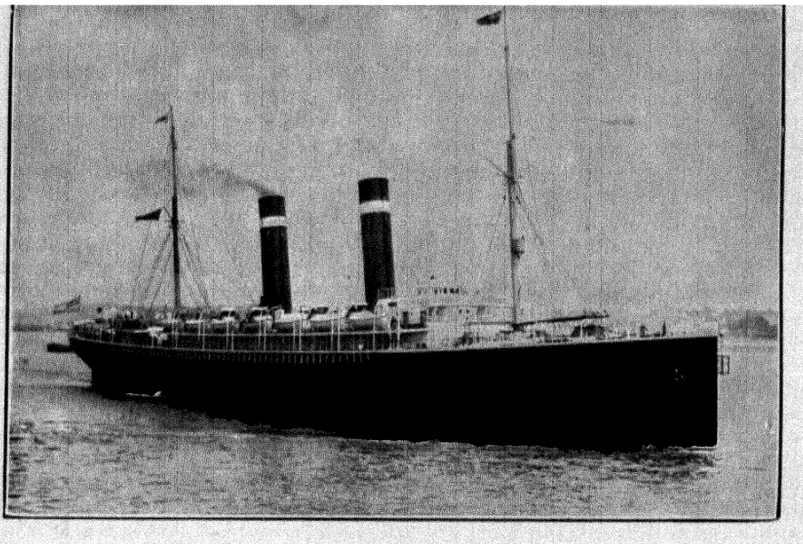


FIG. 29.—American Liner *St. Paul.*

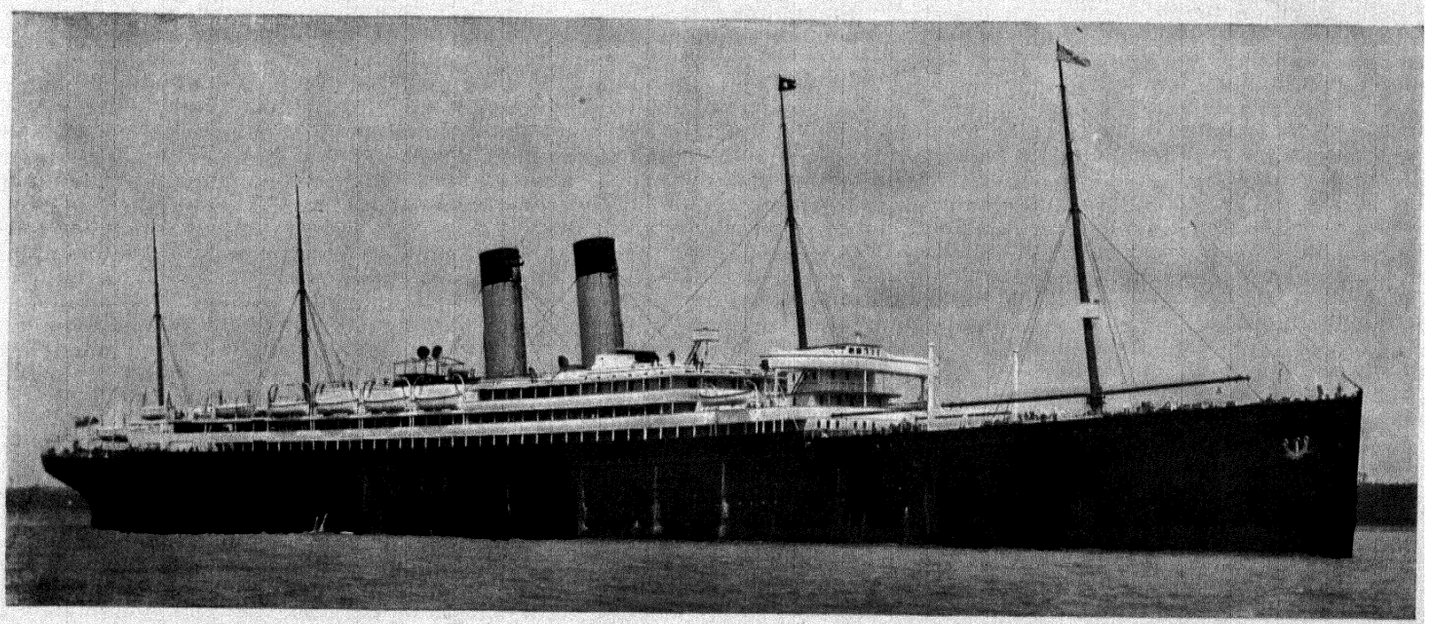
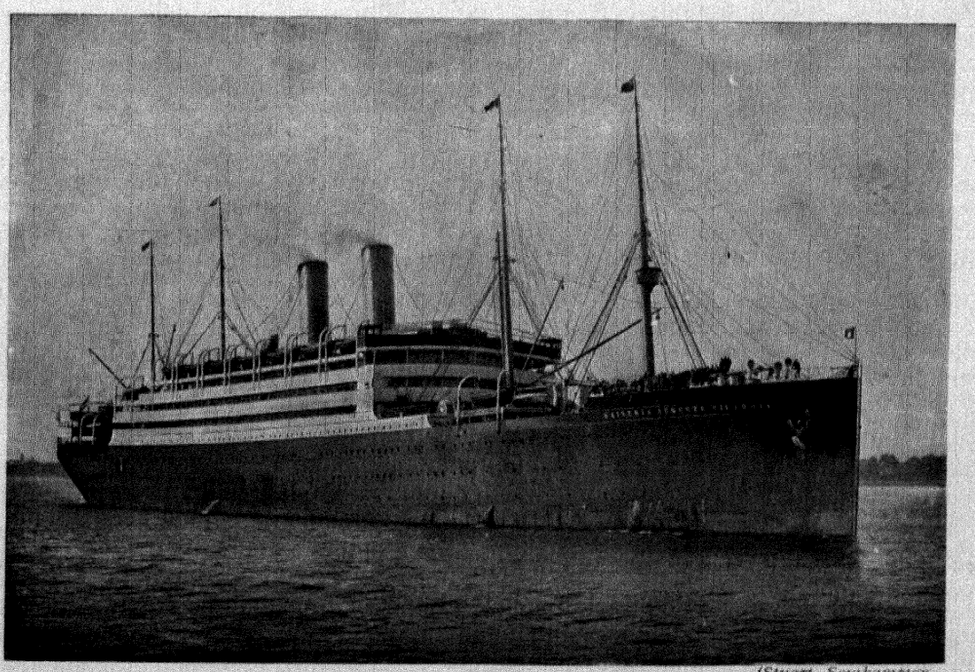


FIG. 31.—White Star Liner *Adriatic.*



(*Stuart, Southampton.*)

FIG. 32.—Hamburg-American Liner *Kaiserin Auguste Victoria.*

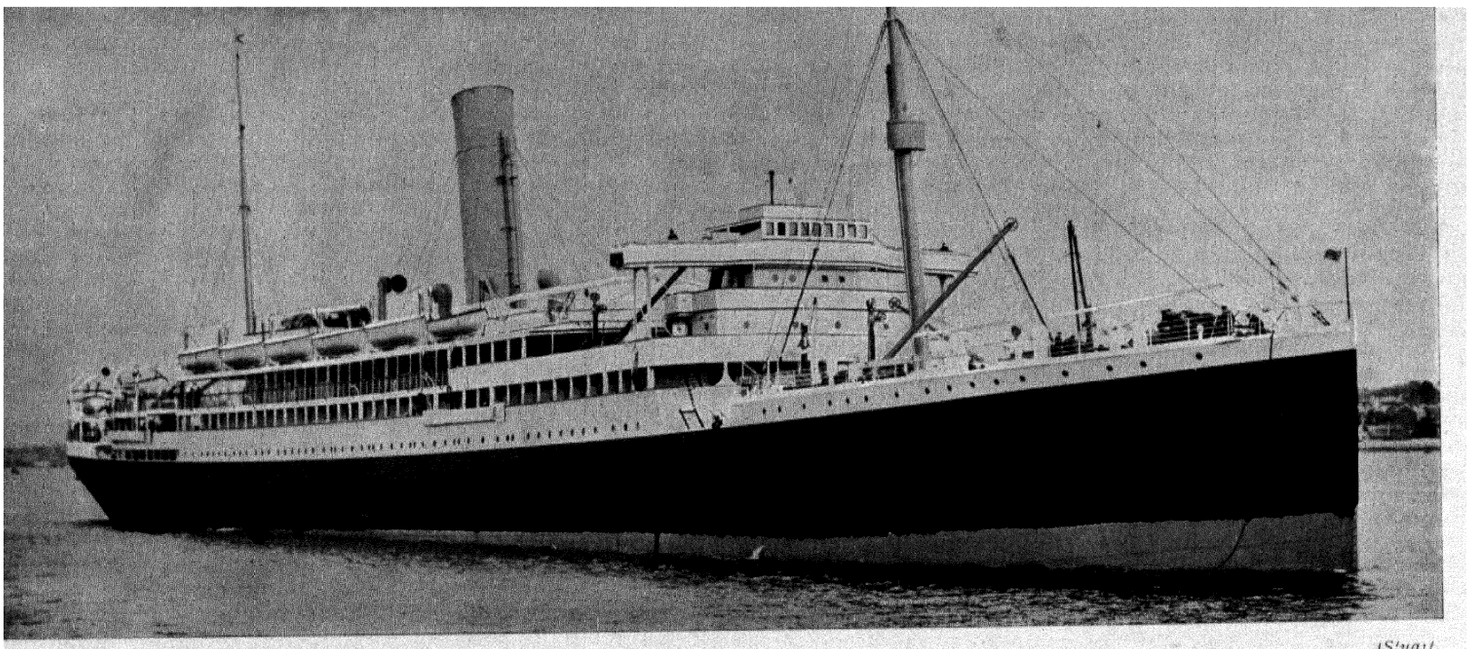


FIG. 33.—Royal Mail Steamer *Avon*. (*Stuart.*

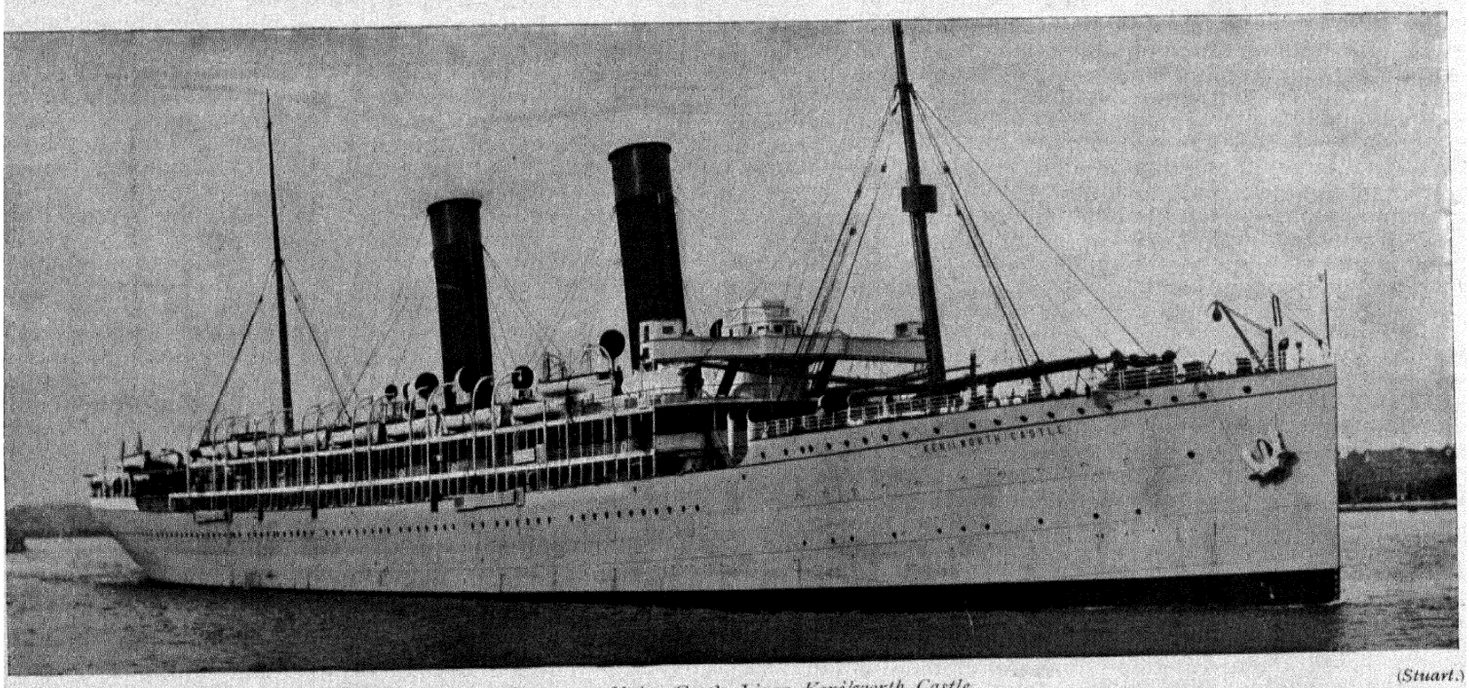


FIG. 34.—Union-Castle Liner *Kenilworth Castle* (*Stuart.*)

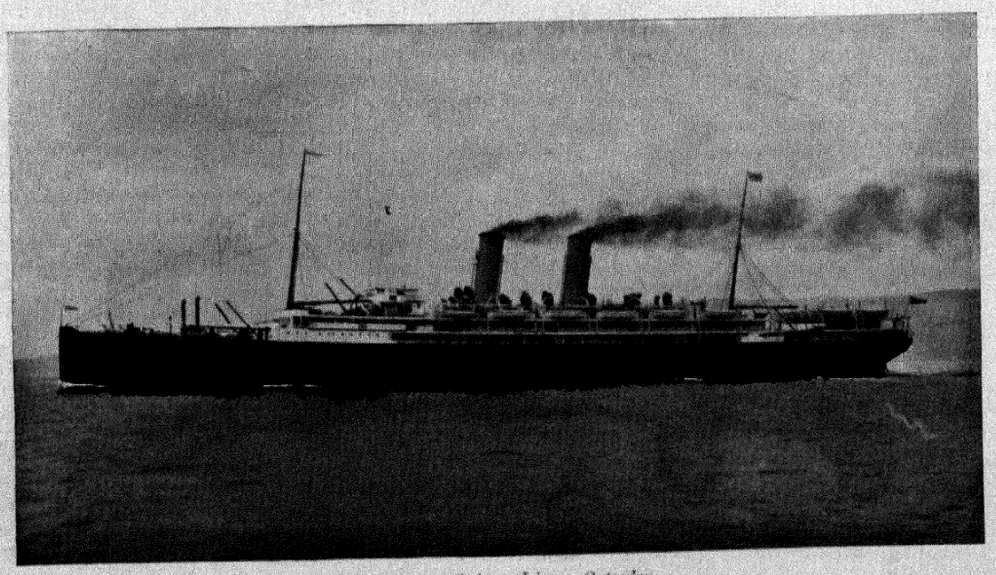


FIG 35.—Orient Liner *Osterley*.

goods wagons. Ballast tanks are provided, and powerful centrifugal pumps fitted, so that the trim of the vessel can be adjusted as necessary while embarking and disembarking the trains; she is built specially strong so that she can be driven through ice during the winter months.

In 1883 the "Solano," a large train ferry 406 ft. long, was built by Messrs Harlan & Hollingsworth of Wilmington, Delaware, to run between Bernicia and Porto Casta in connexion with the Central Pacific railway. In 1899 the American railways employed nearly 200 ferries, with an aggregate capacity of over 2000 large wagons, and by 1909 the numbers and capacity had increased to about three times those amounts, on Lake Michigan alone nine such ferries being at work.

Two other interesting examples of train ferries were built on the Tyne by Sir W. G. Armstrong, Whitworth & Co., Ltd., in 1895 and 1896, the former for service on the river Volga, and the latter for service on Lake Baikal in Siberia. The Volga has a rise and fall of no less than 45 ft. between spring and midsummer, and the ice upon it in winter is usually 2 ft., and sometimes 3 ft., thick; thus the problem presented considerable difficulties, which were increased by the fact that the locks of the Marinsky canal system, through which all vessels bound for the Volga must pass, are of such dimensions that it was impossible for vessels of sufficient size to be got through in one piece. It was decided to use two vessels to do the work, the first to act only as an ice-breaker, and the other to act only as a train-carrier. The ice-breaker was built in two pieces, the parting being at the longitudinal middle-line plane of the vessel. This was satisfactorily carried out by means of a double longitudinal middle-line bulkhead extending the whole length of the vessel. On arrival at the canal she was divided into halves, and was joined up again after passing through the last of the locks. Her dimensions were: length 147 ft., breadth 37 ft. 6 in. and depth 16 ft. 6 in., and she was fitted with compound engines and twin screws. The ferry steamer itself (fig. 38, Plate IX.) was 252 ft. long, of 55 ft. 6 in. beam, and of 14 ft. 6 in. depth. Four lines of rails were laid upon her deck, sufficient space being provided for 24 trucks or carriages, which are shown in position in the figure. The difficulty presented by the great difference in the river level was got over by an arrangement of hydraulic hoists, placed at the bow, by which two trucks could be lifted at once to a height of 25 ft., and by having lines of rails at the landing-stages at two levels. The vessel was fitted with twin screws and compound engines, which gave her a speed of 9 knots. It was found necessary to divide her into four parts for the passage through the canal locks; the divisions were made at the longitudinal middle-line plane and athwartships at her middle. Each quarter, when apart, formed a water-tight hull, and reunion was effected while the parts were afloat.

The *Lake Baikal Ferry* was built for carrying trains across the lake in connexion with the Siberian railway. For more than half the year the lake is frozen over to a considerable thickness, and in this case the vessel must of necessity be herself a powerful ice-breaker as well as a ferry steamer. Her dimensions are: length 290 ft., beam 57 ft., draught under ordinary conditions 18 ft. 6 in., and displacement 4200 tons. The hull is closely subdivided for additional safety in case of perforation. She has three sets of triple-expansion engines, working three independent screw propellers, two placed aft, as in ordinary twin-screw ships, and one placed at the forward extremity for the purpose of disturbing the water under the ice, thus assisting the heavy cast-steel stem and armoured bow to break up the solid field-ice which the vessel has to encounter. The complete structure was first erected on the Tyne, then taken to pieces and shipped to St Petersburg; from thence its numerous parts were carried to what was at that time the terminus of the Siberian railway, whence they were taken to their destination on sledges, and there the ship was re-erected and launched. The boilers constituted the heaviest individual pieces thus transported, as the weight of each could not be reduced below 20 tons.

An interesting example of a modern river train ferry is the "Fabius," built by Messrs G. Rennie & Co., Greenwich, in 1909, for service in southern Nigeria, where the river is 2 m. across. She is a double-ended paddle-wheel vessel; length 160 ft., beam 33 ft. 6 in., depth 10 ft., draught 5 ft. 6 in., speed 7 knots. She can carry six railway carriages and freight and passengers up to a total of 200 tons.

Ice-Breakers.—Steamboats for breaking a passage through frozen waters date from an early period; one is spoken of as early as 1851. The "Ermack" (fig. 39, Plate IX.), built in 1898, is one of the largest and most effective vessels of this type. Her dimensions are: length 320 ft., breadth 71 ft., depth to the upper deck 42 ft. 6 in., and displacement 8000 tons; her engines develop 8000 I.H.P., giving her a speed of 15 knots. Her general outline is shown in fig. 40, from which it will be seen that her bow slopes upwards from below, so as to enable her to run up on to the ice and bring her weight to bear in breaking it. The "Ermack" made her maiden voyage in the winter of 1898–1899, when she steamed through the Baltic to Kronstadt, crushing the ice with comparative ease.

Surveying Vessels.—Special vessels are employed by various governments, and occasionally by institutions or individuals, to survey the oceans and ocean beds, and pursue scientific inquiries of a general nature regarding the sea. The British Admiralty employs the "Egeria," "Fantome" and "Mutine," sloops of about 1000 tons displacement, modified and fitted up for the purpose, as well as two yachts purchased and suitably modified, and two vessels built especially for the purpose. The yachts are the "Waterwitch," 150 ft. long, 640 tons displacement and 10 knots speed, purchased in 1893; and the composite built vessel "Sealark," 180 ft. long, 1034 tons displacement and 11 knots speed, purchased in 1903; both are employed in Eastern waters. The vessels built for the purpose are the "Triton," 145 ft. long, 415 tons displacement, 10 knots speed, built in 1882; and the "Research," 155 ft. long, 545 tons displacement, 10½ knots speed, built in 1888; both these vessels are propelled by paddle wheels, and both are of composite build. The "Dart," a steel yacht 130 ft. long, 500 tons displacement, 7½ knots speed, purchased by the Admiralty in 1882, was in 1910 employed by the New South Wales government. The Canadian government has provided vessels such as the "Cartier," a twin-screw steel vessel, built in 1909, 164 ft. long, 29 ft. beam, 648 tons gross and 11½ knots speed, for survey work on the coast of British Columbia. The Indian government had the steel single-screw vessel "Investigator" built by Messrs Vickers, Sons & Maxim for survey of Indian waters; she is 204 ft. long, 33 ft. beam, 15 ft. 3 in. moulded depth, has a displacement of 1170 tons and a speed of 13½ knots.

The United States government built a surveying vessel, the "Pathfinder," in 1899. She is a steel single-screw vessel rigged as a brigantine, length over all 193 ft., on water-line 165 ft., beam 33 ft. 6 in., depth moulded 19 ft. 8 in., displacement 875 tons at 10 ft. draught, I.H.P. 1170 and speed 13½ knots. She has bunkers for 230 tons of coal, and is fitted up with very complete auxiliary machinery arrangements, electric lighting and ventilation, steam heating, and accommodation for a large staff. The outfit for hydrography and research is perhaps the most complete ever provided. The Carnegie Institution of Washington has fitted out the special non-magnetic vessel "Carnegie," 128 ft. long, 35 ft. beam, 12 ft. 7 in. draught, 568 tons displacement.

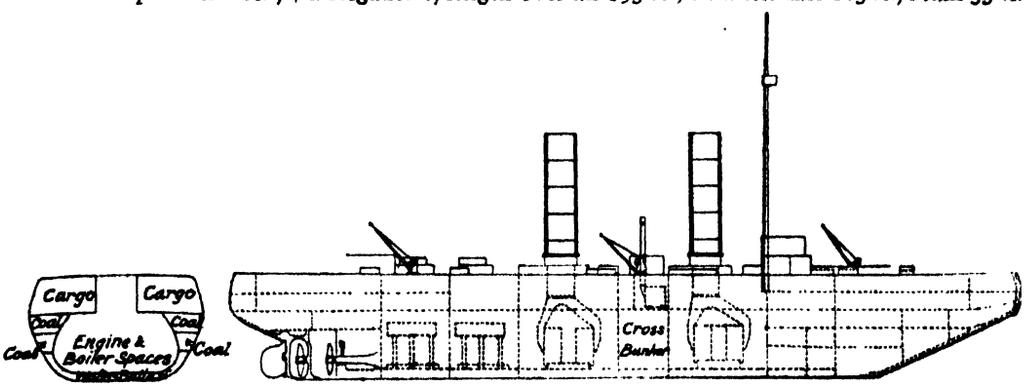


FIG. 40.—Section of "Ermack."

Lightships.—In many places round the coast the safe navigation of ships is assisted by vessels called lightships, moored in positions where lighthouses cannot well be built. Around the southern portion of Great Britain these vessels are maintained by the Trinity Corporation (see LIGHTHOUSE).

Fishing Vessels.—It is not many years since a few old paddle tugs were fitted up with fishing appliances. They proved very profitable, and the experiment led to the building and fitting out of steam vessels specially designed for such employment. Screw steam trawlers (see TRAWL) or other fishing-boats are among the vessels most frequently met with round the British coasts. In 1910 some 3000 such steam vessels of an average net tonnage of 50 tons were on the British register, as well as 23,000 sailing boats of an aggregate net register tonnage exceeding 200,000 tons. Fig. 41 (Plate X.) is the steam herring drifter "Three," and gives a general idea of the type, but there is considerable variety in the methods of fishing, and the fittings of the vessels vary accordingly.

Coastguard and Fishery Cruisers.—The lightships give warning of danger, and can also send signals ashore for the benefit of vessels in distress, but cannot themselves render help. The principal organizations for giving assistance to vessels in distress and for saving life around the British coasts are:—

1. The coastguard service maintained by the Admiralty.
2. The signal services, stations and agents maintained by Lloyd's.
3. The lifeboat services maintained by the Royal National Lifeboat Institution.

The coastguard cruisers not only watch the coast but proceed to the fishery grounds to act as international marine police. They are controlled by an admiral, with headquarters at 66 Queen Victoria Street, London, who in 1910 had at his services the torpedo gunboats "Halcyon," "Leda," "Skipjack" and "Spanker"; the old composite gunboats "Ringdove" and "Thrush"; the vessels "Colleen," "Julia" and "Fanny," purchased and fitted up for the work; and the "Squirrel" and "Argus," two yacht-like vessels specially built for the service. The "Colleen," a wooden vessel built in 1869 and propelled by horizontal trunk engines of 250 I.H.P., is 145 ft. long and 415 tons displacement, and at one time the engines gave her a speed of 8½ knots; the "Argus" is a steel vessel built in 1904, 130 ft. long, 380 tons displacement, 23 ft. beam, 8 ft. 10 in. draught; she has a light fore and aft rig, and vertical triple expansion engines of 500 I.H.P. give her a speed of 12 knots. The Fishery Board of Scotland has provided itself with some small cruisers, such as the "Freya," built in 1904, of length 138 ft., beam 24 ft., moulded depth 12 ft., and gross tonnage 280 tons; and the "Norma," built in 1909, which is 159 ft. long, 25 ft. beam, 14 ft. moulded depth, 457 tons gross tonnage and 950 I.H.P. In 1908 the Irish Fisheries Board procured the small cruiser "Helga," built by the Dublin Dockyard Co., 155 ft. long, 24 ft. 6 in. beam, 13 ft. 3 in. moulded depth; she obtained a speed of 14½ knots on trial with a total deadweight of 140 tons carried.

Salvage and Fire Vessels.—Several private companies maintain special vessels which are available for assistance of vessels in distress, salvage, wreck-raising, &c. Many of these vessels are powerful tugs fitted with derricks and winches for hoisting out cargo and ships' fittings, and provided with powerful steam or electrically driven pumps and special hoses for pumping out flooded compartments of the vessels in distress. Some have been specially built and fitted up for salvage and wreck-raising; others have been built and fitted for salvage and fireboats.

A fire and salvage boat at Elswick is 45 ft. long, 11 ft. beam and 3 ft. draught; she is fitted with a Merryweather quick-steaming boiler, and engines arranged to drive the boat at 8½ knots, or as an alternative to pump out vessels on either side, or to pump from the river for fire purposes and deliver up to 1500 gallons a minute. Many small vessels of this character are provided for harbours, docks and shipbuilding works. One of the most powerful in England is that built for the Manchester Ship Canal. This boat is 90 ft. long, and is fitted with salvage pumps capable of clearing 5000 gallons a minute, as well as independent fire service pumps capable of delivering 4000 gallons per minute at a pressure of 150 lb per square inch. Fire and salvage boats of much greater capacity have been provided at San Francisco, New York and Chicago. Two fireboats of special design were built in 1908 for Chicago. They are 120 ft. long over all, 28 ft. beam, 15 ft. moulded depth, and 9½ ft. draught. Powerful turbine pumps are driven by two Curtis steam turbines on the same shafts, which also carry 275-volt 200-kilowatt electric motors for operating the propeller motors. The pumps can be worked so as to deliver 4500 gallons per minute at 300 lb per sq. in., 9000 gallons at 150 lb or larger volumes at lower pressures; the maximum speed of the turbines and pumps is 1700 revolutions per minute. Twin screws are fitted and each is driven by a motor arranged to develop 250 H.P. at 200 revolutions per minute. The boats are fitted with electric light, search-light, and steam steering gear. New York has ten powerful fireboats, several of which can throw over 10,000 gallons of water per minute. The "Beta" of the London Fire Brigade is 100 ft. long, 11 knots speed, and can deliver 4000 gallons per minute at a pressure of 140 lb per sq. in., engines and pumps being driven by vertical steam engines.

Lifeboats and Vessels.—The lifeboat services around the British shores are maintained almost entirely by the Royal National Lifeboat Institution. In March 1910 there were 281 lifeboats in service, varying in length from 30 ft. to 56 ft. All are fitted with air-casing or watertight air-cases of sufficient capacity to keep them afloat if completely filled by the sea, and all are arranged so as automatically to relieve themselves of any sea breaking into the boat. The type of boat varies according to the service intended and the views of the men who use them — 182 are self-righting if capsized and 99 not self-righting. The conditions of service are such that the application of steam or other motive power to assist the crews presents many difficulties; these difficulties have, however, been successfully overcome by the institution and its advisers, and details of the power-driven boats are given in a paper read by Mr J. R. Barnett at the Institute of Naval Architects, March 1910. Four steam lifeboats have been tried and found very useful under the conditions in which they are employed, while three petrol-driven lifeboats, 40 to 43 ft. in length, 13 to 16 tons weight, 24 to 40 H.P. and about 7 knots speed, have been supplied as an experimental measure, and on their voyages to their stations proved to be very seaworthy and reliable boats. The institution employs one steamship, the steel twin-screw tug "Helen Peel" of 230 tons displacement, which is stationed at Falmouth and used to tow lifeboats to sea and assist them in their work, and also to render aid to vessels in distress which have no chance of getting private tugs. The United States government has, however, taken the lead in this direction, in building and equipping a special vessel, the "Snohomish," for life-saving services on the North Pacific coast. This vessel is officially termed a revenue cruiser, and is 152 ft. long over all, 29 ft. beam, 17 ft. 6 in moulded depth, and displaces 795 tons at a draught of 12 ft. 4½ in.; a single screw driven by triple-expansion engines of 1370 I.H.P. gave a speed of 13¼ knots on trial. (See LIFEBOAT.)

Tugs or Tow-Boats.—On canals and rivers steam barges are often employed for towing, and small tugs are also built for this purpose, but on swift, large rivers the tugs are often of considerable power. The tug "Little John," built by Messrs Yarrow for service on the Trent canals, is 80 ft. long, 14 ft. 6 in. beam, draught with steam up 22 in., displacement about 40 tons. Twin screws are fitted working in tunnels, and this little vessel has towed five barges, weighing with their loads 247 tons, at a speed of 5¼ knots. A river tug recently built by Messrs Thornycroft & Co. for service on the swift waters of the Upper Yangtse, and named the "Shutung," is 150 ft. long, 15 ft. beam, with a depth of 6 ft. 6 in., fitted with compound surface-condensing engines of 550 I.H.P., driving twin screws working in tunnels (as the draught of the vessel is very limited) and giving a speed of about 11 knots. After trial at Southampton the tug was taken to pieces, the sections shipped to China, with sections of a barge of corresponding dimensions, and both were put together and completed at Kiangnan. This was the first steamer to attempt regular passages in these troubled waters, and steamer and consort performed their first voyage with success. The American river tow-boat "Sprague" is 318 ft. long over all, 64 ft. 8 in. wide, depth amidships 7 ft., displacement 2200 tons, registered tonnage 1479. She is fitted with a stern wheel 40 ft. in diameter and 40 ft. in width, driven by two tandem compound engines of 12-ft. stroke, the cylinders being 28 in. and 63 in. in diameter; and at 9½ revolutions per minute her horse-power is estimated at 1500 H.P. In 1907 she towed on one occasion 56 coal boats, each 180 ft. long and 26 ft. wide, loaded with over 67,000 tons of coal and covering a water area of nearly 7 acres. On the American rivers the superiority of the screw propeller is, however, now realized, and shallow-draught tow-boats with propellers working in tunnels have been adopted. Interesting tugs have been built by Messrs Cox & Co. of Falmouth for work in the North-Eastern Railway Docks on the Tyne. Great power in small length was required, and engines of 1000 I.H.P. are installed in vessels 75 ft. long, 26 ft. beam, 12 ft. 6 in. deep, having a mean draught of 10 ft.; twin screws set widely apart being provided to give manœuvring power. Tugs in common use in harbour and coasting services are often 90 ft. to 120 ft. in length, 20 to 23 ft. beam, 10 to 12 ft. depth, 9 to 12 ft. draught, 400 to 600 I.H.P. and 11 to 12 knots speed; tugs fitted with independent acting paddle-wheels are popular for some services on account of their great handiness, but the great majority of new vessels are fitted with single or twin screws. For ocean service larger vessels are built. A steel tug built by the Bath Iron Works for the American coal trade is 165 ft. over all and 1045 tons displacement, with triple-expansion engines of 900 H.P. The "Cornell" is one of the largest American sea-going tugs; when towing she has developed 1390 I.H.P. at 97 revolutions, and when running light 1900 I.H.P. at 135 revolutions and a speed of 15½ knots. The "Hearty," built to go out under her own steam to work in the Hooghly, is 212 ft. long, 30 ft. beam, 12 ft. 6 in. draught, 1300 tons displacement, vertical compound engines of 2100 I.H.P. drive, twin screws, and the vessel can steam at 14½ knots. Recent screw tugs of the "Rover" type, built for the British Admiralty, are 154 ft. long, 27 ft. 4½ in. beam, 11 ft. draught, 615 tons displacement, 1400 I.H.P., giving 13¼ knots with twin screws. The latest paddle tugs of the "Grappler" type are 152 ft. long, 28 ft. beam moulded, 53 ft. 3 in. over guards, 11 ft. 4 in. draught and 690 tons displacement. Inclined compound engines are fitted with means to work the wheels independently or together as desired. 1250 I.H.P. gives a speed of 12 knots. In these tugs the towing hook is carried well forward to permit the tugs to manœuvre freely, and good beam is given so that in case of a heavy side pull the tug will not capsize.

Each year from 20 to 30 tugs are built in the United Kingdom, and many of them are fitted with powerful pumps and heavy derricks and winches, so that they are of service in case of fire or salvage. The North-Eastern railway tugs referred to are able to pump 500 gallons a minute, *i.e.* about 140 tons an hour, while the "Lady Crundall," belonging to Dover, can pump 700 tons an hour.

Yachts.—Vessels built for pleasure purposes and for racing have for many years been known as *Yachts*. (See YACHTING.)

In 1825 Mr Assheton Smith built a steam yacht, and although the building of such yachts was discouraged by the clubs, he continued to build, and produced between 1825 and 1851 nine steam yachts of various sizes; one built in 1844 had a screw propeller, the others were fitted with paddle wheels. In 1856 the ban on steam yachts was withdrawn by the clubs, and others began to build; but as late as 1864 there were only 30 steam yachts afloat. In 1876, however, Lloyd's Register Committee issued *Rules for the Building and Classification of Yachts*, and from about that date great improvements were made in the design and construction of yachts of all classes, as well as in their propelling machinery, and steam yachts were built in much greater numbers.

As with trading vessels, the machinery at first fitted in yachts was only regarded as auxiliary; a well-known example of a successful auxiliary steam yacht is Lord Brassey's "Sunbeam" (fig. 42, Plate XI.), built in 1874, of the following dimensions: length over all 170 ft., beam 27 ft. 6 in., depth of hold 13 ft. 9 in., displacement 576 tons, registered tonnage 334 tons gross, 227 tons net, and Thames

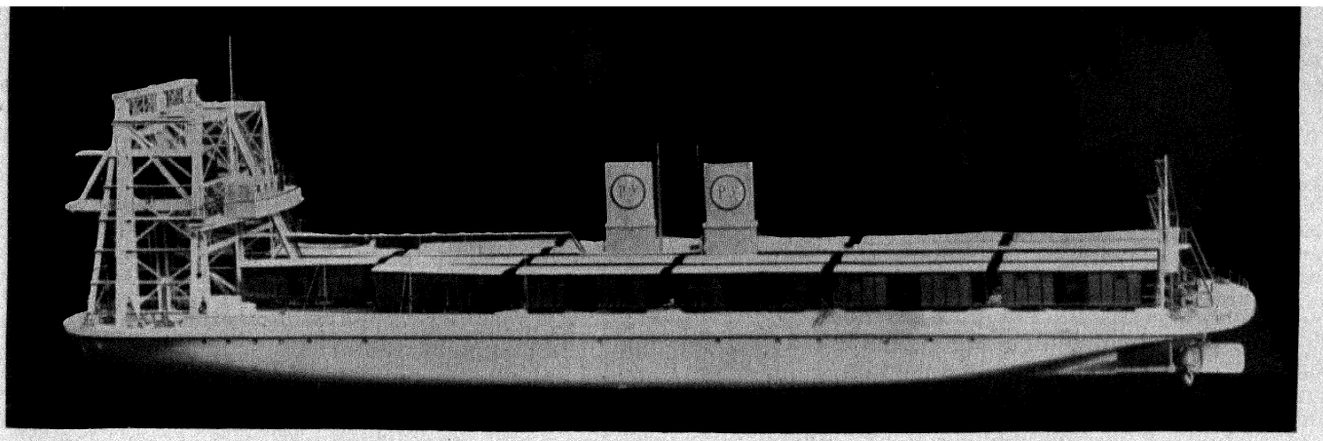


FIG. 38.—River Volga Train Ferry.

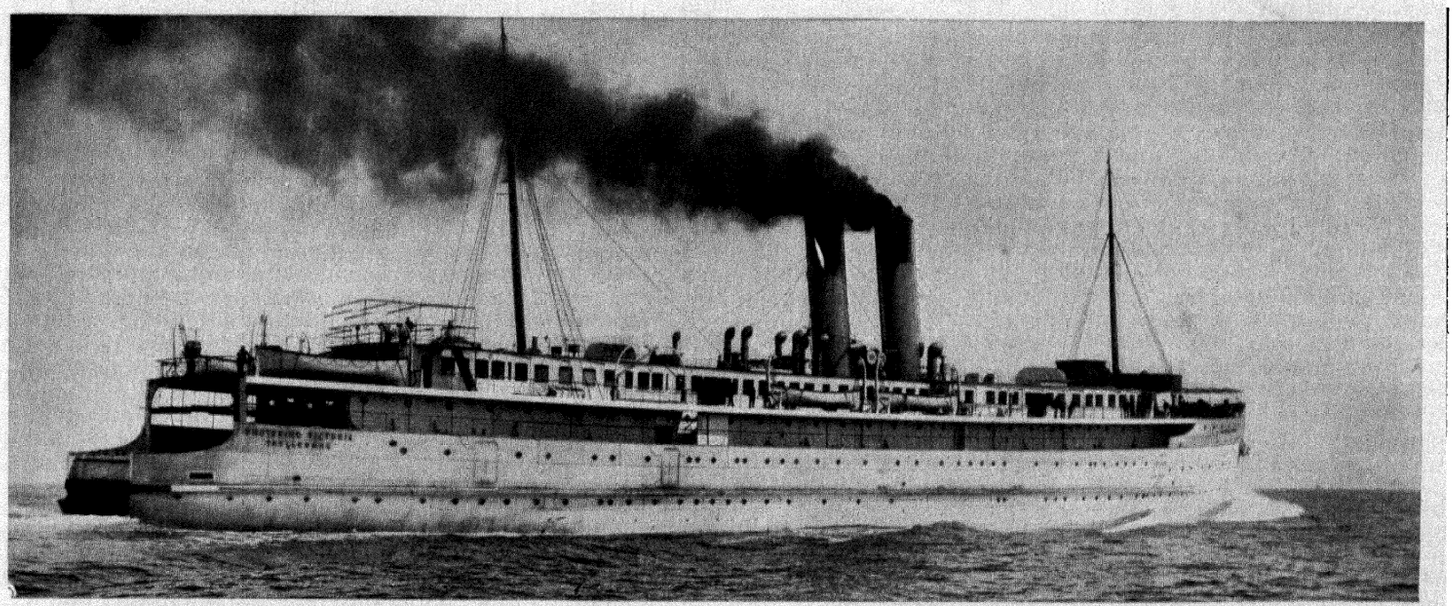


FIG. 37.—Sea-going Train Ferry Steamer *Drottning Victoria.* (*Frank & Sons.*)

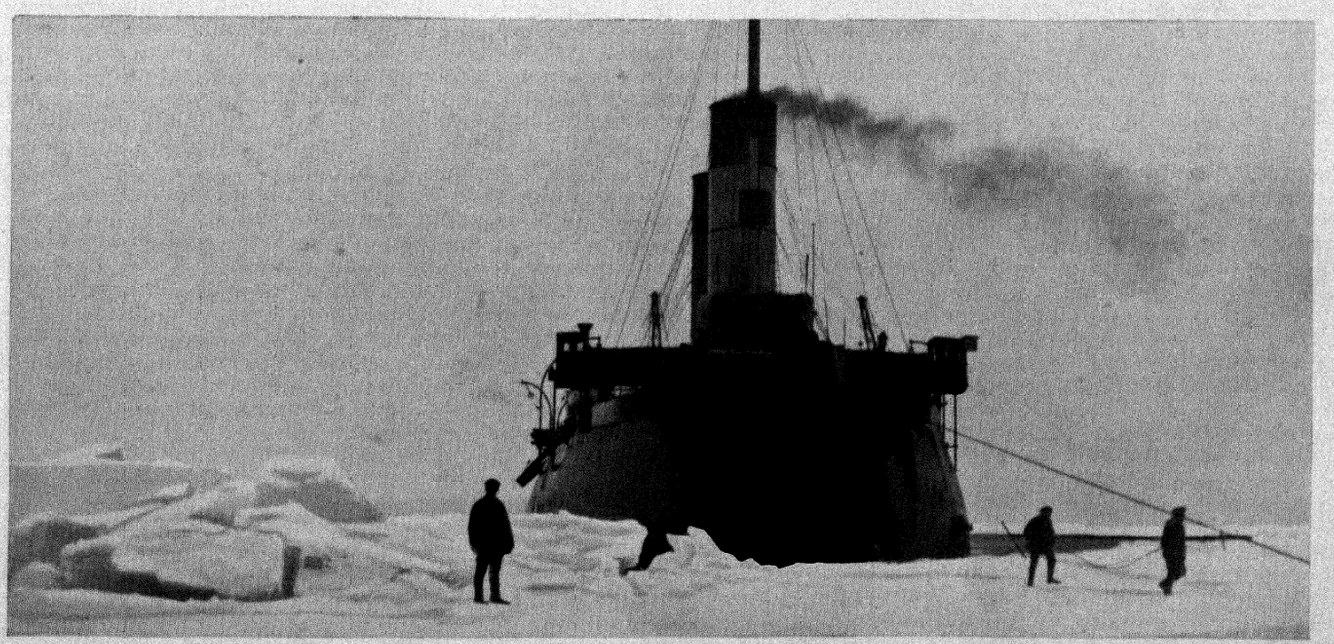


FIG. 39.—Ice-breaking Steamer *Ermack.*

FIG. 41.—Steam Fishing Vessel—Steel Screw Drifter—*Three.*

FIG. 46.—Motor Driven Mail Boat *Manawe.*

FIG. 17.—Excursion Steamer *Bournemouth Queen.*

FIG. 45.—Australian Motor Yacht *Bronzewing.*

yacht measurement 532 tons; she is rigged as a three-masted schooner; her original sail area, 9200 sq. ft., has recently been reduced to 7950 sq. ft.; her hull is *composite*, the frames being of iron and the planking of teak; her engines are compound of 70 N.H.P. Very much larger yachts have been built in recent years, such as the "Lysistrata," 286 ft. long, 40 ft. beam, 13 ft. 9 in. depth of hold, 1943 tons gross tonnage and 2089 tons Thames Y.M., built in 1900; and the "Liberty," 208 ft. long, 35 ft. 6 in. beam, 17 ft. 9 in. depth of hold, 1607 tons gross tonnage and 1571 tons Thames Y.M., built in 1908. These two vessels and many others of similar types are American-owned. The yacht "Emerald," of 750 tons yacht measurement and 1400 H.P., built on the Clyde in 1902, crossed the Atlantic in May 1903, and was the first turbine steamer to be classed in any registry. The "Atalanta" (ex "Lorena"), of 1398 tons Y.M., built in 1903, fitted with turbines of 3800 H.P., was the finest turbine-driven private yacht afloat in 1910. The "Tarantula," built in 1902, of 122 tons Y.M. and fitted with turbines of 2200 H.P., is a high-speed vessel resembling a torpedo-boat destroyer. The "Winchester," built in 1909, is of a similar type; she is 165 ft. long, 15 ft. 6 in. beam, 188 tons Y.M., and has turbines of 2500 H.P., which give her a speed of 26½ knots.

The royal yachts of European sovereigns are the largest yachts yet built. They include the imperial Russian yacht "Pole Star," of 3270 tons and 5600 I.H.P., built in 1888; the imperial German yacht "Hohenzollern" (fig. 43, Plate XI.), of 3773 tons Y.M. and 9500 H.P., built in 1893; the Spanish royal yacht "Giralda," of 1664 tons Y.M., built in 1894; the imperial Russian yacht "Standart," of 4334 tons Y.M. and 11,000 H.P., built in 1895; and the British royal yachts, "Victoria and Albert," of 5005 tons Y.M. and 11,000 I.H.P., built in 1899, and the "Alexandra" (fig. 44, Plate XI.), of 2157 tons Y.M. and 4500 H.P., built in 1907.

Propulsion by Electricity.—In 1883 Messrs Siemens & Co. fitted up a launch, 40 ft. long and 6 ft. beam, with an electric motor driving a single propeller and operated by a battery of secondary cells, and at a displacement of 5 tons a speed of 7 knots was obtained. A launch 25 ft. long, provided with an electric motor capable of giving a speed of 7 knots, also was supplied to H.M. yacht "Victoria and Albert" in 1903. A number of other electric launches similarly fitted have been built chiefly for river service, the batteries being recharged from shore stations from time to time; but the method has not been extensively adopted, except in submarines. In some cases the submarine's secondary battery has been used for propulsion on the surface as well as when submerged, being recharged from shore or from a parent vessel as required; but in nearly all recent vessels they are used only for propulsion when submerged, the engines fitted for propulsion on the surface being arranged to drive dynamos for recharging the cells. In a number of small vessels and oil-tank steamers electric motors are fitted for driving the propeller and supplied with current from dynamos driven by steam turbines or internal combustion engines.

Propulsion by Naphtha Engines.—In 1888 several launches were built on the Thames in which petroleum spirit was used for fuel in place of coal, and also as an expanding agent for driving the propelling machinery in place of steam. A number of these boats were afterwards built in England and America, and known as *zephyr* or *naphtha* boats. Further particulars of these boats will be found in a paper read by Mr Yarrow before the Institute of Naval Architects in 1888.

Propulsion by Internal Combustion Engines.—Experiments have been made at various times with machinery in which the fuel is burnt or exploded in the engine itself without having recourse to the transfer of energy by means of an expanding and condensing agent such as steam or naphtha, and by these experiments the modern internal combustion engine has been slowly evolved and adapted for marine propulsion. In 1680 an engine was patented in which gunpowder was exploded, and the engine was operated by the vacuum produced by the cooling of the gases; in 1794 an engine was patented in which the explosion of turpentine spirit drove the pistons forward, and about 1823 a gas-driven vessel was run on the river Thames. In the later years of the 19th century gas engines were highly developed for use in factories, &c., on shore, and petrol engines for driving motor cars, &c., and since the beginning of the present century similar engines adapted for marine propulsion have been greatly improved and produced in considerable numbers, especially in the United States, some of the vessels being as large as 800 tons gross.

Such vessels may be considered in three groups. (1) High-speed racing boats, pleasure boats of various sizes for service on rivers and in harbours, fireboats, patrol boats and launches for river work, yachts' tenders and sea-going yachts of light scantlings, in which highly volatile and readily exploded fuels such as gasolene, petrol and naphtha are used. (2) Vessels of low speed, in which the weight of the engine is not of great importance, such as barges for use on rivers and canals, ferry-boats, small tug-boats, slow-speed cargo vessels and slow-speed oil-tank vessels, which have been fitted with engines using kerosene or paraffin, as well as oil fuels of greater specific gravity, and of higher flash-point and requiring a higher temperature for evaporation; in some cases these low-speed vessels have been fitted with engines using gas produced from anthracite coal, prepared charcoal and heavy oil. (3) Vessels in which auxiliary propelling machinery of low power is fitted; they include a large number of fishing vessels, smaller numbers of coasting schooners, lifeboats and a few large vessels; in these both light and heavy oils and gas have been employed.

As examples of class (1) may be mentioned the racing boats "Ursula," built at Cowes in 1908, 49 ft. 6 in. long, 5 tons total weight, fitted with petrol engines of 800 H.P., driving twin screws at about 950 revolutions, and giving a speed of 38½ knots; and "Columbine," built on the so-called hydroplane principle in 1910, 26 ft. long, 65 H.P. and over 30 knots speed; the American yacht "Kalmia," 83 ft. long, 14 ft. 3 in. beam, 3 ft. 9 in. draught; and the yacht "Swiftsure," 70 ft. long, 11 ft. beam, 38 tons gross, 3 ft. draught, 160 H.P. and 16 knots speed, built at Cowes in 1909 and navigated under her own power to St Petersburg.

Examples of class (2) are the double-ended ferry-boat "Miss Vandenburg," employed on the St Lawrence, 100 ft. long, 20 ft. 9 in. beam, 9 ft. depth, 5 ft. draught, 150 tons displacement, fitted with two paraffin engines each of 75 H.P.; the yacht "Bronzewing" (fig. 45, Plate X.), built at Sydney in 1908, 110 ft. long, fitted with three paraffin engines each of 105 H.P.; the "Lochinvar," a West of Scotland passenger vessel of 12 knots speed, 145 ft. long, 200 tons gross, fitted with three paraffin engines each of 100 H.P.; and the "Manatee" (fig. 46, Plate X.), 93 ft. long, 16 ft. beam, 5 ft. 6 in. draught, fitted with two paraffin motors of 75 H.P., giving her 10½ knots speed, built at Cowes in 1909 for service as a mail and passenger boat in Southern Nigeria, which was navigated to Forcados, a distance of 4000 m., under her own power and without escort.

Amongst examples of class (3) may be mentioned the three-masted topsail schooner "San Antonio" of Rotterdam, 165 ft. long, 27 ft. 3 in. beam, 9 ft. 2 in. depth and 410 tons gross, fitted with engines of 160 H.P., using crude heavy oil and driving a single screw; the "Modwena" of Glasgow, a barque-rigged sailing yacht of 400 tons, fitted with paraffin engines of 200 H.P., giving a speed of 9½ knots; the "Carnegie," already referred to under surveying vessels, which is fitted with gas engines of 150 H.P. driving twin screws; and the yacht "Lady Evelyn," of 366 tons Y.M., fitted in 1910 with heavy oil engines of 500 H.P.

The power of individual internal combustion engines completed up to 1910 was somewhat limited, and great difficulties had been encountered in the use of heavy oil fuels; but great advances and improvements had been made which were opening up the way for the more extensive adoption of motors of large power using heavy oil fuels. An ocean-going motor-driven cargo vessel of 9000 tons and 12 knots speed, was in 1910 being built in Germany for the Hamburg-America line, and fitted with heavy oil engines of 3000 H.P. driving twin screws, while engines of 10,000 H.P. were also being manufactured.

V. War Vessels

The adoption of iron and steel as the material for shipbuilding, and the development of the steam engine, have influenced warship construction in the same manner as they have influenced the construction of ships for the mercantile marine; but, in addition, the introduction of armour for the protection of ships, the great advances made in its manufacture, and, above all, the marvellous improvements in explosives and in the design and manufacture of guns and torpedoes, have changed the conditions of naval warfare, and called for corresponding changes in the design of warships. Those who are concerned in such questions may refer with advantage to an interesting comparison between the old "Victory" (fig. 1, Plate XIII.) and a modern battleship instituted by Sir Andrew Noble in his address to the Mechanical Science Section of the British Association in 1890. Sir Andrew Noble's remarks in this connexion are the more weighty, coming as they did from the director of the great arsenal of Sir W. G. Armstrong, Whitworth & Co., and from one whose scientific research has incalculably advanced our knowledge of artillery and explosives. Sir Andrew follows up this comparison by the following reference to the condition of things just before the Crimean War:—

"The most improved battleships of the period just anterior to the Crimean War differed from the type I have just described mainly by the addition of steam power, and for the construction of these engines the country was indebted to the great pioneers of marine engineering, such as J. Penn & Sons, Maudslay, Sons & Field, Ravenhill, Miller & Co., Rennie Bros., &c., not forgetting Messrs Humphreys & Tennant, whose reputation and achievements now are even more brilliant than in those earlier days. Taking the 'Duke of Wellington,' completed in 1853, as the type of a first-rate just before the Crimean War, her length was 240 ft., her breadth 60 ft., her displacement 5830 tons, her indicated horse-power 1999, and her speed on the measured mile 9·89 knots. Her armament consisted of 131 guns, of which thirty-six 8-in. and 32-pdrs. were mounted on the lower deck, a similar number on the middle deck, thirty-eight 32-pdrs. on the main deck, and twenty short 32-pdrs. and one 68-pdr. pivot gun on the upper deck. Taking the 'Caesar' and the 'Hogue' as types of second- and third-rate line-of-battle

ships, the former, which had nearly the displacement of the 'Victory,' had a length of 207 ft., a breadth of 56 ft., and a mean draught of 21. She had 1420 indicated horse-power, and her speed on the measured mile was 10·3 knots. Her armament consisted of twenty-eight 8-in. guns and sixty-two 32-pdrs., carried on her lower, main and upper decks. The 'Hogue' had a length of 184 ft., a breadth of 48 ft. 4 in., a mean draught of 22 ft. 6 in.; she had 797 indicated horse-power and a speed of 8½ knots. Her armament consisted of two 68-pdrs. of 95 cwt., four 10-in. guns, twenty-six 8-in. guns, and twenty-eight 32-pdrs. of 50 cwt.—sixty guns in all.

"Vessels of lower rates (I refer to the screw steam frigates of the period just anterior to the Crimean War) were, both in construction and armament, so closely analogous to the line-of-battle ships that I will not fatigue you by describing them, and will only allude to one other class, that of the paddle-wheel steam frigate, of which I may take the 'Terrible' as a type. This vessel had a length of 226 ft., a breadth of 43 ft., a displacement of about 3000 tons, and an indicated horse-power of 1950. Her armament consisted of seven 68-pdrs. of 95 cwt., four 10-in. guns, ten 8-in. guns and four light 32-pdrs."

The warships which existed at the beginning of the latter half of the 19th century were, with the exception of special vessels, divided roughly into three classes—ships of the line, frigates and gun-vessels. For many years the corresponding types of iron and steel vessels were known as battleships, cruisers and gunboats, but recently we have seen the power of the cruiser increased to that of the battleship, and new types have been produced such as the torpedo boat, the torpedo boat destroyer and the scout, the latter developing into the fast cruiser of continually increasing size; while the submarine torpedo boat has become a recognized sea-going vessel, and is becoming comparable in size with the gun-vessel or the small cruiser. It is proposed to refer to these in the order named. (See also NAVY.)

Battleships.—The destruction of the Turkish fleet at Sinope (30th November 1853) by the Russian fleet, the latter alone being armed with shell guns, and the combined experience of the British and French fleets before Sevastopol when engaging Fort Constantine, demonstrated conclusively that for ships of the line armour protection had become essential. The French government immediately began to build five armour-plated vessels, or batteries, as they were called, for service in the Black Sea; and eight similar vessels were begun shortly afterwards by the British government for the same service.[1] The British vessels did not arrive in time to take any part in the war; but three of the French batteries did, and were very favourably reported on by Admiral Bruat after an engagement with the Kinburn Forts on the 17th of October 1855. With the exception of these three French batteries, the whole of the fleets employed in the operations were composed of unarmoured wooden ships, and a large number of them were sailing line-of-battle ships. As the result of the engagement with the Kinburn Forts, the French began to armourplate sea-going vessels, and the first step in this direction was taken by the celebrated French naval architect M. Dupuy de Lôme, who razeed the "Napoleon," a wooden two-decker, and fitted her with a complete belt of 5-in. armour on a backing of 26 in. of wood. This work was completed in 1859, and the ship, renamed "La Gloire," became the first sea-going armour-clad. Two other vessels of the same design, the "Invincible" and "Normandie," were also laid down, and with the "Magenta," "Solferino" and the "Couronne," a few years later, formed the first fleet of French armour-clads.

In June 1859 the armour-plated iron frigate "Warrior" was commenced by the British government. Others quickly followed, including the "Black Prince," which was a sister ship to the "Warrior," and four other vessels, the "Achilles," the sister ships "Minotaur" and "Agincourt," and the "Northumberland." The distribution of the armour and other features of these vessels are shown in fig. 47. The "Warrior" and "Black Prince" were 380 ft. long and of 8830 tons displacement, had engines of 6000 I.H.P. and a speed of 14½ knots; they were designed to carry thirty-six 68-pdr. 100-cwt. guns, but during construction the 7-in. 6½-ton gun was introduced into H.M. Service, and the ships when completed for sea carried an armament of 28 of these 7-in. guns. They had a central citadel 213 ft. long, protected with 4½-in. iron armour extending from a few feet below the water-line to the height of the upper deck. Their outline was similar to the outline of the wooden frigates of the day, and their rudder-heads and steering-gear were above water and unprotected against injury by shot and shell. In the four vessels which immediately followed, which were from 500 to 1500 tons more displacement, the overhanging bow, as will be seen from fig. 51, was given up, bows adapted for ramming were introduced, and some protection was afforded to the steering-gear by water-line belts of armour which extended the whole length of the vessel. In 1861 the British government began the construction of eleven armour-clads, six of which, including the "Hector" and "Valiant," sister ships of 6700 tons displacement and 3500 I.H.P., were iron vessels, and five, the "Caledonia," "Royal Oak," "Ocean," "Prince Consort," and "Royal Alfred," were wooden vessels of rather over 4000 tons.

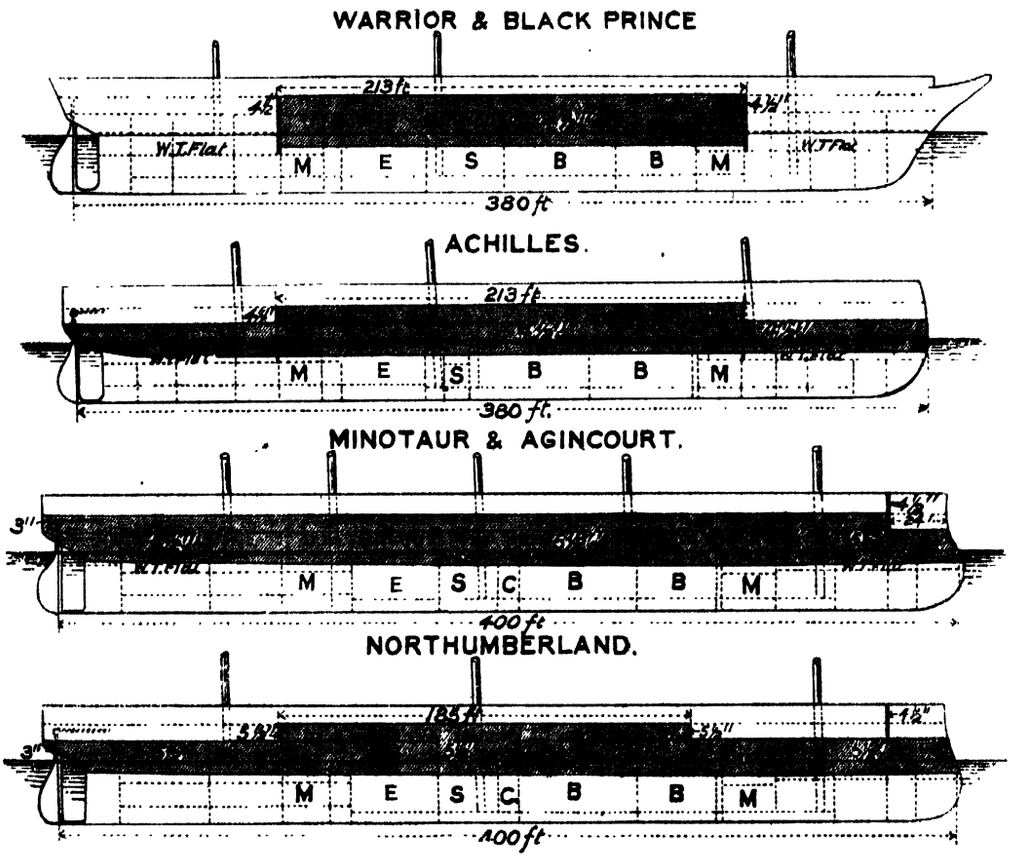


FIG. 47.—"Warrior" and "Black Prince," "Achilles," "Minotaur" and "Agincourt," and "Northumberland." E, Engine-room; B, boiler-room; C, coal bunkers; M, magazines; S, shell-rooms.

The reconstruction of the British fleet was taken in hand in earnest in 1863, when Mr (afterwards Sir) Edward J. Reed was placed at the head of the Construction Department at the Admiralty, with Messrs Barnaby, Barnes, Crossland, Morgan and Wright—the last-named (afterwards Sir James Wright) holding the position of engineer-in-chief—as

Sir E. J. Reed.

[1] See letters of the earl of Rosse on this subject, *Transactions of Inst. of Naval Architects* for 1908.

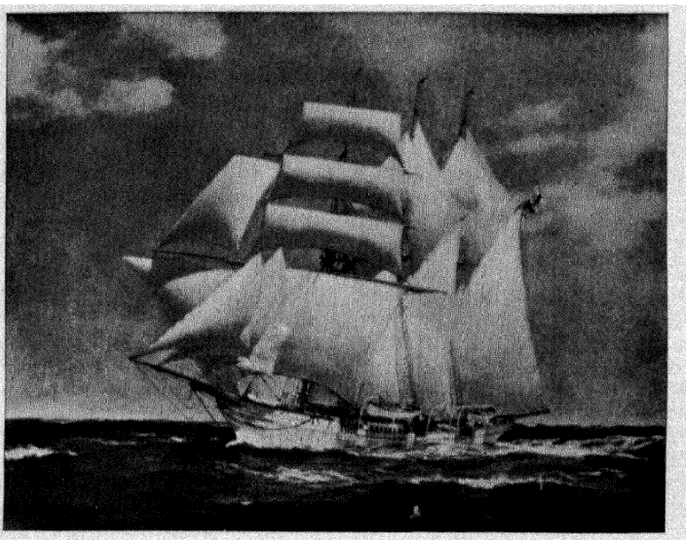


FIG. 42.—Sailing Yacht, with Auxiliary Steam Power, *Sunbeam*.

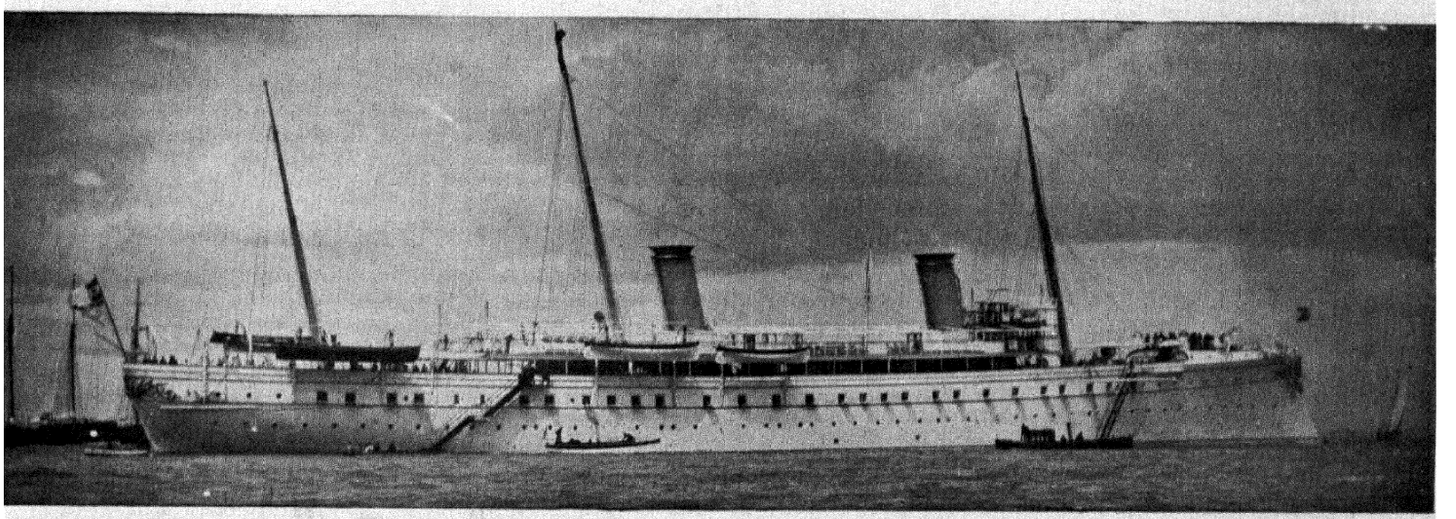


FIG. 43.—Imperial German Steam Yacht *Hohenzollern*. (*Photo, West.*

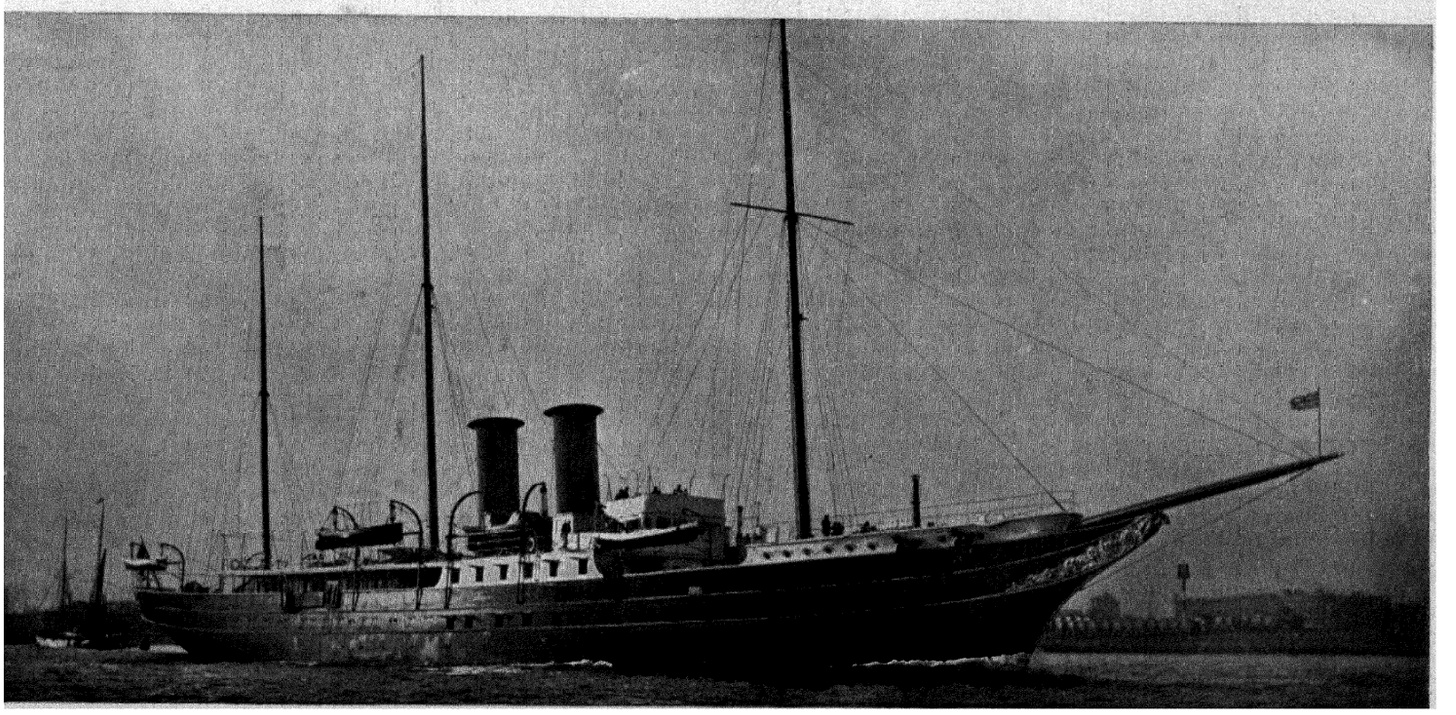


FIG. 44.—The Royal Steam Yacht *Levantia* (*Hoffm*

FIG. 49.—H.M.S. *Devastation.*

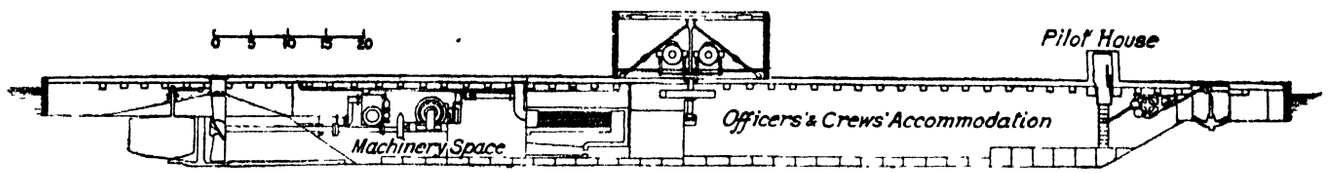
FIG. 50.—H.M.S. *Inflexible.*

FIG. 3.—H.M.S. *Camperdown.*

FIG. 55.—H.M.S. *Renown.*

his immediate assistants. Various types of vessels were devised, with arrangements of armour and dispositions of guns, to provide for the new conditions which had been introduced; and, in addition, great advance was made in the structural arrangements of ships, which up to this period had been considerably influenced by the old systems of construction in use in wooden ships. In investigating the qualities of ships, Sir Edward Reed had the good fortune to secure the co-operation and assistance of Mr William Froude, F.R.S., who had been the first to demonstrate accurately the theory upon which the behaviour of ships in a seaway depends. Mr Froude's experimental investigations on the forms of ships and kindred matters, begun in 1870 on behalf of the Admiralty and continued till his death in May 1879, had a most important bearing on the improvement of ships and on the science of naval construction generally. It is not too much to say that nearly the whole of the accurate information as to the best forms of ships and their resistance at various speeds, in the possession of naval architects to-day, is the direct result of Mr Froude's work, and that of his son, Mr R. E. Froude, F.R.S., who continued the work after his father's death.

Among the considerations which Reed had in view in the reconstruction of the navy may be enumerated the following: (1) Steadiness of ship as a gun platform, with ample stability in all conditions of lading to enable her to keep the sea in all weathers, and sufficient stability in a partially riddled condition to enable her to reach port in safety. (2) Protection by armour of the vitals of the ship, and of the heavy-gun positions, especially against shell fire. (3) The carrying of guns of power sufficient to penetrate the armour of any possible enemy. (4) Mounting the guns sufficiently high above the water-line to enable them to be fought in bad weather. (5) Simultaneous all-round fire, with concentration of as many guns as possible on any given point of the compass. (6) Speed to overtake or get away from an enemy. (7) Manœuvring power to maintain, as far as possible, any desired position with regard to an enemy. (8) Large radius of action. (9) Proper provision for the berthing of officers and crew. (10) Limitation of size and cost.



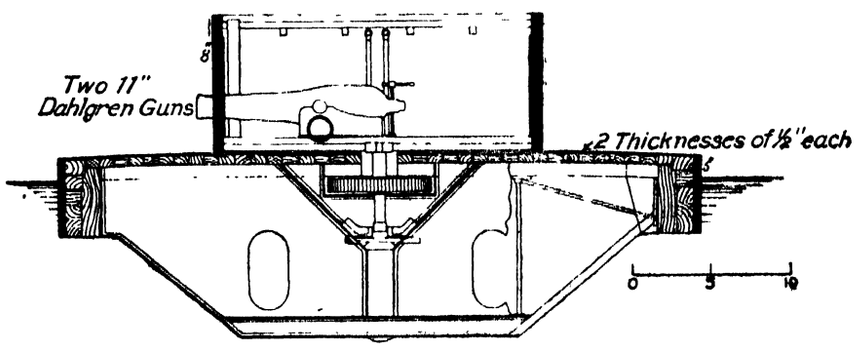


FIG. 48.—Diagram of U.S.A. "Monitor."

Objections were raised to the early armour-plated ships on the score of their unhandiness, heavy rig, exposed position of guns, &c. To meet these, Reed designed a number of vessels. The "Bellerophon," launched in 1865, was a vessel of 7550 tons displacement, 6500 I.H.P., 14 knots speed, and was 300 ft. long. Her armament consisted of ten 9-in. 14-ton and five 7-in. 6½-ton guns. Her water-line was wholly protected by 6-in. armour, and she was provided with a central battery 98 ft. long, protected with armour of the same thickness. She carried a considerable spread of canvas, and she was fitted with a balanced rudder. The "Hercules," completed in 1868, was a much more important ship, her dimensions being: length 325 ft., breadth 59 ft., draught 26½ ft., displacement 8680 tons. Her engines of 8500 I.H.P. gave her a speed of about 14½ knots. She had two 9-in. guns, mounted one forward and one aft on the main deck behind 6-in. armour, and eight 10-in. guns, mounted in a central battery on the main deck. Her water-line was protected by armour 9 in. thick amidships, reduced to 6 in. at her ends, and her battery was protected by 6-in. armour. The "Sultan," completed in 1871, was in many respects a similar ship but larger, having a displacement of 9300 tons, 2 ft. more beam and 1 ft. more draught; she attained a speed of upwards of 14 knots. Her main-deck battery carried the same guns as the main-deck battery of the "Hercules," but the 9-in. guns at the extremities of the vessel on this deck were dispensed with, and she carried, in addition, an upper-deck battery, placed over the after-end of the main-deck battery, in which four 9-in. guns were carried. Both batteries were protected with 6-in. armour; elsewhere the armour followed that of the "Hercules."

Turret Ships.—The system of mounting heavy guns in revolving turrets was advocated in England by Captain Cowper Coles after experience in the Crimean War; and in June 1860 he embodied his ideas in a paper read before the United Service Institution. When the American Civil War broke out, Congress ordered a number of armoured vessels to be built, and one of the first to be completed was the turret vessel "Monitor" designed by Ericsson. She was 170 ft. in length, 41½ ft. beam, 1200 tons displacement, of low speed and low freeboard, the sides being protected by 3- to 5-in. armour, built up of 1-in. plates on 27 in. of wood backing, and the single revolving turret which carried two 11-in. smooth-bore guns protected by 8-in. armour built up of 1-in. plates and placed amidships as shown in fig. 48. Her defeat of the "Merrimac" belongs to history. Several other similar low-freeboard turret vessels were built in America, and one of them, the "Miantonomoh," 250 ft. long, 55½ ft. beam, 14 ft. draught, 3850 tons displacement, 1800 I.H.P., 12 knots speed, with twin screws and two turrets carrying four 10-in. B.L. guns, of only 2 to 3 ft. freeboard, succeeded in crossing the Atlantic, returning again in safety; but the "Monitor" herself was caught in a gale and foundered off Cape Hatteras in 1862.

The first turret ships in the British navy were the "Royal Sovereign" and "Prince Albert." The former, a wooden ship, launched in 1857 as a 121-gun three-decked line-of-battle ship, of a tonnage of 3760 tons, was in 1864 cut down to 7 ft. above water and fitted with 5½-in. side-armour bedded on a 36-in. wood side, and with four turrets on Captain Cowper Coles' plan; and the latter, an iron vessel, 240 ft. long, 48 ft. beam, launched in 1864, with 4½-in. side-armour with 18-in. backing fitted on 1-in. skin plating, also carried four turrets, two fitted with pairs and two with single 12-ton guns; both were low-freeboard vessels and were reserved for coast defence. The "Monarch," of 8300 tons displacement, was laid down in June 1866 as a sea-going turret ship. She was launched in May 1868, her dimensions being: length 330 ft., breadth 57 ft. 6 in. and draught 26 ft.; her I.H.P. was 8000, giving her a speed of about 15 knots, and she carried a large spread of canvas. She had a complete armour belt 9 ft. 9 in. wide and 7 in. thick, reduced to 6 in. at the extremities. Above this armour belt amidships, for a length of 84 ft., she was provided with a citadel, also of 7-in. armour, which protected the bases of two revolving turrets, each protected with 10-in. armour and carrying two 12-in. guns. She also carried two 9-in. guns forward on the upper deck and one 7-in. gun aft on the main deck, all protected by armour.

The design of the "Monarch" did not satisfy Captain Coles, and he induced the Admiralty to build a turret ship of much lower freeboard, in accordance with his views. This vessel was the "Captain," built at Birkenhead and launched in March 1869. By an unfortunate error her freeboard was even less than Captain Coles had contemplated. She was fully rigged, with tripod masts and large sail-spread; this spread of canvas, with her low freeboard and deficient stability, resulted in her capsizing in the Bay of Biscay on 6th September 1870, amongst those drowned being her designer.

A number of low-freeboard turret vessels of the "Monitor" class, without masts and sails, were built for the British navy at this time, mostly for coast defence. Amongst these, the "Cerberus" for Australia and the "Abyssinia" and "Magdala" for India were completed in 1870. The "Abyssinia" had a displacement of 2900 tons and a speed of about 9½ knots; her dimensions were: length 225 ft., beam 42 ft., draught 14½ ft., and her armament consisted of four 10-in. 18-ton guns. The other two vessels had the same armament, but were somewhat larger, being of 3340 tons displacement; and the thickness of their side-armour was 8 to 6 in., against 7 to 6 in. in the "Abyssinia." Several vessels of this type were also built for home service, including the single-turret vessels "Glatton" of 4910 tons and "Hotspur" of 4010 tons, each carrying two

18-in. 25-ton guns, and the "Cyclops," "Gorgon," "Hecate" and "Hydra," each of 3560 tons and provided with two turrets carrying two 10-in. 18-ton guns. They were protected with armour from 8 to 12 in. thick, and their speed was from 10 to 12 knots.

The "Devastation," commenced in 1869, represented Reed's views of what a sea-going turret ship should be. Low sides were adopted, but not in combination with rigging and sails. She was the first sea-going battleship in the British navy which depended wholly on steam power for propulsion. She was 285 ft. long, 62 ft. 3 in. broad, 27 ft. mean draught and 9330 tons displacement. Her sides, which, except right forward, rose only to a height of 4 ft. 6 in. above water, were protected with armour 12 in. thick. Her armament consisted of four 35-ton guns, mounted in pairs in two turrets, one at each end of a raised breastwork or redoubt which extended about 150 ft. along the middle of the upper deck. The guns were thus elevated to the height of some 14 ft. above the surface of the water. The turrets were protected by armour 12 in. and 14 in. thick, and the breastwork or redoubt by armour 10 in. and 12 in. thick. A forecastle extended forward from the fore-end of the breastwork at a height of 9 ft. 3 in. above the water-line; but in wake of this forecastle the side armour dropped to a height of only 4 in. above the surface of the water, at which level there was an armoured deck. She was provided with twin-screw machinery of 7000 I.H.P., which gave her a speed of 14·2 knots, and she carried a large coal supply. After the loss of the "Captain," a special committee, including many of the highest professional and scientific authorities in the United Kingdom, was appointed to examine into the design of such vessels. Of the "Devastation" they reported that "ships of this class have stability amply sufficient to make them safe against the rolling and heaving action of the sea"; they agreed, however, in recommending a plan which the constructors of the Admiralty had proposed, with the view of increasing her range of stability and the accommodation of the crew. This consisted in the addition of side superstructures, formed by continuing up the ship's side with light framing and plating as high as the level of the top of the breastwork, and carrying the breastwork deck over to the sides. The structures were continued aft on each side some distance beyond the breastwork, providing two spacious wings, which added largely to the cabin accommodation. A good idea of her general appearance may be obtained from fig. 49 (Plate XII.). The "Devastation" was followed by the "Thunderer" of the same dimensions, and the "Dreadnought" of 10,820 tons displacement, 8000 I.H.P. and 14 knots speed; a vessel of higher freeboard, plated with 14 in. of armour and carrying four 38-ton guns; she was the most powerful and best protected vessel of her day.

Sir Edward Reed retired from the Admiralty a short time before the "Captain" foundered at sea. During his seven years' term of office some forty iron armour-clads of various sizes and types, besides iron cruisers and numerous other vessels, had been added to the British navy, the adoption of armour for the protection of the vital parts of ships had become established, and especially had the importance of utilizing armour in such a manner as to exclude projectiles from the region of the water-line become recognized. The change from the widely-distributed armament of the first broadside armour-clads to the highly concentrated armament of the turrets, and from the high freeboard ship with sail-power to the low freeboard turret ship without sails, had also been effected; so that when Sir Edward Reed retired in 1870, the latest type of battleship was entirely different from that which existed when he took office; and although the construction of broadside ironclads had not been discontinued, "the wooden walls" had practically ceased to exist. Sir Edward Reed was succeeded by a Council of Construction composed of his immediate assistants, with Mr Barnaby (afterwards Sir Nathaniel Barnaby) as its president; but three years later this council was dissolved, and Sir N. Barnaby was placed at the head of the Construction Department.

The sea-going qualities of the "Devastation" had successfully demonstrated that the battleship of the future might depend wholly on steam propulsion; and although many naval officers and others continued to hold the view that sea-going ironclads must of necessity be rigged ships, in the designs which immediately followed sail power was omitted. In the "Inflexible" (fig. 50, Plate XII.), and the sister ships "Ajax" and "Agamemnon," the offensive power was concentrated mainly in two pairs of heavy guns, as it was in the "Devastation" and other turret ships which preceded them; but in them the armour defence also was concentrated over a comparatively small space amidships, the unprotected ends being formed into what was called raft bodies by belts of cork, within which was placed a portion of the ship's coal, &c. Thus the buoyancy was secured by a citadel amidships which could not be penetrated, and by ends which might be

Sir Nathaniel Barnaby.

AJAX and AGAMEMNON (of 1876)

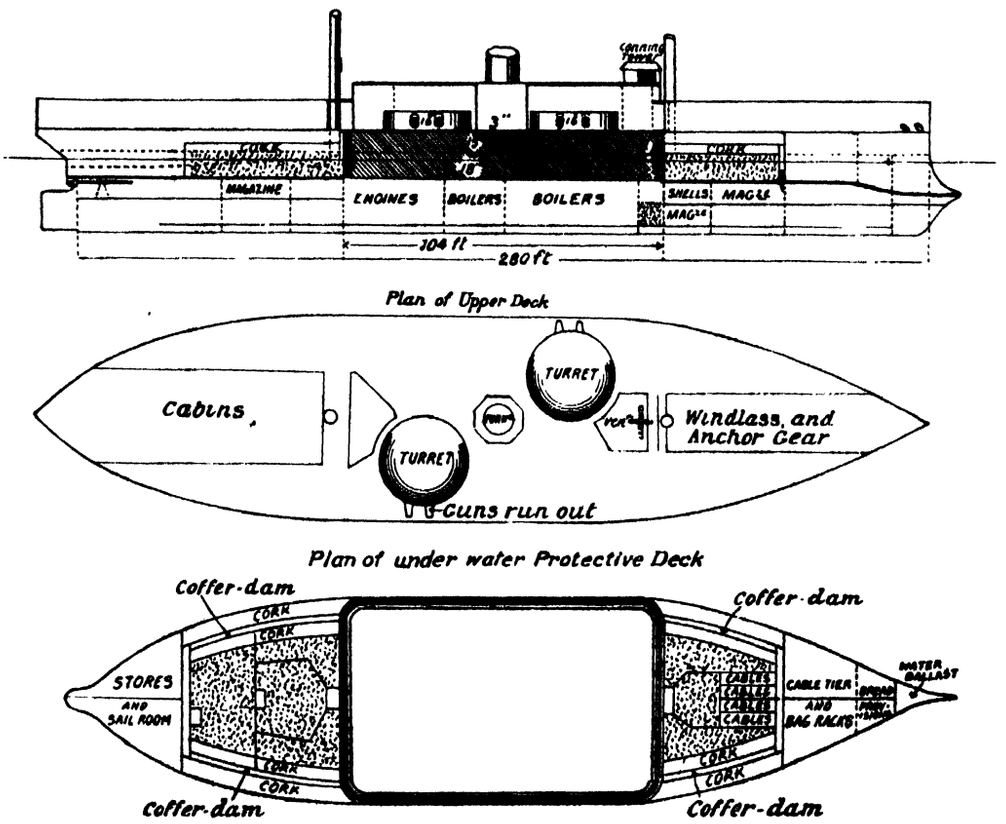


FIG. 51.—Arrangement of "Ajax" and "Agamemnon."

riddled but (it was contended) not be destroyed. The arrangement shown in fig. 51 represents the "Ajax" and "Agamemnon." The "Inflexible" was similar but larger. Sir N. Barnaby described the design of the "Inflexible" in 1874 before the Institution of Naval Architects thus:

"Imagine a floating castle 110 ft. long and 75 ft. wide, rising 10 ft. out of the water, and having above that again two round turrets planted diagonally at its opposite corners. Imagine this castle and its turrets to be heavily plated with armour, and that each turret has within it two guns of about 80 tons each—perhaps in the course of a few years guns of twice 80 tons each. Conceive these guns to be capable of firing, all four together, at an enemy ahead or on either beam, and in pairs towards every point of the compass.

"Attached to this rectangular armoured castle, but completely submerged, every part being 6 ft. to 7 ft. under water, there is a hull of the ordinary form, with a powerful ram bow, with twin screws and a submerged rudder and helm. This compound structure is the fighting part of the ship. Seaworthiness, speed and shapeliness would be wanting in such a structure if it had no additions to it; there is therefore an unarmoured structure lying above the submerged ship and connected with it, both before and abaft the armoured castle; and as this structure rises 20 ft. out of the water,

from stem to stern, without depriving the guns of that command of the horizon already described, and as it moreover renders a flying deck unnecessary, it gets over the objections which have been raised against the low freeboard and other features in the 'Devastation,' 'Thunderer' and 'Fury.'[1] These structures furnish also most luxurious accommodation for officers and seamen. The step in advance has therefore been from 14 in. of armour to 24 in., from 35-ton guns to 80-ton guns, from two guns ahead to four guns ahead, from a height of 10 ft. for working anchors to 20 ft., and this is done without an increase in cost, and with a reduction of nearly 3 ft. in draught of water, &c."

The dimensions of the "Inflexible" were: length 320 ft., beam 75 ft., mean draught 26 ft. 4 in., and displacement 11,880 tons, and her speed was 14 knots. The dimensions of the "Ajax" and "Agamemnon," begun in 1876, were: length 280 ft., beam 66 ft., mean draught 24 ft. 9 in., and displacement 8660 tons. They carried four 12½-in. guns; their citadels were 104 ft. long, protected with 18-in. armour, their turrets being protected by 16-in. armour; and their speed was 12 knots. The "Edinburgh" and "Colossus," begun three years later, were of the same type, but were built of steel and were of 9480 tons displacement. Their citadels were longer, and their speed was 14½ knots. Compound armour, adopted in these two ships for the first time, gave them a great advantage in defensive power.

The "Collingwood," begun in 1880, was the first of the battleships of a new type known as the "Admiral" class. In these vessels the main armament consisted of four heavy guns mounted in pairs on the middle line of the ship, in fixed heavily protected gun-positions called barbettes, one at each end of the ship; this main armament was supplemented by a secondary armament of lighter and more rapid-firing guns mounted on the broadsides between the barbettes. This arrangement of the armament, which is illustrated in fig. 52, continued, with small modification, to be adopted in the battleships of the British navy down to 1903.

The principal features of the "Collingwood" were: length 325 ft., beam 68 ft., mean draught 27 ft., displacement 9500 tons. She carried 18-in. armour on her sides, 16-in. on bulkheads, 11½-in. on barbettes and 12-in. conning towers. Her armament consisted of four 12-in. 45-ton guns, six 6-in. guns, and a number of smaller guns. Her speed was 16½ knots, and she carried 900 tons of coal, with capacity for 1200. She was followed two years later by the "Rodney," "Howe," "Benbow," "Camperdown" and "Anson," which were of the same type, but larger. These six ships constitute what is known as the "Admiral" class. A good idea of their general appearance is obtained from fig. 57 (Plate XII.), which represents the "Camperdown." The "Victoria"[2] and the "Sans Pareil," built a few years later, were, with the "Benbow," the only ships of the British navy built to carry 110-ton guns, the former having them in pairs in a turret heavily armoured, and the latter singly in barbettes.

Among the last of the battleship designs undertaken by Sir N. Barnaby was that of the "Trafalgar" and "Nile," which was completed by Messrs. F. K. Barnes and H. Morgan after his retirement. These vessels, laid down in January and April 1886, were the largest ships then built for the British navy. They were 11,940 tons displacement, 345 ft. long, 73 ft. beam, and 28 ft. 10 in. mean draught; had engines of 12,000 I.H.P. and a speed of 16¾ knots. Their armour-protection consisted of a belt 230 ft. long and 20 in. thick, with bulkheads 18 in. and 14 in. thick. Above the belt was an armoured redoubt of 18 in. compound armour which enclosed the turret bases. The turrets themselves had 18-in. armour, and between the turrets was an octagonal battery of 3 in. to 5 in. of steel containing the 4·7-in. Q.F. guns. The thickness of the protective deck was 3 in. The disposition of armament originated in the "Collingwood" was adopted in these vessels, but the heavy guns were placed in turrets instead of in barbettes. The armament consisted of four 13·5-in. 67-ton B.L. guns, six 4·7-in. Q.F., eight 6-pdrs. Q.F., twelve 3-pdrs. Q.F., besides boat guns and six torpedo tubes. They carried 900 tons of coal at normal displacement, and had stowage for 1100 tons.

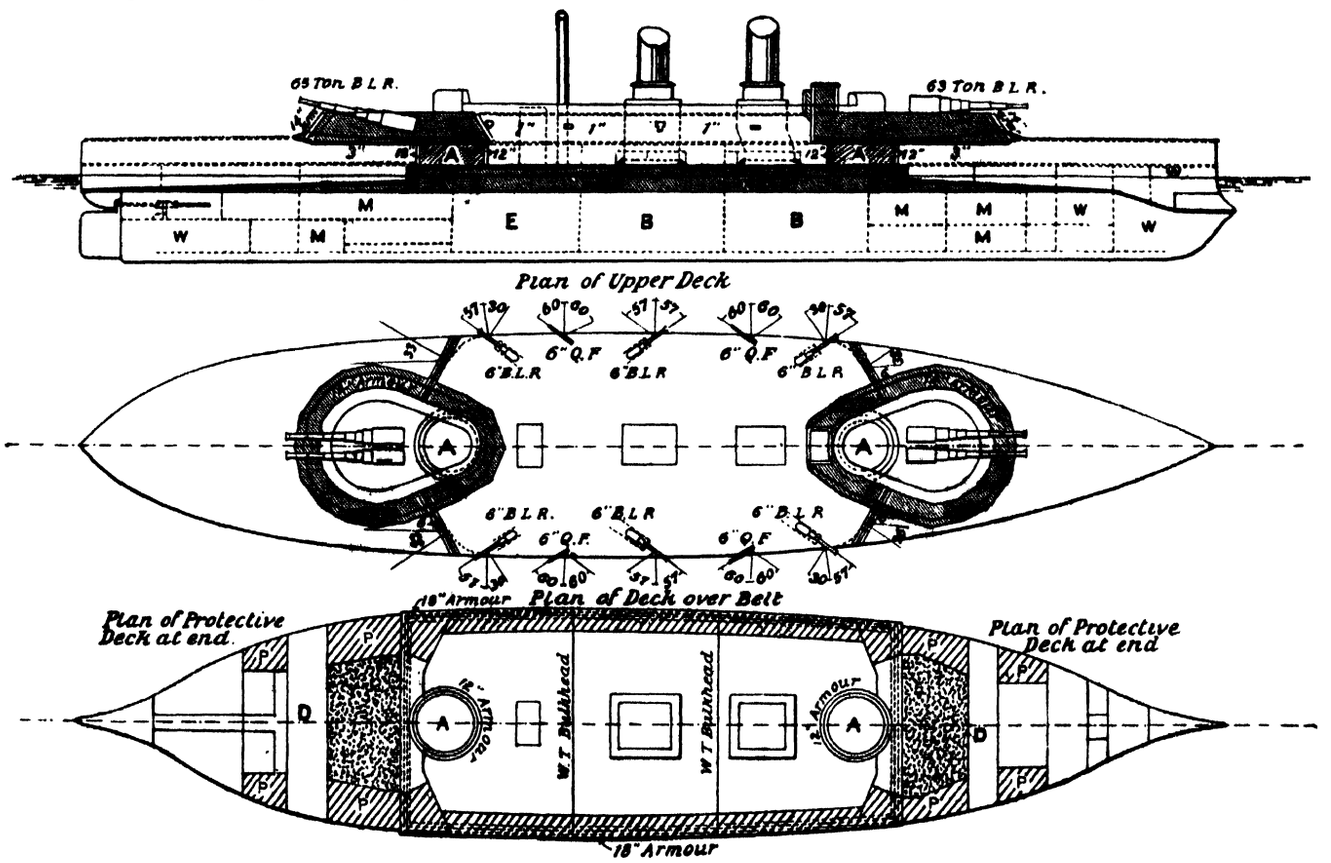


FIG. 52.—The "Collingwood." A, communicating tubes; B, boiler-rooms; D, water-chambers; E, engine-room; M, magazines and shell-rooms; P, patent fuel packing; W, water-ballast tanks.

Sir Nathaniel Barnaby retired from office in 1885. During his term of office there were built for the British navy upwards of twenty armoured battleships of various classes, in addition to a much larger number of cruisers of all sizes. The fight for supremacy between the gun and the armour plate had begun in earnest when Sir N. Barnaby took office, the increased weight of projectile and penetrative power obtained by the concentration of the armament into a few heavy guns being followed by the concentration of the armour into a short belt. The concentration of guns and armour reached a limit in the "Inflexible" and her immediate successors; the later ships of Sir N. Barnaby's design carried a secondary battery of lighter guns in addition to the heavy main armament, and had much longer water-line belts. These changes, combined with the

[1] The "Fury" was modified and renamed "Dreadnought" before being launched.

[2] The "Victoria" was accidentally rammed and sunk by the "Camperdown" during the Mediterranean manœuvres of 1893.

introduction of compound armour and the adoption of steel instead of iron for the building material, both of which date from his time, allowed of greater armour protection and of other advantages, including increased speed, &c.

Sir Nathaniel Barnaby was succeeded in October 1885 by Mr W. H. White (afterwards Sir W. H. White, F.R.S.). The battleships then building were of four different types and included two of the "Colossus" class, six of the "Admiral" class, two "Trafalgars," and the "Victoria" and "Sans Pareil." Their completion proceeded very slowly, and no new battleships were laid down till 1889, when the Naval Defence Act resulted in a reconsideration of the subject by the Board of Admiralty.

Sir W. H. White.

Before coming to a decision various designs were discussed, and the First Lord convened a meeting, not only of the members of the Board, but of a number of distinguished and experienced naval officers as well as the Director of Naval Ordnance and the Director of Naval Construction. Subsequently the Board issued instructions for the preparation of detailed designs embodying the features which were agreed upon as being most desirable; and on these designs the seven barbette battleships of the "Royal Sovereign" class and the turret ship "Hood" were built.

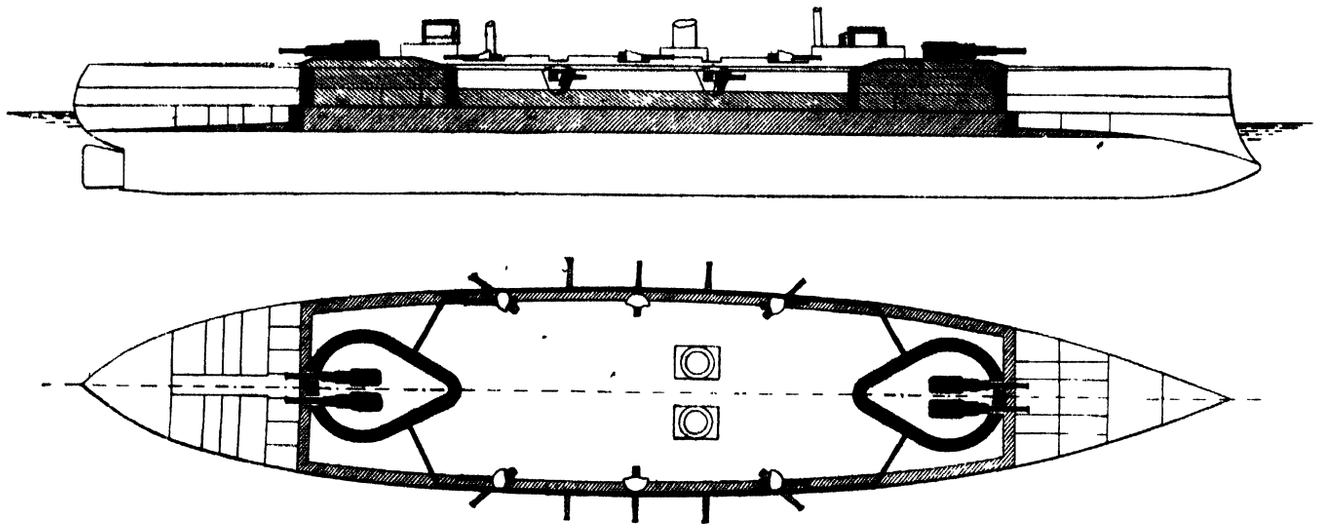


FIG. 54.—The "Royal Sovereign."

The general arrangements of guns and armour in the vessels of the "Royal Sovereign" class is shown in fig. 54. They were 380 ft. in length, 75 ft. beam, 27⅛ ft. draught, 14,150 tons displacement, 13,000 I.H.P., and 17½ knots speed. The coal bunkers can hold 1450 tons, of which 900 tons is included on the above displacement. For three-fifths of the length amidships the side is protected by an 18-in. belt of armour, a horizontal 3-in. protective deck being worked across the ship at the *middle* or *belt* deck; between the belt deck and main deck 4-in. side armour is worked. Before and abaft the belt curved protective decks 2½ in. thick were worked, extending down to the ram forward and covering the steering gear aft. Four 13½-in. B.L. 67-ton guns were fitted in pairs in pear-shaped barbettes forward and aft, protected by 17-in. armoured barbettes extending down to the belt deck; ten 6-in. Q.F. guns were fitted, four being on the main deck in 6-in. armoured casemates, which were adopted in these vessels for the first time; sixteen 6-pdr. and twelve 3-pdr. Q.F. guns were fitted, and seven torpedo tubes. The "Royal Sovereign" was laid down at Portsmouth in September 1889, floated in February 1891, and completed in May 1892. (The six upper-deck 6-in. guns were protected by 5-in. casemates added 1901 to 1904.)

The "Hood" was similar in displacement, armament, armour, horse-power, speed and general dimensions, but was of less freeboard, the heavy guns being fitted in turrets revolving on armoured redoubts of reduced heights.

The "Centurion" and "Barfleur," laid down in 1890, were designed as sheathed second-class battleships for service in distant waters; they were 360 ft. in length, 70 ft. beam, 25 ft. 6 in. mean draught, 10,500 tons displacement, 13,000 I.H.P., and 18½ knots speed. They were armed with four 10-in. B.L. guns in circular barbettes of 9-in. armour, ten 4·7-in. and twenty-two small Q.F. guns, and five torpedo-tubes, four of the 4·7-in. guns being on the main deck in casemates of 5-in. armour; the armour belt was 12 in. thick, the protective decks 2 in., and the side armour between belt and main decks 3 in. thick. They were re-armed and improved in 1902–1903.

The "Renown" (fig. 55, Plate XII.), laid down in 1893, was 380 ft. long, 72 ft. beam, 25 ft. 6 in. mean draught, 12,000 I.H.P., and 18 knots speed, armed with four 10-in., ten 6-in., fourteen 12-pdr. and eight 3-pdr. guns, and five torpedo tubes. She was the first vessel in the British navy to be protected by Harveyized armour; the belt armour had a maximum thickness of 8 in., the barbettes were of 10-in. armour, the casemates 6 in., and the decks 2 in. to 3 in. thick. An innovation was made in the form of the protective deck, the sides being bent down to the level of the lower edge of the side armour, while the midship portion was kept flat at the level of the upper edge of the side armour. This method of construction was followed in all succeeding British battleships.

The "Majestic," laid down about the same time, was an unsheathed first-class battleship, 390 ft. long, 75 ft. beam, 27½ ft. mean draught, 14,900 tons displacement, 12,000 I.H.P., and 17 knots speed; her bunkers held 2000 tons of coal, of which 900 tons are included in the displacement named. Her armament consisted of four 12-in. wire-wound guns, which were more powerful than the heavier 13½-in. guns of the "Royal Sovereign," twelve 6-in. Q.F., eighteen 12-pdr., twelve 3-pdr. and smaller guns, and five torpedo tubes, four of them submerged. Her protective deck was 2½ in. thick on the flat part amidships and 4 in. thick on the sloping sides; above the deck a broad belt of 9-in. Harveyized armour was fitted, rising to the main deck. The barbettes were protected by 14-in. armour, and all the 6-in. guns were protected by 6-in. casemates. The "Majestic" was laid down at Portsmouth on the 5th of February 1894, floated on the 31st of January 1895, and completed in December 1895.

Nine vessels of the same class were built, the last being the "Hannibal" (fig. 56, Plate XIV.), completed in April 1898. In two of the vessels, "Caesar" and "Illustrious," the barbettes were made circular, central revolving hoists being fitted and the guns arranged to load at any angle of training, a system which was adopted in the heavy gun mountings of all the later British battleships.

The "Formidable" and "London" classes, laid down from 1898 to 1901, differ very slightly from each other, and for all practical purposes may be taken as identical, the main difference being in a rearrangement of the armour protection to the bow in the later ships. The former class consists of the three battleships "Formidable," "Irresistible" and "Implacable," and the latter of the five battleships "London," "Bulwark" (fig. 57, Plate XV.), "Venerable," "Queen" and "Prince of Wales." These classes represent a development of the "Majestic" class, being 400 ft. long, 75 ft. beam, 26 ft. 9 in. draught, and 15,000 tons displacement, the belt being of the same general thickness and extent as in the "Majestic," but of Krupp steel, protection being given to the bow by 2-in. side-plating. In the "Formidable" the protective deck proper was formed as in the "Majestic," but thinner, being 2 in. to 3 in. thick, and a second protective deck, 1 in. thick, was formed at the main deck, giving a flat top to the citadel formed by the side belt and the bulkheads. In the "London" class the lower protective deck was thinner and the upper one thicker than in the "Formidable" class, the protection being extended forward by thinner material, tapering to 2 in. at the bow, and the forward transverse armour bulkhead being omitted. The 12-in. guns in both classes were

longer and heavier than in the ships of the "Majestic" class, and were in barbettes 12 in. thick; in addition, there were twelve 6-in. Q.F. guns—all in casemates—sixteen 12-pdrs. and four torpedo tubes. These eight battleships were each provided with 20 Belleville boilers, developed 15,000 H.P., and had a speed of 18 knots. They carried 900 tons of coal at their normal displacement,

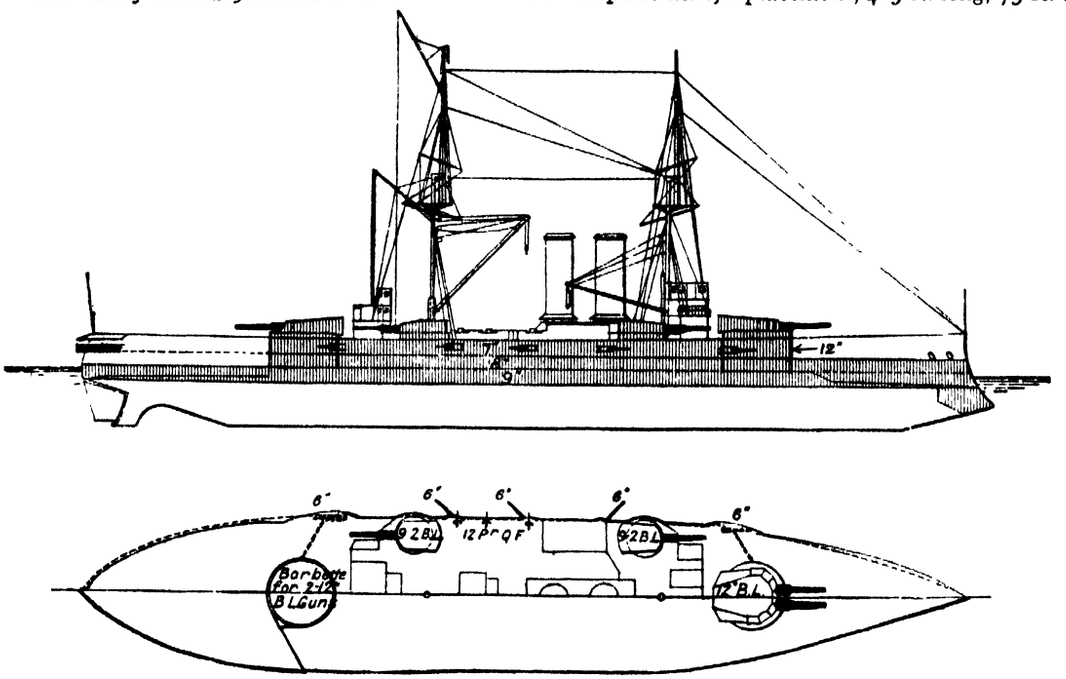


FIG. 59.—Arrangement of Guns and Armour, H.M.S. "King Edward VII."

and had bunker space for 2200 tons; they were afterwards fitted to burn oil as well as coal in their boilers, the double bottom compartments having been adapted for the stowage of oil in bulk.

The line of development, as traced above, may be taken to begin with the "Collingwood" and to run through the "Admiral" class, the "Nile" and "Trafalgar," the "Royal Sovereign" class, the "Majestic" class, and the "Formidable" class to the "London" class, the most powerful type of warship constructed for the British navy up to the end of the 19th century. Branching off from this line, at a time when battleships became much heavier (the "Royal Sovereign" class were of 2200 tons more displacement than the "Nile" and "Trafalgar"), a series of smaller, faster, and more lightly armed and armoured battleships than the series terminating with the "London" class was also built. These began with the "Barfleur" and "Centurion," which, though contemporary with the "Royal Sovereign" class, were of 1440 tons less displacement; they were followed by the "Renown," the "Canopus" and the "Duncan" class.

The six ships of the "Canopus" class may be regarded as a development of the "Renown." Begun in 1896, they were 12,950 tons in displacement, 390 ft. long, 74 ft. beam, and 26 ft. draught. They had a 6-in. Harveyized belt, 14 ft. broad and 195 ft. long; two protective decks (anticipating the "Formidable" in this respect); and two 12-in. barbettes, each carrying two wire-wound 12-in. guns, against the "Renown's" 10-in. They also carried twelve 6-in. guns in 5-in. casemates, ten 12-pdrs., a number of smaller and machine guns, and four submerged torpedo tubes. They were the first battleships of the British navy to be fitted with water-tube boilers; they had 20 Bellevilles, developed 13,500 H.P., and had a speed of 18¼ knots. They carried 1000 tons of coal at normal load, and had bunkers for 2300 tons. The ships of the "Duncan" class were longer and larger than those of the "Canopus" class. They were begun in July 1899, were of 14,000 tons displacement, 405 ft. long, 75 ft. 6 in. beam, 26 ft. 6 in. draught. They had a belt of Krupp steel, 7 in. thick amidships, tapering to 3 in. at bow, and two protective decks, as in the "Canopus"; they had two barbettes, 11 in. thick, for four 12-in. guns, and carried twelve 6-in. Q.F. guns in 6-in. casemates on the main and upper decks; also a number of smaller guns and four submerged torpedo tubes. They were provided with 24 Belleville boilers, would develop 18,000 H.P., and attain a speed of 19 knots. Their normal coal supply was 900 tons, and they had bunker capacity for 2000 tons. Six of these ships were built, one of them, the "Montagu," being lost on Lundy Island in 1906. Vessels of similar type had been built abroad, but there was a tendency to provide in them a more powerful secondary armament. In 1901 France built the "République" with eighteen 6·5-in. guns as her secondary armament; Italy laid down the "Regina Elena," carrying twelve 8-in. guns as her secondary armament; and Germany the "Braunschweig," carrying fourteen 6·7-in. and twelve 3·4-in. guns as her secondary armament. In 1902 the United States followed with the "Georgia," carrying a secondary armament of eight 8-in. and twelve 6-in. guns, while two English vessels, the "Libertad" and "Independencia," laid down for Chile, carried no less than fourteen 7·5-in. guns as their secondary armament.[1] In 1902 the "King Edward VII." (fig. 58, Plate XIV.), the last battleship for which Sir William White was responsible, was laid down, carrying four 12-in. guns, with a secondary armament of four 9·2-in. and ten 6-in. guns. She may be considered as an enlarged "Duncan," with the main-deck guns increased from eight to ten in number and enclosed in a battery having sides and ends protected by 7-in. armour, with the backs of the casemates replaced by splinter bulkheads 1 to 2 in. in thickness, and with the four 6-in. guns in casemates on the upper deck replaced by four 45-calibre 9·2-in. guns, protected by enclosed revolving armour shields. The general arrangements of the guns and armour are shown in fig. 59.[2]

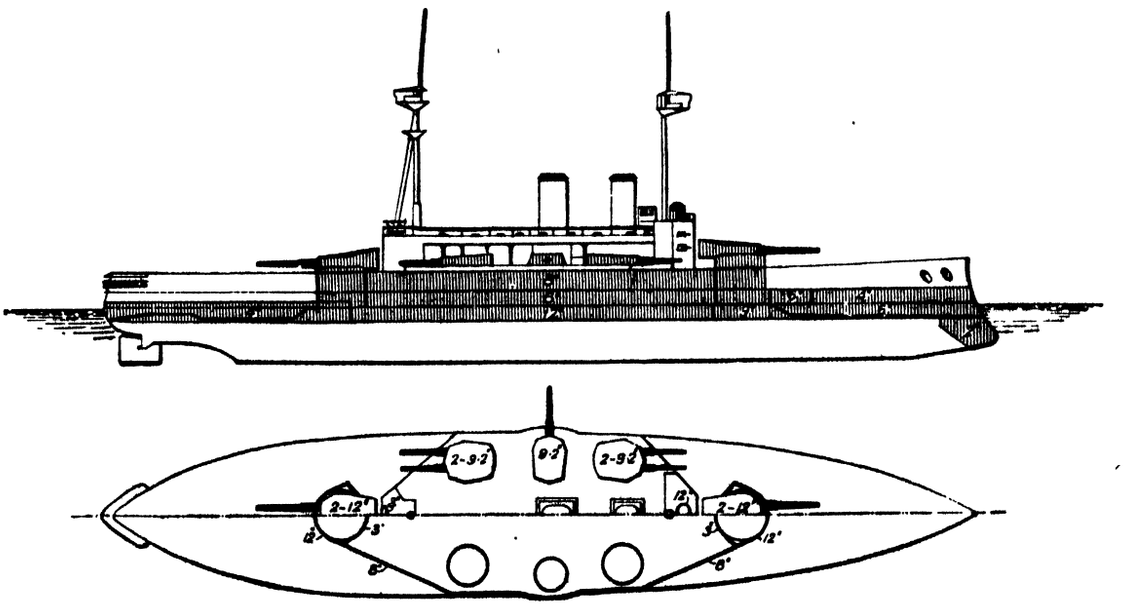


FIG. 61.—Arrangement of Guns and Armour, H.M.S. "Lord Nelson."

[1] These two vessels were afterwards purchased by the British government and became the "Swiftsure" and "Triumph" (fig. 69, Plate XVIII.).

[2] The gun and armour diagrams and many particulars of modern vessels are taken by permission from *Brassey's Naval Annual.*

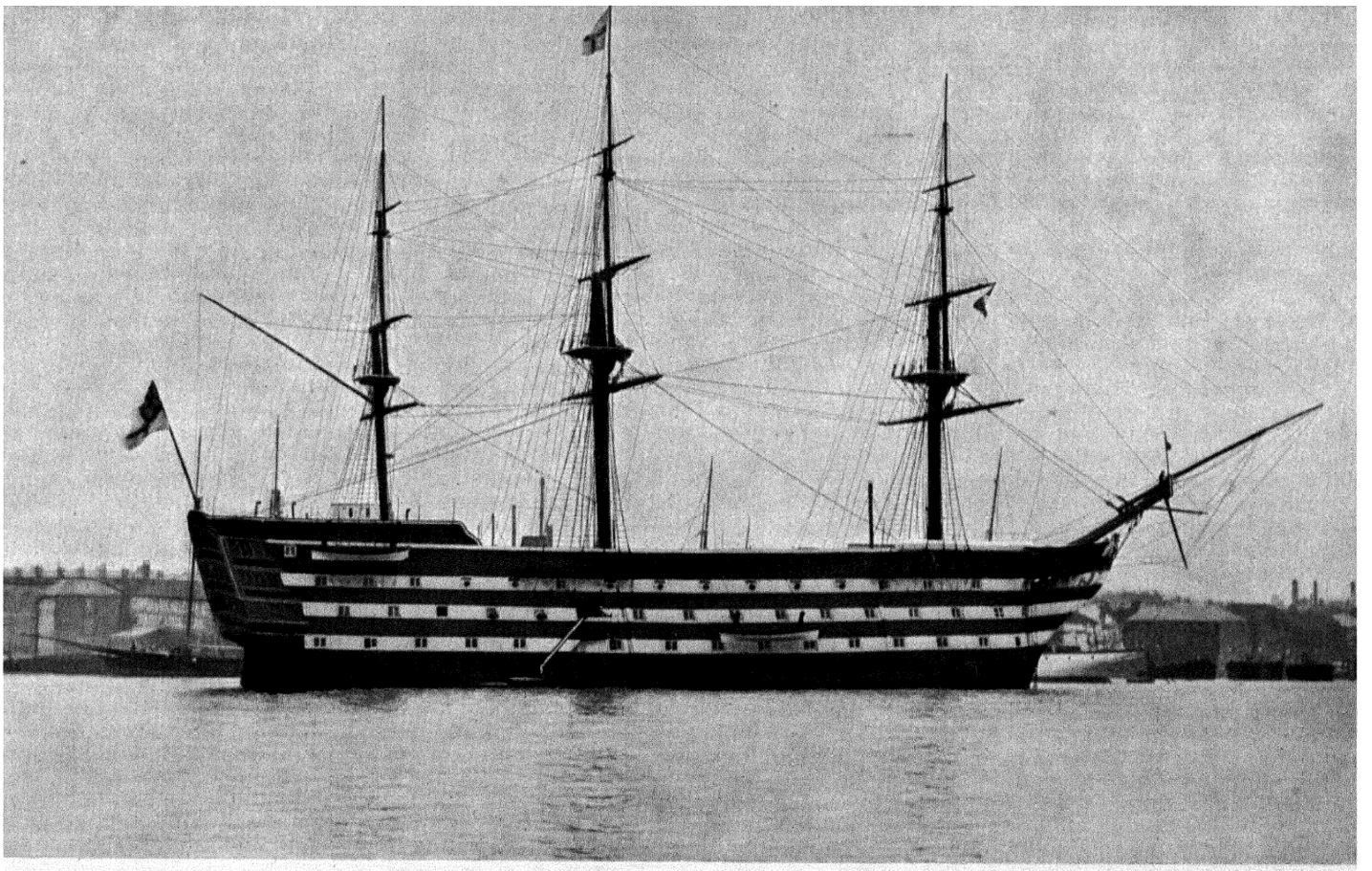


FIG 1.—H.M.S. *Victory.*

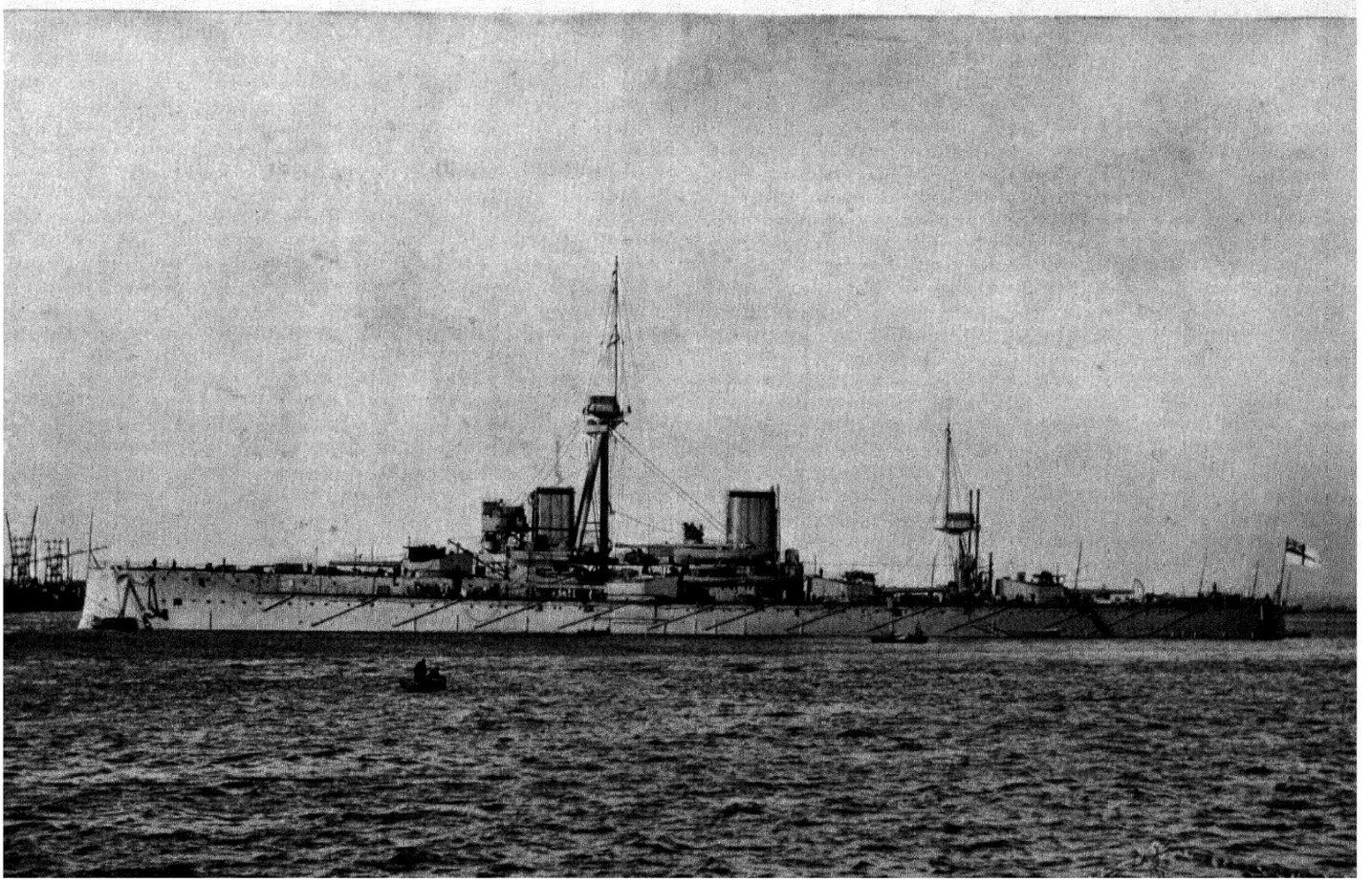


FIG 64.—H.M.S. *Dreadnought.*

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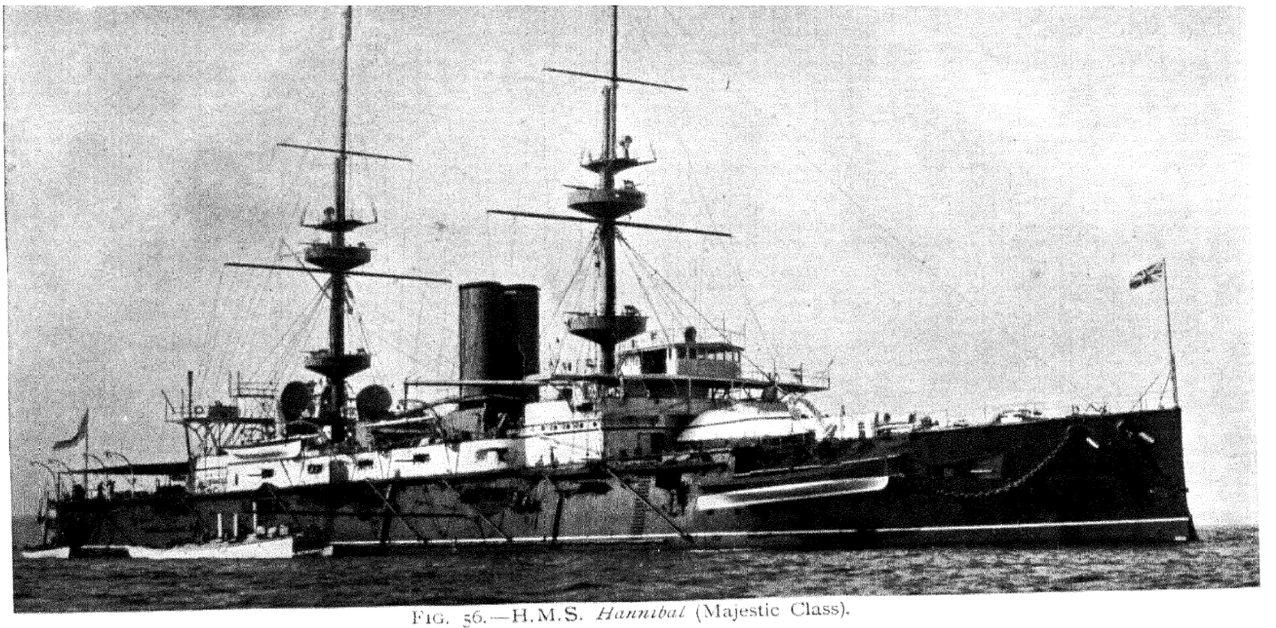


FIG. 56.—H.M.S. *Hannibal* (Majestic Class).

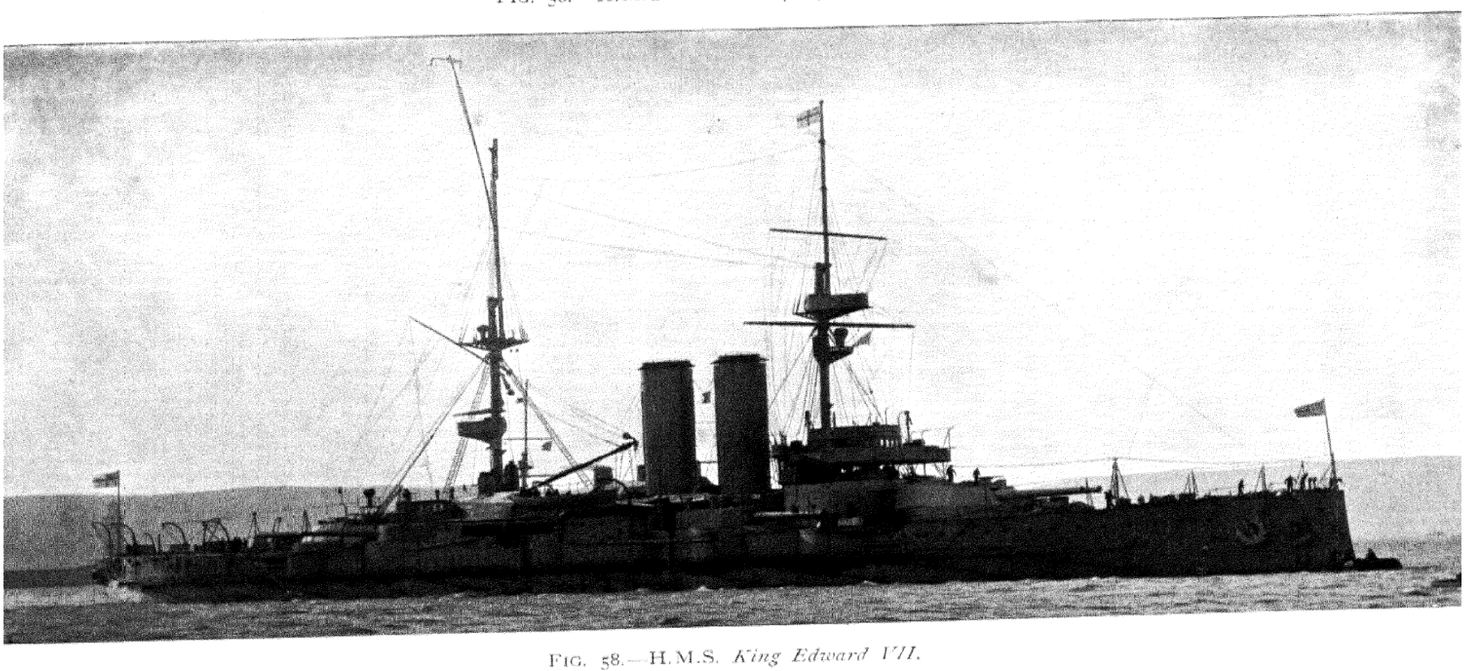
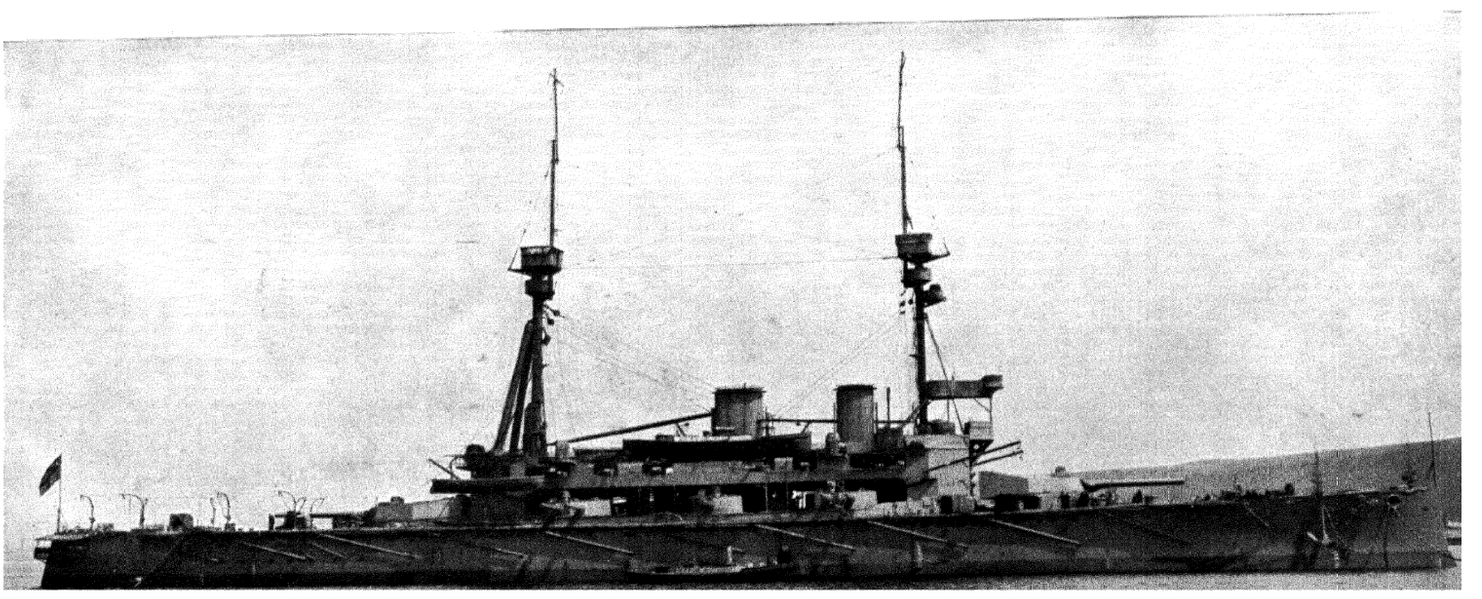


FIG. 58.—H.M.S. *King Edward VII.*



[illegible] H.M.S. [illegible] rd Nelson Class)

for the remainder of the crew is available on the main and lower decks aft."

The tabulated particulars given in Parl. Paper Cd. 3048 for the designs approved are shown in Table XIV.

It is interesting to note that the distribution of armament finally adopted in the "Dreadnought" was nearly that of a design considered by Sir Nathaniel Barnaby at the Admiralty in 1874, which was a combination of the "Devastation" and "Inflexible" designs. The armament was an all-one-calibre big gun armament of 16-in. 80-ton guns carried in pairs in turrets above the upper deck, one pair being placed at each extremity on the middle line, and two pairs on the broadside *en échelon*, having training on each broadside as well as ahead and astern, thus giving a fire of six guns ahead, six astern and eight on each broadside. The scheme was considered inadmissible on account of the great displacement involved, 16,000 tons. The arrangement of eight heavy guns then contemplated was actually adopted in the "Invincible" design, but it was not considered that four pairs of 12-in. guns was a sufficiently heavy armament for the battleships of the "Dreadnought" class; a proposal to place a fifth pair of guns on the middle line between the broadside guns and the aftermost pair of guns was finally adopted, the turrets on the broadside being placed abreast of each other instead of *en échelon* on account of the great increase of length and displacement involved.

The main features in which the "Dreadnought" differed from the "Lord Nelson" are:—(1) The all-one-calibre big gun armament in place of the mixed armament of 12-in. and 9·2-in. guns. (2) The increase of 3 knots in speed. (3) The height of freeboard provided forward to enable the vessel to fight her bow guns at high speed in a sea way. (4) Great increase in manœuvring power due to fitting twin rudders behind propellers.

The weight of the armament of the "Dreadnought" is the same as that of the "Lord Nelson"; it is 30 % greater than that of the "King Edward VII.," the 1400 tons increase of displacement (about 8 % of the displacement of the "Lord Nelson" and "King Edward VII.") being used in obtaining the increase of 3 knots of speed.

The general arrangements of guns and armour of the "Dreadnought" are shown in fig. 63, and on Plate XIII., fig. 64, a photograph of the vessel is given. She was built and tested as rapidly as possible, her keel was laid on the 2nd of October 1905, she was launched on the 10th of February 1906, King Edward VII. himself performing the christening ceremony and starting the vessel down the ways; and she went to sea, for steam, gunnery and torpedo trials, on the 1st of October 1906, one year after the laying of the keel. The whole of the trials were completed without hitch of any kind, the machinery realized the expectations as to power and smoothness of running, and a speed of 21·6 knots was obtained on the measured mile, with an expenditure of power well within the capacity of the boilers. She left England for a long experimental cruise on the 5th of December 1906.

Immediately after the trials of the "Dreadnought," three other vessels, the "Bellerophon," "Temeraire" and "Superb" of 18,600 tons were begun, the additional 700 tons in displacement being absorbed in additional armour protection and an improved anti-torpedo-boat armament consisting of sixteen 4-in. guns. In 1907 and 1908 the "St Vincent," "Collingwood" and "Vanguard" of 19,250 tons displacement were begun, in which further additions to the armour protection were made. These were followed by the "Neptune," "Hercules" and "Colossus," of about 20,000 tons displacement, laid down in 1909, the additional 800 tons lengthening the ships and enabling the 12-in. guns on the broadside to be placed *en échelon* and the second pair of guns from aft to be lifted high enough to fire over the aftermost pairs of guns; the whole of the main armament being thus able to fire on either broadside and eight guns to fire astern. Each of these vessels was completed in two years from the date of laying the keel. See Table XV.

On the 29th of November 1909 the "Orion," the leading vessel of what in 1910 was the most recent group of

TABLE XIV.

Name of Ship	Dreadnought.	Invincible.	Inflexible.	Indomitable.
Class and type	Battleship	Armoured Cruiser	Armoured Cruiser	Armoured Cruiser
By whom designed	Sir Philip Watts, K.C.B.	Sir Philip Watts, K.C.B.	Sir Philip Watts, K.C.B.	Sir Philip Watts, K.C.B.
When and where laid down	2nd Oct. 1905, Portsmouth	2nd April 1906, Sir W. G. Armstrong, Whitworth & Co., Newcastle-on-Tyne	5th Feb. 1906, Messrs John Brown & Co., Glasgow	1st March 1906, Fairfield Shipbuilding and Engineering Co., Glasgow
Date of completion	1906–1907	1908–1909	1908–1909	1908–1909
Length	490 ft.	530 ft.	530 ft.	530 ft.
Breadth	82 "	78 ft. 6 in.	78 ft. 6 in.	78 ft. 6 in.
Mean load draught	26 ft. 6 in.	26 ft.	26 ft.	26 ft.
Weight of hull including armour and backing	11,100 tons	9,660 tons	9,660 tons	9,660 tons
Displacement at load draught	17,900 "	17,250 tons	17,250 "	17,250 "
Makers of machinery	Messrs Vickers, Sons & Maxim, Barrow-in-Furness	Messrs Humphreys, Tennant & Co., Deptford	Messrs John Brown & Co., Glasgow	Fairfield Shipbuilding and Engineering Co., Glasgow
Estimated horse-power (natural draught)	23,000	..	..	..
Corresponding estimated speed at load draught, smooth water, clean bottom (natural draught)	21 knots	..	..	..
Coal capacity at load draught	900 tons	1000 tons	1000 tons	1000 tons
Armament, not including machine guns or torpedoes	Ten 12″ B.L. and twenty-seven small Q.F. guns	..	..	..
Estimated first cost	£1,558,683	..	..	..
Estimated proportion of incidental charges	125,614	..	..	..
Total estimated cost, excluding guns and ordnance stores	1,684,297	..	..	..
Estimated cost of guns	113,200	..	..	..
Total estimated cost, including guns	1,797,497	£1,736,645	£1,726,990	£1,730,733

"Dreadnoughts," was laid down at Portsmouth,[1] and the following vessels of the group (the "Thunderer," "Monarch" and "Conqueror") were ordered to be built in the private yards of the Thames Iron Works, Sir W. G. Armstrong & Co. on the Tyne, and Beardmore & Co. on the Clyde a few weeks later. In these vessels there is a considerable increase in displacement, amounting to 2500 tons or 12½% beyond that reached in the preceding group, their displacement being 22,500 tons on a length of 545 ft. between perpendiculars. The additional displacement has allowed the whole of the turrets to be placed on the middle line, the side armour to be raised to the upper deck, and heavier guns to be carried.

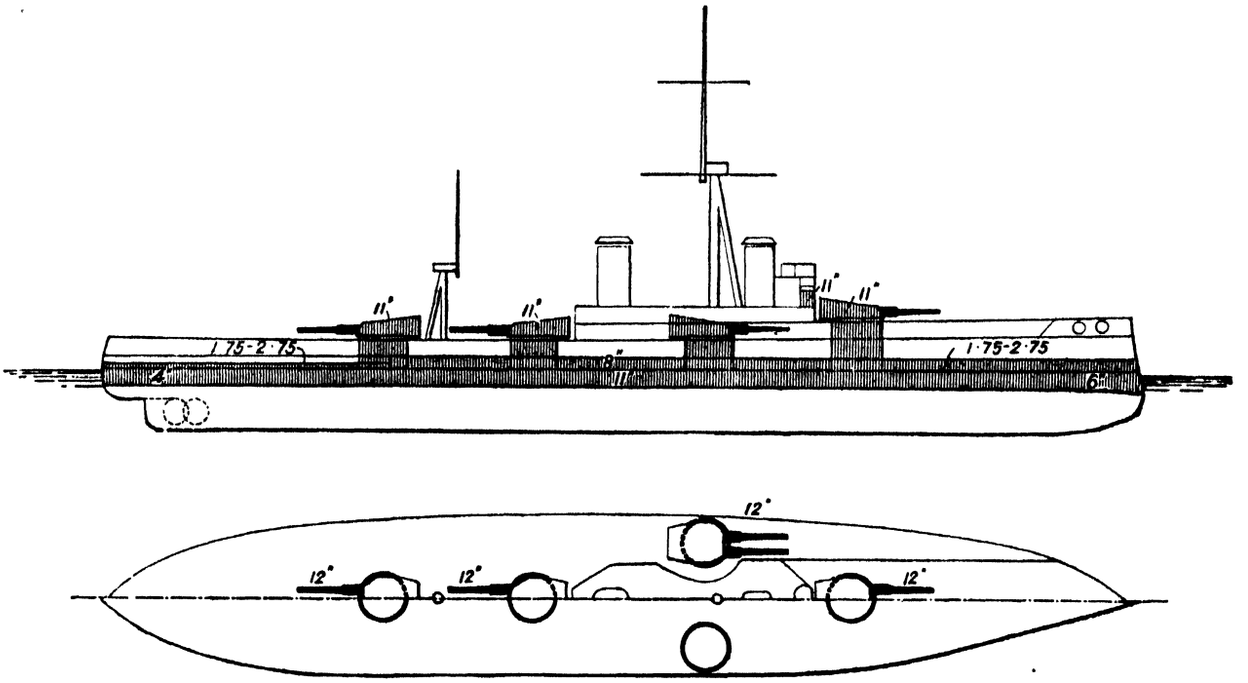


FIG. 63.—Arrangement of Guns and Armour. H.M.S. "Dreadnought."

Great Britain thus had in 1910 fourteen "Dreadnoughts" built and building, not including the "Dreadnought" cruisers described later on under cruisers.

In the first seven vessels—"Dreadnought," "Bellerophon," "Temeraire," "Superb," "St Vincent," "Collingwood" and "Vanguard"—six 12-in. guns could fire directly ahead and six directly astern, and eight could fire on the broadsides. In the next three—"Neptune," "Colossus" and "Hercules"—six 12-in. guns could fire ahead, eight could fire astern, and the whole ten could fire on either broadside. In the last four—"Orion," "Thunderer," "Monarch" and "Conqueror"—four guns could fire ahead, four astern and the whole ten on either broadside. Their displacement had been reached by five steps from that of the "King Edward VII." and "Lord Nelson,"—the first of 1400 tons, 8½%; the next three each of about 700 tons, say 4%; and the last of 2500 tons, or 12½%. The first of these increases, though not without precedent in the British navy,[2] elicited some hostile criticism. Its justification lay in the fact that all the world followed the lead. The 22,500 tons of the "Orion" was not acceptable in 1904, but her design was practically that advocated by Lord Fisher when he took office as First Sea Lord in October 1904 after certain modifications had been made as the result of investigations at the Admiralty.

The general growth of the fleets of British and foreign powers is dealt with in the article NAVY. Some details may be given here of foreign battleships.

United States.—In 1889 the "Texas," designed by the late Mr William John, was laid down. On a displacement of 6315 tons she carried an armament of two 12-in. and six 6-in. guns at a speed of 17 knots—the 12-in. guns being mounted in two turrets placed diagonally in a central citadel and protected by 12-in. armour. She was followed by the "Maine," which was sunk in Havana Harbour. In 1891 the "Indiana," "Massachusetts" and "Oregon" were laid down, of 10,288 tons displacement and 16 knots speed, protected by 18-in. belt armour and armed with four 13-in. and eight 8-in.

TABLE XV.—*Particulars of British Battleships of Dreadnought Type.*

Vessel.	Date of Launch.	Hull. Material.	Length.	Breadth.	Mean Draught.	Load Displacement.	Speed.	Horse Power.	No. of Screws.	Machinery. Engines.	Boilers.	Armament.	Heavy Guns where Mounted.	Thickest Armour.	Cost (excluding guns).
			Feet.	Feet.	Feet.	Tons.	Knots.								£
Dreadnought .	1906	Steel.	490.0	82.0	26½	17,900	21.6	23,000	4	Parsons Turbines.	Babcock & Wilcox	10—12" 24—12 pr.	Barbettes.	11"	1,699,900
Bellerophon .	1907	,,	490.0	82.0	27.0	18,600	21.8	23,000	4	,, ,,	,, ,,	10—12" 16—4"	,,	11"	1,649,042
Temeraire .	1907	,,	490.0	82.0	27.0	18,600	22.07	23,000	4	,, ,,	Yarrow large tube	10—12" 16—4"	,,	11"	1,627,655
Superb . .	1907	,,	490.0	82.0	27.0	18,600	21.6	23,000	4	,, ,,	Babcock & Wilcox	10—12" 16—4"	,,	11"	1,544,146
St. Vincent .	1908	,,	500.0	84.0	27.0	19,250	21.7	24,500	4	,, ,,	,, ,,	10—12" 20—4"	,,	10"	1,612,810
Collingwood .	1908	,,	500.0	84.0	27.0	19,250	21.5	24,500	4	,, ,,	Yarrow large tube	10—12" 20—4"	,,	10"	1,589,240
Vanguard .	1909	,,	500.0	84.0	27.0	19,250	22.1	24,500	4	,, ,,	Babcock & Wilcox	10—12" 20—4"	,,	10"	1,465,381
Neptune . .	1909	,,	510.0	85.0	27.0	20,000	21.0[1]	25,000	4	,, ,,	Yarrow large tube	10—12" 16—4"	,,	10"	1,589,240
Colossus . .	1910	,,	510.0	85.0	27.0	20,000	21.0[1]	25,000	4	,, ,,	Babcock & Wilcox	10—12" 16—4"	,,	10"	..
Hercules . .	1910	,,	510.0	85.0	27.0	20,000	21.0[1]	25,000	4	,, ,,	Yarrow large tube	10—12" 16—4"	,,	10"	..

[1] Estimated.

[1] She was launched on the 20th of August 1910.

[2] From the "Trafalgar" to the "Royal Sovereign," and from the "Duncan" to the "King Edward VII.," increases in each case of 17% were accepted.

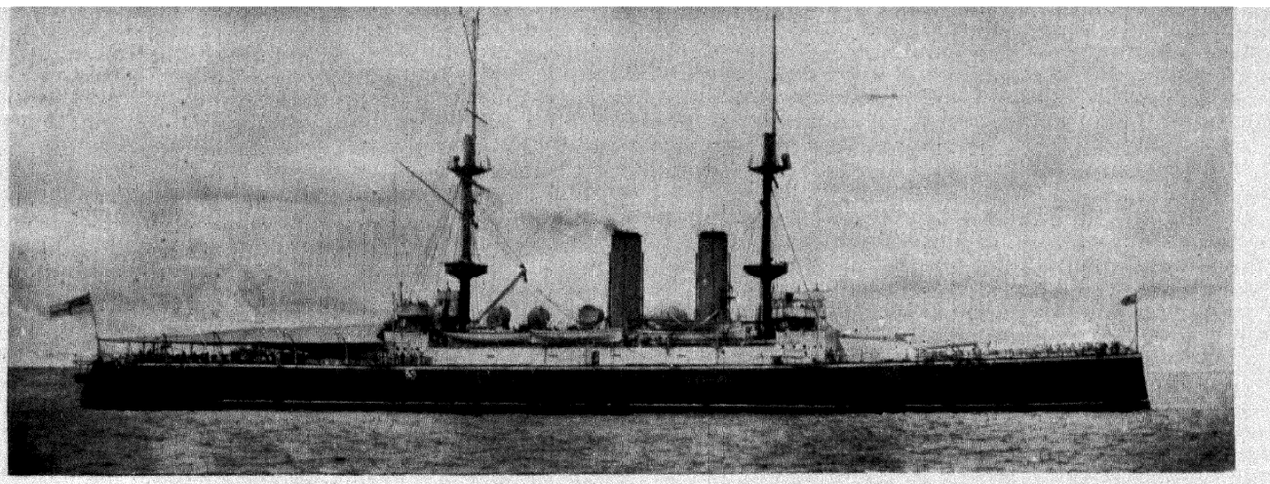


FIG. 57.—H.M.S. *Bulwark*

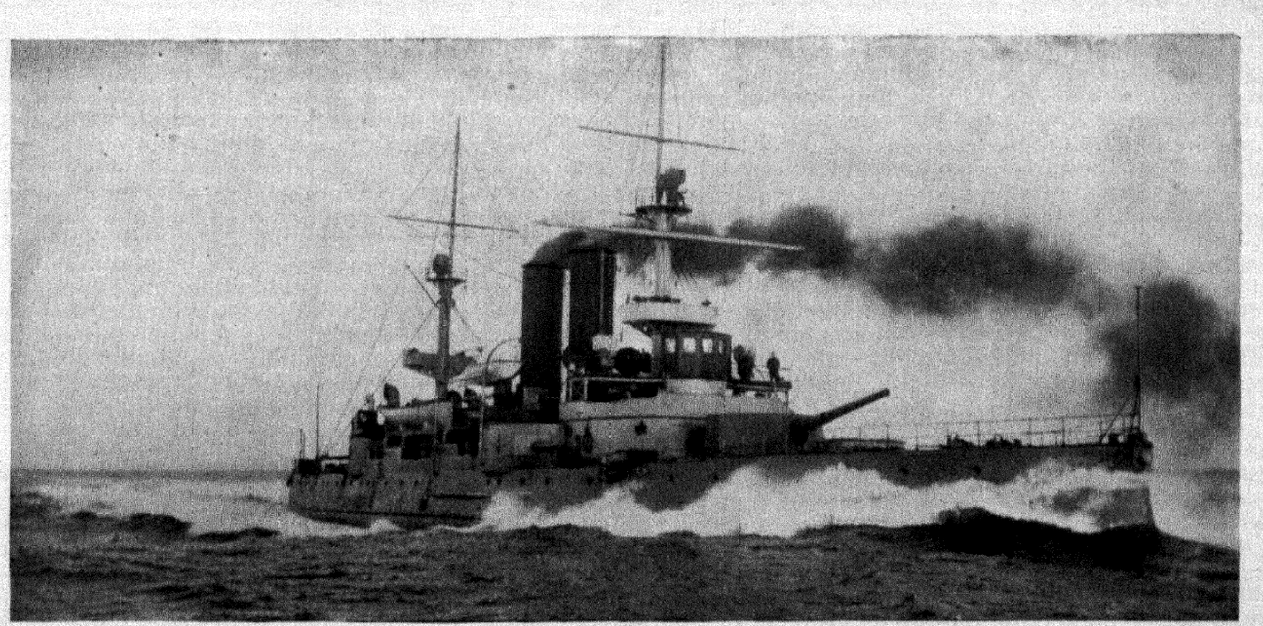


FIG. 81.—Norwegian *Norge*.

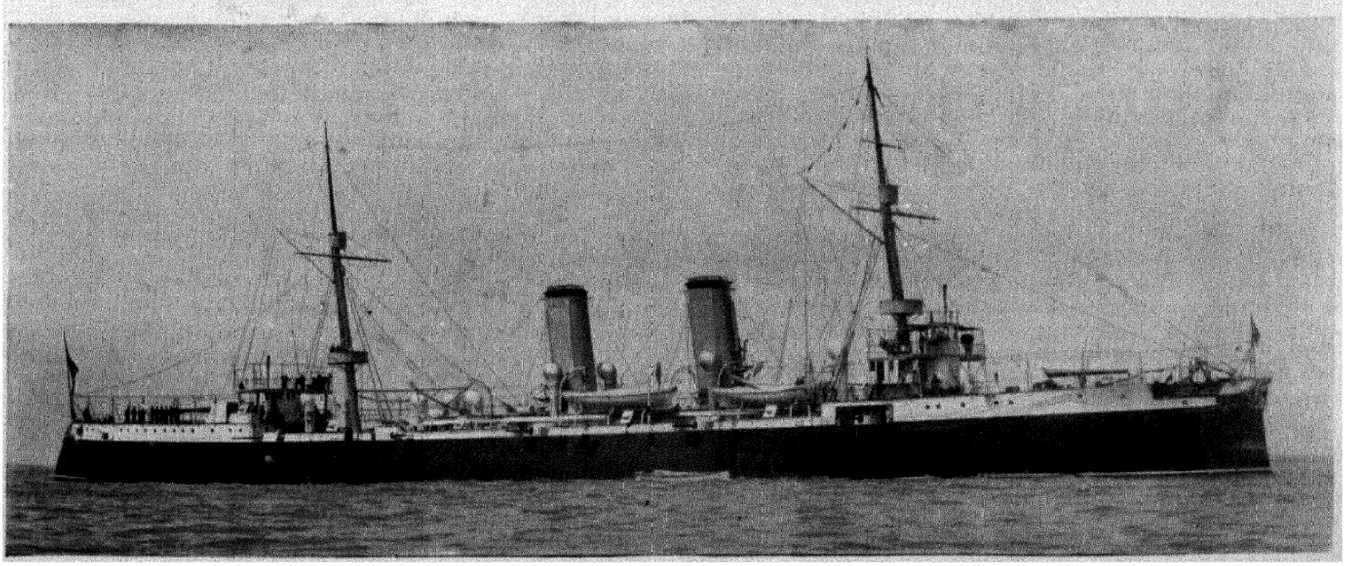


FIG. 98.—Chilean *Chacabuco*

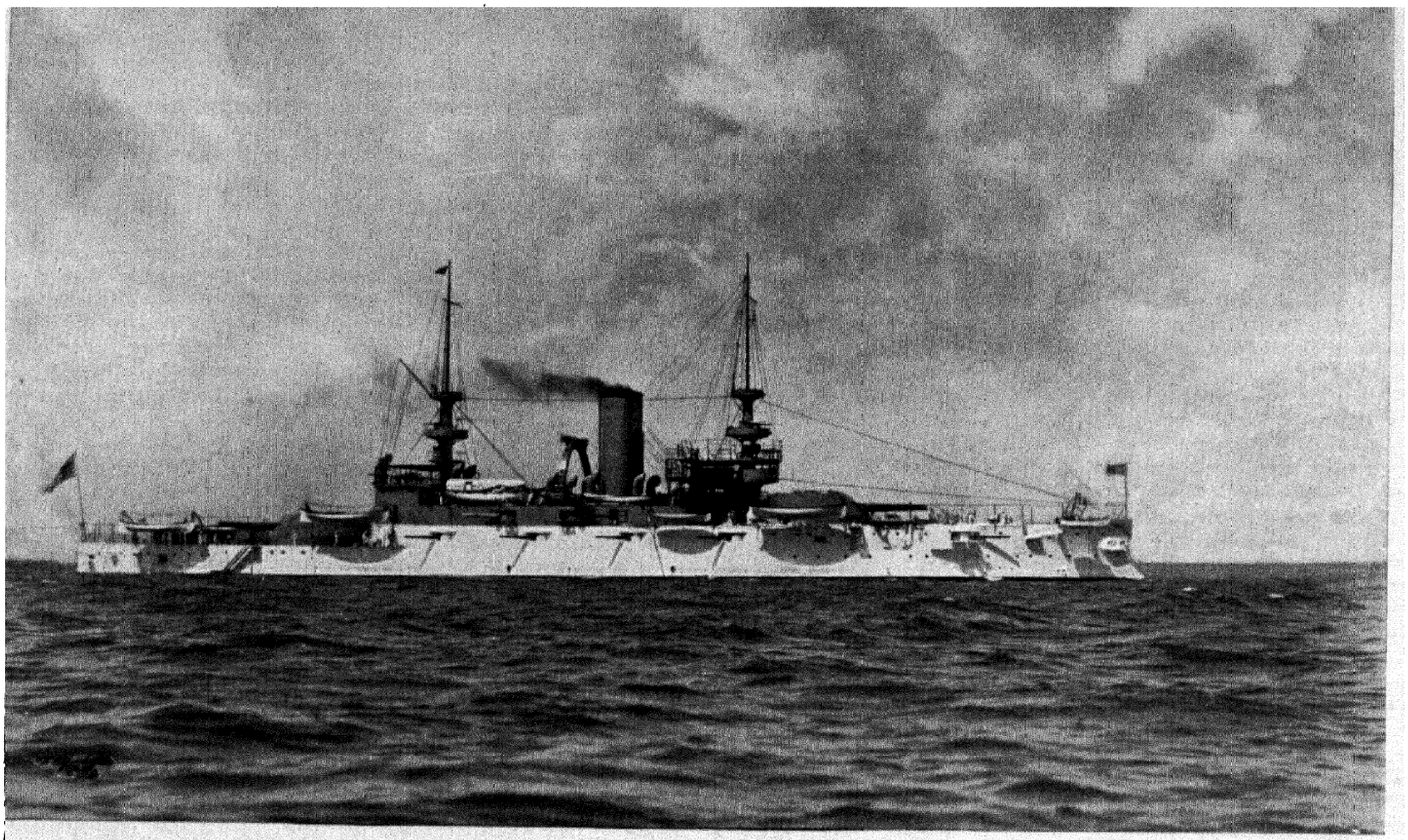


FIG. 66.—U.S.A. *Illinois.*

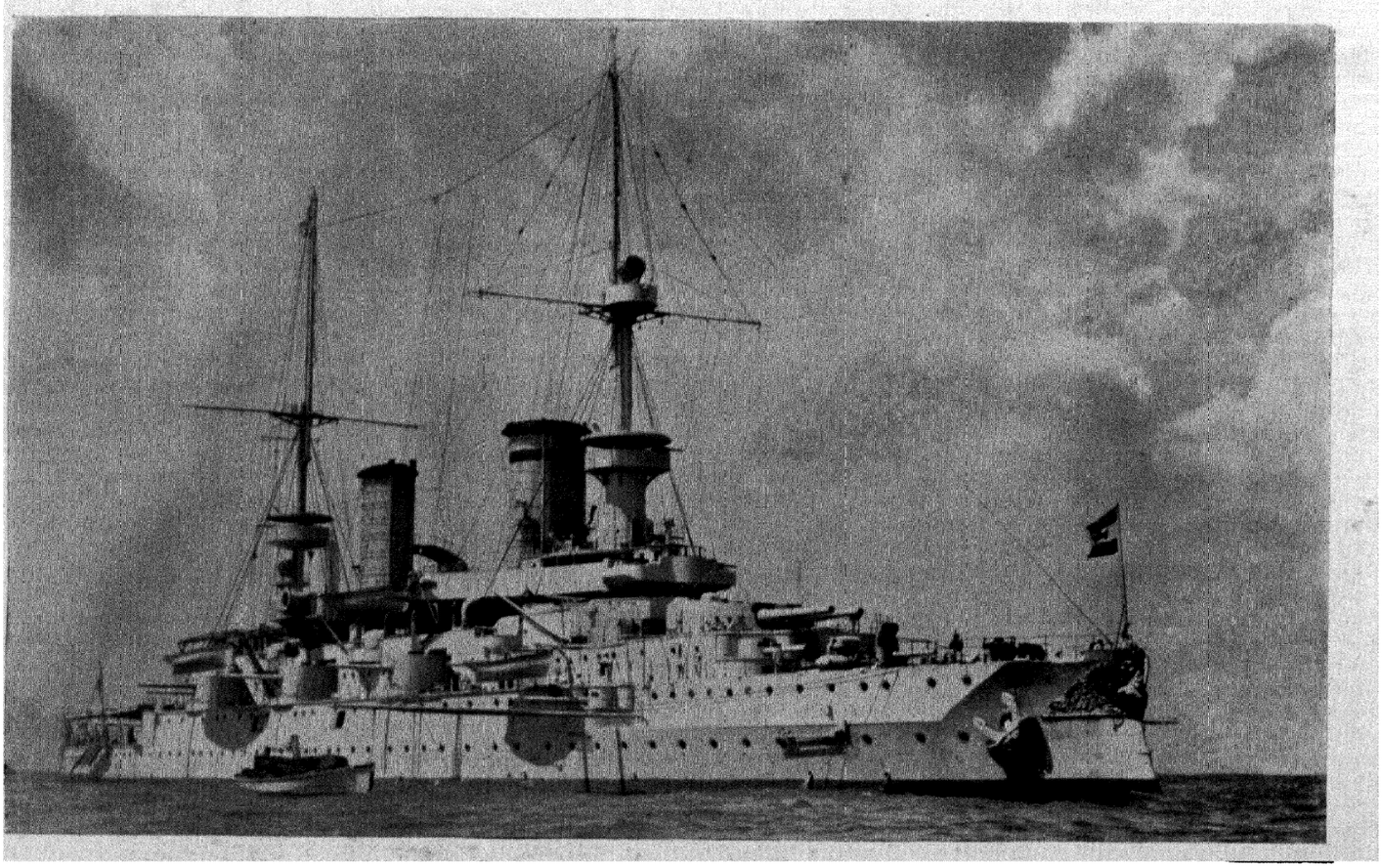


FIG. 70.—German A[illegible]

guns, the 13-in. guns being mounted in pairs in turrets on the upper deck, and the four 8-in. guns singly in turrets at the corners of the superstructure deck. They were followed by the "Iowa" of 11,346 tons, laid down in 1893; and in 1896 by the "Kearsarge" and "Kentucky," whose principal dimensions were:—length 368 ft., beam 72 ft., mean draught 23 ft. 6 in., displacement 11,525 tons, I.H.P. 10,500 and speed 16 knots as designed, 12,000 I.H.P. and 16¼ knots being reached on trial. They carried four 13-in. guns in turrets 15 in. thick, four 8-in. guns in turrets 9 in. thick, fourteen 5-in. Q.F. guns, twenty-seven smaller guns, and four torpedo tubes; and at the above displacement they carried 410 tons of coal, but could stow 1590 tons. They had a novelty in the shape of two double-storeyed turrets, one forward and one aft. In this arrangement a second turret is superposed or built on the first, the structure so formed turning as a whole; a pair of 8-in. guns is mounted in the upper turret, and a pair of 13-in. guns in the lower. A later example of American design is furnished by the five first-class battleships of the "Georgia" class (fig. 65), laid down in 1902, which have a displacement of 15,320 tons, length 435 ft., beam 76 ft. 10 in., and a mean draught of 24 ft.; they have a complete water-line belt of Krupp armour, from 11 in. to 8 in. thick, tapering to 4 in. at the bow; above this belt there is a belt of lighter armour, 6 in. thick and 245 ft. long, forming a battery for the 6-in. Q.F. guns, which extends to the upper deck; there are also four turrets—two large double-storeyed turrets, as in the "Kentucky," placed one forward and one aft, and two smaller turrets, one placed on each side forward. The larger turrets carry each a pair of 12-in. guns and a pair of 8-in. guns, and are protected by a maximum thickness of 11-in. armour, and the smaller carry each a pair of 8-in. guns and are protected by 6½-in. armour. In addition to the four 12-in. and eight 8-in. guns thus disposed, there are also twelve 6-in. guns on the main deck and some forty-two smaller guns.

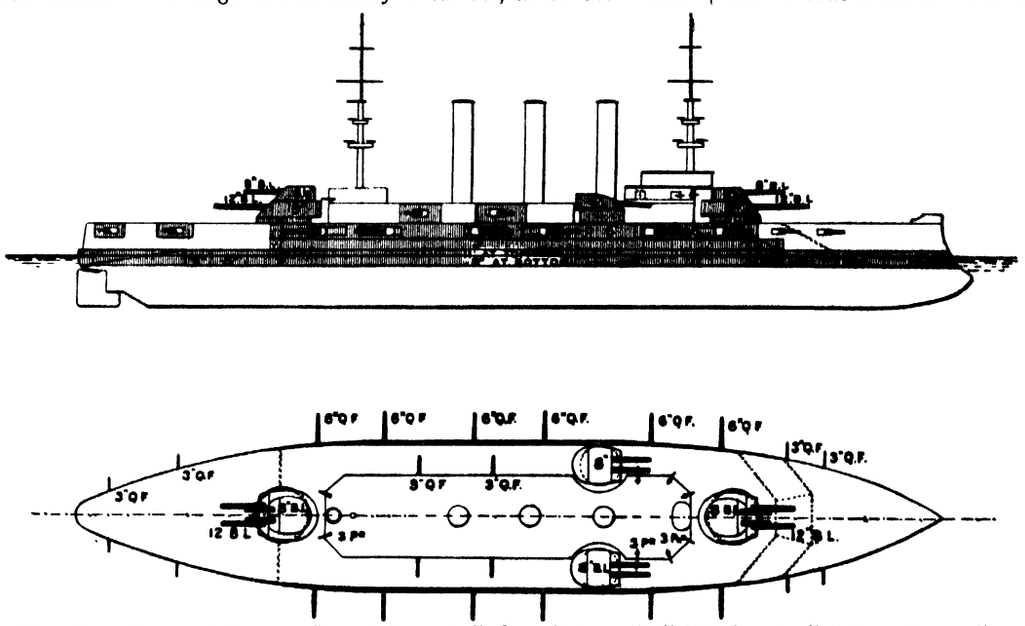


FIG. 65.—Gun and Armour Plan "Georgia" class ("Georgia," "Nebraska," "New Jersey," "Rhode Island" and "Virginia").

Machinery of 19,000 I.H.P. was provided for a speed of 19 knots, and both were exceeded on the trials of the vessels. They carry 900 tons coal on the trial draught, and when fully loaded with 1900 tons of coal have a draught of 26 ft. This comparatively shallow draught is a distinctive feature of all the early United States battleships, but in later years a notable increase of draught was accepted. Between the "Kearsarge" and the "Georgia" were built in 1896–1898 the "Alabama," "Illinois" (fig. 66, Plate XVI.), and "Wisconsin," somewhat similar to the "Kearsarge," carrying four 13-in. guns and fourteen 6-in. guns, and in 1899–1901 the second "Maine," the "Missouri" and "Ohio," which more nearly resembled the "Georgia," as they carried 12-in. guns for their main armament.

The "Georgia" class was followed by two much larger vessels, the "Connecticut" and "Louisiana," laid down in 1903; they were 450 ft. long, 76 ft. 10 in. beam, 17,600 tons displacement and 24 ft. 6 in. draught when loaded with 900 tons coal, and 26 ft. 9 in. draught when loaded with full complement of ammunition and stores and 2200 tons coal; and they marked a great advance in fighting power. While retaining four 12-in. guns for the main armament, they carried eight 8-in. and twelve 7-in. guns as a secondary armament, and they were well protected, guns and armour being arranged as shown in fig. 67. Engines of 16,500 I.H.P. were provided for a speed of 18 knots, and both were considerably exceeded on trial. In these and later American vessels tall towers of open lattice-work, somewhat resembling the Eiffel Tower, were fitted instead of hollow steel masts for supporting signal and fire-control arrangements. While the vessels of the "Connecticut" class were building in 1904, two other very similar but smaller vessels, the "Idaho" and "Mississippi," were also laid down, of 13,000 tons with reduced armament and armour and less speed.

The first two American "Dreadnoughts," the "Michigan" and "South Carolina," were laid down in 1906; they are 450 ft. long, 80 ft. 3 in. beam, displacement 16,000 tons and draught 24 ft. 6 in. when carrying 900 tons of coal, increasing to 17,620 tons and 27 ft. draught when fully loaded. Engines of 16,500 I.H.P. are provided for 18·5 knots, and the armament consists of eight 12-in. guns mounted in four pairs, two pairs forward and two pairs aft, all on the middle line and arranged so that the guns of the second pair sweep over the turrets of the adjacent pair nearer the extremities of the vessel; an anti-torpedo boat armament of twenty-two 14-pdr. guns is provided, but no secondary armament. The sides and barbettes are protected by 8 in. to 12 in. of armour, the belt armour tapering to 4 in. at the bow and stern. In 1907 the "Delaware" and "North Dakota" were laid down; the size of the vessels was increased to 20,000 tons in order to carry 12-in. and 14-in. guns behind armour from 12 in. to 8 in. in thickness and obtain a speed of 21 knots, and they are 510 ft. long, 85 ft. beam, 26 ft. 10 in. mean draught. Ten 5-in. guns are carried on the main deck behind 5-in. armour, two are carried on the main deck forward and two aft, in casemates. Curtis turbines are fitted in the "North Dakota" and reciprocating engines of the latest type in the "Delaware"; the boilers provided on each ship are for 25,000 I.H.P.; on trial the "Delaware" developed 28,578 I.H.P. and recorded a speed of 21·56 knots, while the "North Dakota" reached 31,826 H.P. and 22·25 knots.

Parsons turbines were adopted for the four battleships next laid down. The first two, the "Florida" and "Utah," commenced in 1909, are very similar to the "Delaware," but of 21,825 tons displacement and 28 ft. 6 in. mean draught. The second pair, the "Arkansas" and "Wyoming," begun in 1910, are of much greater displacement, viz., 26,000 tons; 8100 tons greater than the "Dreadnought" and 3500 tons greater than the "Orion." They are 554 ft. long, while a beam of 93 ft. and the same mean draught of 28 ft. 6 in. have been accepted. Turbines of 33,000 H.P. are provided for a speed of 20·5 knots, four propellers being fitted as in H.M.S. "Dreadnought." The coal to be carried on trial has been increased to 1650 tons, in place of the 1000 tons in preceding vessels. Twelve 12-in. and twenty-one 5-in. guns are carried and vanadium steel armour of 8-in. to 11-in. thickness is fitted on sides and barbettes, associated with protective decks of increased thickness. Six pairs of 12-in. guns are carried, all on the middle line; the foremost pair is 34 ft. above the designed load-line, the second pair 40 ft., and the third pair 32 ft.; the aftermost guns are 25 ft. above water, the next forward 32 ft. and the third pair from stern again at a height of 25 ft. Twenty-one 5-in. anti-torpedo-boat guns are carried, and the complement of officers and men has reached the high total of 1100. The main armament of the later vessels, "New York" and "Texas," is composed of ten 14-in. instead of twelve 12-in. guns, and the displacement is increased to 27,000 tons and the H.P. to 35,000.

Germany.—In 1885 Germany had one first-class battleship, the "König Wilhelm," of 9567 tons displacement, and four smaller vessels, the "Baden," "Bayern," "Sachsen" and "Württemberg," of 7400 tons each. The "Kaiser" and "Deutschland," central-battery ships designed by Sir Edward Reed, and two turret ships, the "Preussen" and "F. der Grosse," followed shortly afterwards. The "Kaiser" and "Deutschland" were 285 ft. in length, had a displacement of 7600 tons, 8000 I.H.P. and 14½ knots speed; were armed with eight 22-ton guns and one 18-ton gun, and had side armour of a maximum thickness of 10 in. The vessels of the "Preussen" class were sea-going ships of the "Monarch" type, 308 ft. in length and of 6750 tons displacement and 14 knots speed, with belt armour of a maximum thickness of 9½ in. and turret armour 8½ in. thick.

In 1891 an advance was made by laying down the "Brandenburg" class of 9901 tons, carrying six 11-in. guns in three barbettes, one forward and one aft, and one on the middle line amidships. They were followed by the five first-class battleships of the "Kaiser" class, the last of which, the "Kaiser Friedrich III." (fig. 70, Plate XVI.), was finished in 1900. They are of 10,900 tons displacement, length 377 ft., beam 66 ft. 10 in., draught 25 ft. 9 in., 13,000 I.H.P. and 18 knots speed. They have belts of Krupp steel extending from the after

barbette to the stem, with a maximum thickness of 12 in., tapering to 6 in. at the bow; there is no side armour above this belt. The main armament consists of four 9·4-in. guns, placed in pairs in barbettes, one forward and one aft, protected by 10-in. armour. On the main deck they have four 5·9-in. Q.F. guns in 6-in. armoured casemates, two on each side; and on the upper deck they have eight similar guns, protected in like manner, and six others in turrets—three each side; in all, eighteen 5·9-in. guns, besides twelve 3·5-in. and smaller guns. There are five vessels of the "Wittelsbach" class, a development of the "Kaiser Friedrich III."; they are 700 tons more displacement, 15 ft. longer and 1½ ft. more beam, but are of shallower draught. They have engines of 15,000 H.P. and a speed of 19 knots, or a knot more than their predecessors. Their armament is the same, but the 9·4-in. guns are better protected. The main armour belt is somewhat longer, but in other respects the thicknesses and general disposition of the protection are similar to the "Kaiser Friedrich III." class.

In the next five vessels, the "Braunschweig" class, laid down in 1901–1902, the 9·4-in. guns were replaced by 11-in. guns for the main armament; and the eighteen 5·9-in. guns were replaced by fourteen 6·7-in. guns for the secondary armament. The displacement was increased to 12,988 tons, the speed of 18 knots was maintained, and the armour protection practically as in the preceding

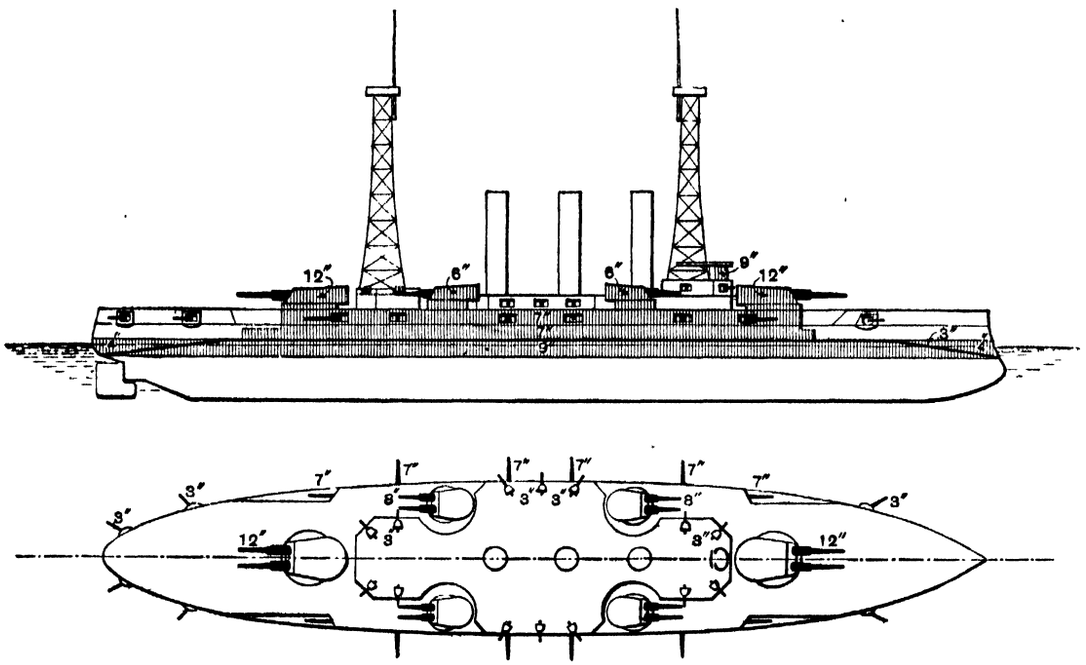


FIG. 67.—Arrangement of Guns and Armour of U.S. "Connecticut."

vessels. Five vessels of the new "Deutschland" class which followed in 1903–1905 were very similar to the "Braunschweig" class.

The "Nassau," the first of the German "Dreadnoughts" laid down in 1907, was 455 ft. in length and of 18,200 tons displacement, and carried an armament of twelve 11-in., twelve 5·9-in. and sixteen 3·4-in. guns, had an armour belt of Krupp steel 11 in. to 4 in. in thickness, I.H.P. 22,000 for 19 knots and speed on trial 20·7 knots. The "Posen" (fig. 71, Plate XVII.), "Rheinland" and "Westfalen" of the same type were also laid down in 1907 and were built and completed for sea with extraordinary rapidity. The "Westfalen" attained 20·25 knots on trial with 26,792 H.P. The next three vessels, "Thüringen," "Helgoland" and "Ostfriesland," laid down in 1908, are provided with twelve 12-in. guns arranged as in H.M.S. "Neptune"; they are of 22,150 tons displacement and 25,000 I.H.P. for 19·5 knots speed (probably at continuous sea speed; a measured-mile speed of about 2 knots more would doubtless be expected); they are protected by 12-in. Krupp steel armour; their dimensions are: length 489 ft., beam 98 ft., draught 27 ft. 6 in. The vessels laid down in 1910 were said to be still larger.

France.—For many years the French designers favoured the placing of the four heavy guns of their battleships in separate barbettes—a 12-in. gun at each end and a 10·8-in. gun on each side of the vessel amidships, intermediate positions being arranged for the smaller guns. Such vessels as the "Carnot," "Charles Martel," "Jaureguiberry," "Masséna," "Bouvet" approximating to 12,000 tons displacement, and built in the 'nineties, were so arranged. These were followed by a series of vessels in which the 12-in. gun alone was accepted for the main armament, and two pairs were fitted, one forward and one aft as in British vessels; the "Gaulois," "Charlemagne," "St Louis" and "Suffren" were so arranged. The "Suffren," commenced in 1899 (displacement 12,728 tons, length 410 ft., beam 70 ft. and draught 27 ft. 6 in.), had a complete water-line belt of Harveyized steel armour of 11¾ in. maximum thickness, and above this, up to the main deck, similar armour, 5 in. thick, extending from the after turret to the bow; she had also a short armoured battery on the main deck which enclosed the funnel uptakes. There were eight turrets on her upper deck—one forward and one aft, each carrying two 12-in. guns, and six arranged three on each broadside, each carrying a 6·4-in. gun. The armour of the larger turrets was of the same thickness as the armour belt, namely, 11¾ in., and that of the smaller turrets 5 in. She mounted eight 3·9-in. guns on the superstructure, and also had twenty-two smaller guns and four torpedo tubes, of which two were submerged. She had triple screws, engines of 16,000 I.H.P. and a speed of 18 knots. The "République," laid down in 1901, and the "Patrie," laid down in 1902, were superior in speed and armament to any British battleships then building. They had a displacement of 14,865 tons, and were of 439 ft. length, 79 ft. 6 in. beam and 27 ft. 6 in. extreme draught. They had three screws, and a nominal I.H.P. of 17,500 for a speed of 18 knots; but on trial these were considerably exceeded, the "Patrie" reporting 19,000 I.H.P. and 19·47 knots. They carried four 12-in. B.L. guns in pairs in turrets on the middle line, as in the British ships, twelve 6·4-in. Q.F. guns in pairs in turrets on the upper deck, six additional 6·4-in. Q.F. guns in casemates on the main deck, twenty-six 3-pdrs., three above-water and two submerged torpedo tubes. There was a complete water-line belt of a maximum thickness of 12 in., the bow was protected by 4-in. armour and there was a partial 4-in. belt above the 12-in. belt. The protective deck was 4 in. thick on the slopes, and the armour of the main turrets 12½ in., the whole armour being of Harvey quality.

Four later vessels of the class, "Justice," "Démocratie," "Liberté" and "Vérité," were given a still more powerful secondary armament of 7·6-in. guns—six placed in well-protected turrets at a great height above water, and four in casemates between decks. Six vessels, the "Condorcet," "Danton" (fig. 72), "Diderot," "Mirabeau," "Vergniaud" and "Voltaire," were laid down in 1907. All had Parsons turbines of 22,500 H.P. for a speed of 19·25 knots, and their main armament consisted of four 12-in. and twelve 9·4-in. guns, as shown in fig. 72. The later French ships "Courbet" and "Jean Bart" carry twelve 12-in. guns in six pairs, two forward and two aft on the middle line, one pair training over the other, and one pair on each side amidships as in "Dreadnought." They are of 23,000 tons displacement and 20 knots speed, and have an anti-torpedo boat armament of twenty-two 5·5-in. guns, all in casemates of 7-in. armour.

Japan.—Previous to the Russo-Japanese War Japan had provided herself with a number of excellent battleships built in Great Britain, such as the "Fuji" of 12,450 tons, laid down at the Thames Ironworks in 1894, the "Hatsuse," built at Elswick, the "Asahi," built at Clydebank, and the "Shikishima," built at the Thames Ironworks, all of about 15,000 tons displacement and laid down in 1897–1898. The dimensions of these vessels were: length 400 ft., beam 75 ft. 6 in., mean draught 27 ft. The I.H.P. was 15,000, giving a speed of 18 knots. The armour-belt extended the full length of the ship at the water-line, and had a maximum thickness of 9 in.; between the top of this belt and the main deck, for a length of some 220 ft., was an upper belt 6 in. thick, which was continued by oblique bulkheads to the sides of the heavy-gun barbettes. The barbettes themselves, which were two in number, one forward and one aft, had armour 14 in. thick, and the conning-tower also was 14 in. thick. The armament consisted of four 12-in. 49-ton B.L. guns, two mounted in each barbette and loading in any position of training; fourteen 6-in. Q.F. guns, all in 6-in. casemates, eight on the main deck and six on the upper deck; and twenty 12-pdrs., besides smaller guns and four submerged torpedo tubes. The "Mikasa," laid down at Barrow in 1899, was a slight modification of the "Hatsuse" class design, being 200 tons heavier and 6 in. more in draught. The principal difference was that the eight 6-in. Q.F. guns on the main deck were increased to ten in number, and instead of being in separate casemates were in a 6-in. armoured central battery, with 2-in. divisional screen bulkheads.

The "Hatsuse" was destroyed in the war by a mine explosion; and the "Mikasa" was seriously damaged by mines. After the war she was accidentally sunk on the 10th of September 1905; she was, however, refloated on the 8th of August 1906, repaired and recommissioned. The Japanese fleet in 1910 contained

several vessels which were captured from Russia during the war, such as the "Iwami" of 13,515 tons (late "Orel"), the "Hizen" of 12,275 tons (late "Retvizan"), the "Segami" of 12,790 tons (late "Peresviet"), the "Suwo" of 12,997 tons (late "Pobyeda"), the "Tango" of 10,960 tons (late "Poltava"), and the "Iki" of 9700 tons (late "Imperator Nicolai I."). The "Suwo" and "Hizen" may be taken as typical examples of these captured vessels. The former is of the following dimensions: length 436 ft., beam 71½ ft., draught 27½ ft., and displacement 12,670 tons; she has engines of 15,000 H.P. and a nominal speed of 19¼ knots, carried an armament of four 10-in. guns, mounted in pairs in turrets on the middle line forward and aft; eleven 6-in. guns, distributed five on each broadside and one in the extreme bow of the vessel; twenty 3-in. guns and twenty-six smaller pieces; and six torpedo tubes. She is protected by a complete water-line belt of armour, 9 in. thick amidships, tapering to 4 in. at the ends, reinforced by a protective deck 2¾ in. thick. Above the belt, for a length of 185 ft. amidships, is a lighter belt of 5-in. Krupp armour, protecting the bases of the 6-in. guns, and terminated by transverse bulkheads. The 10-in. gun turrets are 10 in. thick, and the 6-in. guns are protected by casemates 5 in. thick. This vessel carries 30 Belleville boilers, and has storage for 2000 tons of coal. The "Hizen" ("Retvizan") was built at Cramp's, U.S.A. She is of 12,700 tons displacement, 376 ft. long, 72¼ ft. beam, and 26 ft. draught. She has four 12-in. B.L. guns in pairs in turrets, twelve 6-in. Q.F. guns in 5-in. casemates, twenty 12-pdrs. and twenty-eight smaller guns, besides four submerged and two above-water torpedo tubes. She is protected by a water-line belt extending from the after-turret to the stem, and tapering in thickness from 9 in. to 2 in. Above this is a complete belt of 6 in. maximum thickness, and the main armament is protected by turrets 10 in. thick. She has 16,000 H.P. and a speed of 18 knots, and has stowage for 2000 tons of coal.

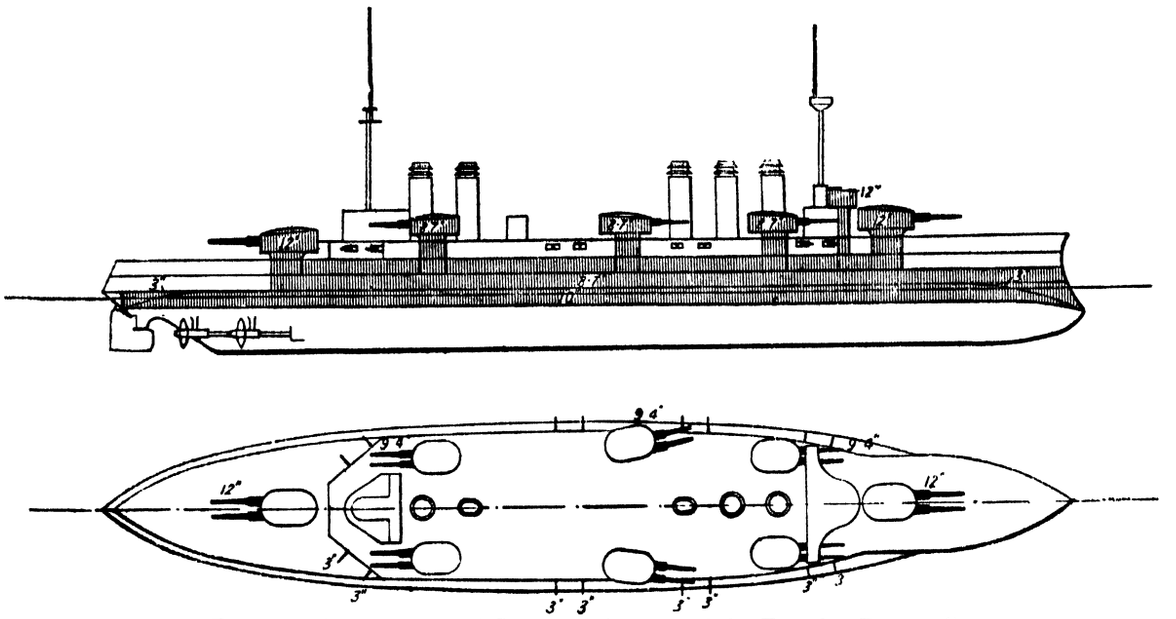


FIG. 72.—Arrangement of Guns and Armour of the French "Danton."

The "Kashima" (fig. 73, Plate XVII.) was laid down at Elswick in 1904 and the "Katori," at Barrow in the same year; they were not delivered until the war was over. Also during the war Japan laid down two very much larger vessels, the "Aki" and "Satsuma." The "Aki" is the larger of the two, being 492 ft. long, 83½ ft. beam, 27½ ft. draught, and 19,800 tons displacement; she carries four 12-in., twelve 10-in., eight 6-in. and twelve 12-pdr. guns and five torpedo tubes, and is protected by 9-in. to 5-in. armour. Curtis turbines of 24,000 H.P. are provided for a speed of 20 knots. It is noteworthy that this vessel was laid down on the 15th of March 1905, while the "Lord Nelson" of 16,500 tons was not laid down until the 18th of May 1905 and the "Dreadnought" of 17,900 tons not until the 2nd of October 1905. The "Aki" also exceeds in displacement the "St Vincent," laid down in 1907–1908, and her tonnage was not reached in Great Britain until 1909, when the "Neptune" was laid down. The "Aki" was followed by still larger vessels, the "Kawachi" and "Settsu," both of 20,800 tons. The "Kawachi" is thus 900 tons greater than the "Neptune," and she was laid down one day before that vessel. The general arrangement of armour and guns of these large vessels is shown in fig. 74; they are protected by armour of 12 in. to 5 in. in thickness, and in addition to twelve 12-in. guns they carry ten 6-in., twelve 4·7 in. and four 12-pdrs.

Russia maintained in 1910 two fleets, one being in the Black Sea, prevented by treaty from passing through the Dardanelles, and the other, the main Russian Fleet, in the Baltic.

In 1882 three remarkable vessels were laid down for the Black Sea Fleet, the "Catherine II.," "Tchesme" and "Sinope." They were barbette ships of 10,180 tons displacement, with a compound armour belt of a maximum thickness of 16 in., armed with six 12-in. B.L. guns mounted in pairs on the upper deck in a large pear-shaped barbette, and seven 6-in. guns on the main deck; and having a speed of 16 knots. Other vessels built for this fleet were the "Twelve Apostles" of 8709 tons, "George the Victorious," 11,032 tons, the "Three Prelates," 13,318 tons, the "Rostislav," of 8880 tons laid down in 1895 and the "Panteleimon" of 12,582 tons laid down in 1897. The latest vessels built on the Black Sea are the "Ioann Zlatoust" and "Evstafi," of 12,840 tons and 16 knots, carrying four 12-in., four 8-in., twelve 6-in., fourteen 12-pdr. and six 3-pdr. guns; both were laid down in 1903.

Of the main Russian Fleet outside the Black Sea only a few battleships survived the Russo-Japanese War; these included the "Tzesarevich" of 13,000 tons, built in France in 1899, carrying four 12-in. guns in two barbettes, and twelve 6-in. guns in pairs in turrets; also the "Slava," laid down on the Neva in 1902, 370 ft. long, of

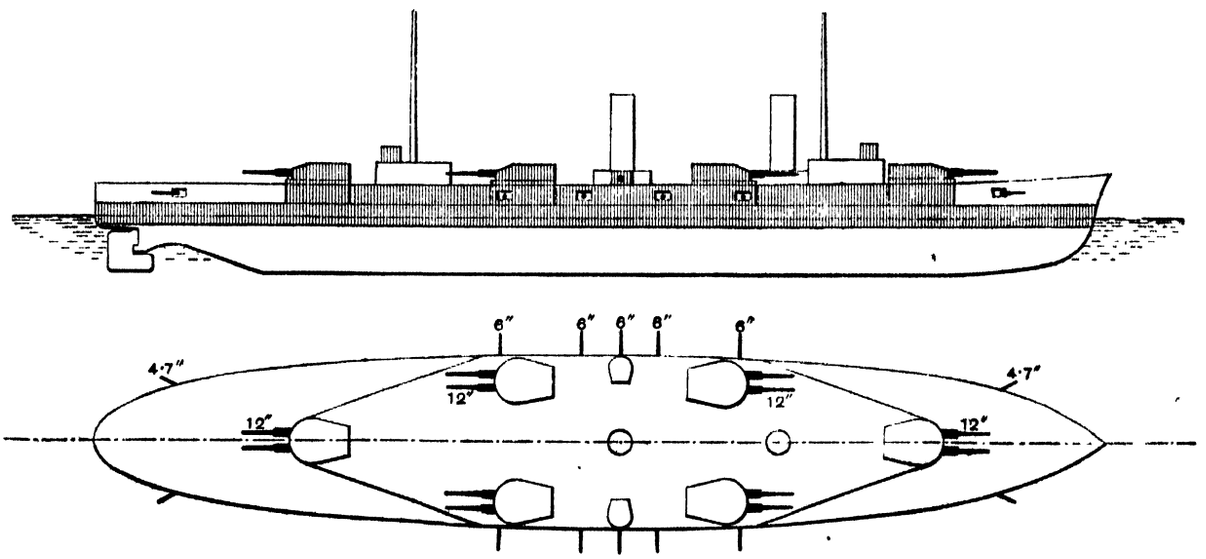


FIG. 74.—Arrangement of Guns and Armour of "Kawachi."

13,516 tons displacement, 16,000 I.H.P. and 18 knots speed, her hull protected by armour of 9 in. to 4 in. in thickness. The "Slava" carried four 12-in. guns in barbettes having 10-in. armour, and twelve 6-in. guns in turrets having 6-in. armour.

In January 1903 Russia laid down the "Imperator Pavel I.," a larger and more powerful vessel than any then building by any other power, being of 17,400 tons displacement—almost that of the

"Dreadnought," but laid down 2½ years earlier; she carries four 12-in. and fourteen 8-in. guns as well as twelve 4·7-in. guns arranged as shown in fig. 75, from which it will be seen that an attempt was made to protect almost the whole of the vessel above water with armour varying from 8½ in. to 3 in. in thickness. Engines of 17,600 I.H.P. are provided for 18 knots speed. A sister vessel, "Andrei Pervozvanni," was also laid down in 1903, but neither vessel was completed in time to take part in the war. In 1909 four vessels were laid down, which were again larger than any then building for any other power, viz. the "Sevastopol," "Petropavlovsk," "Gangut" and "Poltava," of 23,000 tons displacement, with Parsons turbines of 42,000 H.P. for 23 knots speed, 600 ft. long, 89 ft. beam, 27 ft. 3 in. draught, protected by 11-in. armour, armed with twelve 12-in. and sixteen 4·7-in. guns, the 12-in. guns being carried in four three-gun turrets placed at considerable distances apart on the middle line.

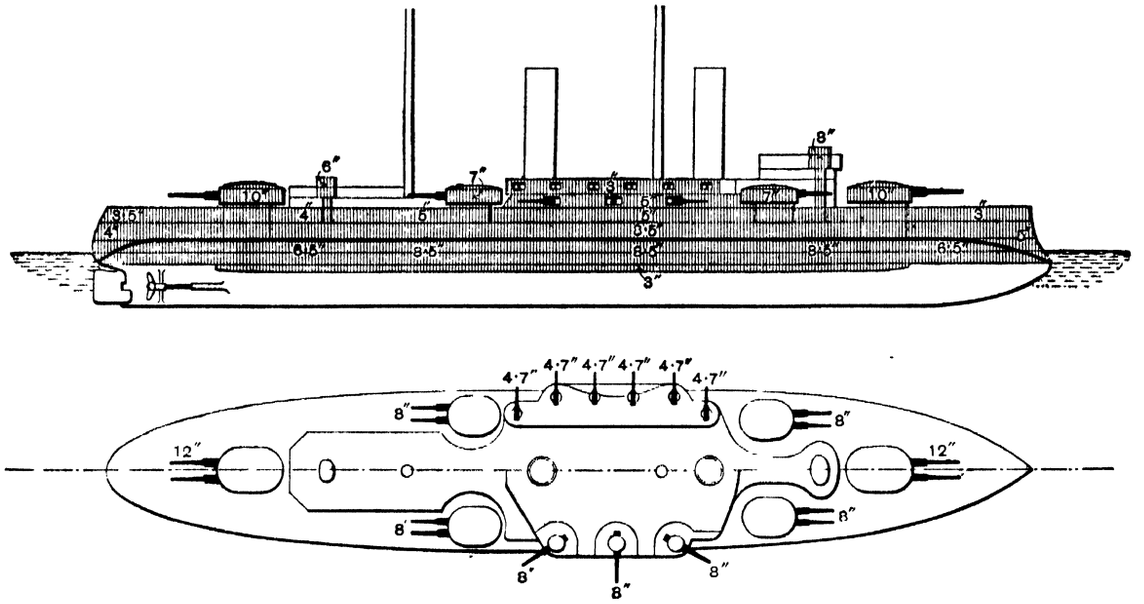


FIG. 75.—Arrangement of Guns and Armour of "Imperator Pavel."

Italy.—The Italian navy has always contained interesting vessels embodying the independent thought and skill of her own designers. The "Duilio," launched in 1876, and the "Dandolo," launched in 1878, were 340 ft. in length, 10,400 tons displacement, and carried four 100-ton M.L. rifled guns, mounted in two turrets and capable of penetrating 22·7 in. of iron at 1000 yds. They had a central citadel 107 ft. in length, protected by 21½ in. of steel armour, with 18-in. armour on the turrets. Their engines were of 7900 I.H.P., giving a speed of 15 knots. In the "Italia" and "Lepanto," launched in 1880 and 1883 respectively, side armour was dispensed with, a curved 3-in. armour deck, with its sides 5½ ft. below the water-line, being fitted from stem to stern, with armour glacis protection to the funnel openings, &c., in this deck; they carried four 100-ton breech-loading guns mounted in two barbettes arranged so as to permit all four guns to fire ahead, astern or on either broadside as in "Inflexible"; their displacement was 13,500 tons, their length 400 ft., and they had engines of 18,000 I.H.P. designed to give a speed of 18 knots. They were followed by three of the "Andrea Doria" class of 11,000 tons, launched in 1884 and 1885, armed with four 105-ton breech-loaders, and protected by an 18-in. belt of compound armour; and by the "Re Umberto," "Sicilia" and "Sardegna" of 13,250 tons, launched 1888 to 1891, and armed with four 67-ton B.L. guns having a penetration of 27 in. of iron at 1000 yds. In 1897 Italy launched the second-class battleships "Ammiraglio di Saint Bon" and the "Emanuele Filiberto" of 9800 tons and 18 knots speed, carrying four 10-in., eight 6-in. and eight 4·7-in. guns and armoured with 10-in. to 4-in. armour. These were followed by the "Regina Margherita," laid down in 1898, and the "Benedetto Brin," laid down in 1899, two vessels of 13,426 tons displacement and 20 knots speed, of good freeboard, carrying an armament similar to that of the "Duncan" and in addition four 8-in. guns; the 12-in. guns are protected by 10-in. armour, the 6-in. guns and the ship's sides by 6-in. armour with 3-in. side plating forward and aft. Four very notable vessels were next laid down—the "Regina Elena" (fig. 76, Plate XVII.) and "Vittorio Emanuele III." in 1901, and the "Napoli" and "Roma" in 1903, each on a displacement of 12,625 tons, carrying two 12-in. and twelve 8-in. guns in turrets, as well as a large number of small quick-firing guns; their machinery of 20,000 I.H.P. is provided for a speed of 22 knots; their hulls are cut down, giving reduced freeboard as compared with "Benedetto Brin," and the hulls and machinery are built as lightly as possible. For several years no new design was adopted, but in 1909 the "Dante Alighieri" was laid down, of 18,700 tons displacement, an increase of 50 % over that of the preceding vessels. She was reported to be 492 ft. long, 79 ft. beam, carrying twelve 12-in., eighteen 4·7-in. and sixteen 3-in. guns, turbines of 30,000 H.P. being provided for a speed of 23 knots, and side armour fitted 9 in. thick amidships tapering to 6 in. forward and 4½ in. aft. Three later vessels, the "Conte di Cavour," "Giulio Cesare" and "Leonardo da Vinci," are of 22,000 tons, 35,000 H.P., 23 knots, and carry thirteen 12-inch guns.

Austria.—Until quite recently Austria has made no attempt to maintain battleships of the first class. Three small battleships, the "Monarch," "Budapest" and "Wien," were laid down in 1893–1894, of 5550 tons displacement and 17½ knots speed, carrying four 9·4-in., six 6-in. and twelve 3-pdr. guns, with armour 10½ in. to 4 in. in thickness. In 1899 three larger vessels, the "Habsburg" (fig. 77, Plate XVII.), "Arpad" and "Babenberg," were begun, of 8340 tons displacement and 18 knots speed, carrying three 9·4-in., twelve 6-in. and several smaller Q.F. guns and well armoured. In 1901 it was decided to build the "Erzherzog Karl Friedrich" and "Ferdinand Max," of 10,600 tons and 19 knots, carrying four 9·4-in. and small Q.F. guns as in the "Monarch," but with the secondary armament increased to twelve

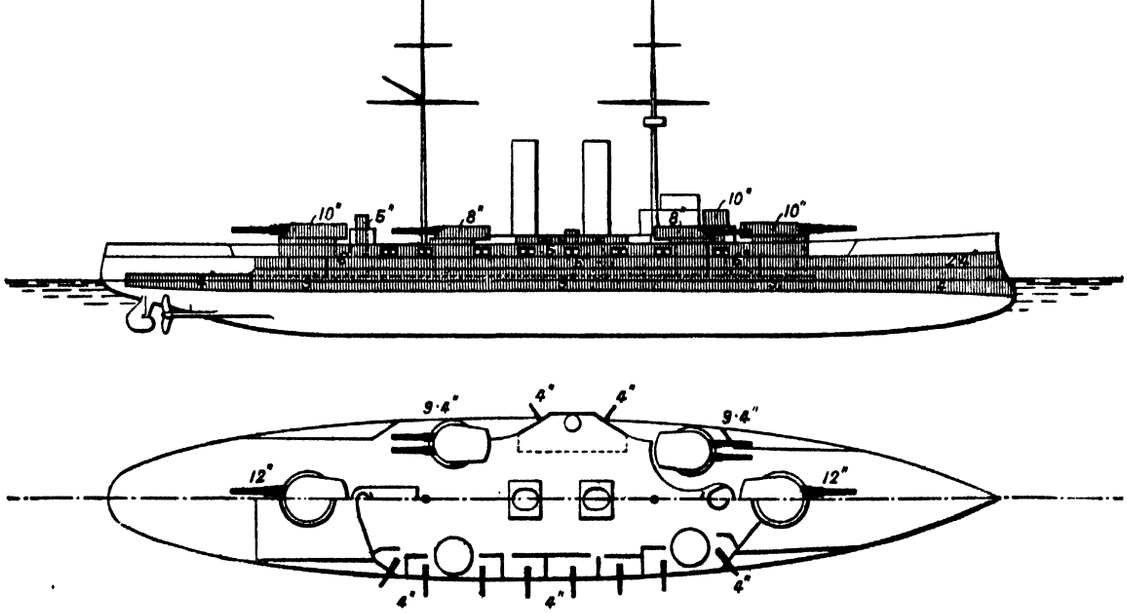


FIG. 78.—Arrangement of Guns and Armour of Austrian "Erzherzog Franz Ferdinand."

FIG. 73.—Japanese *Kashima*

FIG. 76.—Italian [illegible]

FIG. 77.—Austrian Habsburg Class. (*Photo, Cribb.*)

FIG. 74.—German *Posen*. (*Photo, Symons.*)

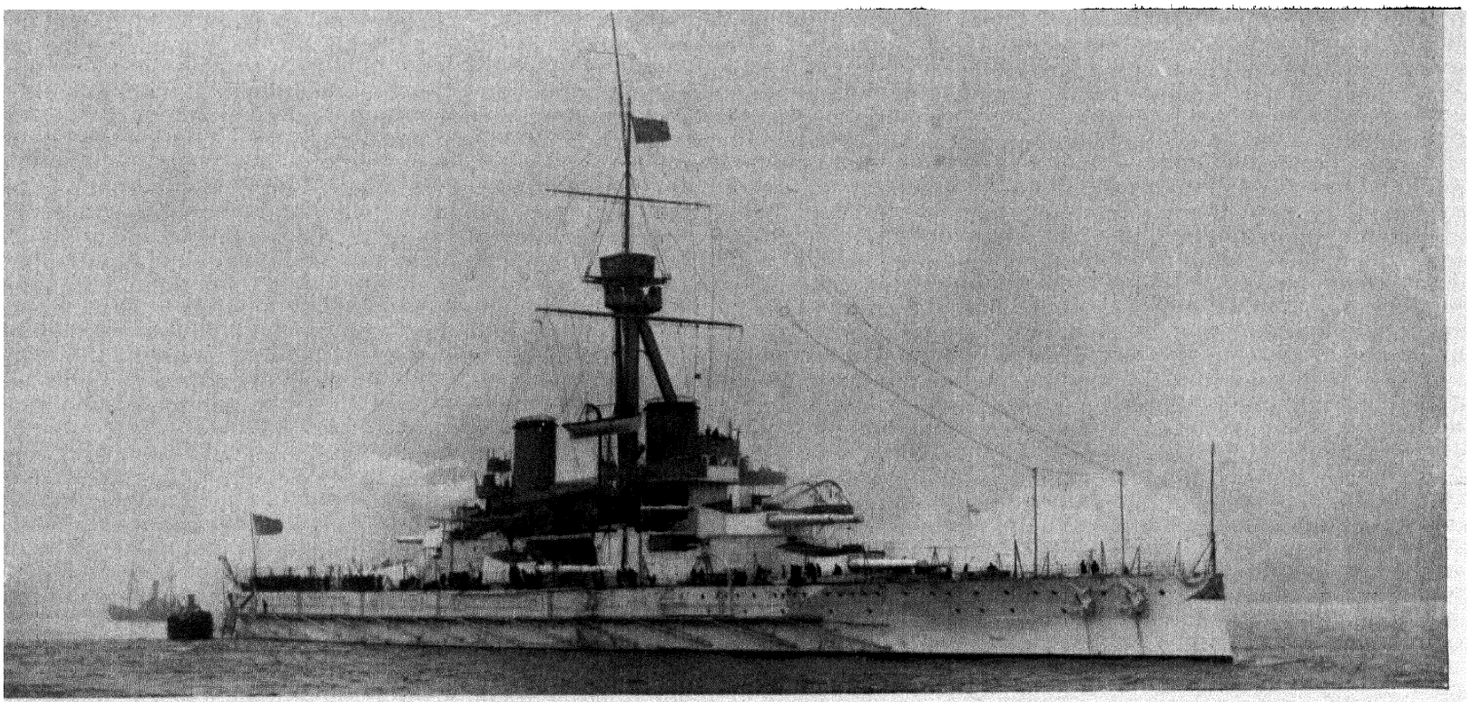


FIG. 79.—Brazilian *Minas Geraes.*

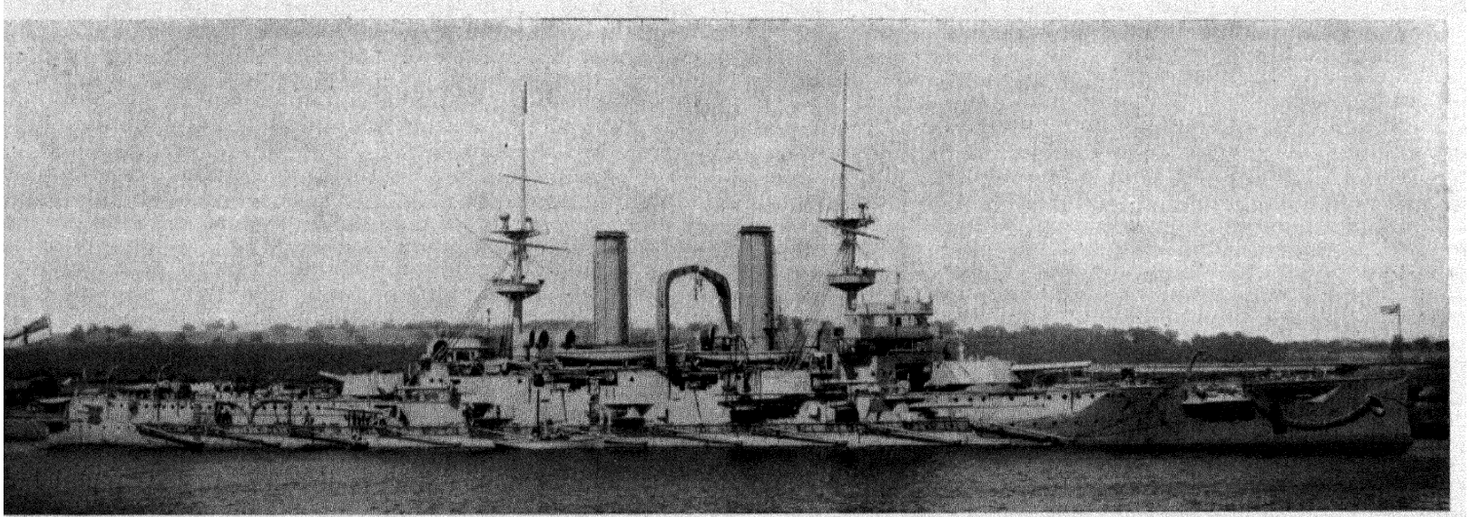


FIG. 69.—H.M.S. *Triumph.*

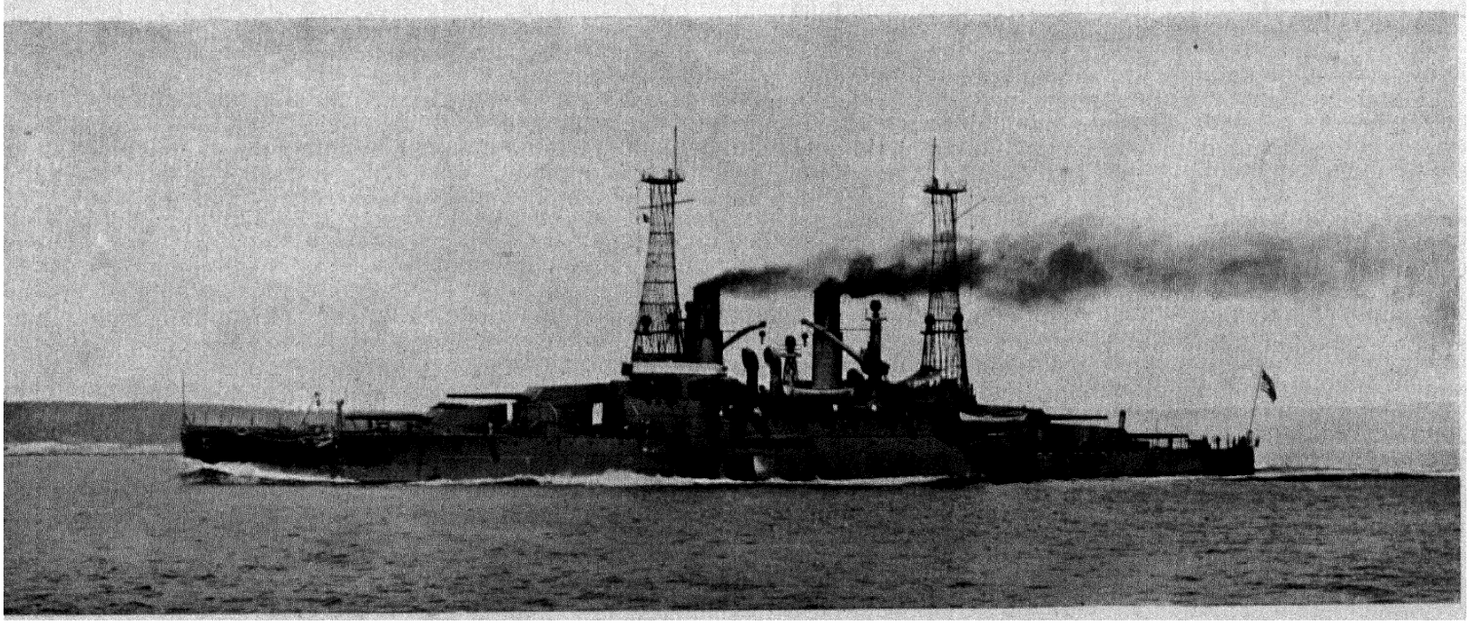


TABLE XVI.—*Development of some of the Leading Features of Notable Armoured Battleships from 1860 to 1910.*

Vessel.	Date of Launch	Hull: Material.	Hull: Length	Hull: Breadth	Hull: Mean Draught	Hull: Load Displacement	Speed.	I H P	No. of Screws	Propulsive Machinery: Engines	Propulsive Machinery: Boilers	Armament (including Machine Guns)	Heavy Guns—where mounted	Thickest Armour	Cost (excluding Guns)
			ft	ft in	ft in	tons	knots							inches	£
Warrior	1860	Iron	380	58 0	26 7	8 830	14 25	6,000	1	Horizontal, trunk, jet condensing 1 expansion 1 set of 2 cylinders, 112 ×48	10 rectangular 22 lb pressure	28—7 6½ ton guns	Broadside	4½	356,693
Agincourt	1865		400	59 3	26 -	10 690	14 8	5,000	1	Horizontal, jet condensing 1 expansion 1 set of 2 cylinders 101 ×54	10 rectangular	17—12 ton M L R	Broadside	5½	49 ,069
Bellerophon	1865	,,	300	50 1	26 0	7,550	14 2	6,500	1	Horizontal trunk surface condensing 1 expansion 1 set of 2 cylinders, 104 ×48	Rectangular 26 lb pressure	10—14 ton and 5—6½ ton guns	Central battery	6	447 618
Monarch	1868		330	57 6	0 0	8 300	15 0	7 850	1	Horizontal 1 expansion 1 set of 2 cylinders 120 ×54	Rectangular 31½ lb pressure	4—12—25 ton, —9—12 ton, 1—7 6½ ton and 20 small guns	Turrets	Turrets 10 Sides, 7	476,971
Sultan	187	,	325	61 0	0 1	9,300	14 1	7 7×	1	Horizontal trunk, surface condensing 1 expansion 1 set of 2 cylinders, 118 ×54	Rectangular 30 lb pressure	8—18 ton and 4—12 ton guns	Central battery	9	485,155
Devastation	1871	,,	285	62 4	27 0	9,330	14 2	7 000	2	Horizontal, trunk, surface condensing 1 expansion 2 sets of 2 cylinders, 88 ×39	8 rectangular 30 lb pressure	4—12—35 ton and 10 smaller guns 2 torpedo tubes	Turrets	Turrets 14 Sides, 12	430,746
Inflexible	1876		320	75	26 1	11,880	14 0	8 000	2	Vertical 2 expansions 2 sets of 3 cylinders 70 + @ 90 ×48	8 single ended, oval 4 double ,, ,, 60 lb pressure	4—16—80 ton and 8—4—22 cwt guns 4—14 torpedo tubes	Turrets	24	961,406
Benbow	1885	Steel	330	63 6	28 6	11,600	16 9	11 500		Vertical expansions 2 sets of 3 cylinders 52 +72 @74 ×45	12 oval	2—16½ 110 ton, 10—6 and 13 smaller guns 5 torpedo tubes	Barbettes	18	774,711
Royal Sovereign	1891	,	380	75 6	27 6	14 15	17 5	13,000	2	Vertical 3 expansions 2 sets of 3 cylinders, 40 +59 +88 ×51	8 single ended return tube 148 lb pressure	4—13½ 67 ton, 10—6 and 38 smaller guns 7 torpedo tubes	Barbettes	18	839,136
Majestic	1896	,	390	75 0	27 6	14,900	17 5	12 000	2	Vertical 3 expansions 2 sets of 3 cylinders 40 +59 +88 ×43	8 single ended return tube boilers	4—12 46 ton, 12—6 and 38 smaller guns 5—18 torpedo tubes	Barbettes, hooded	Barbettes, 14 Sides, 9 Harveyized	872,458
Formidable	1898	,,	400	75 0	26 9	15 000	18 0	15,000	2	Vertical 3 expansions 2 sets of 3 cylinders, 250 lb pressure 31½ +51½ +84 ×51	20 Belleville, with economizers 300 lb pressure	4—12 40 ton, 12—6 and 32 smaller guns 4—18′ torpedo tubes	Barbettes, hooded	Barbettes, 12 Sides, 9 Krupp	1,022,745
Duncan	1901	,	405	75 6	26 6	14 000	19 0	18,000	2	Vertical 3 expansions 2 sets of 4 cylinders 31½ +54½ +2@63 ×48	24 Belleville, with economizers	4—12, 12—6 and 26 smaller guns 4 torpedo tubes	Barbettes, hooded	Barbettes, 14 Sides, 7	1,023,147
Swiftsure	1903	,,	436	71 0	24 7	11,800	20 0	12,500	2	Vertical triple expansion 2 sets of 4 cylinders, 29 +47 +2 @ 54 ×39	Yarrow large tube	4—10, 14—7 5, 14—14 pr, 2—12 pr, and 8—6 pr and machine guns	Barbettes	10	849,474
King Edward VII	1903	,,	425	78 0	26 9	16,350	18 5	18,000	2	Vertical triple expansion 2 sets of 4 cylinders, 38 +60 +2 @ 67 ×48	Babcock and Wilcox and cylindrical	4—12, 4—9 2, 10—6, 14—12 pr 17—3 pr and machine guns 4 torpedo tubes	Barbettes	12	1,383,845
Lord Nelson	1906	,,	410	79 6	27 0	16,500	18 5	16,750	2	Vertical triple expansion 2 sets of 4 cylinders, 33 +53 +2 @ 60 ×48	15 Yarrow large tube	4—12, 10—9 2 and 24—12 pr and 5 machine guns 5 torpedo tubes	Barbettes	12	1,540,889
Dreadnought	1906	,,	490	82 0	26 6	17,900	21 6	23,000	4	Parsons turbines	Babcock and Wilcox	10—12′, 24—12 pr and 5 machine guns 5 torpedo tubes	Barbettes	11	1,699,900
Imperator Pavel I (*Russian*)	1907	,,	429 9	79 9	28 6	17,400	18 0	17,600	2	Vertical triple expansion	Belleville	4—12, 14—8′, 12—4·7′, and 14 smaller, light and machine guns 5 torpedo tubes	Barbettes	12	1,170,000
Posen (*German*)	1908	,,	455	88 6	26 6	18,200	20 5	20,000	3	3 sets 4-cylinder vertical triple expansion	Schultz Thorny croft	12—11″, 12—5 9′, 20 smaller, light and machine guns 6 torpedo tubes	Barbettes	12	1,800,000

TABLE XVI. (*Continued*).—*Development of some of the Leading Features of Notable Armoured Battleships from 1860 to 1910.*

Vessel.	Date of Launch.	Hull. Material.	Length.	Breadth.	Mean Draught.	Load Displacement.	Speed.	I.H.P.	Propulsive Machinery. No. of Screws.	Engines.	Boilers.	Armament (including Machine Guns).	Heavy Guns—where mounted	Thickest Armour.	Cost (excluding Guns).
			Ft.	Ft. In	Ft. In.	Tons	Knots							Inches	£
Erzherzog Franz Ferdinand (Austrian)	1908	Steel.	450′ 9″	80 6	26 6	14,226	20·5	20,000	2	2 sets 4-cylinder vertical triple expansion	Yarrow	4—12″, 8—9·4″, 20—3·9″, 6·12 pr. and 2 machine guns 3 torpedo tubes	Barbettes	10	..
Minas Geraes (Brazilian)	1908	,,	500	83 0	25 0	19,281	21·4	27,212	2	Vertical triple expansion	Babcock and Wilcox	12—12″, 22—4·7″, and 8—3 pr. guns	,,	12	1,821,400
Delaware (United States)	1909	,,	510	85 3	27 0	20,000	21·5	28,578	2	Vertical triple expansion	Babcock and Wilcox	10—12″, 14—5″, and 10 smaller, light and machine guns 2 torpedo tubes	,,	11	..
Danton (French)	1909	,,	476	84 0	27 0	18,028	19·25	22,500	4	Parsons turbines		4—12″, 12—9·4″, and 26 smaller, light and machine guns 2 torpedo tubes	,,	12	2,068,000
Kawachi (Japanese)	Bdg. in 1910	,,	520	84 0	27 0	20,800	20·0	26,500	4	Curtis turbines	Miyabara small tube	12—12″, 10—6″, and 12—4·7″ guns 5 torpedo tubes	,,	12	..
Alphonso XIII. (Spanish)	,,	,,	435	78 0	25 6	15,400	19·5	15,300	4	Parsons turbines	Yarrow	8—12″, 20—4″, 2—3 pr., 2 light, and 2 machine guns 3 torpedo tubes	,,	10	..
Moreno (Argentine)	,,	,,	578	95 9	27 6	28,000	21	30,500		Curtis turbines	Babcock and Wilcox	12 12″, 12—6″, 16—4″, and 10 smaller guns 2 21″ torp. tubes	,,	12	2,200,000

7½-in. guns all well protected, while the next step was to vessels of a type very similar to the "King Edward VII." class, but of greater gun-power and higher speed, with somewhat thinner armour and smaller coal capacity. These vessels, "Erzherzog Franz Ferdinand," "Radetsky" and "Zrinigi," were being completed in 1910. Their arrangements of guns and armour are shown in fig. 78. Battleships of far greater fighting value were in 1910 laid down by Austria; of 20,000 tons displacement, 25,000 H.P., and 22 knots speed, mounting ten 12-in. guns, protected by 11-in. armour, and costing about 2½ millions sterling each.

Brazil.—For several years by mutual arrangement no battleships were added to the South American navies, but in 1906 Brazil ordered three vessels of 19,281 tons, 1380 tons heavier than the "Dreadnought," which was not then finished; the first two of these carry twelve 12-in. guns in place of the ten of the "Dreadnought," and can fire ten guns on either broadside, eight ahead and eight astern; they also carry fourteen 4·7-in. guns behind 9-in. armour on the main deck, and eight behind thinner armour on the upper deck. The ship's side, barbettes and gun mountings are protected by 9-in. armour, the belt armour tapering to 4-in. forward and aft. The vessels are 500 ft. long, 83 ft. beam and 25 ft. draught; engines of 23,500 I.H.P. being provided for 21 knots. The leading vessel, the "Minas Geraes" (fig. 79, Plate XVIII.), was built at Elswick; she obtained about 21½ knots on trial, and passed through all her severe gun trials with great success. Fig. 80 shows the general arrangements of guns and armour. The second vessel, the "Sao Paulo," was built at Barrow, and was also completed to the same design. The third vessel, the "Rio de Janeiro," which in 1910 was being built by the Elswick firm, has been redesigned to be 655 ft. in length over all, 92 ft. beam and 32,000 tons displacement on a draught of 26 ft. Her armament was to be twelve 14-in. guns, with a secondary armament of fourteen 6-in. guns, an anti-torpedo armament of fourteen 4-in. guns, as well as a number of smaller guns, and three submerged torpedo tubes. She was fitted with four screws and turbines of 45,000 H.P. to drive her at 22½ knots. Her cost was reported to be almost £3,000,000, and in 1910 she was by far the largest vessel on the stocks.

Argentine Republic.—Early in 1910 the Argentine Republic ordered two vessels, the "Moreno" and "Rivadavia," of 28,000 tons, armed with twelve 12-in. guns, twelve 6-in. and sixteen 4-in. guns, to be built by the New York Shipbuilding Co. and the Fore River Shipbuilding Co. respectively. Their displacement is much greater than that of the largest battleships building at the time they were ordered, although they are 4000 tons smaller than the "Rio de Janeiro." They are 578 ft. long, 96 ft. beam, 27½ ft. draught, and turbines of 40,000 H.P. are provided for a speed of 22½ knots. The armament is arranged somewhat as in "Minas Geraes," but with the midship barbettes arranged so that the guns can fire on either broadside, giving a fire of twelve guns on either broadside, eight ahead and eight astern. The ship's side and the heavy guns are protected by 12-in. armour, and the 6-in. guns by 6-in. armour; 1600 tons of coal are carried on the load draught out of a possible 4000 tons, and there is also a large stowage for oil fuel.

Spain.—For some years battleship building was suspended in Spain, but, after considerable negotiation with British firms, designs were approved for three vessels of 15,130 tons and 19½ knots, to carry eight 12-in. and twenty 4-in. guns, with 10-in. armour on the barbettes, 9 in. on side tapering to 3 in. at bow and 4 in. at stern, and fore and aft internal bulkheads 1½ in. thick for protection against torpedoes. These vessels were named "Espana," laid down in 1909, "Alfonso XIII." and "Jaime I.," in 1910.

Smaller Battleships.—At various times several of the naval powers have laid down smaller battleships than these already referred to, such as the British "Conqueror" and "Hero," of 6200 tons, launched in 1882 and 1888 respectively; the armoured Coast Defence ships of France, of which the "Admiral Trehouart," launched in 1893, of 6534 tons, 17 knots, carrying two 12-in. and eight 3·9-in. guns with good armour protection, is a good example; the monitors of the United States named "Little Rock," &c., launched in 1900, of 3235 tons and 12 knots, carrying two 12-in. and four 4-in. guns; and the principal battleships of the lesser European powers. A good example of the last is the Norwegian armour-clad "Norge" (fig. 81, Plate XV.). This vessel and her sister the "Eidsvold," with their predecessors "Harald Haarfagre" and "Tordenskjold," were built at Elswick for the royal Norwegian navy, and completed in 1900. They had a displacement of 3850 tons, length 290 ft., beam 50 ft. 6 in., draught 16 ft. 6 in., and with twin-screw engines of 4500 horse-power attained 16½ knots speed. They were heavily armed with two 8-in. B.L. guns in armoured gun-houses, one at each end of the vessel; six 6-in. Q.F. guns, four mounted in 5-in. nickel steel casemates, and two in the open, with strong shields; eight 12-pdrs. and six 3-pdrs.; and two submerged torpedo tubes. The water-line was protected with 6-in. Krupp armour over a length of 170 ft., and bulkheads of the same thickness were provided at each end of the belt. These ships form a class of vessels of small size which would prove formidable opponents to many larger armoured ships, and are especially useful for coast-defence purposes.

Table XVI. shows the development of the leading features of notable armoured battleships from the time of the "Warrior."

Cruisers.—The cruiser type was primarily intended to co-operate with armour-clad fleets, in the same manner as sailing frigates did with fleets of sailing line-of-battle ships, and the earliest cruisers were modelled directly upon the frigates which preceded them, the differences between the two being those incidental to the use of steam power and to the substitution of iron for wood as the building material. As steam propulsion grew in favour engines of greater power were provided, and the rig and sail-spread were reduced till at the present day they

FIG. 88.—H.M.S. *Powerful.*

FIG. 87.—H.M.S. *Edgar.*

FIG. 90.—H.M.S. [illegible] *castle*

FIG. 89.—H.M.S. [illegible] *Talent*

(*Photo, West*)

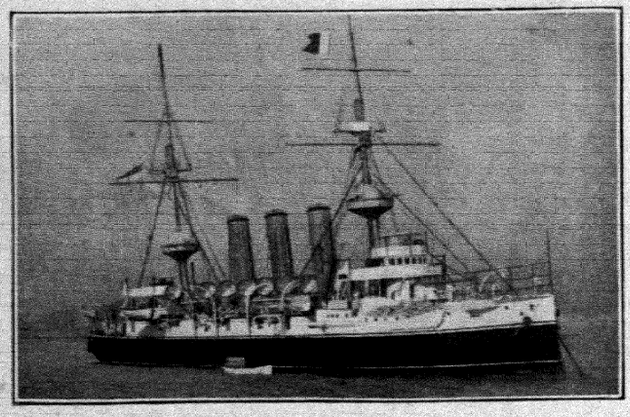


FIG. 85.—H.M.S. *Hermes*.

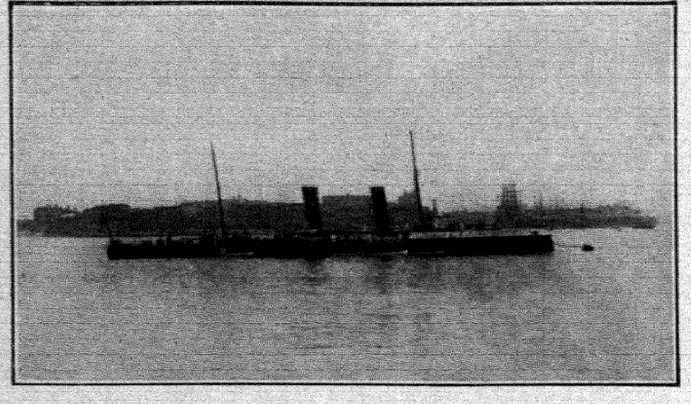


FIG. 114.—H.M.S. *Sharpshooter*.

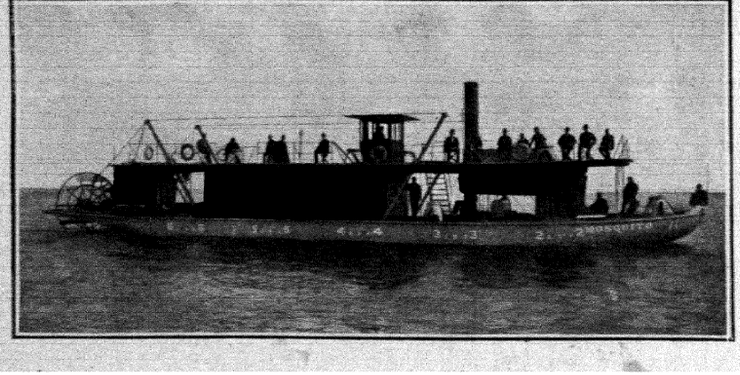


FIG. 116.—H.M.S. [illegible]

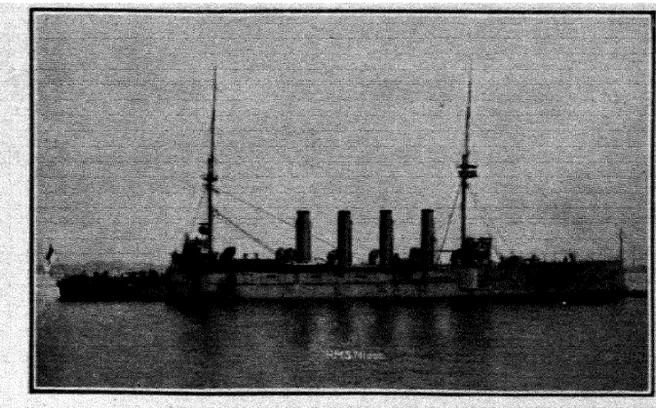


FIG. 86.—H.M.S. *Niobe*.

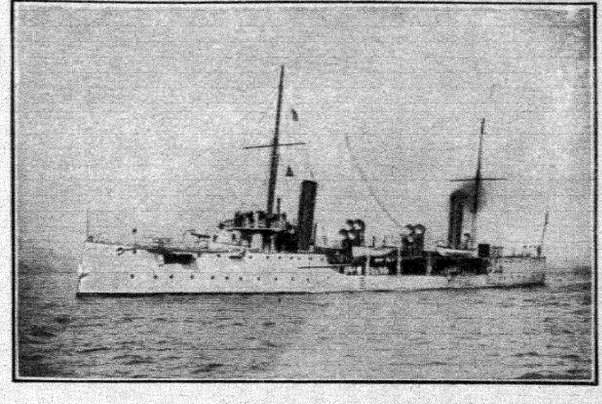


FIG. 115.—H.M.S. *Hazard*.

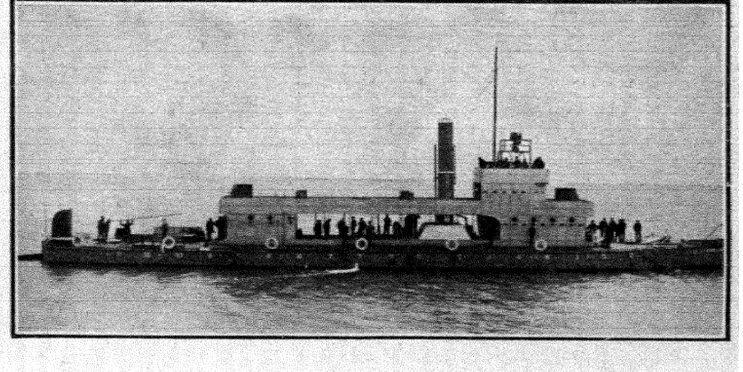


FIG. 113.—Nile Gunboat

have entirely disappeared. When the final adoption of iron led to the remodelling of the details of construction by Sir E. J. Reed, the new system of construction was applied to the cruisers of the day, but no attempt was made till much later to give these cruisers any protection, nor was the question of their armament given the importance which it afterwards came to have.

Lord Armstrong was one of the first to recognize the importance of developing this class of vessel. He considered the essential features of a cruiser to be high speed, protection without the use of side armour, a powerful armament and minimum size and cost; and his views were adopted by the Elswick firm in a large number of cruisers built for foreign Powers down to the introduction of high explosives, when side armour was advocated in place of, or in addition to, the armour deck. The cruisers built for the British navy prior to 1880—of which the principal types were such vessels as the "Inconstant," of 5780 tons (1866); the "Active," of 3080 tons (1867); the "Raleigh," of 5200 tons (1871); and the faster despatch vessels "Iris" and "Mercury," of 3730 tons (1875)—had been almost entirely unprotected; and although the "Comus" and "Leander" classes had been given a partial protective deck, the Elswick-built "Esmeralda" (1883) (fig. 82, Plate XXIII.) may be quoted as the first vessel in which the important features of a complete protective deck and good protection to the guns were combined with high speed and a powerful armament. On the other hand, the "Impérieuse" and "Warspite," completed in 1881, of much greater displacement than the "Esmeralda," were provided with a partial belt of 10-in. compound armour in combination with a protective deck. Thus the necessity for protecting cruisers led to the introduction of two types—the "protected" cruiser, of which the "Esmeralda" may be taken as the pioneer, and the "armoured" cruiser, of which the "Impérieuse" and "Warspite" are early representatives; but while in the British navy the "protected" cruiser type was repeated and developed, the "armoured" type was discontinued, and with the exception of the "Orlando" class, built shortly afterwards, the whole of the cruisers built for the British navy for another fifteen years were of the "protected" type. In France and Russia, however, the armoured cruiser continued in favour, the "Dupuy de Lôme" of 1890, for the former, and the "Rurik" of 1892, for the latter, being vessels of this type.

The reintroduction of side armour in British-built cruisers came about when the improvement of armour by the development of the Harvey and Krupp processes of manufacture enabled more efficient protection to be provided with a much thinner belt than had previously been possible. The Elswick cruiser "Esmeralda" (second), built for Chile in 1895, was one of the first in which the use of side armour was revived. She was followed by other vessels of the armoured type built by the same firm for the Chilean and Japanese navies. In 1898 the "Cressy" class (fig. 83, Plate XXI.) was begun for the British navy, and since this date all cruisers of 9000 tons and above for the British navy have been provided with side armour.

In the United States the adoption of armour belts of the new material for cruisers came somewhat earlier than it did in the British navy, the "Brooklyn" (fig. 84, Plate XXII.), built in 1895, being so protected; and the development of the type has been very marked in recent years, the tendency being to go to larger displacements, in order to provide greater protection and heavier armaments, with each new class of vessel. Indeed, the first-class armoured cruiser of 1910 might be very well described as a high-speed battleship.

In the British navy, as might be expected, the demand for vessels to meet the varied and diverse requirements that necessarily arise in a fleet of such magnitude has led to the production of a number of types, each adapted to its own special duties. They may be classified as (1) unprotected cruisers; (2) protected cruisers of first, second and third classes; and (3) armoured cruisers. Unprotected cruisers have neither side armour nor other protection against loss of buoyancy from injury by shot and shell. Protected cruisers have no side or vertical armour, but they have horizontal armour decks with strong sloping sides in the vicinity of the water-line, upon which coal is carried in minutely divided bunker compartments. Armoured cruisers have side or vertical armour in addition to protective decks. Each of these classes includes a number of groups of sister ships, but we shall confine ourselves to describing the main features of a representative ship in a few of the most important groups.

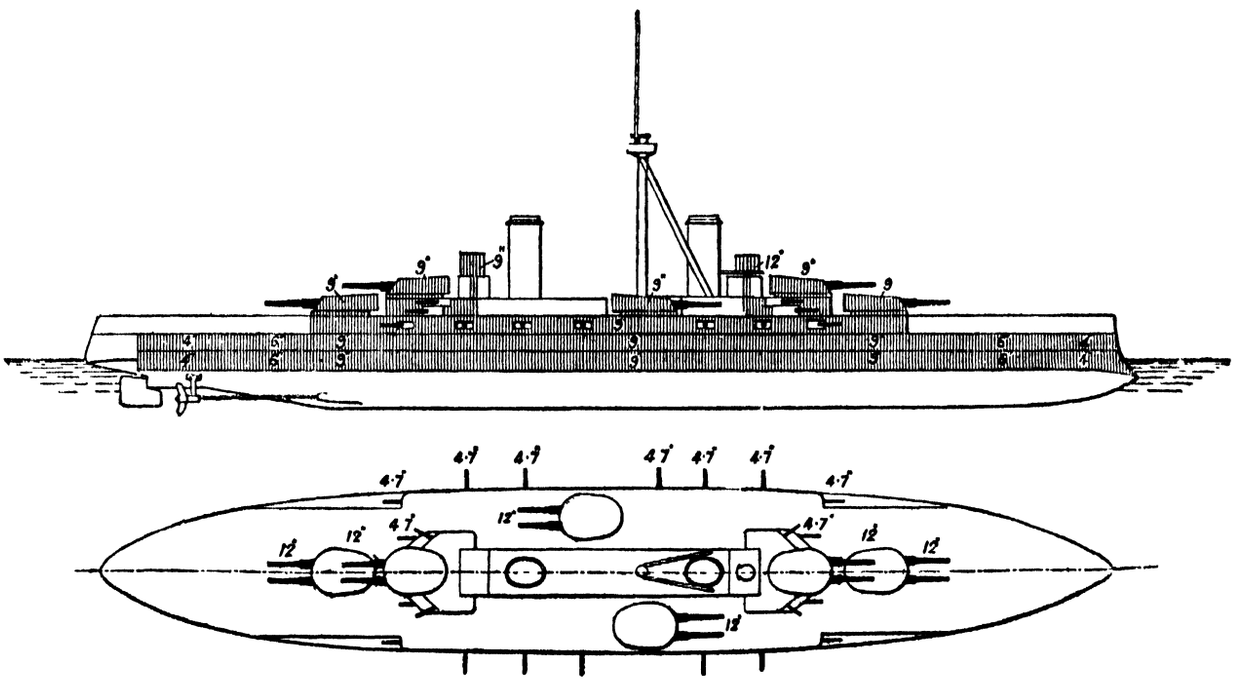


FIG. 80.—Arrangements of Guns and Armour of "Minas Geraes."

Second-class cruisers.

The protected cruiser of medium displacement affords a convenient starting-point, as the latest vessels of this type in 1910 were of about the same displacement as the largest first-class cruisers of thirty years before, and a comparison of representative ships of these classes illustrates the great advances made in thirty years in ships of approximately the same size; while a further comparison of these second-class cruisers (as the vessels of medium displacement are styled) with the first-class protected cruisers and the armoured cruisers of the present day shows the growth in size and power of the largest units of the cruiser type during the same period. It should, however, be noted that while some second-class cruisers reached such a displacement (5600 tons) as to allow of this comparison being made, the great bulk of the vessels of this class were smaller. The "Mersey" is an early example of a vessel of this class which has seen considerable service. Begun in 1883, her principal dimensions are: length 300 ft., beam 46 ft., mean draught about 20 ft., and displacement 4050 tons. Protection to the vitals of the ship is provided for by means of a protective deck a little above the level of the water-line, 2 to 3 in. in

thickness, in combination with a system of coal-stowage in bunkers along the water-line. She carried two 8-in. and ten 6-in. B.L. guns and four torpedo tubes. Her horse-power was 6000 (forced draught) and speed 17·3 knots, and she carried 750 tons of coal at normal draught, with capacity for 900 tons. The "Astraea," begun in 1890, may be taken as representing the second-class cruisers of that date. She is built of steel, sheathed and coppered, is 320 ft. long, 49 ft. 6 in. beam, 21 ft. 6 in. mean draught and 4360 tons displacement, and carries two 6-in. Q.F. guns and eight 4·7-in. Q.F. guns, all on the upper deck and protected by shields, together with four torpedo tubes. She is protected by a steel deck 1 in. to 2 in. thick, and the engine cylinders, which project through this deck, are shielded by 5-in. sloping coamings. The coal bunkers in the neighbourhood of the water-line are minutely subdivided, and the stowage is arranged so as to make full use of the coal protection. Her engines develop 9000 H.P. (under forced draught) and her speed is 19·5 knots. Her coal stowage is 1000 tons.

The "Hermes" (fig. 85, Plate XX.) is one of the largest second-class cruisers added to the Royal Navy. She is 350 ft. long, 54 ft. beam, 20 ft. 6 in. mean draught and 5600 tons displacement. She presents a striking contrast compared with the "Inconstant," built in 1866, of almost the same displacement. The "Inconstant" was fully rigged, and sailed almost as fast as she steamed; while the "Hermes" has no sail, and steams 20 knots, or 6 knots faster than did the older vessel. The "Inconstant" was entirely unprotected, and carried her guns on the broadside, with very limited arcs of training; whilst the "Hermes" has all-round fire, the fire ahead and astern is a very large percentage of that on the broadside, and her guns all train through large arcs (120° and above) and are well protected by enveloping shields, and the ship herself is protected by a steel deck 1½ to 3 in. thick, besides having coal protection. The "Inconstant's" main armament consisted of ten 9-in. and six 7-in. M.L. guns; the "Hermes'," of eleven 6-in. Q.F. guns, each firing probably ten rounds to one of the "Inconstant's" 9-in., and with a perforation of wrought iron of about one-third as much again. The "Hermes" is built of steel, sheathed with wood and coppered. She carries also eight 12-pdrs. and six 3-pdrs., and two submerged torpedo tubes. She has Belleville boilers, developing 10,000 H.P. and giving her a speed of 20 knots.

Somewhat similar to the "Hermes" in external appearance, the four vessels of the "Arrogant" class (fig. 86, Plate XX.) possess certain features of special interest which distinguish them from all other second-class cruisers, in which class they are usually included. They are of 150 tons greater displacement than the "Hermes," are 30 ft. shorter, but have 3 ft. 6 in. more beam and 6 in. more draught. They are built of steel and are unsheathed, have Belleville boilers, and engines giving 10,000 H.P. and a speed of 19 knots. They have an armament of four 6-in. Q.F. guns, three of which fire right ahead and one right astern; six 4·7-in. Q.F. guns, three on each broadside; eight 12-pdrs.; nine smaller guns; and two submerged torpedo tubes. All the guns are mounted on the upper deck in shields. The protective deck varies from 1½ in. to 3 in. in thickness. The bow is protected by a belt of 2-in. nickel steel extending to about 40 ft. back from the ram, the top of this belt being level with the main deck, and the bottom edge sloping downwards to strengthen the ram, and a cofferdam formed by two water-tight transverse bulkheads about 3 ft. apart, and extending from keel to main deck, separates the bow from the rest of the vessel. The "Arrogants" are fitted with tandem rudders, and the deadwood at the after end of the ship is cut away.

The "Gladiator," which was sunk in the Solent in 1908 after collision with the "St Paul," was one of the "Arrogant" class. The Canadian cruiser "Rainbow," one of the "Apollo" class, very similar to but smaller than the "Astraea" class, is of 3400 tons, 9000 I.H.P., 20 knots, and carries two 6-in. Q.F., six 4·7-in. Q.F., eight 6-pdrs., and four torpedo tubes.

The protected cruisers of greater displacement, or first-class cruisers, as they were called, may be divided into four well-marked classes: "Blake" and "Blenheim" class, "Edgar" class (fig. 87, Plate XIX.), "Powerful" and "Terrible" class (fig. 88, Plate XIX.) and the "Diadem" class. The "Blake" and "Blenheim," begun in 1888, were amongst the earliest cruisers designed by Sir William White at the Admiralty; they are of 9000 tons displacement, 375 ft. long, 65 ft. beam and 27 ft. draught. They carry two 9·2-in. B.L. guns, one firing directly ahead and the other directly astern, protected by open shields 6 in. thick; ten 6-in. Q.F. guns, of which four are on the main deck, protected by casemates of 6-in. compound armour, and six on the upper deck in shields; sixteen 3-pdrs.; two submerged and two above-water torpedo tubes. Their protection consists of a complete armour deck of steel 3 in. to 6 in. thick, with a dome or coaming over the tops of the cylinders 4 in. to 8 in. thick. Their machinery consists of four independent sets of vertical triple-expansion engines, two on each shaft, for which steam is provided from six double-ended cylindrical boilers, giving 20,000 H.P. under forced draught, and a speed of 21 knots; with open stokeholds their power is 13,000 H.P., which gives them a speed of 19¼ knots. They carry 1500 tons of coal. The "Edgar" class, begun in 1889, are vessels of 7350 tons displacement, 360 ft. long, 60 ft. beam and 23 ft. 9 in. mean draught. Their armaments consist of two 9·2-in. B.L. guns and ten 6-in. Q.F., disposed and protected in the same way as the corresponding guns of the "Blake," with twenty-four smaller and machine guns, two submerged and two above-water torpedo tubes. The protective deck has a maximum thickness of 5 in., and the cylinders are protected by a raised coaming on this deck, with sloping sides 6 in. thick. They have six double-ended cylindrical boilers and two sets of vertical triple-expansion engines, developing with forced draught 12,000 I.H.P. and giving a speed of 20 knots. They carry 850 tons of coal at normal draught, with storage for 1250 tons. Nine vessels of this class have been built, four of them being sheathed with wood and coppered, the remaining five, including the "Edgar," being unsheathed. The "Powerful" and her sister the "Terrible" are the largest protected cruisers which have been built. They were begun in 1894. They are of steel, sheathed with wood and coppered, are of 14,200 tons displacement, 500 ft. length, 71 ft. beam and 27 ft. mean draught, armed with bow and stern 9·2-in. B.L. chasers, and twelve 6-in. Q.F. guns, of which eight are in 6-in. Harveyized casemates on the main deck and four in similar casemates on the upper deck. They have also eighteen 12-pdr. Q.F. guns, twelve 3-pdrs., nine machine guns and four submerged torpedo tubes. The 9·2-in. guns are protected by a shallow ring of 6-in. Harveyized steel, surmounted by a 6-in. shield enveloping the gun and crew. The ship herself is protected by a complete deck at the water-line level of Harveyized steel plates 3 in. to 6 in. in thickness, and by a double line of coal bunkers above it. The machinery arrangements constitute the striking feature of these ships. They have no less than forty-eight Belleville boilers in eight boiler-rooms, with two sets of triple-expansion 4-cylinder engines, developing 25,000 H.P. with open stokeholds and giving the ships a speed of 22 knots. They carry as a normal supply 1500 tons of coal, and their bunkers will hold 3000 tons. Four 6-inch guns were added on the upper deck of these ships in 1902.

First-class cruisers.

The "Diadem" class, launched in 1897 and 1898, were the last first-class protected cruisers added to the British navy. There are eight vessels of this class, but in the four last-built vessels, of which the "Spartiate" was one, some changes were made. The first vessel of the "Diadem" class was begun in 1895, is of 11,000 tons displacement, 435 ft. length, 69 ft. beam, 25 ft. 3 in. mean draught, and is built of steel, sheathed and coppered. Her principal armament consists entirely of 6-in. Q.F. guns, of which there are sixteen, twelve being protected by 5-in. casemates of Harveyized steel, and the others disposed, two on the forecastle as bow chasers, and two on the quarter-deck as stern chasers, all in separate shields. She also carries thirteen 12-pdrs., eleven smaller guns, including machine guns, and two submerged torpedo tubes. The protection consists of a steel deck, whose slopes are 4 in. thick and horizontal portions 2½ in. thick, upon which is stowed the 1000 tons of coal which the vessel ordinarily carries, the full coal capacity being 2000 tons. She is provided with 30 water-tube boilers of the Belleville type, and her machinery develops 16,500 H.P., giving her a speed of 20·5 knots. The Canadian cruiser "Niobe" is one of the first four; in the last four ships the casemates are 6 in. thick and the machinery is of greater power, viz. 18,000 I.H.P., giving a speed of a quarter of a knot higher.

Third-class cruisers.

Third-class protected cruisers included vessels varying in displacement from 1500 to 3000 tons. With a reduction of displacement come reduction of initial cost and cost of upkeep, a smaller crew, a shorter time for building, and the many advantages attendant upon reduced size and draught of water. It has been found possible to embody in a ship of about 2000 tons displacement many of the most important requirements of a modern cruiser, and a large number of vessels of this class have been added to the fleet. Among these may be mentioned the "Barham," a typical small cruiser, which was built in 1889 of steel, of 1830 tons displacement; she is 280 ft. long between perpendiculars, 35 ft. broad and of 12 ft. 8 in. draught of water. As originally completed, this vessel had cylindrical boilers and a H.P. of 4700, giving a speed of 19 knots. In 1898 she and her sister, the "Bellona," were reboilered with water-tube boilers of the Thornycroft type, and with these a H.P. of 6000 is obtained, and the vessel reaches a speed of nearly 20 knots. The protection afforded is in the usual form of a protective deck, 1 in. thick on the flat, and sloping sharply downwards near the water-line, where the thickness is increased to 2 in.; and above this deck the coal stowage is arranged in subdivided bunkers. She carries an armament of six 4·7-in. Q.F. guns in shields on the upper deck, four 3-pdrs., two machine guns and two above-water torpedo tubes. She carries 140 tons of coal in her normal condition, and her bunkers will take 250 tons. She has a light fore-and-aft rig. The "Barham" was followed by several vessels of the "Tauranga" class, built for service in Australian waters, and the "Pearl" class for service in other waters, all of 2575 tons displacement, 19 knots speed and carrying eight 4·7-in. and eight 3-pdr. Q.F. guns. In 1896–1898 nine smaller and faster cruisers were laid down, known as the "Pioneer" class, which might be taken to include the "Pelorus" class, the differences between them being small. Of the two classes eleven vessels have been built. The "Pioneer" is 305 ft. long, 36 ft. 9 in. broad, 13 ft. 6 in. mean draught and of 2200 tons displacement. She has water-tube boilers of the small-tube type,

FIG. 95.—H.M.S. *Invincible*. (Hopkins

FIG. 94.—H.M.S. *Minotaur*

FIG. 96.—H.M.S. *Cressy*

FIG. 97.—H.M.S. *Cornwall*

FIG. 101.—German *Blücher*. (Symons

FIG. 102.—German *Von-der-Tann*. (Symons.)

FIG. 100.—German [illegible] *Brooklyn*

and engines of 7000 H.P., giving her a speed of 20 knots. She carries 250 tons of coal at the above displacement, and has stowage for 550 tons. She has eight 4-in. Q.F. guns, eight 3-pdrs., and two above-water torpedo tubes, and a 2-in. steel protective deck.

This type of cruiser reached its final development in the four vessels of the "Diamond" class, of 3000 tons, laid down in 1902–1903, which were the last third-class cruisers designed by Sir William White. Three of the vessels, "Diamond," "Sapphire" and "Topaze," were fitted with reciprocating engines of 9800 I.H.P. for 22 knots, and in the fourth, the "Amethyst," Parsons turbines were fitted. All were 360 ft. long., 40 ft. beam, 14 ft. 6 in. draught, and carried twelve 4-in. and eight 3-pdr. Q.F. guns. On trial the "Topaze" reached a maximum speed of 22·25 knots, while the "Amethyst" obtained 23·63 knots, an advantage of 1·38 knots per hour for the turbine with practically the same coal consumption, and with a distinctly less rate of coal consumption at equal speeds for all speeds above 14 knots. The experiment was regarded as a great success for Parsons turbines, and materially influenced the question of their adoption in succeeding vessels at home and abroad.

In 1903 four vessels classed as *scouts* were laid down, viz., the "Pathfinder," "Patrol," "Sentinel" and "Skirmisher," of about 2900 tons displacement, and 25 knots speed; 370 ft. long, with engines of 17,000 I.H.P., and carrying ten 12-pdr. and eight 3-pdr. Q.F. guns as well as two torpedo tubes. Two others laid down in 1903 were named "Forward" and "Foresight," and carried fourteen 12-pdrs. and two 3-pdrs., and obtained the 25 knots with 15,000 I.H.P. The last two of the series — "Adventure" and "Attentive" (fig. 89, Plate XIX.) — of 16,000 I.H.P. and 26 knots, were laid down at Elswick in 1904; they were 374 ft. long, 38 ft. 3 in. beam, 12 ft. 6 in. draught, 2670 tons displacement, 16,000 I.H.P., carried ten 12-pdrs. and eight 3-pdrs.

Four vessels, named "Boadicea," "Bellona," "Blanche" and "Blonde," were laid down in 1907–1909, of slightly larger dimensions, the "Blonde" being 385 ft. long, 41 ft. 6 in. beam, 13 ft. 6 in. draught, 3360 tons displacement, 18,000 I.H.P., 25 knots, and armed with ten 4-in. Q.F. guns and two torpedo tubes.

In 1909 five vessels of 4800 tons displacement, 22,000 I.H.P., 25 knots speed, carrying two 6-in. and ten 4-in. Q.F. guns, with two torpedo tubes, were laid down and known as second-class protected cruisers of the "Bristol" class. They are 430 ft. long, 47 ft. beam, 15 ft. 3 in. draught and protected by a 1-in. steel deck with 2-in. slopes. Fig. 90, Plate XIX., shows the "Newcastle," a vessel of this class built at Elswick. Four other vessels, the "Dartmouth" class, laid down six months later, were very similar, but slightly larger to give one knot more speed. The navy estimates for 1910–1911 provided for laying down five larger vessels of this type. The Australian cruisers "Melbourne" and "Sydney" are of the "Dartmouth" class, while the new Canadian cruisers are of the later type.

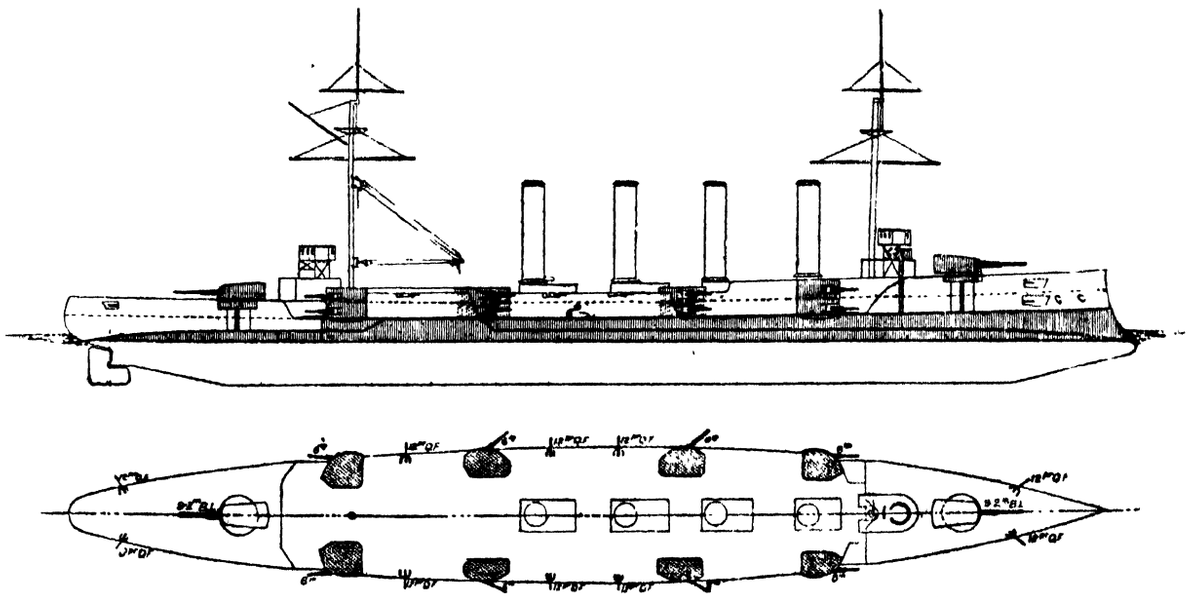


FIG. 92.—Arrangement of Guns and Armour of H.M.S. "Drake."

Between 1870 and 1881, several armoured cruisers were laid down in England and abroad, those in England being the "Shannon," of 5390 tons and 12½ knots, laid down in 1873, the "Nelson" and "Northampton," of 7630 tons and 13 knots, laid down in 1874, and the "Impérieuse" and "Warspite," laid down in 1881. The two last-named ships were provided with masts and a good spread of sails, and were the last large vessels to be so fitted for the British navy. The sails were not found to be of much service and were removed. These vessels were of 8400 tons displacement, 315 ft. long, and were protected by a partial belt amidships of 10-in. compound armour over a length of about 140 ft., with a protective deck above it 1¼ in. thick and transverse bulkheads at the ends of the belt 9 in. thick, the protective deck from these bulkheads to the ends of the ship being 3 in. thick. They had machinery of 10,000 H.P. and a speed of 16¾ knots. They carried four 9·2-in. B.L. guns in separate barbettes—one forward, one aft, and one on each beam—besides ten 6-in. guns, twenty-six smaller and machine guns, and six torpedo tubes. They were sheathed with wood and coppered, in order to be able to keep the sea for a long period without docking. The next vessels of the type were the "Orlando" class, begun in 1885. Seven of these were launched in 1886 and 1887. They were much smaller than the "Impérieuse," being only 5600 tons displacement, 300 ft. long and 56 ft. beam, and 22 ft. 6 in. draught. They had a water-line belt of compound armour, 10 in. thick and nearly 200 ft. long; extending over the top of this, and sloping down forward and aft to the ends of the ship, was a deck 2 in. to 3 in. thick. Their armament consisted of two 9·2 in. B.L. guns —one forward and one aft —instead of the four carried in the "Impérieuse" and "Warspite," but in other respects the same armament as the latter ships. They had engines of 8500 H.P. and a speed of over 18 knots. These vessels were all built from the designs of Sir N. Barnaby.

Armoured cruisers.

As already stated, between 1885 and 1898 no armoured cruisers were laid down for the British navy. The "Cressy" (fig. 83, Plate XXI.) class, commenced in 1898, consists of six vessels of 12,000 tons displacement, 440 ft. length, 69 ft. 6 in. beam, and 26 ft. 3 in. mean draught. They are built of steel, sheathed and coppered, have a belt of Harveyized steel 11 ft. 6 in. wide, 230 ft. long, and 6 in. thick, with bulkheads 5 in. thick and 2 in. protective plating on the sides from the forward bulkhead to the stem. They carry two 9·2-in. B.L. guns in barbettes and gun-houses 6-in. thick, mounted on the middle line forward and aft, twelve 6-in. Q.F. guns in 6-in. casemates, and twenty-five 12-pdrs. and smaller guns, with two submerged torpedo tubes. Their H.P. is 21,000 with natural draught, steam being supplied by 30 Belleville boilers, and their speed is 21 knots. They carry 800 tons of coal at normal draught, with capacity for 1600 tons.

The four vessels of the "Drake" class (see fig. 91, Plate XXIV.), laid down in 1899, were for several years the largest and fastest armoured cruisers afloat. They are of 14,100 tons displacement, are 500 ft. long, 71 ft. beam, and 26 ft. mean draught. They are unsheathed, are protected by a Krupp steel 6-in. belt extending from barbette to barbette, and from 6 ft. below water to the height of the main deck, completed at the after end by a 5-in. bulkhead, and carried forward to the bow by 2-in. plating extending right up to the upper deck. There are two protective decks, the lower, being 3 in. to 2 in. in thickness, and the main deck, which is 1 in. thick. Their armament consists of two 9·2-in. B.L. guns in barbettes and gun-houses 6 in. thick on the middle line forward and aft as shown in fig. 92, sixteen 6-in. Q.F. guns in 6-in. casemates, fourteen 12-pdrs., twelve smaller and machine guns and two submerged torpedo tubes. Their speed was 23 knots as designed, and all the vessels of the class have attained over 24 knots on service. They have engines of 30,000 H.P., the boilers being of the Belleville type. They carry 1250 tons of coal, with bunker capacity for 2500 tons.

A consideration of the above features will illustrate the difficulties of the classification of modern ships. The "Drake" is called an armoured cruiser, but she is superior to the battleships "Renown," "Barfleur," and "Canopus" in armour protection and in her secondary quick-firing armament, as well as in speed and coal endurance, and is somewhat inferior to them only in the number, weight, and protection of primary armament. If 10-in. guns had been given to this vessel in lieu of her 9·2-in., she would probably have been called a first-class battleship, and would have been a 23-knot battleship at that. Each successive increase of size has given the battleship more speed and the armoured cruiser heavier guns and armour, thus tending to merge the two types in one.

The next series of armoured cruisers was composed of ships of much less power produced in reply to the fast lightly armed cruisers being built abroad as commerce destroyers, and a considerable number of such vessels so built, although weak compared with the "Drake," were much less costly and at the same time endowed with

great sea-keeping power and were superior in all respects to the vessels which caused them to be built. The first set comprised ten vessels of the "Monmouth" class, laid down in 1900 and 1901. Fig. 93 (Plate XXI.) gives a view of the "Cornwall," which may be taken as typical of the class. They are of 9800 tons displacement, length 440 ft., beam 66 ft., mean draught 24 ft. 6 in. They are armoured with a belt of 6 in. of Krupp steel over the main part of the length, diminishing in thickness towards the extremities; they carry fourteen 6-in. Q.F. guns, of which ten are in 4-in. casemates, and the others mounted in pairs in turrets and gun-houses 4 in. thick, forward and aft; they also carry ten 12-pdr., eleven small and machine guns and two submerged torpedo tubes. Their horse-power is 22,000, giving them a speed of 23 knots.

They were followed by six vessels of the "Devonshire" class, laid down in 1902, which were given greater gun power and better armour protection to meet the corresponding advances in foreign vessels. They were of 10,850 tons displacement, 21,000 I.H.P. and 23½ knots speed; were armed with four 7·5-in. and six 6-in. Q.F. guns protected by 6-in. armour, and the armour belt was increased from 4 in. to 6 in. in thickness. These were the last armoured cruisers designed by Sir William White.

pairs in four barbette turrets placed as already stated in describing the development of the "Dreadnought" design (see Table XIV. and fig. 96). Thus three pairs of guns can fire directly ahead, three directly astern, and the whole armament can fire on either broadside. In the "Invincible," built at Elswick, all the heavy guns are worked by electric power; in the other vessels they are worked by hydraulic power as usual in H.M. Navy. An anti-torpedo boat armament of sixteen 4-in. guns is provided. The 12-in. guns are protected by 8-in. armour, and a broad belt of side armour is fitted 7 in. thick amidships, and 4 in. forward and aft, associated with thick protective decks. All are fitted with Parsons turbines of 41,000 H.P. and obtained over 27 knots on trial without pressing the boilers. The high steaming power of these ships was shown by the "Indomitable," which conveyed King George V. and Queen Mary (then prince and princess of Wales) to Canada and back in 1908, and steamed on her return-journey across the Atlantic—from Belleisle to the

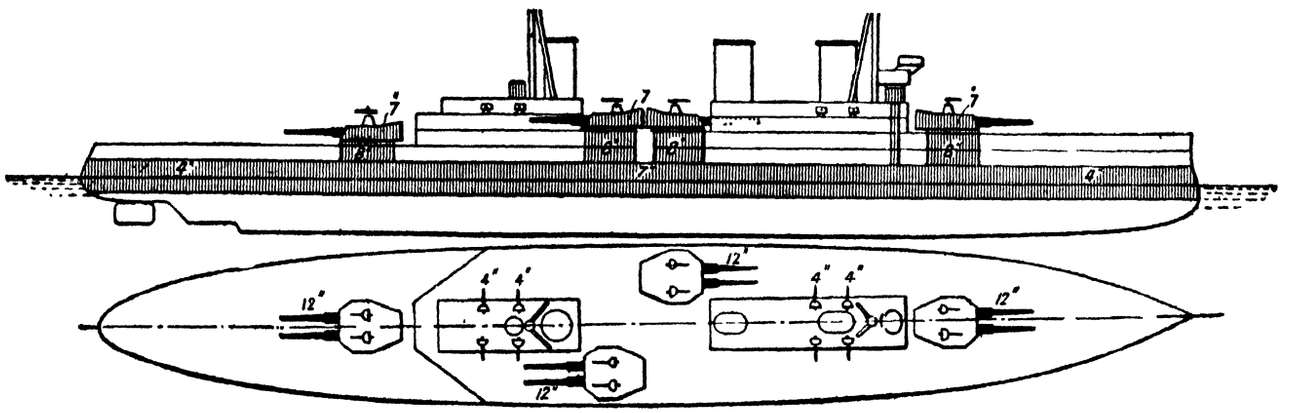


FIG. 96.—Arrangement of Guns and Armour of H.M.S. "Invincible."

The next armoured cruisers built for the British navy, the six vessels of the "Duke of Edinburgh" type, laid down in 1903–1904, were of much greater power, of 13,550 tons displacement, 23,500 I.H.P. and 23 knots speed, and have a main armament of six 9·2-in. guns, mounted singly in barbettes. The secondary armament consists of ten 6-in. Q.F. guns in the first two vessels of the class, but in the remaining four vessels the ten 6-in. guns are replaced by four 7·5-in. guns. They also carry from twenty-five to twenty-nine 3-pdrs. and machine guns and three torpedo tubes. The guns and ship's side are protected by 6-in. armour. In 1905 the "Minotaur" class (fig. 94, Plate XXI.) was laid down, consisting of three vessels of 14,600 tons displacement, 27,000 I.H.P. and 23 knots speed, carrying an armament of four 9·2-in. guns mounted in pairs in 7-in. barbettes forward and aft, and ten 7·5-in. guns all on the upper deck in shallow barbettes of 6-in. armour, with 6 in. enclosed shields. The belt armour is 6 in. thick amidships, tapering to 4 in. forward and 3 in. aft. These vessels are 490 ft. long, 74½ and 75½ ft. beam, 25 to 26 ft. mean draught, and are the last large cruisers to be propelled by reciprocating engines, or to be armed with 9·2-in. guns. They carry 1000 tons of coal on the load draught, and can stow 2000 tons of coal besides 700 tons of oil fuel.

The next cruisers to be built were the "Invincibles," which might have been classed as battleships on account of their heavy armament and substantial armour protection; the former greatly exceeding in power the armament of any battleship before the "Lord Nelson," and the latter exceeding that provided in any armoured cruisers. Their most striking feature, however, is their great speed, previously only reached by torpedo boats and torpedo boat destroyers, in which everything was sacrificed to obtain the highest possible speed. They were named "Invincible" (fig. 95, Plate XXI.), "Indomitable" and "Inflexible," and were laid down in 1906 at the yards of the Elswick, Fairfield and Clydebank Companies respectively. Their dimensions were:—length 530 ft., breadth 78 ft. 6 in., draught 26 ft., displacement 17,250 tons. They were armed with eight 12-in. guns mounted in

Dreadnought cruisers.

Fastnet—at an average speed of 25·13 knots, a record speed at the time for a transatlantic voyage.

It is interesting to compare the "Indomitable's" performance on the voyage referred to above with that of the "Hero"—a screw line-of-battle ship of 91 guns and 600 nominal horse-power, when employed on a similar errand. This ship was considered a crack ship of her class in 1860, and in that year was selected to convey King Edward VII. (then prince of Wales) on a visit to Canada; she made the passage from Plymouth to St John's in 13 days under steam and sail, and this was considered an exceedingly good performance for a line-of-battle ship in those days.

In 1909 the "Indefatigable" of 18,750 tons displacement was laid down at Devonport; she is very similar to the "Invincible," with the same armament and certain minor improvements. She was followed in 1910 by the "Lion" at Devonport and "Princess Royal" at Barrow, each 660 ft. long, 88 ft. 6 in. beam, and of 26,350 tons displacement on a draught of 28 ft. Parsons turbines of 70,000 H.P. are provided to give a sea speed of 28 knots. Table XVII. contains further particulars of the British "Invincibles," from which it may be seen that the Australian cruisers "Australia" and "New Zealand" are similar to the "Indefatigable."

With regard to cruisers of other navies than the British, it may be said that the vessels constructed at Elswick exercised considerable influence in their development as well as of those of the British navy. The "Esmeralda" (fig. 82, Plate XXIII.) of 1883, built for the Chilean government, but bought by Japan in 1895 and re-named "Idzumi," was of 2950 tons displacement, had 6000 H.P. and 18·3 knots speed, was protected by a complete 1-in. steel deck, and carried the very heavy armament of two 10-in. B.L. guns, six 6-in. Q.F., two 6-pdrs., seven smaller guns and three torpedo tubes. The "Piemonte" (fig. 97, Plate XXIV.), built for the Italian navy in 1888, had a displacement of only 2640 tons, but was of 13,000 H.P. and had a speed of nearly 22½ knots. She was protected by a steel deck of 3 in. maximum thickness, and carried six 6-in. Q.F., six 4·7-in. Q.F., ten 6-pdrs., eleven smaller guns and three torpedo tubes, an armament which, as pointed out by Lord Armstrong, was capable of discharging in a given time twice the weight of shot and shell that could be fired by the largest war vessel then afloat. The "Buenos

FIG. 103.—French *Montcalm*.

Japanese *Esmeralda*

FIG. 104.—French *Leon Gambetta*.

(*West.*)

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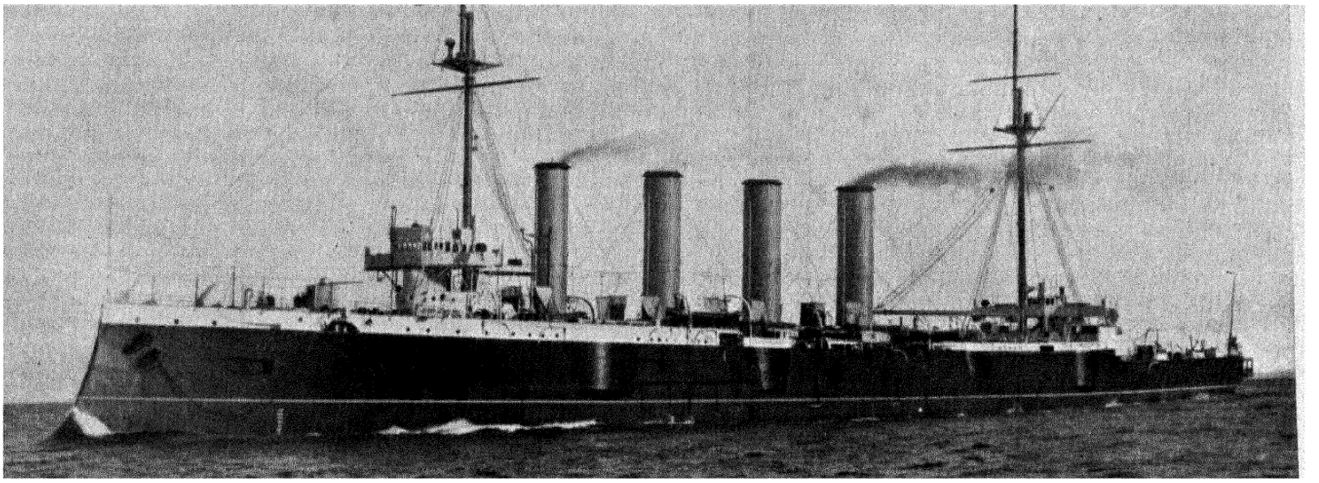


FIG. 91.—H.M.S. *Drake*.

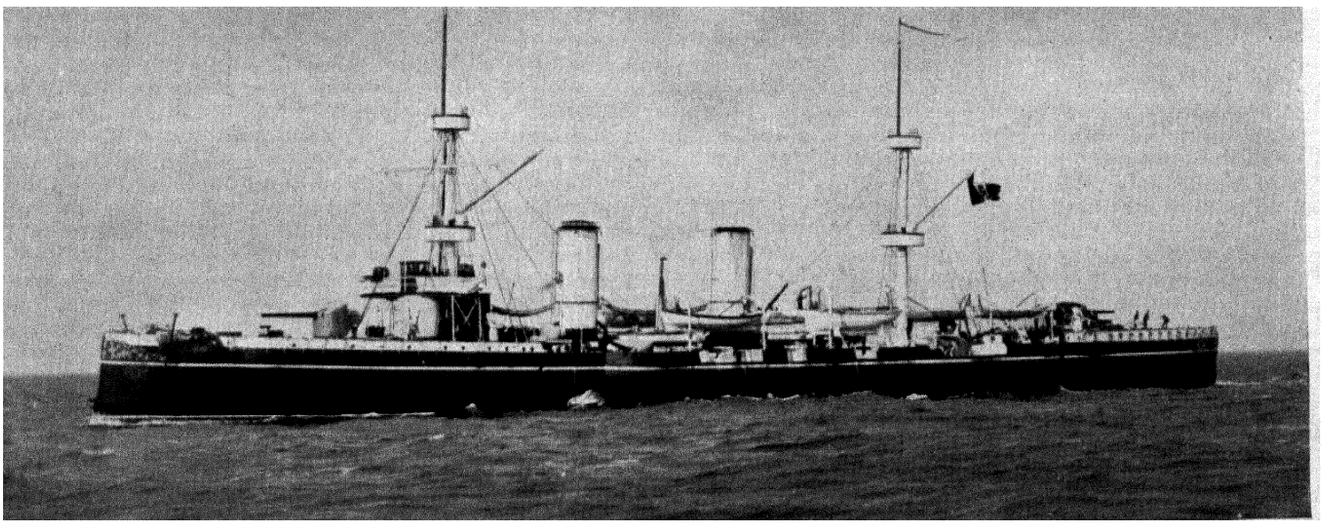


FIG. 97.—Italian *Piemonte*.

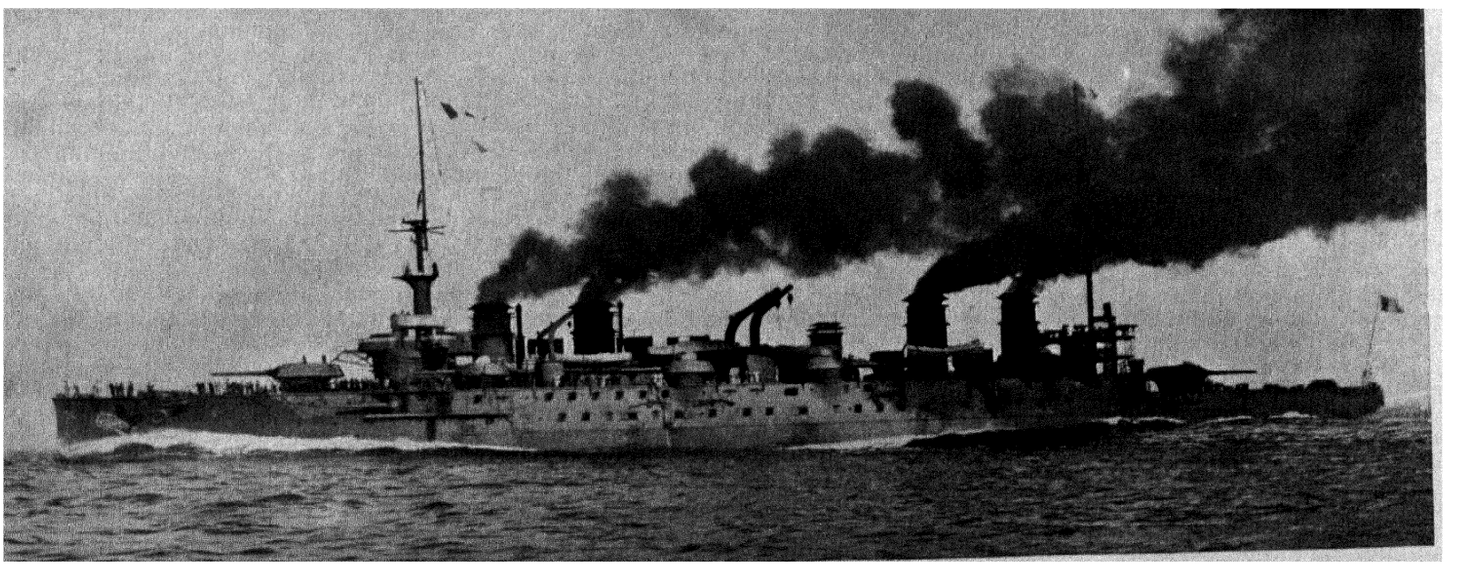


FIG. 105.—French *Jules Michelet*.

(A. [illegible], Toulon.)

TABLE XVII.—*Particulars of British Dreadnought Cruisers.*

Vessel.	Date of Launch.	Hull. Material.	Length.	Breadth.	Mean Draught.	Load Displacement.	Speed.	Horse Power.	No. of Screws.	Machinery. Engines.	Boilers.	Armament (including machine guns).	Heavy Guns where Mounted.	Thickest Armour.	Cost (excluding guns).
			Ft.	Ft.	Ft.	Tons.	Knots.								£
Invincible .	1907	Steel.	530·0	78·5	26·0	17,250	20·5	41,000	4	Turbines.	Yarrow	8—12″ 16—4″ 5m.	Barbettes	7″	1,678,995
Inflexible .	1907	,,	530·0	78·5	26·0	17,250	25·0	41,000	4	,,	,,	8 - 12″ 16 - 4″ 5m.	,,	7″	1,638,229
Indomitable .	1907	,,	530·0	78·5	26·0	17,250	25·0	41,000	4	,,	Babcock & Wilcox	8 12″ 16 - 4″ 5m.	,,	7″	1,671,880
Indefatigable .	1909	,,	555·0	80·0	26·5	18,750	25 0	43,000	4	,,	,, ,,	8 12″ 16—4″ 5m.	,,	7″	1,449,826
Australia .	1909	,,	555·0	80·0	26·5	18,750	25·0	43,000	4	,,	,, ,,	8 - 12″ 16—4″ 5m.	,,	7″	1,449,826
New Zealand .	1909	,,	555·0	80·0	26·5	18,750	25·0	43,000	4	,,	,, ,,	8—12″ 16—4″ 5m.	,,	7″	1,449,826
Lion . .	1910	,,	660·0	88·5	28·0	26,350	28·0	70,000	4	,,	Yarrow		,,	..	..
Princess Royal	..	,,	660·0	88·5	28·0	26,350	28·0	70,000	4	,,	,,		,,	..	..

Aires," built in 1895 for the Argentine Republic, is 396 ft. in length and of 4800 tons displacement, her machinery developing 13,300 H.P. with open stokeholds, and giving her a speed of 23·2 knots. She is protected by a complete deck 1½ in. to 3 in. thick, and carries a powerful armament of quick-firing guns, consisting of two 8-in., four 6-in., six 4·7-in., twenty-two smaller guns and five torpedo tubes. Her normal coal supply is 350 tons, and she can stow 1000 tons in her bunkers. Rather smaller than the "Buenos Aires," but of still later build (1901), is the Chilean cruiser "Chacabuco" (fig. 98, Plate XV.). She is a characteristic Elswick cruiser in design and general appearance, being heavily armed, fast and of moderate displacement. Her dimensions are: displacement 4500 tons, length 360 ft., breadth 46 ft. and draught 18 ft. She carries an armament of two 8-in. Q.F. guns, mounted on the middle line forward and aft, and protected by well-armoured gun-houses, ten 4·7-in. Q.F. guns in shields on the broadsides and nineteen smaller guns, including machine-guns. She is protected by a strong armoured deck 1⅜ in. thick on the flat to 4½ in. on the slopes, and by the 1000 tons of coal which forms her normal supply. Her engines develop nearly 16,000 H.P., and her speed is 23 knots.

In the matter of armoured cruisers also Elswick has taken a leading place—among the cruisers built by this firm being the "Esmeralda" (second), of 7000 tons, in 1895 for Chile; the "O'Higgins," of 8500 tons, in 1896 for the same state; the "Asama" and "Tokiwa," of 9700 tons, in 1897 for Japan; and the "Idzumo" and "Iwate," in 1899, also for Japan. The "Idzumo" (fig. 99, Plate XXIII.) is 9750 tons displacement, 400 ft. long, 68 ft. 6 in. beam, 24 ft. 3 in. draught. She has 16,000 H.P. and a speed of 22 knots; is protected by a complete belt of Krupp steel 7 in. thick, tapering to 3½ in. at the ends, a 2½-in. steel deck with a citadel above it 5 in. thick, and carries an armament of four 8-in. Q.F., fourteen 6-in. Q.F., twelve 12-pdrs., seven smaller guns and four torpedo tubes. The 8-in. guns are in pairs in 6-in. barbettes and hoods, while of the 6-in. guns ten are in 6-in. casemates and four in shields. She carries, with bunkers full, 1300 tons of coal.

United States.—In the United States navy the proportion of "protected" cruisers is smaller than in the British navy, as the "armoured" type established itself at an earlier date. The "Philadelphia," begun in 1888, may be taken as an example of the U.S. protected cruiser. She is 4345 tons in displacement and 327 ft. long, has twin screws and a horse-power of 8800, giving her a speed of 19·6 knots. She is protected by a steel deck 2½ in. to 4 in. thick, and carries twelve 6-in. B.L. guns (later converted to Q.F.), seventeen smaller guns and five torpedo tubes.

The "Columbia" and "Minneapolis" are very fast armoured cruisers laid down in 1891. On a displacement of 7350 tons they carry one 8-in., two 6-in., eight 4-in. and twelve 6-pdr. and a number of smaller guns. They are protected by heavy steel decks and thin side armour. The "Columbia" developed 18,500 I.H.P. and 22·8 knots on trial, while the "Minneapolis" reached 20,860 I.H.P. and 23 knots; these powers and speeds were at that date the highest recorded for such vessels. The "Columbia" crossed the Atlantic at 18·4 knots in 1895, but the type has not been repeated in America although followed for a little while by France. The "Brooklyn" (fig. 84, Plate XXII.), begun in 1893, is of the "armoured" type. She is of 9215 tons displacement and 400 ft. long, has twin screws and develops 16,000 horse-power with forced draught, giving a speed of 21 knots. She is protected by a steel belt for two-thirds of her length 8 ft. broad and 8 in. to 3 in. thick, and a complete steel deck 6 in. to 3 in. thick. She carries eight 8-in. B.L. guns in pairs in 15-in. barbettes—disposed one forward, one aft and one on each beam—twelve 5-in. Q.F. guns in 4-in. shields, twenty smaller guns and five torpedo tubes. Her normal coal stowage is 900 tons, and she can stow 1650 tons in her coal spaces.

In 1903–1904 there were launched six armoured cruisers of the "California" class, of 13,700 tons, and in 1904–1905 three of the "St Louis" class, of 9700 tons. The former are vessels 502 ft. in length, 70 ft. beam and 26 ft. 6 in. draught, have machinery developing 23,000 indicated horse-power, and a speed of 22 knots. The latter are 424 ft. in length, 66 ft. beam and 23 ft. 6 in. draught, with engines of 21,000 indicated horse-power, and the same estimated speed, namely, 22 knots. Both classes have fourteen 6-in. Q.F. guns, but the larger vessels have in addition four 8-in. guns in two 6½-in. turrets, besides a heavier battery of smaller Q.F. guns. The "California" class are completely belted with armour having a thickness of 6 in. over half the length amidships and 3½ in. to the ends, and a battery of 5-in. armour enclosing the 6-in. Q.F. guns, and extending to the upper deck. The "St Louis" class have only a water-line belt for about one-half the vessel's length, with a similar battery above it, the whole of the armour being 4 in. thick of Krupp quality. The "California" class comes between the English "Cressy" and "Drake" classes. The "St Louis" class is practically the English "Monmouth," with about a knot less speed, bow-plating omitted and a 4-in. battery added.

In 1903 two larger armoured cruisers, the "Tennessee" and "Washington," were laid down. The speed of 22 knots was retained, but the armament consisted of four 10-in., sixteen 6-in., twenty-two 14-pdrs., twelve 3-pdrs., &c., with four 21-in. submerged torpedo tubes. The side armour was slightly reduced in thickness, but spread over a greater area, giving 5 in. uniformly on the belt and 3 in. forward and aft; the citadel and casemates remain 5 in. thick, but the protection of the heavy guns is increased to 9 in.; in addition, the 14-pdr. battery on the upper deck is protected by 2-in. plating. The displacement is 14,500 tons. Two similar vessels, "North Carolina" and "Montana," were laid down in 1905, but up to 1910 the United States had not proposed to lay down any cruisers corresponding in power and speed to the "Invincible."

Germany.—Germany for many years built a number of small cruisers of moderate speed for service on distant stations, &c., and subsequently a series of very successful third-class and second-class cruisers of increasing power and speed. Seven vessels of the "Gazelle" class were launched in 1898–1900. The "Gazelle" was of 2558 tons, 6370 I.H.P. and 19¼ knots speed; the "Niobe," a sister vessel, was of the same displacement, and the five later vessels were of 2608 tons; several developed nearly 9000 I.H.P. and obtained 21⅞ to 22¼ knots speed. The "Undine," "Arcona" and "Frauenlob," laid down in 1901, were of 2656 tons displacement; these were all sheathed with wood and coppered. Seven vessels of the "Hamburg" class were laid down in 1902–1904, of 3200 tons displacement, having the same protection as the preceding vessels and carrying the same armament at a higher speed, machinery of 10,000 I.H.P. being provided for 22 knots. The highest speed reached was 22·6 knots by the "Lübeck," which was fitted with Parsons turbines of 13,500 H.P. and driven by eight screws on four shafts. Four vessels of the "Königsberg" class, laid down in 1905, are of 3350 to 3500 tons displacement. They retain the same protection—a deck ·8 in. to 2 in. in thickness and the same armament—ten 4·1-in., fourteen smaller guns and two submerged torpedo tubes; but their machinery has been varied to admit of trial of various types of turbines and reciprocating engines. The "Königsberg," "Stuttgart" and "Nürnberg" are fitted with engines of 13,200 I.H.P. for 23·5 knots; while the "Stettin" is fitted with Parsons turbines of 15,500 H.P., and attained 24·0 knots on trial. The next two vessels, "Dresden" and "Emden," of 3592 tons, laid down in 1906, have the same protection as before, but twelve 4·1-in. guns are carried instead of ten, and a still higher speed is aimed at. The "Dresden" is fitted with Parsons turbines of 16,000 H.P., and the "Emden," with reciprocating engines of 15,000 I.H.P., to give a speed of 25 knots. Four later vessels are of 4230 to 4280 tons displacement, and are fitted with machinery of about 25,000 H.P. for a speed of 25 knots, as follows: the "Kolberg" with Schichau turbines, the "Mainz" with A.E.G. (modified Curtis) turbines, the "Cöln" with Zoelly turbines and the "Augsburg" with Parsons turbines. Two vessels of the same type were in 1910 under construction, in which a further increase of speed was contemplated; the displacement is increased to 4800 tons and the H.P. to 30,000; one of these, the vessel to replace "Bussard," was to have Schulz turbines. Thus in these second-class cruisers Germany was carrying out the greatest series of experiments on turbines which had been attempted, no less than five different types of large power being tested in comparison with reciprocating engines.

Besides the foregoing very fast vessels, in 1897–1898 Germany built five larger second-class cruisers of the "Hertha" class. They

were lofty vessels, and carried a good armament of two 8·2-in., eight 5·9-in. and ten 3·4-in. guns, as well as other smaller guns and three submerged torpedo tubes; they were 344 ft. long, 56 ft. to 58 ft. beam, 21 to 22 ft. mean draught, 5575 to 5790 tons displacement; they had a protective deck 1·6 to 3·9 in. in thickness, and 3·9 in. gun houses. Fig. 100 (Plate XXII.) shows the "Victoria Luise," the second vessel of the class.

The older German cruisers, "Fürst Bismarck" and "Prinz Heinrich," laid down in 1896-1898, were armed with 9·4-in. and 5·9-in. guns, and had speeds of 19–20 knots. The "Prinz Adalbert" and "Friedrich Karl," laid down in 1901, and "Yorck" and "Roon," laid down in 1902–1903, were of 8850 to 9350 tons displacement and 21 knots speed, carrying four 8·2-in., ten 5·9-in., twelve 3·4-in. guns and four submerged torpedo tubes. The 8·2-in. guns were carried in enclosed 6-in. shields forward and aft; and the other guns were mostly in a very short citadel amidships, protected by 4-in. armour; the water-line being completely protected by 4-in. to 3-in. armour. The latest vessels of this type, the "Gneisenau" and "Scharnhorst," were laid down in 1905–1906 of 11,420 tons displacement and 22½ knots speed.

In 1907 Germany commenced a new series of large and powerful cruisers, the "Blücher" (fig. 101, Plate XXII.), the first of the series, being of 15,550 tons displacement, an increase of more than 4000 tons beyond that of the preceding German vessels. She carries twelve 8·2-in., eight 5·9-in., sixteen smaller guns and four submerged torpedo tubes, and is protected by 7-in. armour. Engines of 32,000 I.H.P. were provided, and the maximum speed on trial exceeded 25 knots. In the second vessel, the "Von der Tann" (fig. 102, Plate XXII.), the main armament was increased to eight 11-in. guns; she is 560 ft. in length, 85 ft. beam, 27 ft. draught and 18,700 tons displacement; Parsons turbines of 45,000 H.P. were provided for 25 knots speed, and both power and speed were exceeded on trial. The third vessel, the "Moltke," is of 23,000 tons displacement, of 26 knots speed, and is armed with 12-inch in place of 11-inch guns, and cost £2,200,000.

France.—In France the line of development of the cruiser has been similar to that in Great Britain. In 1887 four third-class cruisers were built, of which the "Forbin" may be taken as a type; she was 312 ft. long, 30½ ft. beam, 16 ft. draught, 1935 tons displacement, 5800 I.H.P. and 20 knots speed, protected by a 1½-in. deck and a belt of cellulose, and armed with four 5½-in. and eight 3-pdr. guns and five torpedo tubes. These were followed by "Linois," "Galilee," "Lavoisier," of about 2300 tons in 1893, and the "d'Estrées" and "Infernet" in 1897. The latter were 312 ft. long, 39 ft. beam, 17 ft. 9 in. draught and 2420 tons displacement, sheathed and coppered, protected by a 1½-in. deck and armed with two 5·5-in., four 3·9-in. and eight 3-pdr. guns and three torpedo tubes; 8500 I.H.P. was provided for 21 knots speed.

The French second-class cruisers may be said to have commenced with the "Davout," of 3027 tons, 9000 I.H.P. and 20½ knots, and the "Alger" and "Isly," of 4350 tons, 8000 I.H.P. and 19 knots, in 1887. They were followed by two of the "Friant" class in 1891, two of the "Pascal" class and three of the "Cassard" class in 1893, and the sheathed vessels, "Catinat" and "Protêt," in 1894 and 1895. These vessels were from 3700 to 4050 tons displacement, and 19½ to 20 knots speed, protected by decks 1½ in. to 3 in. in thickness, and armed with four to six 6·5-in. guns, four to ten 3·9-in. guns, as well as smaller guns and torpedo tubes. The last of this series, the "Protêt," was laid down in 1895.

In 1894 France laid down a first-class protected cruiser, the "d'Entrecasteaux," of 8000 tons, carrying two 9·4-in., twelve 5·5-in., twelve 3-pdr. guns and six torpedo tubes, with a speed of 19½ knots, and then by three very remarkable vessels lightly built and armed, but of very high speed, viz. the "Jurien de la Gravière," of 5600 tons and 23 knots, the "Guichen," of 8150 tons and 23 knots and the "Chateaurenault," of 7900 tons and 24 knots.

A new departure was made in 1890 in laying down the armoured cruiser "Dupuy de Lome," of 6300 tons, 14,000 I.H.P. and 20 knots speed, carrying two 7·6-in., six 6·4-in. and several smaller guns; a protective deck 1½ in. thick was fitted, and the whole side of the ship was armoured, the thickness at the water-line amidships being 4·7 in., tapering gradually towards the extremities. This type has, however, not been repeated.

The "Jeanne d'Arc," launched in 1899 at Toulon, is 11,100 tons displacement, 477 ft. in length, 63 ft. 8 in. beam and 24 ft. 8 in. mean draught, has engines of 33,000 indicated horse-power and a speed of 21 8 knots. She has a complete water-line armour belt of Harveyized steel, having a maximum thickness of 6 in., and the bow is also protected as far aft as the bow guns with 1½ in. steel to the upper deck. Her armament consists of two 7·6-in. guns, fourteen 5·5-in. Q.F., twenty-two smaller guns and two submerged torpedo tubes. Of more recent date than the "Jeanne d'Arc," but smaller in size, is the "Montcalm" (fig. 103, Plate XXIII.), an armoured cruiser launched in 1900, of 9367 tons displacement, 453 ft. length, 63 ft. 8 in. beam and 24 ft. 6 in. draught. She carries an armament of two 7·6-in. guns in separate turrets of Harveyized steel 6 in. thick forward and aft, eight 6·5-in. Q.F. guns in casemates on the broadsides, four 3·9-in. Q.F. guns in shields on the broadsides, twenty-two smaller guns and two submerged torpedo tubes. She is protected by a water-line belt 6½ ft. deep, which extends from the bow to within 30 ft. of the stern, where it is terminated by a transverse bulkhead 4 in. thick; amidship this belt is 6 in. thick at its upper edge, diminishing to 2 in. at its lower edge, where it meets the 2-in. protective deck, but the maximum thickness tapers to 3 in. at the forward and after ends. Above this main belt is a thinner one extending over the same length, but only 3½ in. maximum thickness and of about 4 ft. depth. The "Montcalm" has 20 water-tube boilers of the Normand-Sigaudy type, and engines of 19,600 H.P., giving her a speed of 21 knots. She carries 1000 tons of coal and some oil fuel. Her engine-rooms are placed between the two sets of boiler-rooms, instead of abaft them, as is usual in British vessels, the peculiar appearance of many French vessels, with two pairs of funnels widely separated, being thus accounted for.

Three vessels of the "Montcalm" class were ordered, and then three smaller vessels of "Kleber" type, of 7578 tons only, and four larger vessels of improved "Montcalm" type. The latter were very similar to "Montcalm," with improved armour protection and of 500 tons greater displacement. They were followed by three larger vessels, the "Léon Gambetta" (fig. 104, Plate XXIII.), "Jules Ferry" and "Victor Hugo." These vessels are armoured cruisers of about 12,400 tons displacement, length 480 ft., beam 70 ft. 3 in., draught 26 ft. 3 in., with an indicated horse-power of 28,500 and speeds of 22½ to 23 knots.

In 1904 the "Jules Michelet" (fig. 105, Plate XXIV.), of 12,370 tons, was laid down, of 30,000 I.H.P. and 23 knots speed. The "Ernest Renan" followed in 1903, the I.H.P. being 36,000 for 23½ knots.

The most powerful French cruisers built or building in 1910 were the "Edgar Quinet," laid down in 1905, and "Waldeck Rousseau," laid down in 1906, of 13,780 tons displacement, armed with fourteen 7·6-in. guns, eight being fitted in pairs in turrets and four in separate casemates, together with fourteen 6-pdr. and eight 3-pdr. guns and two submerged torpedo tubes; 36,000 I.H.P. is provided for a designed speed of 24 knots.

Japan.—Japan possesses a great variety of cruisers, many of which were built at Elswick, others were captured during the war with Russia, and refitted or reconstructed; the latter including the "Aso" (ex-"Bayan"), the "Tsugaru" (ex-"Pallada"), the "Soya" (ex-"Varyag") and "Sudzua" (ex-"Novik"). In addition, large and small cruisers were built in America, Germany and France, but the finest were built in Japan.

As examples of the Japanese cruisers laid down towards the end of the 19th century may be mentioned the second-class cruisers "Kasagi" and "Chitose," of 4800 and 4900 tons displacement, 15,500 I.H.P. and 22¼ knots speed, built in America and armed with two 8-in. and ten 4·7-in. guns, and the third-class cruisers "Suma" and "Akashi," of 2657 tons displacement and 19½ knots speed, built in Japan and armed with two 6-in., six 4·7-in. and ten 3-pdr. Q.F. guns.

In 1902 Japan launched the protected cruisers "Tsushima" and "Niitaka," of 3365 tons displacement, 9400 I.H.P. and 20 knots speed, armed with six 6-in. and fourteen smaller guns; in 1903 the "Otowa," of 3082 tons, 10,000 I.H.P. and 21 knots carrying two 6-in., six 4·7-in. and six smaller guns; and in 1907 the "Tone," of 4100 tons displacement, 15,000 I.H.P. and 23 knots speed, armed with two 6 in., ten 4·7 in. and three smaller guns and three torpedo tubes. All of these vessels are fitted with reciprocating machinery. The "Yahagi," "Chikuma" and "Hirato," laid down later, have turbine machinery of 22,500 H.P. to give 26 knots speed, two 6-in. and ten 4·7-in. guns and two torpedo tubes. They are 440 ft. long, 52 ft. beam and 5000 tons displacement.

Of first-class protected cruisers Japan possessed in 1910 only two, the "Tsugaru" (ex-"Pallada") and "Soya" (ex-"Varyag"). The "Tsugaru" was built at St Petersburg in 1899, is of 6630 tons, 11,600 I.H.P., 20 knots speed, armed with eight 6-in., twenty-two 12-pdr. and several smaller guns, and protected by an armour deck 1½ to 2½ in. in thickness. The "Soya" was built at Philadelphia in 1899, is of 6500 tons, 20,000 I.H.P., 23 knots speed, armed with twelve 6-in., twelve 12-pdr. and smaller guns, and protected by a 1½ to 3-in. deck. The "Sudzua" (ex-"Novik") is a lighter and faster vessel, of 3000 tons displacement, 25 knots speed, armed with two 6-in., four 4·7-in. and several smaller guns, and protected by a 1·2 to 2-in. deck.

Of armoured cruisers she possessed in 1910 a relatively large number. In 1897 Japan ordered the "Yakumo," of 9850 tons displacement, from Germany, and in 1899 the "Adzuma," of 9436 tons displacement, from France; both vessels have a speed of 21 knots, and carry an armament of four 8-in. guns mounted in pairs in two turrets, and twelve 6-in guns in 6-in. casemates, and are protected by a complete belt of Krupp steel 7 in. to 3½ in. in thickness. They are somewhat similar to the "Iwate" and "Idzumo" (fig. 99, Plate XXIII.), built at Elswick, but with slightly less gun power and speed. The "Aso" (ex-"Bayan"), built in France in 1900, is 7700 tons displacement, 17,000 I.H.P., 21 knots, carrying two 8-in., eight 6-in. and a number of smaller guns, and protected by 8-in. armour.

In 1905 a very important advance was made. Early in that year Japan laid down the "Ikoma" and "Tskuba," 440 ft. in length, 13,750 tons displacement, 23,000 I.H.P. and of 21 knots speed.

These were the first cruisers laid down to carry the guns of a first-class battleship. Their armament includes four 12-in. guns mounted in pairs in two barbettes, one forward and one aft, twelve 6-in. guns in casemates and twelve 4·7-in. guns, and they have a complete armour belt 7 to 5 in. in thickness and 7 in. of armour on the barbettes (fig. 106.) They were followed by the 22-knot cruisers "Kurama," laid down in 1905, and the "Ibuki," laid down in 1906, which are 10 ft. longer, of about 900 tons greater displacement, and 4500 more I.H.P.

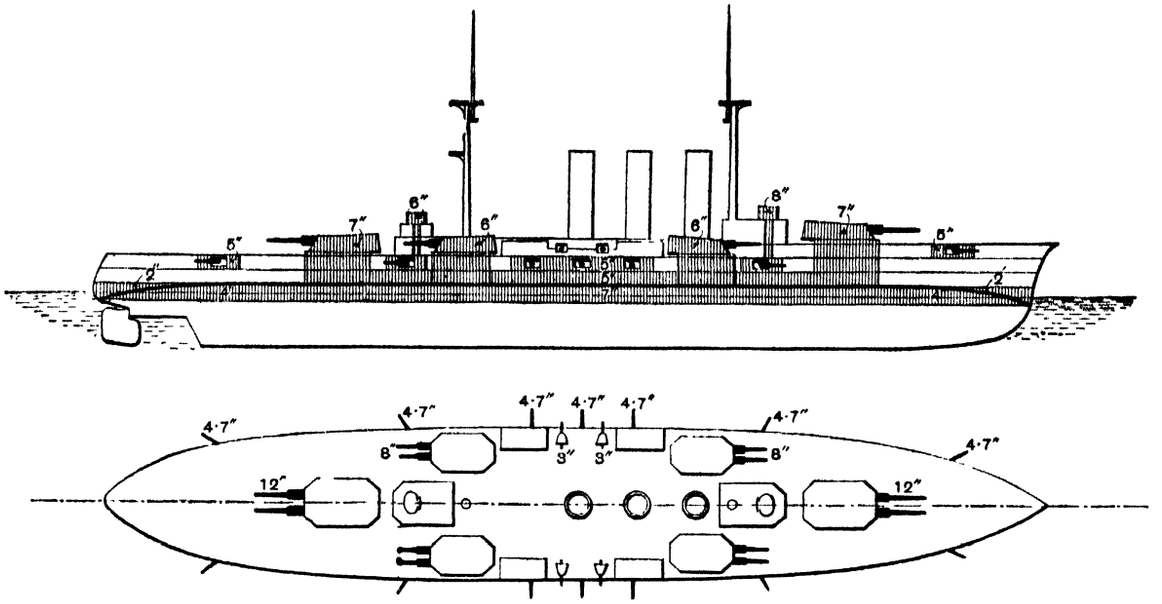


FIG. 106.—Arrangement of Guns and Armour, Japanese "Ibuki" and "Kurama."

than in the "Tsukuba" type. The armament is also more powerful, twelve 6-in. guns being replaced by eight 8-in. guns mounted in pairs in barbettes, while the 4·7-in. guns are increased to fourteen in number. The "Ibuki" is fitted with turbines of 27,000 H.P., the "Kurama" with reciprocating engines of 22,500 I.H.P. The disposition of guns and armour are as shown in fig. 106. In 1910 Japan ordered of Vickers Co. an armoured cruiser of 27,000 tons and 72,000 H.P.

Russia. — Before the Russo-Japanese War, Russia had provided herself with a great variety of fast, well-armed cruisers of various sizes, including some very notable vessels. Of those which remained in 1910 may be mentioned the protected cruiser "Zhemchug," of 3100 tons, 17,000 I.H.P., 24 knots, carrying eight 4·7-in. guns; the "Askold," built at Kiel in 1900, 6500 tons displacement, 20,000 I.H.P. and 23 knots speed, armed with twelve 6-in., twelve 12-pdr. and other smaller guns; the "Diana" and "Aurora," of 6630 tons and 20 knots; the "Bogatyr" and similar vessels launched 1901–1903, of 6675 tons displacement, 20,000 I.H.P., 24 knots speed, armed with twelve 6-in., twelve 12-pdr. and several smaller guns, and having a protective deck 1½ to 2 in. in thickness. The armoured cruisers, "Rossia," of 12,200 tons and 20 knots, and "Gromoboi," of 13,220 tons, 15,500 I.H.P. and 20 knots speed, carry four 8-in., twenty-two 6-in. and other smaller guns, and are protected by 6-in. armour. Since the war several vessels of this type have been built, including three of a new "Bayan" class, 7900 tons displacement, 19,000 I.H.P., 22 knots, armed with two 8-in., eight 6-in., twenty 12-pdr. and other smaller guns, and protected by 6-in. armour; and the "Rurik," built at Barrow in 1906, 490 ft. in length, 15,190 tons displacement, 19,100 I.H.P. and 21½ knots speed, armed with four 10-in. guns mounted in pairs in barbettes forward and aft, eight 8-in. and twenty 4·7-in. guns, and protected by a complete belt of armour 12 ft. deep, 6 in. thick amidships, tapering to 4 in. forward and 3 in. aft.

Italy.—Italy possesses several protected cruisers of the "Piemonte" type already described as well as a number of smaller vessels. She was in 1910 building scouts of the "Quarto" type of about 3500 tons displacement and 27 knots, armed with 4·7-in. and 12-pdr. guns. The most notable Italian cruisers are, however, those of the "Garibaldi" class, which are heavily armed, well armoured and of moderate speed. They have been developed from the "Marco Polo" type, which comprises three vessels; the "Marco Polo," launched in 1892, of 4500 tons, 19 knots, armed with six 6-in., ten 4·7-in. and several smaller guns, and protected by a 4-in. armour belt as well as a steel deck; the "Vettor Pisani" and the "Carlo Alberto," which are of 6400 tons, carry twelve 6-in., six 4·7-in., fourteen 6-pdr. and other smaller guns. The "Giuseppe Garibaldi," "Varese" and "Francesco Ferrucio," launched in 1899, are of 7400 tons displacement, 13,500 I.H.P., 20 knots speed; they are armed with one 10-in., two 8-in., fourteen 6-in. and a number of smaller guns, and are protected by armour disposed as shown in fig. 107; the belt, battery and gun protection are all 6 in., the belt tapering to 4½ in. in thickness at the bow and stern.

In 1905 Italy commenced a series of enlarged "Garibaldis" of 9830 tons and 22½ knots, carrying four 10-in. guns in barbettes forward and aft with a secondary armament of eight 7½-in. guns in turrets on the upper deck amidships, the bases being enclosed in an armoured citadel as shown in fig. 108, which gives the general arrangement of guns and armour in the "Amalfi" and "Pisa."

Gunboats and Torpedo Craft. — Gunboats include numerous small vessels which, even in times of general peace amongst the great maritime nations, have important duties allotted to them. For the patrolling of rivers and islands, protection of fisheries, &c., a battleship or a cruiser, from its size, would be unsuitable, and for the performance of these and other duties special vessels have been built. These types, and those included in the torpedo-craft division, may be conveniently grouped under three headings, as follows:—

I. Sloops.
II. Gun-vessels and Gunboats.
III. Torpedo-boats, Torpedo Gunboats and Torpedo-boat Destroyers.

The "Wild Swan" class, the first of which was launched in 1876 for the British navy, represents one of the earliest of the sloop type. She was a single-screw composite-built vessel of 1130 tons displacement and 170 ft. length, with a speed under steam of 10½

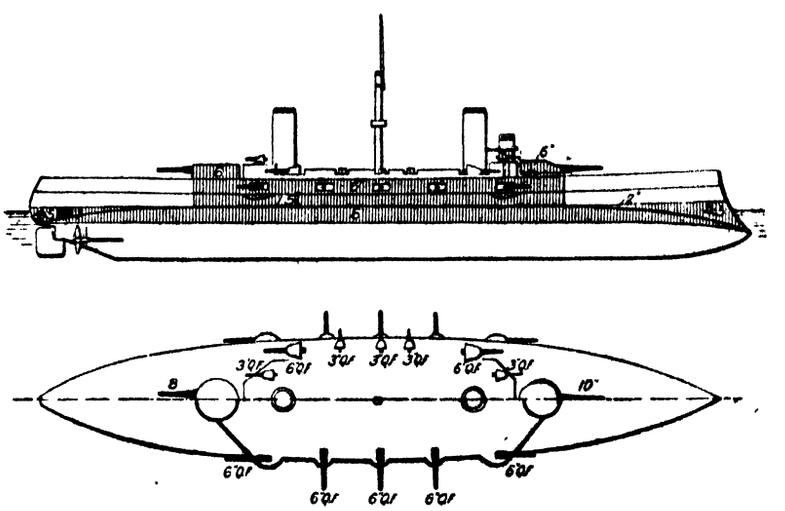


FIG. 107.—Arrangement of Guns and Armour, Italian "Giuseppe Garibaldi."

knots and an armament of two 6-in., six 5-in. B.L. guns, and four smaller guns. This proved a very useful class of ships, and in all sixteen of them were built. The "Beagle" class, commenced in 1889, represented an advance on the "Wild Swan." They were built of steel, sheathed with wood and coppered, and had twin-screws. Their displacement was 1170 tons, and they were 195 ft. long, steamed at 13 knots, and carried eight 5-in. B.L. guns and eight machine-guns. They were followed, at an interval of five years, by the "Torch" and "Alert," which were of 960 tons

Sloops.

displacement, 180 ft. long, steamed at 13½ knots and carried an armament of six 4-in. Q.F. guns, four 3-pdrs. and two machine-guns. They were single-screw vessels, built of steel, sheathed and coppered. The "Condor" class, which comprises six vessels built between 1898 and 1901, are very slightly modified "Torches," having 20 tons more displacement and 6 in. more beam, with the same length,

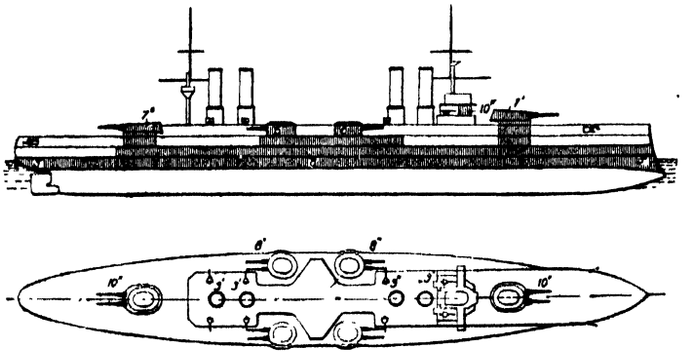


FIG. 108.—Arrangement of Guns and Armour, Italian "Amalfi" and "Pisa."

speed and armament. They are able, however, to maintain a higher continuous speed, being fitted with water-tube boilers. In 1901 to 1902 there were laid down four sloops of the "Fantôme" class, which are larger vessels than the "Condors," being 1075 tons displacement and 185 ft. long. They are twin-screw vessels, built of steel, sheathed and coppered. They have water-tube boilers, giving 1400 H.P., and a speed of 13½ knots. Their armament is similar to that of the "Condor." All the foregoing vessels are fitted as sailing vessels as well as steam. The "Beagle" is schooner-rigged, the others all barque-rigged.

Of the gun-vessel or gunboat type, one of the earliest built for the British navy is represented by the "Staunch," a twin-screw vessel designed by Mr G. W. Rendel, and built at Elswick in 1867. The guiding principle in the design of this vessel was that she should simply be a floating gun-carriage, propelled by steam and provided with plenty of manœuvring power. The 9-in. 12-ton gun which constituted her armament was arranged to sink into and be raised from a well by means of hydraulic power. She was only 180 tons in displacement and 75 ft. long, and had a speed of 6½ knots. The "Medina" class, consisting of twelve gunboats built about 1876, were twin-screw vessels of 363 tons displacement and 110 ft. length, and had a speed of 8½ knots. Their armament was light, consisting only of three 64-pdrs. and three machine guns. They were fitted with bow rudders in addition to those at the stern, in order to increase their manœuvring power. The "Paluma" and "Gayundah" were built at Elswick in 1884 for the Queensland government. They had a displacement of 360 tons and were 115 ft. in length, were schooner-rigged, but had twin-screws and a speed under steam of 10 knots. They carried one 8-in. B.L. gun forward, which was mounted behind a breastwork and had a considerable arc of training; one 6-in. gun, which was mounted aft; and three machine-guns. The "Protector" was a more important craft. Built for the government of South Australia in 1884, she was 920 tons in displacement and 180 ft. long, had twin screws and a speed of 14 knots under steam. She carried one 8-in. B.L. gun forward, mounted as in the "Paluma," five 6-in. 4-ton guns, and five Gatlings. The "Cockchafer" class (1881) and the "Thrush" class (1889) are sea-going cruising vessels of a different type, carrying much lighter guns than in the "Staunch" class. The former, of which four were built, were composite-built, single-screw ships of 465 tons displacement and 125 ft. length, with a fore-and-aft rig and a speed under steam of 9½ knots; the latter, of which there were nine, were schooner-rigged composite vessels of 805 tons displacement and 165 ft. length, with a single screw and a speed of 13½ knots. The armament of the "Cockchafers" consisted of two 64-pdrs. R.M.L. guns, two 20-pdrs. R.B.L. guns, and two machine-guns; that of the "Thrush" (fig. 109, Plate XXVI.) was of six 4-in. B.L. guns and four smaller guns (she was commanded by H.M. King George V. when he was on active service in the navy). The "Bramble," launched in 1898, is a representative of what in 1910 was the most recent type of first-class gunboat. Her displacement is 710 tons, or 100 less than the "Thrush." She is 180 ft. long and has a speed of 13½ knots, is built of steel, sheathed and coppered, and carries two 4-in. Q.F. guns, four 12-pdrs. and ten machine-guns. She has water-tube boilers, twin screws and machinery of 1300 I.H.P.

Gunboats.

Four of these vessels have been built, named the "Bramble," "Britomart," "Dwarf" (fig. 110, Plate XXVI.) and "Thistle." They were designed specially for service on rivers in hot climates; their draught is limited to 8 ft.; their sails are reduced to a very light fore-and-aft rig, and they are fitted with a complete shade deck of teak and felt. They were still on active service in 1910, but no new vessels had been laid down since 1897.

A number of gun-vessels have been designed for special services, among which may be mentioned the "Mosquito" (fig. 111, Plate XX.) and "Herald," two stern-wheel steamers for the Zambezi built by Messrs Yarrow in 1890. They are of 80 tons displacement and 77 ft. long, having a speed of 10½ knots and carrying an armament of four 3-pdrs. and eight machine-guns. They are built in sections, each of which forms a separate pontoon, so that the whole vessel can be readily taken to pieces for transport and easily put together in the water. These two gun-vessels were handed over to the Colonial authorities on the river Zambezi. Built for somewhat similar service, but of different design, are the four shallow-draught river gunboats of the "Sandpiper" class. They are steel twin-screw boats, built in 1897, also by Messrs Yarrow. They are 88 tons in displacement, 100 ft. long and 20 ft. broad, and carry an armament of two 6-pdrs. and four machine-guns. Their speed is 9 knots, and they draw only 2 ft. of water, their screws working in arched tunnels, the summits of which are above the water-level outside. These arches always remain full of water, and serve the double purpose of enabling sufficiently large screws to be fitted for the economical propulsion of the vessel without increasing the draught, and of protecting them from damage. The "Woodcock" and "Woodlark" are larger vessels of the same type, designed for service on the rapid and shallow rivers of China. They were built by Messrs Thornycroft in 1897, are 120 tons in displacement, 145 ft. long, 23 ft. beam and 2 ft. draught of water. They have twin screws, also carried in arched tunnels, and their speed is 15 knots. They carry the same armament as the "Sandpiper" class. In 1901 the "Teal" and "Moorhen," designed for service in China, were also constructed in sections, but are considerably larger than either the "Mosquito" or the "Woodcock," being about 180 tons displacement. They are twin-screw vessels, the propellers being in tunnels, as in the "Woodcock," and their speed is over 13 knots. Their furnaces will burn wood. They carry two 6-pdrs. and four machine-guns. The latest vessel of this type in 1910 was the "Widgeon," of similar construction, built by Messrs Yarrow in 1904 and carrying the same armament. She is 160 ft. long, 24 ft. 6 in. beam, 2 ft. 5 in. draught, 195 tons displacement, 800 I.H.P. and 13 knots speed.

Fig. 112 (Plate XX.) and fig. 113 show a light-draught gunboat of the "Sultan" class, of which several have been built for service on the Nile. She has a displacement of 140 tons, a length of 143 ft., a beam of 24 ft. 6 in., a draught of only 2 ft. and a speed of 12 knots. Her armament consists of one 12-pdr., one howitzer, and four Maxims, and she is protected by a ½-in. bullet-proof breastwork.

The gunboats of other navies are generally similar to those described above. The Brazilian twin-screw gunboat "Tiradentes," built in 1892, of steel, sheathed with teak and coppered, was

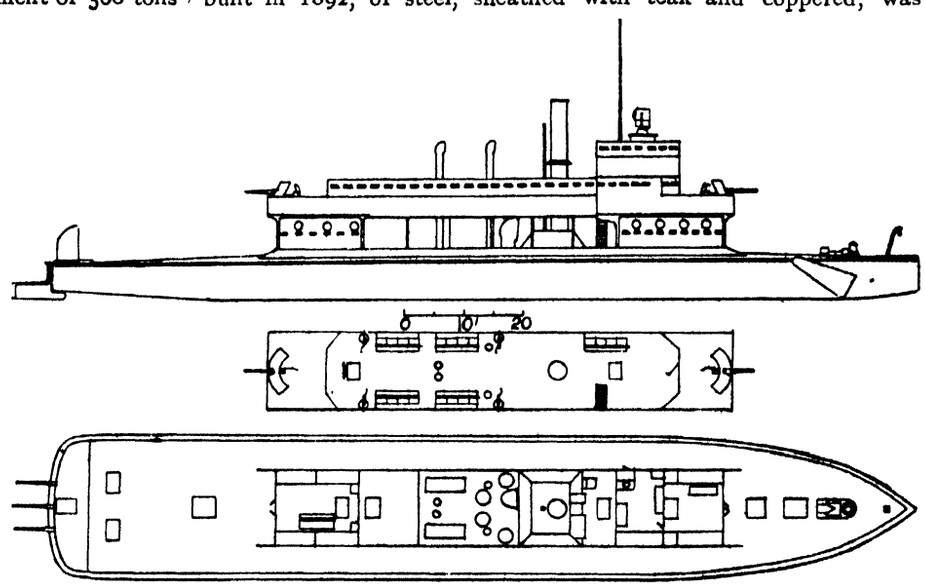


FIG. 113.—Plan of Nile Gunboat "Sultan."

165 ft. long and 800 tons displacement, and attained a speed of 14·5 knots. She had an armament of four 4·7-in. guns, three 6-pdrs. and four machine-guns, and carried a considerable spread of canvas.

In torpedo gunboats and torpedo craft generally, possibly the last thirty years of the 19th century showed more development and greater diversity than in any other type of war vessel then existing. The first small high-speed boat we have any record of is the

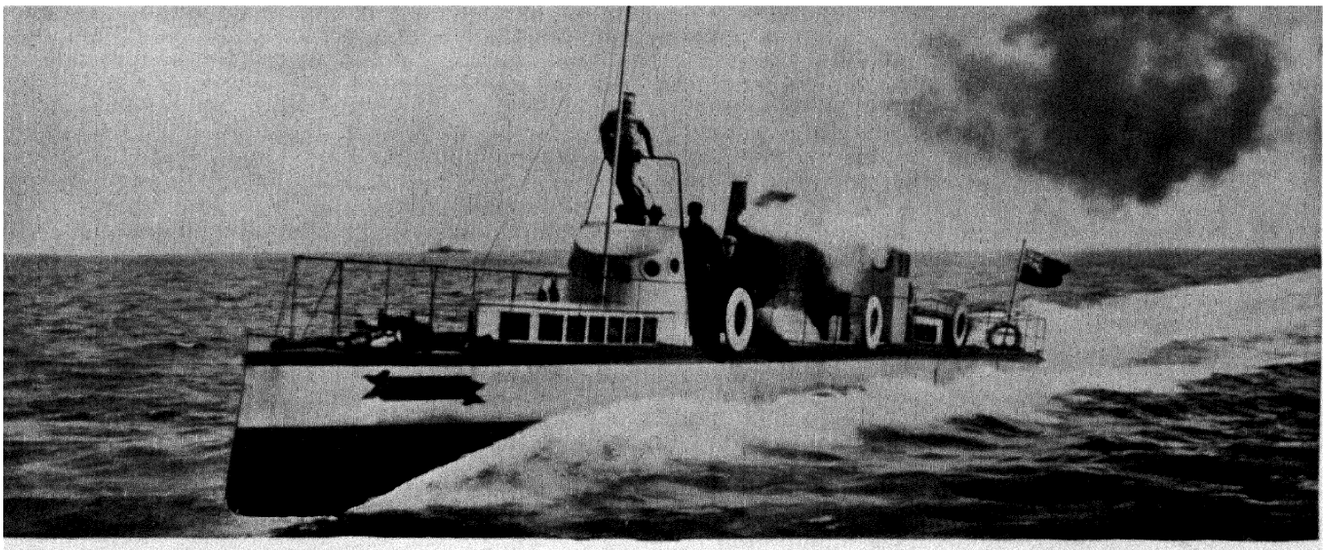


FIG. 117.—*Turbinia.*

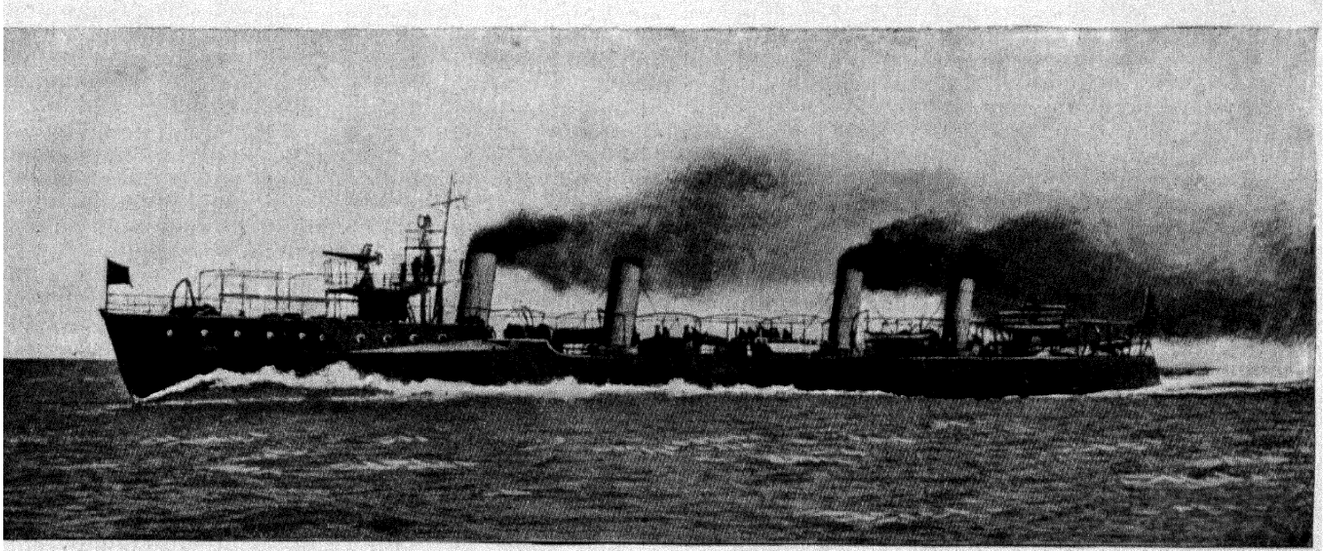


FIG. 120.—U.S.A. *Bainbridge.*

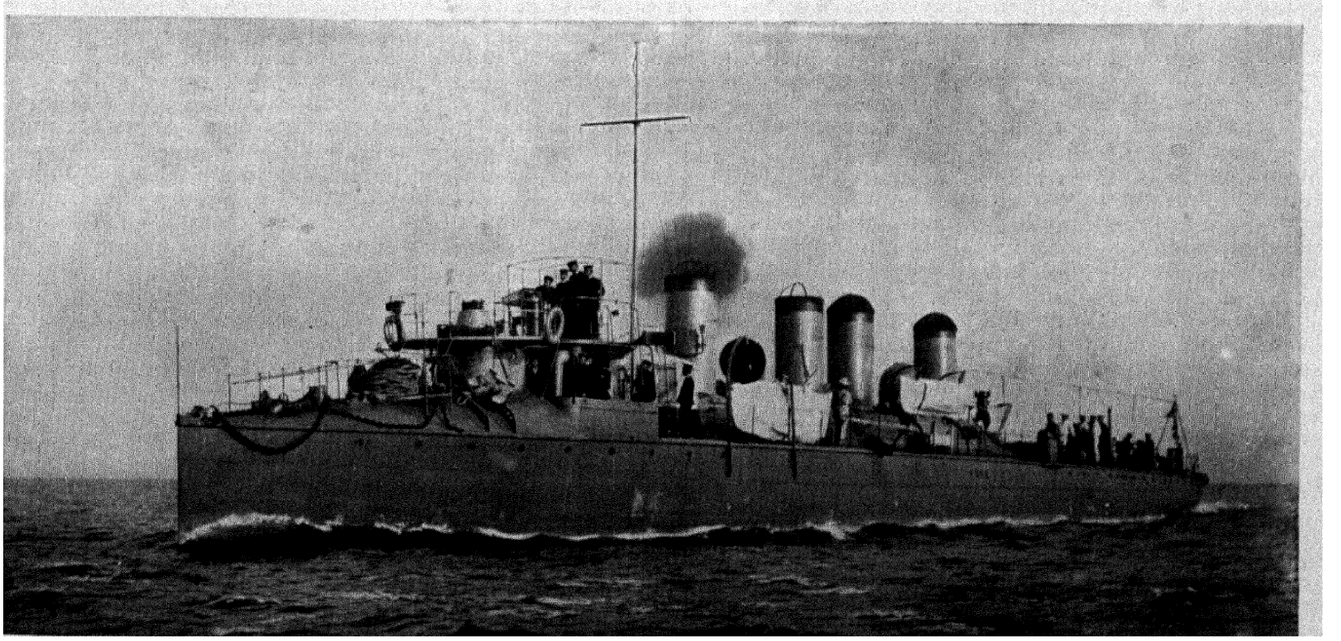


FIG. 121.—Japanese *Yezo*

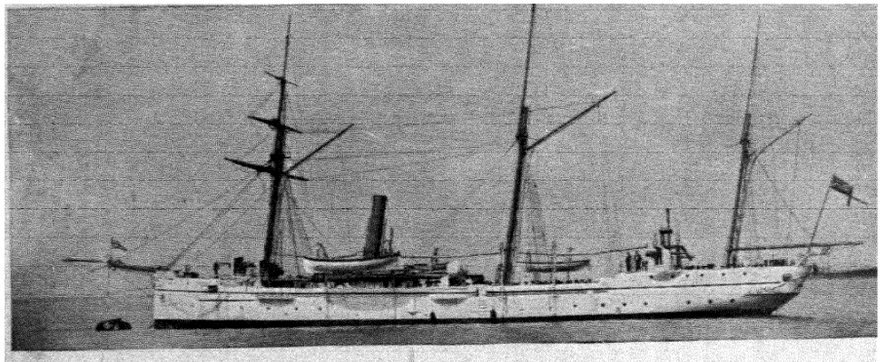
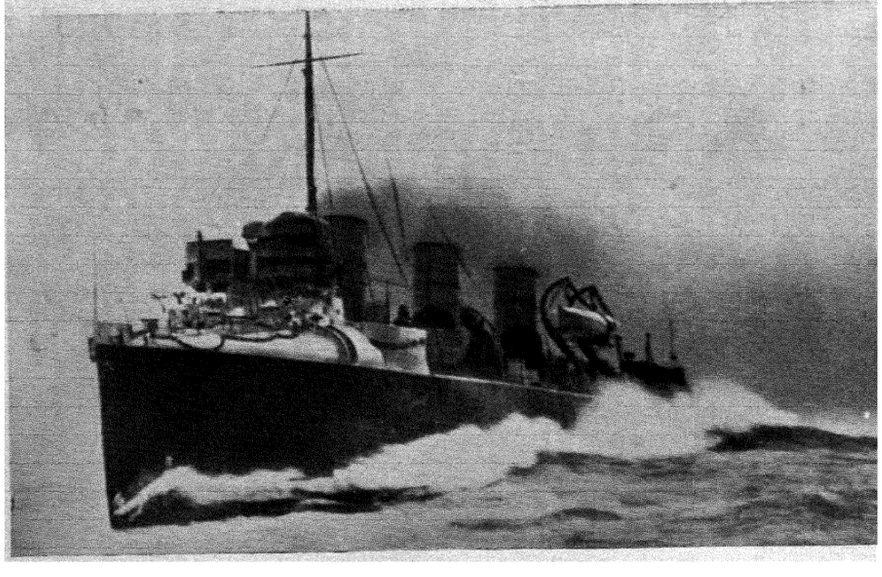


FIG. 109.—H.M.S. *Thrush*



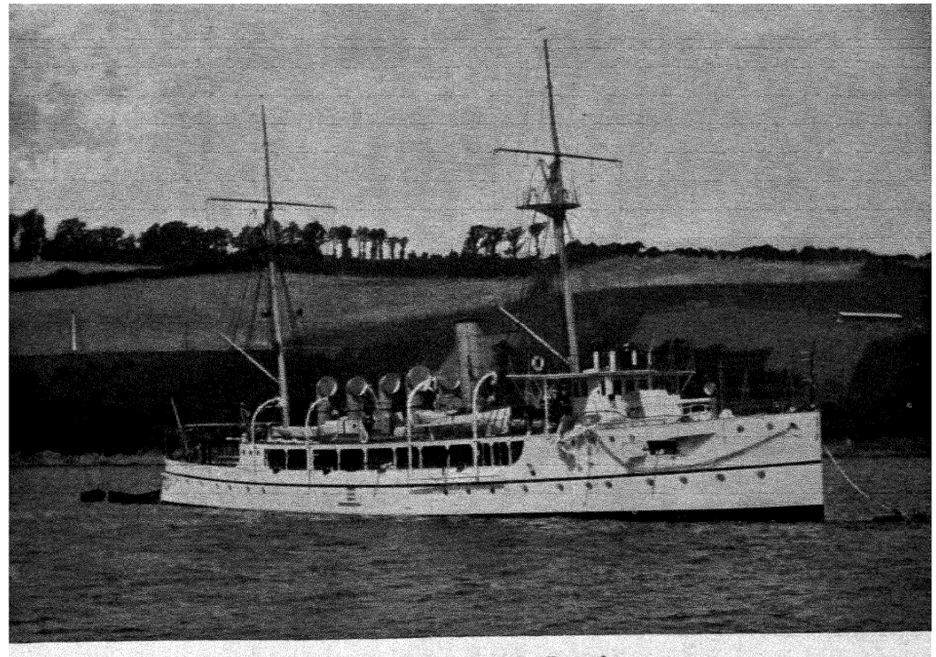


FIG. 110.—H.M.S. *Dwarf*.

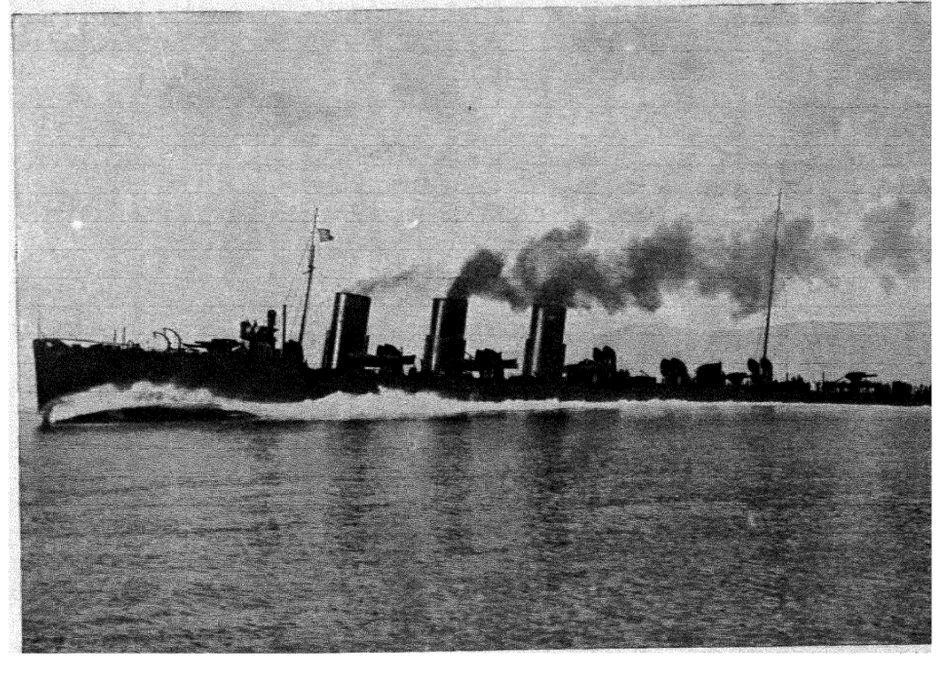


FIG. 119.—H.M.S. *Swift*.

"Miranda," built by Messrs Thornycroft in 1871. She was built of light steel, was 45 ft. in length, 6½ ft. beam and 2½ ft. draught, and attained a speed of 16·4 knots with a single screw, the engine running at 355 revolutions per minute and indicating 58 H.P. The results obtained with her attracted much attention, and in 1873 Thornycroft launched for the Norwegain government a somewhat larger boat, armed with a spar torpedo, which attained a speed of 15 knots. Owing to the introduction of machine-guns in warships as a defence against torpedo-boat attack, it was recognized that there was a very slight chance of a boat approaching sufficiently near to a vessel to successfully attack her by means of a towing or a spar torpedo, and the Whitehead torpedo fired from a revolving tube on the deck was accordingly adopted as the armament of future torpedo-boats. This rendered it unnecessary for the torpedo-boat to approach nearer than say 400 yds., and also enabled the torpedo to be fired without stopping the boat, a point of great importance. The first torpedo-boat for the British navy was built by Messrs Thornycroft four years later; she was called the "Lightning," was 75 ft. in length and 34 tons displacement, had engines giving nearly 500 H.P., and obtained a speed of 19 knots. She was armed with a single torpedo tube. The boats which followed varied somewhat as regards size and speed, but on the whole pursued the usual course of growing larger and more powerful with each new design. By 1885 the length had gone up to 150 ft., the displacement to 125 tons and the speed to 20 knots. This last was not the highest that had been obtained, some of the earlier and smaller boats having reached 21½ knots; but the boats of 1885 carried a heavier armament, consisting of six 3-pdrs. and three torpedo tubes, and were more serviceable and seaworthy craft. A very notable boat of this date was the "Swift," afterwards known as No. 81, built by J. S. White of Cowes; she marked a great advance in seaworthiness and fighting power in combination with high speed.

Torpedo craft.

Messrs Yarrow built for the Austrian navy in 1886 the "Falke," 135 ft. in length and 95 tons displacement, which obtained a speed of 22·4 knots on trial, and a similar boat for the British navy of 105 tons displacement, armed with 5 torpedo tubes and three 3-pdr. guns, which attained a speed of 23 knots on trial. About the same time Messrs Thornycroft built the "Ariete" and "Royo" for the Spanish navy. These vessels had twin screws and water-tube boilers. The former attained a speed of 26 knots on the measured mile and 24·9 knots on a 2 hours' run, and the latter 25·5 knots on the measured mile and 24·6 knots on the 2 hours' run. In 1895 M. Normand built the torpedo-boat "Forban" for the French navy, which attained a speed of 31·2 knots on trial, and the boats of the Normand type which followed her attained equally remarkable speeds. The maximum speeds for the British torpedo-boats up to the end of the 19th century were from 23 to 23½ knots. From 1901 to 1904 larger and faster types of torpedo-boats were constructed. These boats were 160 ft. to 165 ft. in length, 17 ft. to 18 ft. beam, 8½ ft. draught, 180 to 200 tons displacement, 2900 I.H.P., attained a speed of 25 knots and were armed with 3 torpedo tubes. In 1906 to 1909 boats of a new and still faster type were built with turbine machinery and burning oil fuel instead of coal. These boats, 36 in number, vary from 166 to 185 ft. in length, 17½ to 19 ft. beam, 5¾ to 6¾ ft. draught and 243 to 308 tons in displacement. They have engines of 3600 to 4000 H.P. giving speeds of 26 and 27 knots, and are armed with two 12-pdr. guns and three torpedo tubes. The first twelve ordered in 1905 were at first known as Coastal Torpedo-boat Destroyers, and given names such as the "Cricket," "Gadfly" and "Mayfly." They are now numbered throughout, *i.e.* from 1 to 36. The prefix O has been added to the numbers of such of the boats originally bearing these numbers as are still in existence, to distinguish them from the new type boats.

Table XVIII. gives particulars of many of the most notable torpedo-boats built between 1871 and 1910.

The torpedo-boat thus established was primarily a weapon of offence, the only two elements of a protective nature in its design being those of small size and high speed; but even these were also necessary for purposes of offence. The deadly nature of their attack, and the difficulty of meeting it in the ship attacked, led to the construction of special vessels intended, among other duties, to meet and destroy them. The French "Bombe" (1885) was one of the earliest of these; and the "Rattlesnake" and three sister vessels, the first of the English torpedo gunboats, came closely after her. The "Rattlesnake" was launched in 1886, was of 525 tons displacement, and had a speed of 19½ knots. She carried a more powerful armament than the torpedo-boats, namely, one 4-in. gun, six 3-pdrs. and 4 torpedo tubes. She was followed in 1888 by the "Sharpshooter," with ten sister vessels, still larger and more heavily armed. They were 230 ft. long and 735 tons displacement, had engines developing 3500 H.P., giving a speed of 19 knots, and carried two 4·7-in. Q.F. guns, four 3-pdrs. and two torpedo tubes.

France built six vessels of the "Bombe" class, and the "Leger" (a slightly larger vessel), and in 1891 to 1896 built five other torpedo gunboats of about 900 tons and 21 knots. The last was named "La Hire," and was 241 ft. long, 27 ft. 6 in. beam, 12 ft. 9 in. draught, 890 tons displacement; was armed with six 9-pdr. and six 3-pdr. Q.F. guns and was provided with engines of 6400 I.H.P. for 23 knots. These vessels have no torpedo tubes. The torpedo cruiser "Fleurus," laid down in 1891, was armed with four torpedo tubes as well as five 3·9-in. and six 3-pdr. guns. She was also protected by a 1½-in. protective deck and fitted with a belt of cellulose 3 ft. thick in the vicinity of the water-line. Her dimensions were: length 230 ft., beam 29½ ft., draught aft 15 ft., displacement 1300 tons, I.H.P. 4000, and speed 18 knots.

The "Niger" class of 1892, which included eleven vessels (fig. 114, Plate XX.), were repeats of the "Sharpshooters," except that they carried an additional torpedo tube and three machine-guns, with certain hull additions and more durable machinery, the displacement being increased by these causes to 810 tons, and the speed being reduced by a quarter of a knot. In 1893 a fourth series of this class of vessel was begun, known as the "Dryad" class, and considerably larger than the "Nigers," being 250 ft. long and of 1070 tons displacement. They are of 3500 I.H.P., have a speed of 18½ knots, and carry an armament of two 4·7-in. Q.F. guns, four 6-pdrs., and three torpedo tubes. Five vessels of this class were built, the difference between their general appearance and that of the preceding classes being illustrated by fig. 115 (Plate XX.), which shows the "Hazard," which in 1910 was employed on special service in connexion with the reception and trials of British submarines. In these thirty-one British vessels of the torpedo gunboat class the elements of strength and seaworthiness are developed at the expense of speed, and they combine in themselves some of the functions of the torpedo-boat with many of the most important features of the small cruiser. The successive increases of displacement are very largely due to additions to the hull, giving greater habitability and trustworthiness for continuous work at sea. It will be noticed that the speed shows a continuous falling off; but the "Sharpshooter" class and subsequent vessels have been refitted with water-tube boilers in lieu of the locomotive boilers originally fitted, and some of them are in addition re-engined, with the result that a speed of 21 knots was obtained; this, in the ordinary weather met with at sea, would probably enable them to overtake craft of lighter types possessed of considerably greater smooth-water speeds. These vessels have not been repeated, many of them have been sold, but all those remaining are actively employed on a variety of subsidiary but important services.

TABLE XVIII.—*Particulars of Torpedo-boats.*

Vessel's Name.	Country.	Where Built.	Principal Dimensions, &c.							Speed.	Armament, &c.
			Date of Launch.	Length.	Beam.	Draught.	Displacement.	Number of Screws.	Horse-Power.		
Torpedo-boats—				Ft. In.	Ft. In.	Ft. In.	Tons.			Knots.	
Miranda	Great Britain	Messrs Thornycroft, London.	1871	45 0	6 6	2 6	..	1	58	16.4	*Nil.* Experimental boat.
1st torpedo-boat built	Norway	Messrs Thornycroft, London.	1873	57 0	7 6	3 0	..	1	..	15.0	1 spar torpedo.
Lightning (afterwards No. 1 T.B.)	Great Britain	Messrs Thornycroft, London.	1877	75 0	10 10	5 0	34	1	477	18.5	Single torpedo tube.
No. 10 T.B.	,,	Messrs Thornycroft, London.	1880	90 6	10 10	4 0	28	1	450	21.7	1 torpedo tube.
Swift (afterwards No. 81 T.B.)	,,	Messrs J. S. White & Co., Cowes.	1885	150 0	17 6	5 11	125	1	1300	20 5	6 3 pdrs., 3 tubes.
Falke	Austria	Messrs Yarrow, London.	1886	135 0	13 9	5 8	95	1	900	22.4	2 mach.-guns, 2 tubes.
1st class T.B.	China	Elbing.	1886	144 4	16 5	7 6	128	1	1400	24.2	4 1 pdrs., 2 tubes.
Forban	France	Messrs Normand.	1895	144 2	15 2	10 0	135	2	3200	31.2	2 1 pdrs., 2 tubes.
No. 109 T.B.	Great Britain	Messrs Thornycroft, London.	1902	166 0	17 4	8 5	194	1	2900	25.0	3 3 pdrs, 3 tubes.
No. 11 T.B.	,,	Messrs Yarrow, London	1906	172 0	18 0	5 9	263	3	3750	26 0	2 12 pdrs., 3 tubes.
Goyaz	Brazil	Messrs Yarrow, London.	1907	152 6	15 4	..	130	3	..	26.5	2–3 pdrs., 2 tubes.
Gabbiano	Italy	Spezzia	1907	104 0	17 5	7 0	200	2	3000	26.0	3 3 pdrs., 3 tubes.
No. 29 T.B.	Great Britain	Messrs Denny, Dumbarton.	1908	180 0	18 0	5 9	278	3	4000	26.0	2 12 pdrs., 3 tubes.

Torpedo-boat Destroyers were primarily, as their name implies, intended to meet and destroy torpedo-boats, their larger size, greater coal capacity, heavier armament, and higher speed enabling them to overtake such boats before they could complete their attack; but it soon became evident that these additional powers also enabled the destroyer to perform the duties of the torpedo-boat more efficiently than the boat herself, and with the advent of the destroyer the production of the smaller boat declined.

The pioneers of this type of vessel were the "Daring," "Decoy," "Havock" and "Hornet," the construction of which was entered upon in July 1892, the two first-named at Messrs Thornycroft's and the other two at Messrs Yarrow's. They were thus contemporary with the "Dryads," the last of the torpedo gunboats. The success of these four vessels was followed with great interest, and in the following year (1893) six others were begun. One of these, the "Boxer," built by Thornycroft, attained a speed of 29·2 knots. A much greater number of destroyers (32 in all), nearly the whole of which were of 27 knots speed, were laid down in 1894. The succeeding year (1895) saw a great advance in size, power and speed, thirteen destroyers being laid down, for each of which the contract speed was 30 knots. Similar vessels were constructed by various firms in England for foreign powers, and abroad by Messrs Schichau in Germany and M. Normand in France; the "Sokol" being constructed by Messrs Yarrow for the Russian navy. Over sixty destroyers of the 30-knot type were built for the British navy between 1895 and 1905, and in only three vessels with reciprocating engines—the "Albatross," the "Express," and the "Arab"—were speeds exceeding 30 knots contracted for. In 1896 an attempt was made to realize greater speeds, but it was found that the power and cost necessary for the addition of a few knots were disproportionate to the value of the results obtained, and the attempt was not followed by any general increase of speed above 30 to 31 knots in destroyers fitted with reciprocating engines. The general appearance of a typical destroyer of this period is shown by fig. 116 (Plate XXVI.), which represents the "Albatross" at full speed.

Particulars of destroyers will be found in Table XIX.

Experience with the marine steam turbine, the invention of the Hon. C. A. Parsons, dates only from the time of the "Turbinia" (fig. 117, Plate XXV.), which made her successful trials in 1898 after much investigation on the part of the inventor. The turbine machinery consisted of three separate turbines directly coupled to three screw shafts and working in series, one turbine being high pressure, one intermediate and one low pressure. Each screw shaft at first carried three propellers, the total number of propellers thus being nine; the weight of main engines was approximately 3 tons 13 cwt., and the total weight of machinery and boiler, screws and shafting, tanks, &c., 22 tons. The boilers were of the water-tube type, with a working pressure of 225 lb per square inch.

The "Turbinia" was followed by the "Cobra" and "Viper" torpedo-boat destroyers. The machinery of these boats consisted of two sets, one on each side of the ship; each set comprised two turbines, had two expansions, and drove two shafts (making four shafts in all). The outer shaft on each side was driven by a high-pressure turbine, from which the steam passed to a low-pressure turbine on the inner shaft and thence to the condenser; on the inner shaft also was a small turbine, added for going astern, the Parsons steam turbine not being adapted for reversal. Steam was supplied by water-tube boilers of the express type. These vessels attained a speed of upwards of 34 knots, the revolutions of the engines approaching 1200 and the power being estimated at about 12,000 H.P. At the time of their completion these were the fastest vessels of any type afloat, but both were unfortunately lost at sea, the "Viper" after a very short period of service being run upon the Renouquet Rock in the Channel Islands, and the "Cobra" being lost at sea on her first voyage after leaving the contractor's works.

The results attained by these vessels led the British Admiralty to make further experiments with this type of machinery. The "Velox," which had been launched in 1902, was purchased from the Parsons Company, and two experimental vessels were ordered from Messrs Hawthorn, Leslie & Co., both 220 ft. long, about 590 tons displacement and with similar boilers. Both vessels were launched in 1903. One, the "Eden," was fitted with Parsons turbines, and reached 26·1 knots on trial; the other, the "Waveney," with reciprocating engines, reached 25·6 knots on trial; the "Wavency" had twin screws; the "Eden" had six screws, two on each of three shafts, and at high speed showed a great saving in coal consumption.

Experience with the 30-knot boats led to a decision to order boats of stouter build and better sea-keeping qualities. In them the turtleback forward was replaced by a lofty forecastle, and it was laid down that the trials should be run with the boats more heavily loaded and more closely approaching their ordinary loaded condition on service. These changes were embodied in the "River" class, in which a trial speed of 25½ knots under the modified conditions was provided for.

In 1902–1904 thirty-four destroyers of the "River" class were ordered, of the following dimensions, &c.: length 220 to 230 ft., breadth 23½ to 24 ft., mean load draught 8 ft. 2 in. to 8 ft. 8 in., displacement 540 to 590 tons, I.H.P. 7000 to 7500, speed 25½ knots. The 1904 Committee on Designs recommended two new types of destroyers called "ocean-going" and "coastal" respectively, and also one experimental vessel of the highest speed obtainable, all to be fitted with Parsons turbines, and to use oil only for fuel. The ocean-going destroyers include five of 33 knots and the special destroyer of 35 knots named the "Swift" (fig. 118), built by Messrs Laird & Co. She was the largest destroyer afloat in 1910. Fig. 119 (Plate XXVI.) gives a view of this vessel.

From 1906 to 1908 eight ocean-going destroyers of 33 knots of the "Tribal" class were ordered, ranging from 970 to 1045 tons displacement and armed with two 4-in. guns and two 18-in. torpedo tubes. In 1908–1909 sixteen ocean-going destroyers of the "Beagle" class were ordered, of 27 knots speed, coal being used as the fuel instead of oil as in the preceding classes. In 1909–1910 twenty more ocean-going destroyers of the "Acorn" class, designed by Sir Philip Watts, were laid down; in these oil was again adopted for fuel and a speed of 29 knots obtained. These vessels are of 780 tons displacement, 240 ft. long, 25¾ ft. beam, 7¾ ft. draught, 13,500 turbine H.P., and carry two 4-in., four 12-pdr. guns and two 21-in. torpedo tubes. The "Acorn," "Alarm" and "Brisk" are provided with Brown-Curtis turbines, all the others with Parsons turbines. The navy estimates for 1910 provided for laying down twenty-three destroyers. The three Australian destroyers of the "Paramatta" class were designed by Professor Biles, and are of 700 tons displacement and 28 knots speed.

While the idea of the torpedo-boat destroyer originated in Great Britain, and the first boats of the type were built for the British navy, foreign powers were not slow in availing themselves of the results obtained, and large numbers of torpedo-boat destroyers have

TABLE XIX.—*Particulars of Torpedo-boat Destroyers.*

Vessel's Name.	Country.	Where Built.	Principal Dimensions, &c.						Horse-Power.	Speed.	Armament, &c.
			Date of Launch.	Length.	Beam.	Draught.	Displacement.	Number of Screws.			
				Ft. In.	Ft. In.	Ft. In.	Tons.			Knots.	
Daring	Great Britain	Messrs Thornycroft, London.	1893	185 0	19 0	6 6	275	2	4,200	27.0	1—12 pdr., 3—6 pdrs., 3 tubes.
Swordfish	,,	Armstrong, Whitworth, Elswick.	1895	200 0	19 0	6 6	330	2	4,500	27.6	1—12 pdr., 5—6 pdrs., 2 tubes.
Sokol	Russia	Messrs Yarrow, London.	1895	190 0	18 6	7 0	240	2	4,400	29.7	1—12 pdr., 8 others, 2 tubes.
Corrientes	Argentina	Messrs Yarrow, London.	1896	190 0	19 6	7 4	280	2	4,000	27.4	1—14 pdr., 2 tubes.
Chamois	Great Britain	Messrs Palmer.	1896	215 0	20 9	7 3	360	2	6,200	30.0	1—12 pdr., 5—6 pdrs., 2 tubes.
Express	,,	Messrs Laird Bros.	1897	235 0	22 0	9 0	465	2	9,250	31.0	1—12 pdr., 5—6 pdrs., 2 tubes.
Gipsy	,,	Messrs Fairfield.	1897	227 6	22 0	9 0	380	2	6,300	30.0	1—12 pdr., 5—6 pdrs., 2 tubes.
Turbinia	,,	Hon. C. A. Parsons.	1897	100 0	9 0	3 0	44½	3	2,100	32.75	*Nil.* Experimental boat.
Albatross	,,	Messrs Thornycroft, London.	1898	227 6	21 3	8 0	430	2	7,500	31.5	1—12 pdr., 5—6 pdrs., 2 tubes.
Cobra	,,	Armstrong, Whitworth, Elswick.	1899	210 0	21 0	6 9	350	8	12,000	34.0	1—12 pdr., 5—6 pdrs., 2 Hotchkiss, 2 tubes.
Bailey	United States	Morris Heights.	1899	205 0	19 0	6 0	280	2	5,600	30.0	4—6 pdrs., 2 tubes.
Lawrence	,,	Weymouth, Mass.	1900	242 3	22 3	6 2	400	2	8,400	30.0	2—14 pdrs., 5—6 pdrs., 2 tubes.
Derwent	Great Britain	Messrs Hawthorn, Leslie.	1904	220 0	23 6	8 6	555	2	7,000	25.5	4—12 pdrs., 2 tubes.
Swift	,,	Messrs Cammell, Laird.	1907	345 0	34 2	12 0	1800	4	30,000	35.0	4—4", 2 tubes.
Tartar	,,	Messrs Thornycroft, London.	1907	270 0	26 0	9 1	870	3	14,500	33.0	3—12 pdrs., 2 tubes.
Para	Brazil	Messrs Yarrow, London.	1908	240 0	23 7	10 0	550	2	8,000	27.5	2—4", 4—3 pdrs., 2 tubes.
Zulu	Great Britain	Messrs Hawthorn, Leslie.	1909	280 0	27 0	8 10	1000	3	15,500	33.0	2—4", 2 tubes.
Beagle	,,	Messrs J. Brown.	1909	269 0	26 7	8 3	860	3	12,500	27.0	1—4", 3—12 pdrs., 2 tubes.
S 167	Germany	Elbing.	1909	..	..	..	607	.	12,000	30.0	2—24 pdrs., 2 machine, 3 tubes.
Smith	United States	Philadelphia.	1909	289 0	26 0	8 0	700	3	10,000	28.35	5—14 pdrs., 2 machine, 3 tubes.
Mameluck	France	Nantes.	1909	210 7	21 9	10 4	405	3	7,750	28.0	6—9 pdrs., 3 tubes.
San Luis	Argentina	Messrs Cammell, Laird.	1910	285 0	28 0	9 0	960	2	20,000	32.0	4—4", 4 tubes.

been added to the fleets of foreign navies, the boats built by Messrs Schichau of Germany and Normand of France having especially achieved success in the attainment of high speeds on trial. The "Bainbridge" class (fig. 120, Plate XXV.), built for the U.S. navy in 1901, are 245 ft. long, 23 ft. 7 in. wide, draw 6 ft. 6 in. of water, and have a displacement of 420 tons. Their sea-going speed is 29 knots, and their armament consists of two 18-in. torpedo tubes, two 3-pdr. Q.F. guns, and five 6-pdrs. The destroyers building in 1910 are of 742 tons with a speed of 29½ knots.

German destroyers are numbered consecutively, the numbers being prefixed by letters indicating the yard where built. Thus, S for Schichau works, Elbing; G, Germania works, Kiel; V, Vulcan works, Stettin. Numbers below 90 are appropriated for torpedo-boats. Two destroyers only have names, viz. S. 97, which also bears the name "Sleipner," and is fitted to serve as the emperor's yacht; and one without a number named "Taku," late "Haijing," taken from China in 1900, but built at the Schichau works in 1898. (The British navy list also contains the name of a destroyer "Taku," built at the same works in 1898, and also taken from China in 1900.) The German torpedo-boat flotilla is divided up into sections, each section led by a division boat of much larger size than the others. These division boats increased in size, from 226 tons displacement, 1800 I.H.P. and 21 knots speed in 1887, to 374 tons, 5500 I.H.P. and 28 knots speed in 1898. Division boats are numbered D 1 to D 10, and of these two bear names, D 1 that of "Carmen," and D 2 "Alice Roosevelt." Since 1898 torpedo-boat destroyers have been built in place of division boats. The first 46, built between 1898 and 1906, are of very similar type, the length gradually increasing from 207 to 216 ft., the displacement from 394 to 480 tons, engine-power from 5400 to 6500 I.H.P., speed from 26½ to 28 knots, while the breadth remained at 23 ft., and the draught at 7¾ ft. G 137, built at Kiel in 1906, is 235 ft. long, 560 tons displacement, 11,000 I.H.P., and obtained 33·9 knots speed. The nominal speed of the 48 vessels which followed is 30 knots, but several have exceeded this speed on trial. Recent destroyers are about 620 tons displacement, 12,000 H.P., and speeds of 34 to 36 knots have been reported. They are armed with two 24-pdr. Q.F., two machine-guns and three torpedo tubes, while two of 950 tons and 18,000 H.P. were launched in 1910.

In 1902–1903 Japan built in her own yards three destroyers of 375 tons, 6000 I.H.P. and 29 knots, armed with two 12-pdr. and four 6-pdr. guns and two torpedo tubes. She had previously obtained a number of boats from Messrs Thornycroft & Yarrow. The "Niji" (fig. 121, Plate XXV.) was one of the "Ikadzuchi" class built by Messrs Yarrow; of 340 tons displacement, 6000 I.H.P. and 31 knots speed, armed with two 12-pdr. and four 6-pdr. guns and two torpedo tubes, and may be taken as typical of all of the foreign built Japanese destroyers. Between 1904 and 1908 Japan built 35 destroyers of 375 tons, 6000 I.H.P. and 29 knots, carrying six 12-pdr. guns and 2 torpedo tubes; and in 1910 was building two ocean-going destroyers, the "Umikaze" and "Yamakaze," of 1150 tons, 20,500 H.P. and 35 knots, armed with two 4-in. and five 12-pdr. guns and three 18-in. torpedo tubes.

The largest torpedo-boat destroyers building by France in 1910 were of 750 tons displacement, 14,000 H.P., 31 knots speed and armed with two 3·9-in. and four 9-pdr. guns and four torpedo tubes; Russia was building vessels of about 1000 tons and of 35 knots speed.

Submarine Boats.—About 1880 much attention began to be paid by several of the naval powers to the development of the submarine boat, the United States and France in particular.

The history of the subject goes back at least 300 years, but the first undoubted success with a submarine vessel was achieved by Bushnell in America in 1775. It was worked by one man, for whom it provided just sufficient room; its general appearance, according to Bushnell's own description, bore some resemblance to two upper tortoise shells of equal size joined together, the entrance to the vessel being represented by the openings in the swellings of the shells at the animal's head; the body of the vessel was constructed of wood. The operations on board were entirely manual. By an oar in form of a screw with its spindle passing through the top the boat was sunk or raised, by another oar at the after end it was propelled; a rudder was used for guidance, and in some cases for propulsion; valves admitted water when submergence was required, and hand pumps discharged this water when it was desired to come to the surface, and a detachable weight of 200 lb was also supplied for emergency use. The air in the boat was capable of supporting the operator for thirty minutes; and as soon as he brought the boat to the surface, two air pipes, for discharge of foul and supply of fresh air, opened automatically. A compass, a pressure-gauge, and a sounding-line and lead were among the fittings. Behind the vessel was a large magazine containing 150 lb of powder, and a time-control for exploding it. From the magazine was led a rope to a wood screw at the fore part of the crown of the boat, and this screw, being worked from within, could be driven into the object to be destroyed in such a manner as to keep the magazine required for the explosion in position after it had been detached from the boat. During the War of Independence the boat was submerged beneath the British warship "Eagle," and the operator attempted to attach the wood screw to her bottom planking: in this he failed, apparently simply because he did not let go his detachable weight and so get enough upward pressure to drive the screw into the plank. The magazine was released and exploded an hour afterwards, but at some distance from its intended position.

The problem of submarine navigation received the practical attention of Fulton during the time that he was making his experiments upon steam propulsion, and even at an earlier

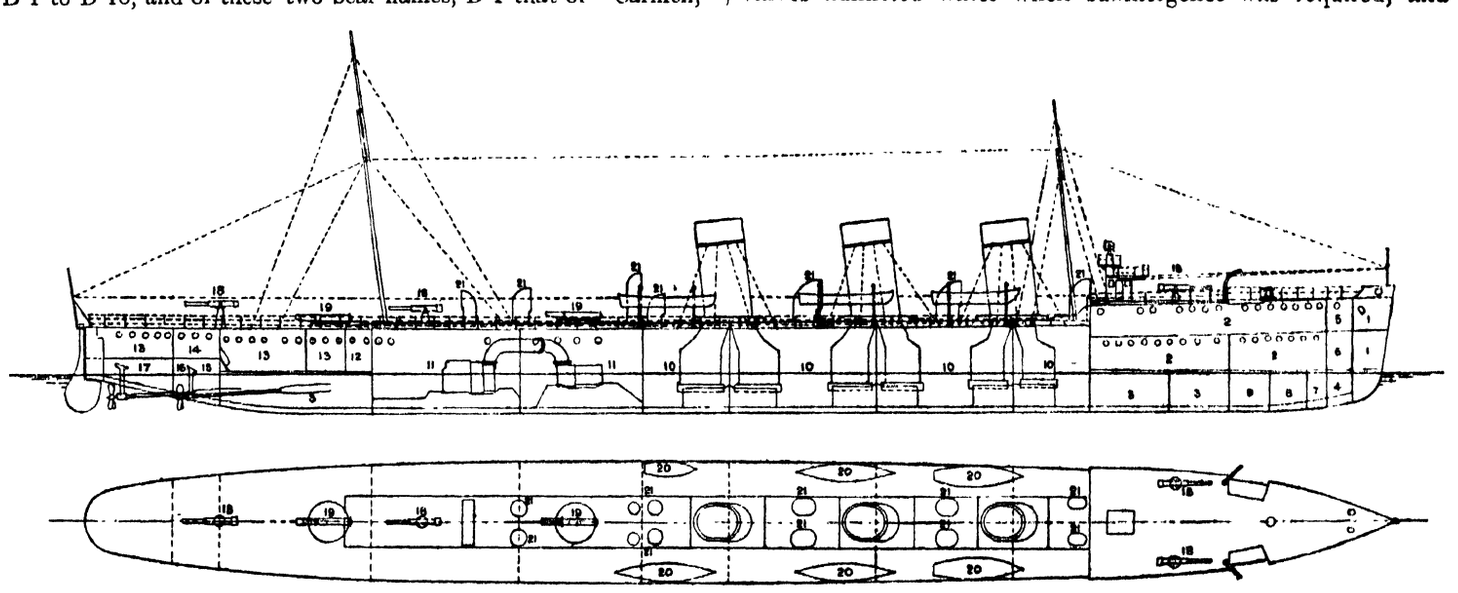


FIG. 118.—Torpedo-boat Destroyer "Swift."

1, Fore peak.
2, Crew space.
3, Oil-fuel tank.
4, W.T. compartment.
5, Paint-room.
6, Chain locker.
7, Fresh-water tank.
8, Naval store.
9, Magazine and shell-room.
10, Boiler-room.
11, Engine-room.
12, Dynamo-room.
13, Cabin.
14, Ward-room.
15, Magazine.
16, Spirit-room.
17, Store.
18, 4-in. Q.F. gun.
19, 18-in. torpedo tube.
20, Boat stowed.
21, Ventilator.

period. He constructed two submarine boats in France, and one in America. One of the former, the "Nautilus," was built with the direct encouragement of Napoleon in 1801. It was supplied with compressed air for respiration, and with it Fulton conducted a series of experiments under the direction of a commission of naval officers. He descended to a depth of 25 ft., and remained under water for fully four hours, placing below a vessel provided for the purpose a torpedo by which it was blown into fragments. As with his steam engine, so too with his submarine boats, the report of the commission charged with investigation was so unfavourable that Fulton was much discouraged, and though he afterwards continued his labours in this direction, the results achieved by him were practically lost. Fulton's boat, like Bushnell's, was propelled by manual power, two horizontal screws being employed for propulsion, and two vertical screws for descending and ascending: it was built of wood with iron ribs, and was sheathed with copper.

The substitution of mechanical for hand power came later, and one of the first mechanically driven boats was the "Plongeur," built in France in 1863 from the designs of Charles Brun. This boat had a length of 146 ft. and a diameter of 12 ft., and was propelled by an 80-horse-power compressed-air engine. During the American Civil War the Confederates built a number of iron cigar-shaped boats; some were propelled by steam engines and some by hand. Each was armed with a torpedo containing 50 to 70 lb of powder carried at the end of a spar. These boats were known as "Davids," from their diminutive size as compared with the size of the ships attacked, and in 1864 one of the hand-worked boats, 50 ft. long, manned by a crew of nine men, successfully attacked the Federal ship "Housatonic," and sank her by means of a spar torpedo, but in so doing was herself sunk. It is claimed that the loss of the boat was due to faulty handling and not to inherent defect. Against the protest of her builder, she was immersed only to the hatch coaming; and the cover being left open, she was swamped and sunk by the wave thrown up by the explosion.

About the same time another hand-worked submarine, called the "Intelligent Whale," 26 ft. in length and 9 ft. in diameter, attracted some attention in America. An officer with two other persons dived with her in water about 16 ft. deep; the officer, in diver's dress, left the boat through a manhole in the bottom, placed a torpedo under a scow and blew the latter to pieces.

In 1875 Mr J. P. Holland produced his first plan for a submarine vessel, and in 1877 he constructed a small experimental boat, which embodied features now accepted as essentials in American design. His plan ensured that when, for the purpose of diving, water was admitted into compartments of limited size, the total weight of the boat and its contents should still be a little less than the total buoyancy. Immersion was maintained by the action of horizontal rudders, which gave a downward tendency so long as the boat had any forward motion, and there always remained enough surplus buoyancy to bring the boat to the surface on the stoppage of her propelling machinery. Any weight consumed on board was automatically compensated for by admission of water, so that the total weight remained fixed and constant; while the confinement of the water to small compartments further secured a fixed centre of gravity. The securing of these qualities of fixed weight and fixed centre of gravity is essential, and the want of them has been the cause of failure in many other designs. With the necessarily slight longitudinal stability possessed by a submarine boat, any change of centre of gravity in the fore-and-aft direction has a notable effect on the angle of trim; and such a change may readily occur, for instance, from the surging of water in a large ballast-tank not completely full. An unintentional alteration of trim when the submarine boat is being propelled involves several possible dangers: in extreme cases the crew or some of the fittings may be thrown out of position; but in any case the path of the submarine is altered, and may tend either to too great immersion on the one hand, or to breaking the surface of the water on the other. From the risk of these dangers it is claimed by Mr Holland that his design is free. The first of his boats now under discussion was steered down and up inclines by her horizontal rudders, and motive-power was obtained from a petroleum engine. The tests to which she was subjected showed that inefficiency of the engine, difficulty of vision and trouble with the compass tended to destroy the boat's usefulness.

Holland's boat.

In 1883 Mr Nordenfeldt, famous as an inventor in many directions, built a submarine boat at Stockholm. She had a length of 64 ft., a main diameter of 9 ft. and a displacement of 60 tons; she was propelled by a compound surface-condensing engine indicating 100 H.P., and on a measured-mile trial, not being submerged, attained a speed of 9 knots. Steam was supplied by an ordinary marine return-tube boiler, worked under forced draught, which could be fired as long as the boat was at the surface. Storage of steam was effected at the surface, and the steam thus stored was used to drive the engine in the submerged condition. To store sufficient steam two large tank reservoirs or cisterns were connected with the boiler, and the contents of boiler and tanks (8 tons of water in all) were raised to a temperature corresponding to 150 lb pressure. In preparing for submergence the firing of the boiler was stopped, and the steam given off by the heated water in boiler and tanks sufficed to propel the boat for a period. The smoke was driven out through two channels, which passed round the hull and pointed astern. The material of the hull was mild steel, the frames being 3 in. by 3 in. by ⅜ in., and the plating ⅜ in. to ⅝ in. in thickness; the depth to which she could safely descend was about 50 ft. When ballasted ready for a submerged trip, this boat showed only a very small dome for observation above the level of the water, the reserve buoyancy represented by this dome being but 1 cwt. To overcome this reserve two propellers working on vertical shafts were fitted in sponsons, one on each side of the boat, nearly amidships. These propellers were driven by a 6-horse-power engine, and drew the boat under water to the desired depth; an automatic contrivance, set in motion by the water pressure outside the boat, closing the throttle-valve when the safety limit of depth was approached. On coming to rest, the reserve buoyancy brought the boat again to the surface. When propelled by the main engines in the submerged condition, the boat was kept horizontal by means of two bow rudders operated by a plumb weight. The crew consisted of three men only, this small number rendering unnecessary the employment of artificial means of maintaining a pure atmosphere. The scheme of attack was to approach the hostile ship running at the surface until the danger of discovery was imminent, then to descend to the "awash" condition with only the dome above water, and finally to go below the surface and advance to striking distance entirely submerged, rising if necessary once or twice to allow the direction to be adjusted by observations made from the dome "awash." The weapon of offence employed was a Whitehead torpedo, carried outside on the bow and discharged mechanically. Several larger boats were subsequently built from Mr Nordenfeldt's designs; they all involved the same principles, but were in some details made more efficient both for attack and defence.

Nordenfeldt's boat.

The three main points insisted upon by Nordenfeldt were: (1) that his method of storing energy gave him a reservoir which was not liable to get out of order, could readily be repaired if necessary, and required for its manipulation no knowledge beyond that possessed by an ordinary engineer; (2) that for submergence he relied on mechanical means easily controlled, adding, as a criticism upon the alternative method of descending by steering downwards, "I need only point out the great risk of allowing an object 100 ft. long and of great weight to proceed in the downward direction even at a small angle, as the impetus gained would very easily carry it beyond a safe depth so quickly that they might not have time to check it"; (3) that the bow rudders always secured a horizontal position when the boat was running submerged, which position he had found to be a *sine qua non* for a submarine boat.

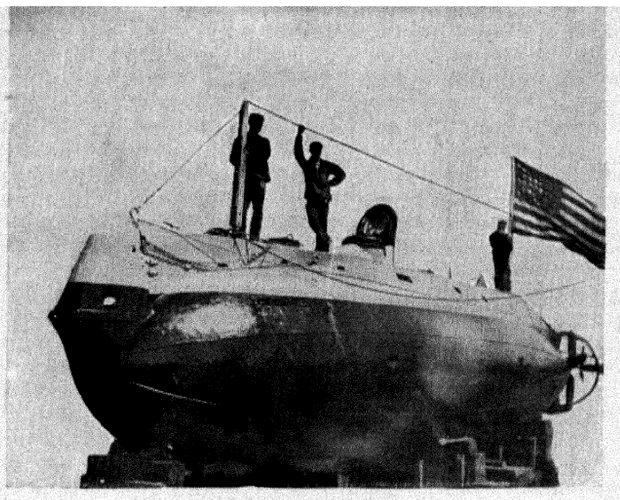


FIG. 122.—*Holland Submarine.*

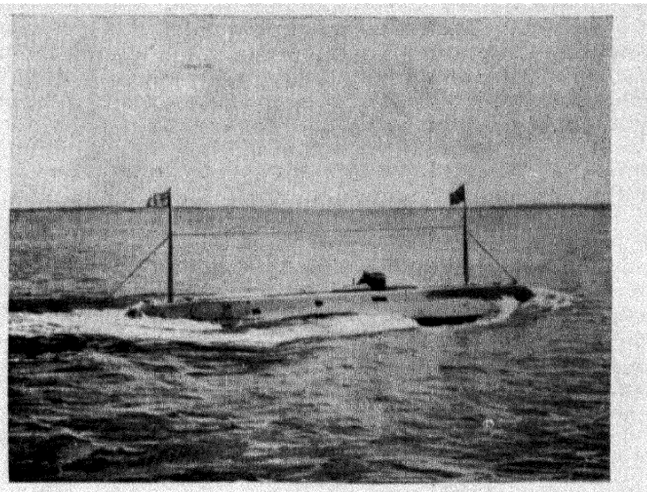


FIG. 123.—*Holland Submarine.*

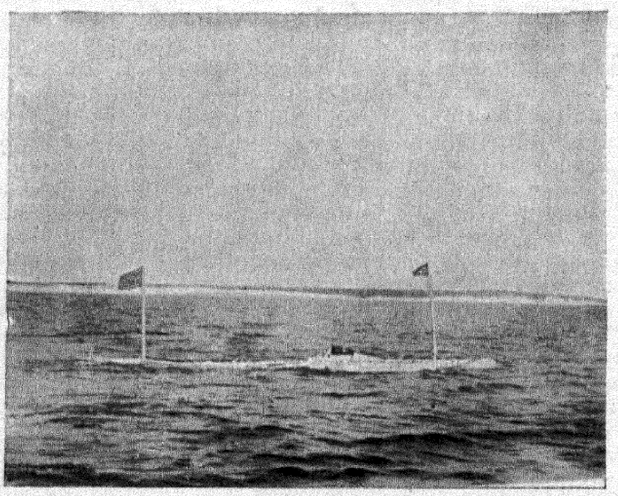


FIG. 124.—*Holland Submarine.*

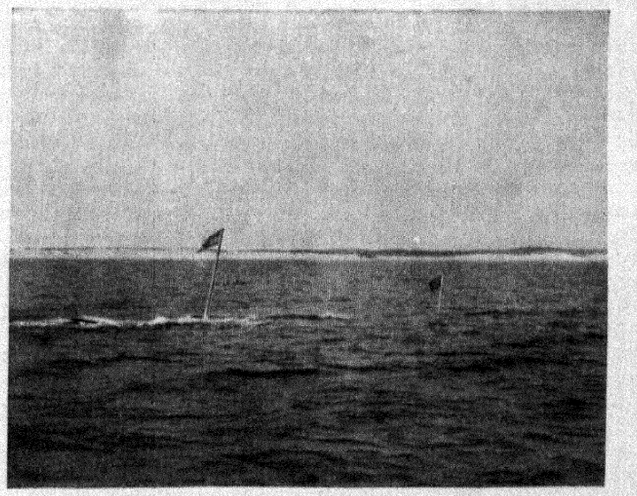


FIG. 125.—*Holland Submarine.*

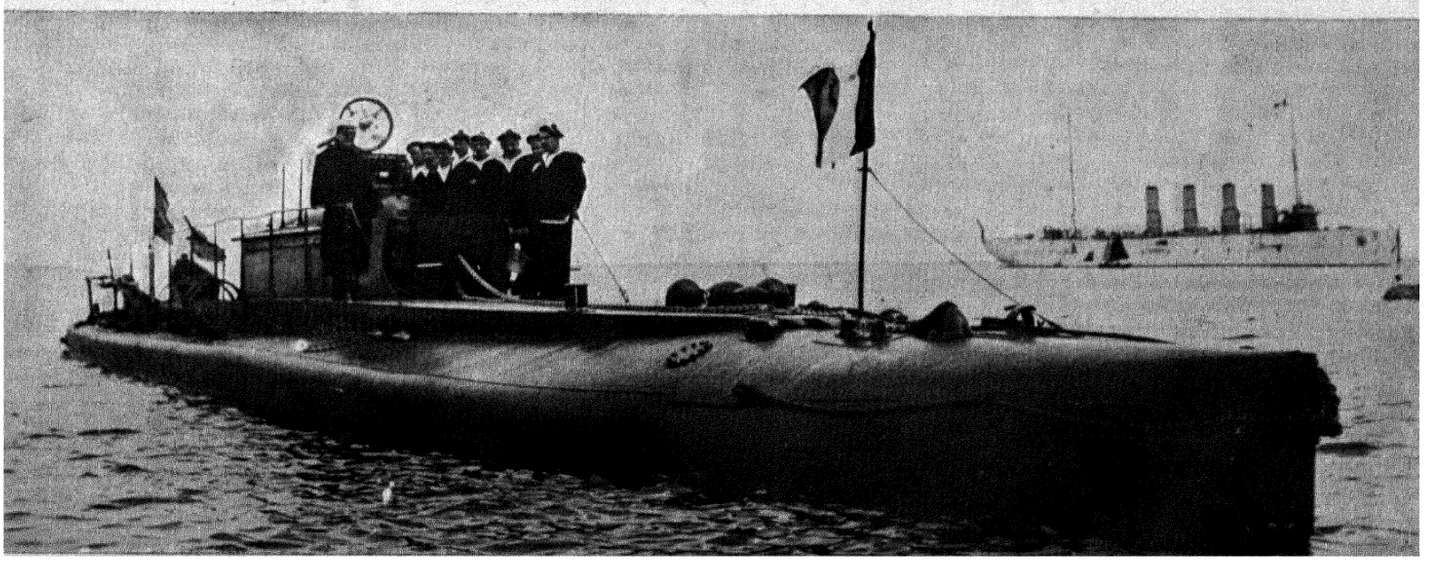


FIG. 128.—French Submersible *Vendémiaire*

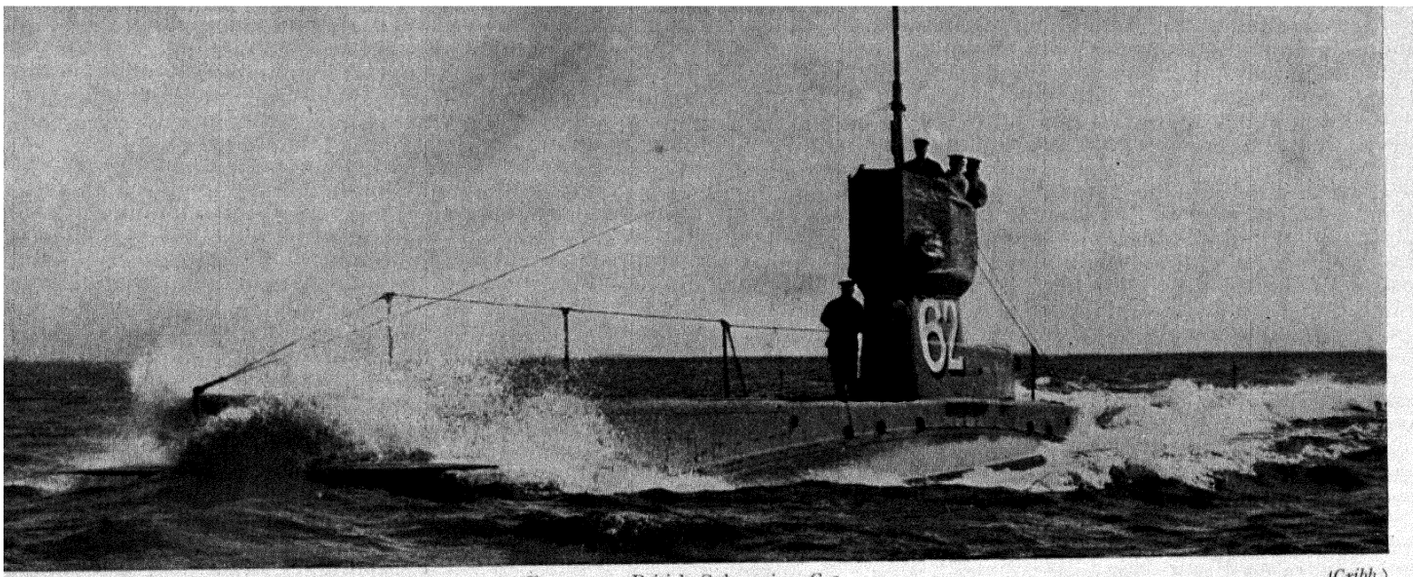


FIG. 129.—British Submarine *C 3*. (*Cribb.*)

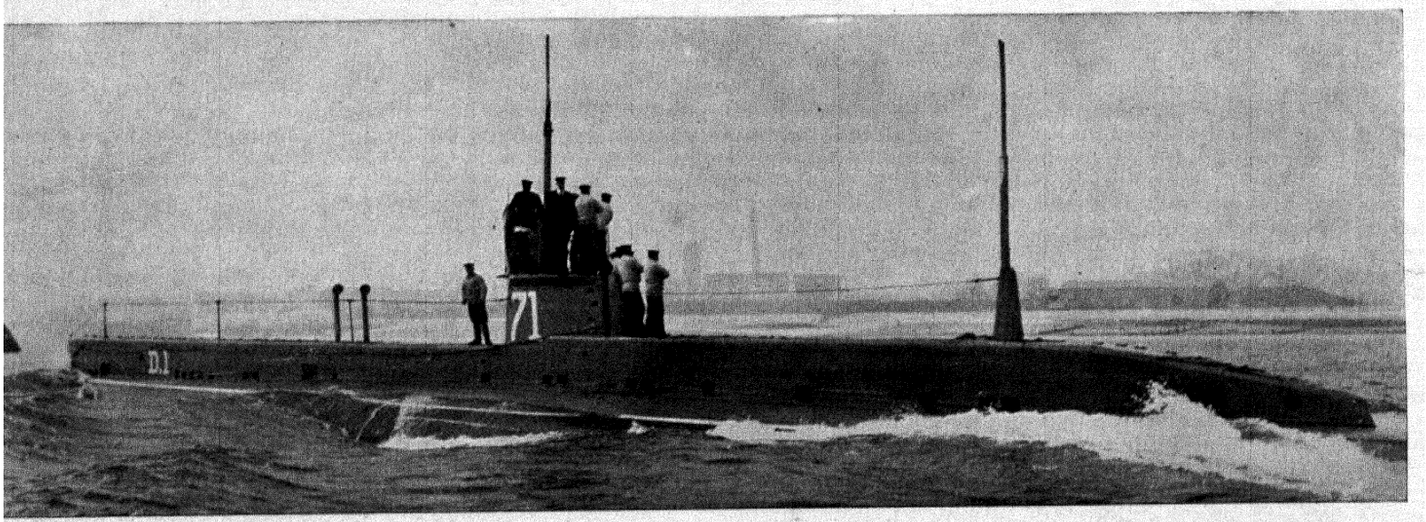


FIG. 130.—British Submarine *D 1*. (*Cribb.*)

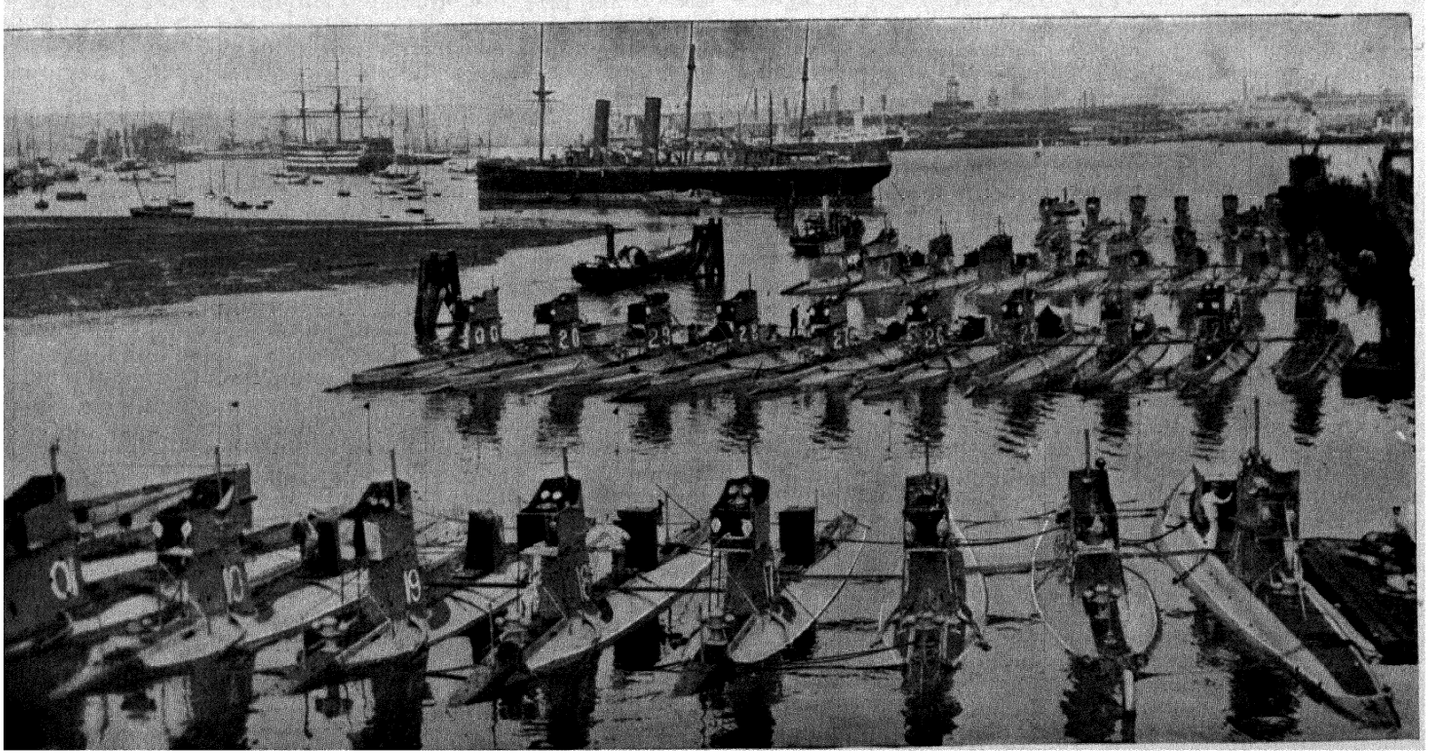


FIG. 131. British Submarine Flotilla at Portsmouth.

In response to an invitation for proposals for submarines, made by the U.S. government in 1887, designs by Holland and Nordenfeldt were submitted. After much consideration the proposals of the former designer were accepted, and formed the basis of the designs for the "Plunger," the "Holland" and the six vessels of the "Adder" class. From what has been already stated, the criticism of Admiral Hichborn (chief constructor of the U.S. navy) will be understood when he characterizes Holland's method as a "steering-under" or "diving" device, and Nordenfeldt's as a "down-haul" or "sinking" design. The great majority of modern boats are worked by the Holland method. The "Plunger" was authorized in 1903; she has a length of 85 ft., diameter 11½ ft., light displacement 154 tons and load displacement 168 tons; she is of sufficient strength for a submergence of 75 ft., and when wholly submerged has a margin of buoyancy of ½ ton. In addition to her horizontal rudders for diving, she has two down-haul screws, fitted in opposition to Mr Holland's recommendations; she may therefore be said to be a combination, for diving purposes, of both the Holland and the Nordenfeldt designs. The "Plunger's" main engines are used for propulsion when she is navigated at the surface of the water. As originally designed they were triple-expansion steam engines, driving triple screws, but have since been altered to gasolene internal-combustion engines driving a single screw. These engines are also used for charging electric accumulators, from which alone motive-power can be obtained when the boat is submerged. The current for charging the accumulators is obtained from a dynamo of 70 H.P., which can always be run in the awash condition to keep the accumulators fully charged. In the awash condition, when the boat is otherwise air- and water-tight, communication is kept up with the outer air by means of ducts and a smoke-pipe, the former bringing in air for combustion and respiration, and the latter carrying off deleterious products of all kinds. For submergence special fittings are used to close these ducts and pipes, and to stop the gasolene generator. The main engine is then no longer available, and for propulsion power is drawn from the accumulators, the dynamo thus becoming a motor which derives current from the accumulators and itself drives the screw-shaft. As was the case with Mr Holland's earlier boats, great attention is given to automatic control of weights, and water-ballast is admitted to compensate for any change, such as would be produced by the discharge of a torpedo. With her original machinery the "Plunger" was to have had a surface speed of 15 knots; her anticipated speed awash or submerged is now 8 knots. To assist in determining the boat's direction a *camera lucida* is ordinarily provided, but for correcting this Mr Holland prefers trusting to observations made during occasional rises to the surface; for this purpose the boat is provided with a conning tower 4 ft. high, protected with 4-in. steel. The "Plunger" is armed with Whitehead torpedoes, and has two tubes for discharging them. After many trials it was at last decided to build a repeat of the "Adder" to take her place, and this second "Plunger" was completed in 1903. The "Holland" is a smaller boat, having a length of about 54 ft., and was purchased in 1900. The official report on this vessel is that "she has shown herself capable of such perfect control in the vertical plane that she may be kept whilst moving within a few inches of any desired depth, and that she may be brought to the surface and submerged again in a very short time." A good idea of the general form of the "Holland" may be obtained from figs. 122, 123, 124 and 125 (Plate XXVII.), the last three of which represent this vessel when undergoing trials to test her driving qualities.

The design of the six submersibles of the "Adder" class is shown in fig. 126. They are of the following dimensions: length 63 ft. 4 in., diameter 11 ft. 9 in.; displacement for surface running 104 tons; submerged displacement 120 tons. The main features of this class are the same as for the "Plunger." The shell-plating is $\frac{7}{16}$ in. in thickness, and the frames 3½ in. by 3 in., with a spacing of 18 in. The main machinery is a four-cylinder single-acting balanced Otto gasolene engine, which at 360 revolutions will develop 160 H.P. and give the boat a speed of about 8 knots. For propulsion in the submerged condition an electric motor is used, working at 800 revolutions, and giving a speed of 7 knots, a single left-handed propeller being employed. The current for the motor is provided by storage batteries capable of supplying 70 H.P. for four hours; and these batteries are charged by the main engine. The requisite air supply is obtained when the vessel is at the surface, and is stored under a pressure of 2000 lb by a pump driven by gearing off the main engine or main motor. Air at a pressure of 50 lb is used for the expulsion of torpedoes, and the same agent, at various degrees of pressure, works the trimming and ballast tanks and some parts of the machinery; while the exhaust air from the latter subserves the purpose of ventilation. The vessel is fitted with power and hand-steering gear, and there are automatic devices for securing a constant depth during submergence. Five Whitehead torpedoes, 45 cm. (about 18 in.) in diameter and 11 ft. 8 in. long, are provided, and there is one expulsion tube placed forward about 2 ft. below the light water-line.

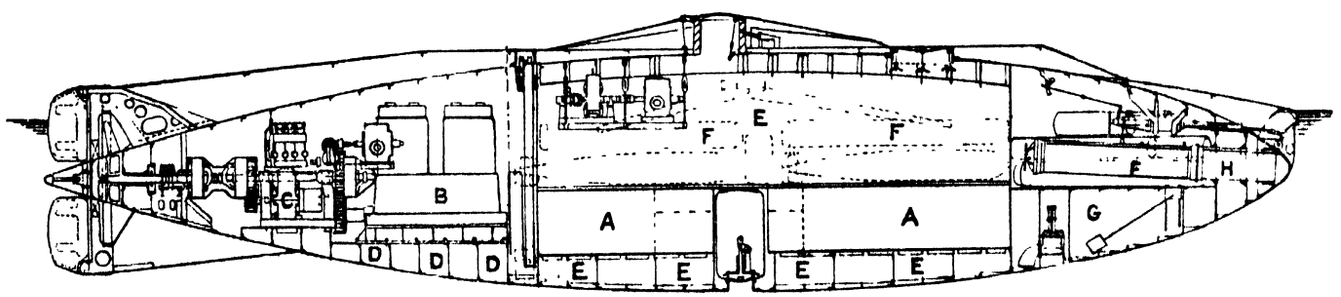


FIG. 126.—Plan of the U.S. "Adder" (reproduced by permission of Admiral Hichborn). A, storage batteries; B, gas-engine; C, dynamo and motor; D, water-tight compartments; E, main ballast tanks; F, air-flasks; G, gasolene tank; H, expulsion tube.

The French submarine boat "Plongeur" has already been mentioned. A further advance in this direction was made in France in 1881, when a small submarine was completed by M. Goubet at Paris. An inspection of this vessel led to an order for the mechanism of a number of boats from this engineer for the Russian government, and several sets were built and delivered early in 1883. The length of a boat constructed by M. Goubet in 1885 was 16 ft. 5 in.; it had an oval section 5 ft. 9 in. in depth and 3 ft. 3 in. in breadth, and tapered to a point at each end. A longitudinal section of the boat is represented by *fig.* 127. The main portion of the hull was of bronze, cast in one piece, and at the centre of its length it was surmounted by a large dome having seven glazed openings. There was just sufficient room for an officer and a man seated back to back within it, their eyes in this position being level with the glass windows of the dome. All valves and other mechanism requiring regulation were brought within reach of these occupants, so that no movement on their part was required which might affect the trim; a reservoir of compressed air supplied the means of respiration, and an air-pump removed the vitiated atmosphere. The motive-power was furnished by accumulators, the electric energy stored therein driving a screw propeller by means of a motor. No means of recharging these accumulators when exhausted was provided on board. Submersion was effected by admitting water into tanks divided by transverse bulkheads at sufficient intervals to prevent the surging of the water in the fore and aft direction. A pump expelled this water again when desired, and a safety weight attached to the bottom of the boat was ready for detachment in the presence of danger. A pressure gauge indicated the depth of water reached, and the officer could regulate the opening of the inlet valves or the action of the pumps to maintain or vary this depth as desired. For controlling the boat in a horizontal direction a specially devised pendulum was employed, by means of which a clutch was moved, and a constantly running shaft was thrown into gear with a pump as soon as the boat departed appreciably from the horizontal plane. The action of the pump was reversible,

Goubet system.

and the clutch engaged it always in such a way that it drew water from a tank at the low end of the boat, and delivered it to a tank at the high end. Several other devices of great ingenuity were employed in the boat; notably a special form of universal joint introduced into the line of shafting. At the after end, close to the propeller, this universal joint was fitted in such a way that the screw could be set at an angle to the line of motion, and steering effected without the aid of a vertical rudder. A torpedo containing 100 lb of dynamite or other explosive was carried outside the hull, and secured by a catch joint. This torpedo, on the submarine boat being manœuvred into position, could be thrown off and allowed to rise and attach itself, by means of spikes, to some vulnerable part of the ship doomed to destruction. Retiring then to a safe distance, the submarine boat could explode the torpedo by the agency of an electric current.

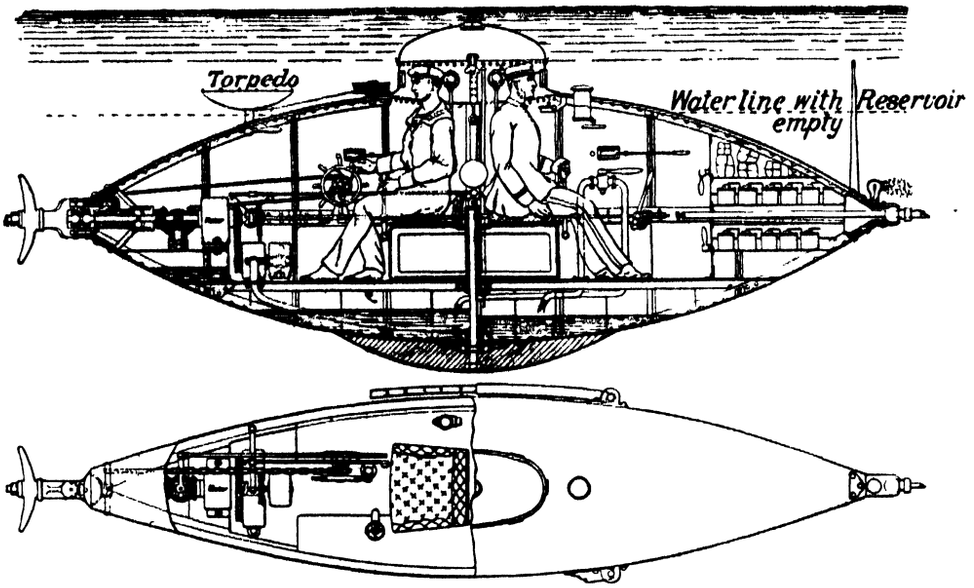


FIG. 127.—Section of Goubet Submarine Torpedo-boat.

Working in the light of his now considerable experience, M. Goubet built several other boats. These were of larger dimensions, having a length of 27 ft.; their material was also bronze, and they were cast in three pieces, the centre one having a thickness of 1 in., while the others were reduced to a little more than ½ in. at the ends. Possessing to a large extent the same contrivances as their predecessor, these improved boats were fitted also with an automatic apparatus for regulating the depth of submersion. In this regulator a piston is moved along a cylinder by the rotation of a rod with a screw thread cut in it, and so increases or diminishes the amount of water in the cylinder. The movement of the piston is effected by a small motor, and the direction of action of the motor is regulated by a commutator placed in juxtaposition to a pressure gauge. When the depth of submersion is too small, current is supplied to move the piston so as to admit more water; when the depth is too great, current is supplied in the opposite direction, and water is expelled. The speed attained by this boat was from 5 to 6 knots. Smaller boats of this type have been built for propulsion by manual power, but, however perfect the mechanism, the range of action of a submarine dependent on man-power for propulsion is very limited. Recent Goubet boats are being built, with motive-power, which it is proposed to carry on board ship and lower from davits when required.

The "Gymnote" was constructed at Toulon in 1888. She is a steel vessel, with a length of 59 ft. and a displacement of 30 tons; being of an experimental character only, she has no weapon of attack. The maximum speed obtainable is 8 knots. The designs of the "Gustave Zédé" and of the "Morse" were both based on those of the "Gymnote," the former having a length of 148 ft. and a displacement of 263 tons. In both of these the hull is of bronze; one great advantage of this metal being that, like the bronze of the Goubet boats, it is non-magnetic in character, and cannot therefore disturb the equilibrium of the compass. With their large dimensions they were intended to be formidable engines of war, and were furnished for attack with Whitehead torpedoes; of these latter they each carry three of 45 cm. (nearly 18 in.) diameter, discharging them by means of a torpedo tube. The "Morse" and the "Gustave Zédé," like the "Gymnote," possess only electric means of propulsion, the power being derived from batteries of accumulators. No power is provided in the vessels by which the accumulators can be recharged, so that the radius of action of these boats is necessarily very limited. The "Narval," designed by M. Laubeuf, and the outcome of a general competition in 1897, has a length of 112 ft. and a total displacement of 200 tons. She was built at Cherbourg in 1898, and is furnished with a triple-expansion steam engine, obtaining its steam from a water-tube boiler of special form and heated by petroleum. As in the American submarines, this engine propels the boat when at the surface, and also drives a dynamo which recharges accumulators, the latter giving the reserve power for use in the submerged condition. A speed of 11 knots is obtained at the surface, and 8 knots when submerged. A new departure in the "Narval" is her double hull, the inner shell of which is of steel plate of sufficient thickness to resist any water-pressure to which the boat may be subjected, and the outer shell, placed at varying distances from the inner, forms a protection to the inner against attack. An armoured dome surmounts the boat, cutting through the external shell and carrying a short and narrow telescopic funnel, which, as in the case of the American boats, must be withdrawn preparatory to diving. Control in the vertical direction is obtained, when diving, by the use of two pairs of horizontal rudders, placed symmetrically—one pair forward, the other aft. By the above arrangement it is claimed that the horizontal direction of the boat is ensured, the American course of inclining the axis of the boat when diving being considered open to such grave objections that it is desirable to avoid it.

The early American boats of the "Holland" type, and the French boats built in the last decade of the 19th century, were the earliest really practical submarine boats, in the sense that unlike the boats which preceded them they were instruments of war which could be used by ordinary trained crews with the average chances of success and failure which attend all warlike operations. They owe their practicability not to any discovery of the method of controlling the movements of a boat beneath the surface of the water, as has been sometimes supposed, since the ordinary method of steering by means of a rudder or a combination of rudders perfectly analogous to that used for manœuvring a ship in the horizontal plane was well known and had been applied to steering submarines in the vertical plane before; but principally to the perfection of the accumulator cell as a means of storing energy for propulsion without the expenditure of air or other weight contained in the boat, and to the introduction of the optical tube. This latter instrument is a telescope with the optical axis twice bent through a right angle by totally reflecting prisms or mirrors; and under diverse forms and various names, such as periscope, cleptoscope, hyphydroscope, omniscope, &c., it affords the only practical means by which objects on the surface of the water can be seen at a distance from the interior of a submerged vessel. The problem of providing means for seeing at a distance through the water still awaits solution, and when solved, if it ever should be, will enormously add to the power of submarine boats as weapons of war.

By far the greater number of submarine boats in existence in 1910 were developments through a process of continuous experiment and improvement of the "Gymnote" and of the early Holland boats, although the process of evolution had been so rapid and extensive that the parentage of these modern boats is barely recognizable. There are, however, a considerable number of submarines built by the Lake Submarine Boat Co. of Bridgeport, U.S.A., in the service of various naval powers. These boats are designed by Mr Simon Lake, who was also a pioneer in submarine boat construction, contemporary with Mr J. P. Holland in the United States of America. His earliest boat, the "Argonaut," was intended rather for running along the bottom in shallow water than for ordinary navigation; and for sending out divers rather than for discharging torpedoes. For this purpose it was fitted with wheels for running along the bottom and with an air-tight chamber having a hatch at the bottom which could be opened when the air pressure in the chamber was made equal to that of the water outside. These features are still retained in many of the modern Lake boats, though these boats are now constructed like all other submarines, primarily for the purpose of submarine navigation.

Other boats which should be mentioned as laying claims to distinctive features in matters of detail are those built by the Fiat San Giorgio Company of Spezia, designed by Colonel Laurenti, and those built by the Germania Werft of Kiel, which are understood to embody the patents of M. d'Equevilley. The Russian government also possesses several boats generally regarded as of a distinctive type designed by M. Drzwiecki.

Perhaps the most outstanding distinction between different submarine boats is the amount of their submerged displacement which is devoted to carrying water ballast. This, of course, measures their reserve of buoyancy in the surface condition, which in different

examples of boats varies from as little as 5 % to as much as 60 % of their surface displacement. It is obvious that, the more water ballast carried, the less of some other weight of machinery or equipment can be carried on a given submerged displacement, and the whole problem resolves itself into making the compromise which will best meet the requirements of the service for which the boat is intended. This fact has sometimes been lost sight of in discussions on this subject, which have tended sometimes to proceed on the assumption of a radical difference in character between boats of high reserve of buoyancy and those of low reserve, even to the extent of giving them the different names of "submersible" and "submarine." Another technical point in the design of submarines which has frequently been the subject of non-technical discussion is the desirability or otherwise of "bow-rudders" or "hydroplanes." This question depends on the form of the boat, and the manner in which it is proposed to handle her, and is unsuitable for discussion except in relation to the ascertained tendencies of a particular form under the vertical hydrodynamical forces which are set up by its propulsion through the water.

Similar considerations apply to the questions whether a submarine boat should have a separate means of propulsion for surface-running distinct from that fitted for submerged propulsion, and if so, whether it should consist of steam or internal-combustion engines. On account of the very limited capacity of even the best modern electric accumulator, any submarine which is intended to have a considerable radius of action must necessarily have heat engines of some description for surface propulsion and for charging batteries.

As to the type of heat engine, France was the only country which in 1910 had fitted steam engines in recently built submarines; and the general tendency was undoubtedly to use internal-combustion engines, of which those burning heavy oil are much less expensive in working than those using gasolene.

The general tendency in 1910 was to increase the size of submarine boats. Improvements in the design, apart from increase in size, depend principally on the improvements which may be made in the internal-combustion engines required for their surface propulsion, and in the improvement or possible elimination of the electric accumulators and motors for submerged propulsion, the weight of which is exceedingly great for the power obtained when compared with that which is obtained from heat engines.

It is the practice of all countries to keep secret the really important details of their submarine boats, to an even greater extent than those of ordinary warships. Some particulars, however, of the newer submarines of different countries are given below, principally to illustrate the progress in size and power.

In *France*, in 1901, M. Romazzotti, already referred to as the designer of the "Morse" and "Gustave Zédé," produced two other boats, the "Français" and "Algérien," similar to the "Morse." Four vessels, the "Sirène," "Triton," "Silure" and "Espadon," of a modified "Narval" type, were built from M. Laubeuf's designs in 1901; two others of a similar type, the "Aigrette" and "Cigogne," but of 170 tons surface displacement, were built in 1904, and two other still larger boats, the "Circé" and "Calypso," in 1905. These two boats are (155 ft. long, 16 ft. beam, 10 ft. draught) of 350 tons displacement on the surface, 480 tons submerged. Two Diesel heavy oil engines are fitted to give 11¾ knots speed on the surface and two electric motors for use when submerged. Four boats of the "Gnôme" type, of 200 tons and 280 H.P. and 135 ft. in length, designed by M. Maugas, were commenced in 1899. In 1901 twenty small submarines of the "Naïade" type were commenced to M. Romazzotti's design; they are 76 ft. in length and of 68 tons displacement, and have a surface speed of 8 knots and a speed of 4·5 knots when submerged. Their motive-power is electrical both for surface and submerged propulsion, except in the case of two boats which are provided with benzol motors for surface work. From 1905 to 1909, 34 boats of the "Pluviôse" type of twin-screw submersibles designed by M. Laubeuf were laid down; they have a displacement on the surface of 392 tons, and have engines of 700 H.P. and a speed of 12 knots on the surface, and 440 H.P. and a speed of 7¾ knots when submerged. Eighteen boats of the class have triple-expansion engines, and each of the remainder has two Diesel heavy oil motors for surface propulsion, while all have electric motors for use when submerged. Some of the steam-driven boats have traversed 730 m. in 82 hours, while the "Papin" with oil motors ran 1200 m. from Rochefort to Oran in six days without calling at any intermediate port. In fig. 128 (Plate XXVII.) is shown the "Vendemiaire," one of the boats of this class. The twin-screw submarines of the "Emeraude" class, six in number, designed by M. Maugas and laid down in 1906, are of approximately the same displacement as the "Pluviôse" class and of about the same speed; their motive-power consists of two Diesel heavy oil engines on surface and electric motors when submerged. A considerable advance in length and displacement was made in 1907, when the "Mariotte," 216 ft. in length, 522 tons displacement on the surface, and 615 tons submerged, the "Archimède," 199 ft. in length and 568 tons displacement on the surface and 797 tons submerged, and the "Admiral Bourgois," 181 ft. in length and 555 tons surface displacement, were laid down. The H.P.s of these three submersibles are 1400, 1700 and 1500 respectively at the surface, giving a speed of 15 knots (submerged speed 10 knots).

After the completion of the last boat of the "Adder" class already referred to, a period of about three years elapsed before the acquisition for the *United States* navy of any additional submarine boats. The "Octopus," which underwent extended trials in 1907, was designed by the Electric Boat Company, the successors of the Holland Boat Company, and marked a great advance in all respects over the earlier boats. She is a twin-screw boat, having two torpedo tubes instead of one, as in the previous boats; she is of about 273 tons displacement submerged and 255 tons on the surface, and is credited with maximum trial speeds of 11 knots on the surface and 10 knots submerged. Three other boats, the "Cuttlefish," "Tarantula" and "Viper," generally similar to but somewhat smaller and less powerful than the "Octopus," were also completed during 1907 and 1908; and the "Snapper," "Bonita," "Stingray" and "Tarpon," of the same size as the "Octopus," in 1909. The "Salmon," a boat similar to the "Octopus," but of 278 tons displacement on the surface, 360 tons submerged and carrying four torpedo tubes, was completed in 1910, and is credited with trial speeds of 13 knots on the surface and 9½ knots submerged. In July 1910 this boat made the ocean passage of about 700 to 800 m. from Quincy, Mass., to Kingston, Bermuda, in four days, and returned in about the same time, proving herself remarkably seaworthy for so comparatively small a boat in the rough weather encountered. Several similar boats were in 1910 under construction.

In 1900 *Great Britain* ordered five submarine boats from Messrs Vickers, Sons & Maxim, at Barrow, who, by arrangement with the Electric Boat Company of New York, were enabled to embody in their designs all the features of the Holland boats of the "Adder" class, which these first British submarines resembled in size and most other respects, the length being about 63 ft. and submerged displacement 120 tons. Subsequent British submarines of the A, B and C classes were designed by Messrs Vickers, Sons & Maxim under instructions from the Admiralty. The progress in size and power has been continuous, and the departure from the original "Holland" type more and more marked with each successive new design. Table XX. indicates the various steps. All the boats there mentioned, except A13, which has heavy oil engines, are fitted with

TABLE XX.

Name or Class of Boat.	Year of Completion.	Length.	Breadth.	Submerged Displacement.	Horse-Power of Engines.	Speed on Surface.
		Feet.		Tons.		Knots.
A1 . .	1903	100	11′ 9″	206	350	9
A2–A4 .	1904–1905	99	12′ 8″	205	450	10¼
A5–A12 .	1905–1906	99	12′ 8″	205	600	11¼
A13 . .	1906–1907	99	12′ 8″	205	500	11¼
B1–B11 .	1905–1907	135	13′ 6″	314	600	12¼
C1–C17 .	1907–1909	135	13′ 6″	314	600	12¼
C19–C38 .	1908–1910	135	13′ 6″	320	600	12¼

gasolene engines for surface propulsion. D1, which also has heavy oil engines, was completed in September 1909, and was the first of a new series of boats for the design of which Sir Philip Watts was personally responsible. She passed through her trials, and seven similar boats were in 1910 under construction. Fig. 129 (Plate XXVIII.) gives a view of C32, while fig. 130 shows D1 under weigh on the surface, and fig. 131 a flotilla in Portsmouth Harbour.

Russia purchased the Lake demonstration boat "Protector" in 1904. This boat is 65 ft. long, 115 tons displacement on the surface and 170 tons submerged. The surface speed is stated to be 9 knots and the submerged 6 knots. A larger boat, of 135 tons displacement—the "Simon Lake"—was also purchased, and four others of the same size built in 1904–1905. In 1907 another small "Lake" boat of 110 tons was obtained, and in 1908 and 1909 seven larger vessels, 125 ft. long, 14 ft. beam, 450 tons on surface, 500 tons submerged, 16 knots speed on surface with petrol engines, and 6½ knots submerged, with electric motors. Of the "Holland" type Russia has obtained a considerable number; fifteen of these are from 106 to 175 tons on the surface, and one is 184 ft. long, 12 ft. beam, 11 ft. deep and 360 tons on the surface. She has also obtained three boats of the "Germania" type, 131 ft. long, 197 tons on the surface, as well as a specimen of a small submarine of 17 tons hoisting weight driven by electric accumulators only, giving 8 knots on the surface and 6 knots submerged, and armed with one torpedo tube. The large boats of the "Lake" type are driven by engines of 1200 H.P., and are stated to carry an armament of two 3-pdr. and two machine guns in addition to their four torpedo tubes. Three of the Russian submarines under construction in 1910 were 500 tons displacement on the surface.

Germany did not build submarines until 1906, when U1 was launched at the Germania Works, Kiel. She is 139 ft. long, 11 ft. 9 in. beam, 7 ft. 9 in. draught and 240 tons on the surface, being

slightly larger than the Russian boats built by the same firm. She is fitted with twin-screws driven by petroleum motors of 450 H.P., giving a speed of 11 knots on the surface, and electric motors of 200 H.P., giving a speed of 9 knots when submerged. Three 18-in. torpedoes are carried, one bow tube only being provided. In 1908–1909 three larger boats were built at Dantzig, and in 1909–1910 three of 600 tons displacement at the Germania works. The boats were reported to have made very long sea passages without escort.

Japan commenced building "Holland" boats in 1905. The first five were 87 ft. in length and 125 tons displacement. Two smaller boats of 86 tons were also built. In 1908 two boats of 320 tons were built at Barrow, and despatched by steamer to Japan; and three similar boats were in 1910 being built in Japan.

In 1894 *Italy* launched the "Delfino," a single-screw boat of 105 tons and 150 H.P. The type has not been repeated, but in 1905 a fresh start was made with three boats of the "Glauco" type, twin-screw boats of 150 tons on the surface, 175 tons submerged, H.P. on surface 600 to 700, speed 14 knots on surface and 8 knots submerged. In 1908 three similar but larger boats followed, the largest being the "Foca," 137 ft. 9 in. long, 14 ft. beam, displacement 175 tons, 900 H.P. and 15 knots speed in surface condition, 225 tons displacement, 200 H.P. and 9 knots when submerged, fitted with two 18-in. torpedo tubes. In 1910 six similar but larger boats were laid down at Spezia.

The increased interest in naval matters in *Austria* is shown by the expenditure on submarines as well as on battleships. In 1907 two boats of the "Lake" type 100 ft. long, 250 tons submerged, were laid down at the government dockyard at Pola; between that date and 1910 two boats of modified "Holland" type, 138 ft. long, 300 tons submerged and 12 knots surface speed, were built at Fiume, and two of the "Germania" type ordered from Kiel.

The Swedish government began by building a submarine boat, the "Hojen," which is understood to have resembled the early "Holland" designs. In 1910 the "Hvalen," a boat similar to the latest Italian submarines, was built for the Swedish government by the Fiat San Giorgio Company at Spezia, and acquired some notoriety by making the voyage from Spezia to Stockholm without escort, including a longest run of about 700 m. from Spezia to Cartagena.

The "Dykkeren," a submarine of the "Laurenti" type, but entirely electrically propelled both at the surface and submerged, was built by the Fiat San Giorgio Company at Spezia for the Danish government in 1909. She is credited with a maximum speed of 12 knots on the surface and 8 knots submerged, but, depending entirely on the energy stored in electric accumulators, her radius of action is necessarily restricted.

Fleet Auxiliaries.—Various types of auxiliaries are provided in the principal navies to perform services of a supplementary, though frequently important character. In many cases fighting vessels of the older classes have been converted and adapted as well as is practicable for these services, but in other cases new vessels have been built or arrangements made with owners of suitable merchant ships for the adaptation and use of those ships when required by the navies. Amongst such auxiliaries the following are found in the British navy:—*Mine-laying vessels*—second-class cruisers of the Apollo class modified for the purpose; *fleet-repair ships*—the modified merchant-built vessels "Assistance" of 9600 tons displacement and the "Cyclops" of 11,300 tons; *distilling vessel*—"Aquarius" of 3660 tons, a modified merchant vessel, and a large number of *tank vessels* such as the "Provider" of 395 tons, specially built for distributing fresh water; *depot and repair ships for destroyers*—the modified cruisers "Blake," "Blenheim," "Leander" and "St George," and the modified merchant vessels "Hecla" and "Tyne"; *depot ships for submarines*—the modified cruisers "Bonaventure," "Thames," &c., and the repair ship "Vulcan," as well as a new vessel the "Maidstone," of 3600 tons, laid down at Scott's Yard, Greenock, in 1910; *oil tank vessels*—the merchant built vessels "Petroleum," of 9900 tons and "Kharki" of 1430 tons, and a new vessel, the "Burma" of 3870 tons, laid down at the Greenock Dockyard Co.'s Yard in 1910. The *hospital ship* "Maine" of 4540 tons was fitted up for service of the United States in the Spanish-American War, and was presented to the British government in 1901 by the Atlantic Transport Co.

Besides the foregoing, arrangements are made for fitting up fast vessels such as the "Mauretania" and "Lusitania" with a number of 6-in. or other Q.F. guns for service as merchant cruisers in time of war, when they would be used as ocean-going scouts, or for the protection of trade routes. Corresponding arrangements are made by several other countries, while in Russia and Japan special mercantile cruisers have been built under the title of Volunteer steamers. A full account of the Russian Volunteer Fleet is to be found in a paper read by Mr H. Rowell at the Institute of Naval Architects 1905, later vessels being described in *Engineering*, 11th March 1910, and an account of the Japanese Volunteer vessels will be found in *International Marine Engineering*, June 1909.

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SHIPBUILDING. When ships were built of wood and propelled by sails their possible size and proportions were limited by the nature of the structural material, while the type of structure had been evolved by long experience and was incapable of any radical modification. Speed depended so much on circumstances independent of the design of the vessel, such as the state of the wind and sea, that it was impossible to include a definite speed over a voyage or measured distance as one of the essential requirements of a design; and the speed actually obtainable was low even under the most favourable conditions when judged by modern standards. Stability depended principally on the amount of ballast carried, and this was determined experimentally after the completion of the vessel. Under these conditions there was no room for any striking originality of design. One vessel followed so closely on the lines of another, that the qualities of the new ship could be determined for all practical purposes by the performance of an almost identical vessel in the past. The theoretical science of shipbuilding, the object of which is to establish quantitative relations between the behaviour and performance of the ship and the variations in design causing them, was generally neglected.

With the introduction of iron, and later of steel, as a structural material for the hulls of ships, and of heat engines for their propulsion, the possible variation of size, proportions and propelling power of ships was enormously increased. In order to make the fullest use of these new possibilities, and to adapt each ship, as closely as may be, to the special purpose for which it is intended, theoretic knowledge has become of paramount importance to the designer. He has been forced to investigate closely those branches of the abstract physical sciences that bear specially on ships and their behaviour, and these mathematical and experimental investigations constitute the study of Theoretical Shipbuilding. It embraces the consideration of problems and questions upon which the qualities of a ship depend and which determine the various features of the design, having regard to the particular services that the ship will be required to perform; *i.e.* the requirements that must be fulfilled in order that she may make her various passages economically and with safety in all conditions of wind and sea, the best form for the hull with regard to the resistance offered by the water and the engine power requisite in order to attain the speed desired, the nature of waves and their action upon the ship, and the structural arrangements necessary in order that she may be sufficiently strong to withstand the various stresses to which she will be subjected. The determination of the most suitable dimensions to fulfil certain conditions involves the consideration of a different set of circumstances for almost every service; and here the experience gained in vessels of similar type, together with the known effect of modifications made to fulfil new conditions of each particular design, can be used as a guide. The requirements of economical working, safety, &c., determine the length, breadth, depth and form. The length has a most important bearing on the economy of power with which the speed is obtained; and on the breadth, depth and height of side, or freeboard, depend to an important degree the stability and seaworthiness of the vessel.

While, however, the importance to the ship designer of mathematical theories based on first principles and experiment can hardly be overrated, it should be observed that the circumstances and conditions postulated are invariably much less complex than those which surround actual ships. The applicability of the theories depends on the closeness with which the assumed circumstances are realized in practice. The ultimate guide in the design of new ships must, therefore, still remain practical experience. To this experience theory is a powerful assistance, but can by no means replace it.

Theoretical Shipbuilding

Stability.

When a ship floats at rest in still water, the forces acting upon her must be in equilibrium. These consist of the weight of the

ship acting vertically downwards through its centre of gravity and the resultant pressure of the water on the immersed hull.

Equilibrium. If the ship be supposed removed and the cavity thus formed filled with water, then, since this volume of water is in equilibrium under the same system of fluid pressures, the resultant of these pressures must be equal and opposite to the weight of the water in the cavity and will therefore act vertically upwards through the centre of gravity of this portion of water. Defining the weight of water displaced by the ship as the *displacement*, and its centre of gravity as the *centre of buoyancy*, it is seen that the fundamental conditions for the equilibrium of a ship in still water are (*a*) that the weight of the ship must be equal to the displacement, and (*b*) that its centres of gravity and buoyancy must be in the same vertical line.

A floating ship is always subject to various external forces disturbing it from its position of equilibrium, and it is necessary

Stability of equilibrium. to investigate the stability of such a position, *i.e.* to determine whether the ship, after receiving a small disturbance, will tend to return to its former position, in which case its equilibrium is termed *stable*, or whether, on the other hand, it will tend to move still farther from the original position, when the equilibrium is termed *unstable*. The intermediate case, when the ship tends to remain in its new position, is a third state of equilibrium, which is termed *neutral*.

Of the modes of disturbance possible, it is evident that a bodily movement of the ship in a horizontal direction or a rotation about a vertical axis will not affect the conditions of equilibrium; the equilibrium is also stable for vertical displacements of a ship. The remaining movements, viz. rotations about a horizontal axis, can be resolved into rotations in which the displacement is unaltered, and vertical displacements, the effect of the latter being considered separately. Of the various horizontal axes about which a ship can rotate two are of particular importance, viz. (1) an axis parallel to the longitudinal plane of symmetry, (2) an axis at right angles to this plane, both axes being so chosen that the displacement remains constant; the stability of a ship with reference to rotations about these axes is known as the *transverse stability* and the *longitudinal stability* respectively. In the following account the consideration of stability is confined at first to these two cases; the general case of rotation about any horizontal axis whatever being dealt with later.

Transverse stability. Let fig. 1 represent a transverse section of a ship, WL being its water line when upright, and W'L' its water line when inclined to a small angle θ as shown.

Assuming that the displacement is unaltered, if G be the position of the ship's centre of gravity and B, B' the positions of its centre of buoyancy in the upright and inclined positions respectively, the forces acting on the ship consist of its weight W vertically downwards through G and the resultant water pressure equal to W acting vertically upwards through B'. These constitute a couple of moment W × GZ where Z is the foot of the perpendicular from G on to the vertical through B'; the direction of the couple as drawn in the figure is such as would cause the ship to return to its original position, *i.e.* the equilibrium is stable for the inclination shown.

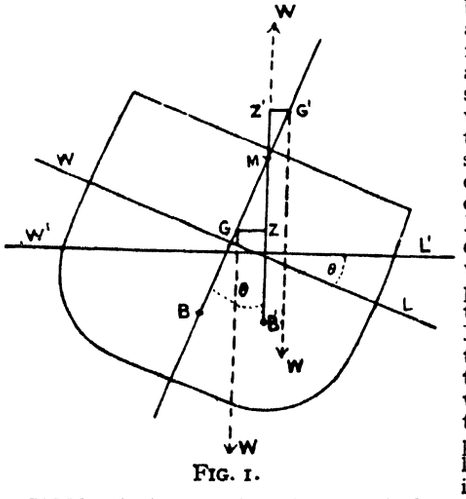


FIG. 1.

If M be the intersection of the vertical through B' with the original vertical, the moment of the restoring couple is equal to W × GM sin θ, and GM sin θ is termed the *righting lever*.

If, by moving weights on board, G be moved to a different position on the original vertical through B, the original position of the ship will remain one of equilibrium, but the moment of stability at the angle of inclination θ will vary with GM. If G be brought to the position G' above M the moment W × G'Z' will tend to turn the ship away from the original position. It follows that the condition that the original position of equilibrium shall be stable for the given inclination is that the centre of gravity shall be below the intersection of the verticals through the upright and inclined centre of buoyancy; and the moment of stability is proportional to the distance between these two points.

When the inclination θ is made smaller the point M approaches a definite position, which, in the limit when θ is indefinitely small, is termed the *metacentre*.

In ships of ordinary form it is found that for 10 to 15 degrees of inclination, the intersection of the verticals through the centres of buoyancy B and B' remains sensibly at the metacentre M; and therefore within these limits the moment of stability is approximately equal to W × GM sin θ. ***Small inclinations.***

Since the angle on either side of the vertical within which a ship rolls in calm or moderate weather does not usually exceed the limit above stated, the stability and to a great extent the behaviour of a vessel in these circumstances are governed by the distance GM which is known as the *metacentric* height. The position of G can be calculated when the weights and positions of the component parts of the ship are known. This calculation is made for a new ship when the design is sufficiently advanced to enable these component weights and their positions to be determined with reasonable accuracy; in the initial stages of the design an approximation to the vertical position of G is made by comparison with previous vessels.

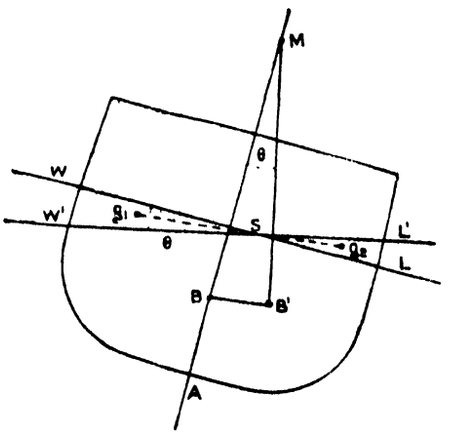


FIG. 2.

The position of the centre of gravity of a ship is entirely independent of the form or draught of water, except so far as they affect the amount and distribution of the component weights of the ship. The position of the metacentre, on the other hand, depends only on the geometrical properties of the immersed part of the ship; and it is determined as follows:

Let WL, W'L' (fig. 2) be the traces of the upright and inclined water planes of a ship on the transverse plane; B, B' the corresponding position of the centre of buoyancy; θ the angle of inclination supposed indefinitely small in the limit, and S the intersection of WL and W'L'; join BB'.

By supposition the displacement is unchanged, and the volumes WAL, W'AL' are equal; on subtracting W'AL it is seen that the two wedges WSW', LSL' are also equal. If dx represent an element of length at right angles to the plane of the figure, y_1, y_2, the half-breadths one on each side at any point in the original water line, so that WS = y_1, SL = y_2, the areas WSW', LSL' differ from $\frac{1}{2}y_1^2 . \theta$, $\frac{1}{2}y_2^2 . \theta$ by indefinitely small amounts, neglecting which the volumes of WSW', LSL' are equal to $\int \frac{1}{2}y_1^2\theta dx$ and $\int \frac{1}{2}y_2^2\theta dx$.

Since these are equal we have

$$\tfrac{1}{2}\int y_1^2 dx = \tfrac{1}{2}\int y_2^2 dx \text{ or } \int y_1 dx \times \frac{y_1}{2} = \int y_2 dx \times \frac{y_2}{2};$$

i.e. the moments of the two portions of the water plane about their line of intersection passing through S are equal. This line is also the axis of rotation, which therefore passes through the centre of gravity of the water plane. For vessels of the usual shape, having a middle line plane of symmetry and floating initially upright, for small inclinations consecutive water planes intersect on the middle line.

Again if g_1, g_2 are the centres of gravity of the wedges WSW', LSL', and v the volume of either wedge the moment of transference of the wedges $v \times g_1g_2$ is equal to the moment of transference of the whole immersed volume V × BB' where V is the volume of displacement.

But $v \times g_1S$ = moment of wedge WSW' about S = $\frac{1}{3}\int y_1^3 . \theta . dx$, and $v \times Sg_2$ = moment of wedge LSL' about S = $\frac{1}{3}\int y_2^3 . \theta . dx$. Adding, $\frac{1}{3}\int (y_1^3 + y_2^3)\theta . dx = v \times g_1g_2 = V \times BB'$. But BB' = BM . θ to the same order of accuracy, and $\frac{1}{3}\int (y_1^3 + y_2^3) . dx$ is the moment of inertia of the water plane about the axis of rotation; denoting the latter by I, it follows that BM = I/V; *i.e.* the height of the metacentre above the centre of buoyancy is equal to the moment of inertia of the water plane about the axis of rotation divided by the volume of displacement. These quantities, and also the position of the centre of buoyancy can be obtained by the approximate methods of quadrature usual in ship calculations, and from them the position of the metacentre can be found.

If the ship is wholly immersed, or if the inertia of the water plane is negligible as in a submarine when diving, BM = O, and the condition for stability is that G should be below B; the righting lever at any angle of inclination is then equal to BG sin θ.

During the process of design the position of the centre of gravity

is determined by the disposition of hull material and fittings, machinery, coal and all other movable weights, the position of which is necessarily fixed by other considerations than those of stability; but the height of the metacentre above the centre of buoyancy varies approximately as the cube of the breadth, and any desired value of GM is readily obtained by a suitable modification in the beam.

The metacentric height in various typical classes of ships at "normal load" is as follows:—

Class of Ship.	Approximate GM in Ft.
First class battleship and cruiser . .	3½ to 5
Second and third class cruiser and scout	2 to 3
Torpedo boat destroyer	1½ to 2½
First class torpedo boat	1 to 1½
Steam picket boat or launch . . .	·8 to 1½
River gunboat (shallow draught) . .	8 to 20
Large mail and passenger steamer .	·5 to 2
Cargo steamer	1 to 2
Sailing ship	2 to 6
Tug	1½ to 2½

The metacentric height adopted in steamships is governed principally by the following considerations:—

(*a*) It should be sufficiently large to provide such a position of G as will give ample stability at considerable angles of inclination and sufficient range.

(*b*) Where ample stability at large angles is obtained by other means, the stability at small angles, which is entirely due to the metacentric height, should be sufficient to prevent forces due to

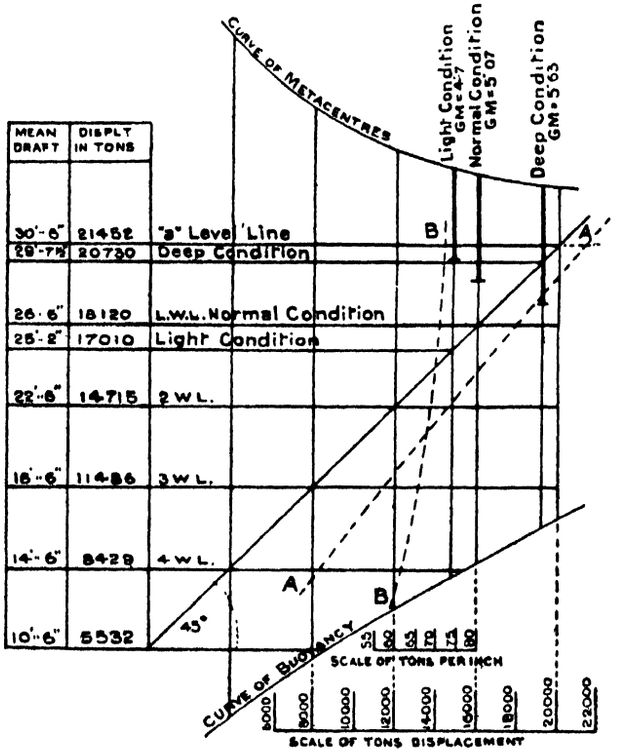


FIG. 3.—Metacentric Diagram of a Battleship.

wind on upper works, movement of weights athwartships, turning, &c., causing large and uncomfortable angles of heel.

(*c*) It should be sufficient to allow one or more compartments to become opened to the sea, through accidental damage, without risk of capsizing.

(*d*) It should, if possible, be sufficiently large in the normal condition of the ship to permit the greatest possible freedom in the stowage of a miscellaneous cargo without producing instability.

(*e*) On the other hand an excessive value causes rapid and uncomfortable rolling among waves.

A ship having small initial stability is said to be "crank," while one possessed of a large or excessive amount is termed "stiff." The former type is generally found to be steadier and easier in rolling among waves; and for this reason when other circumstances permit, the metacentric height is usually chosen as small as possible consistent with safety and comfort.

The metacentric height is affected by an alteration in displacement or in position of the centre of gravity caused by loading or unloading cargo, fuel and stores. In consequence the stability has to be investigated for a variety of conditions, particularly that in which the metacentric height is a minimum. The change in the position of the centre of gravity can be readily determined from an account of the weights removed, added or shifted; and the height of the metacentre is obtained by calculating its position at a number of water lines, and drawing a curve of heights of metacentre above keel on a base of the draught of water. The results are conveniently embodied in the form of a *metacentric diagram*; the curves of height of metacentres and vertical positions

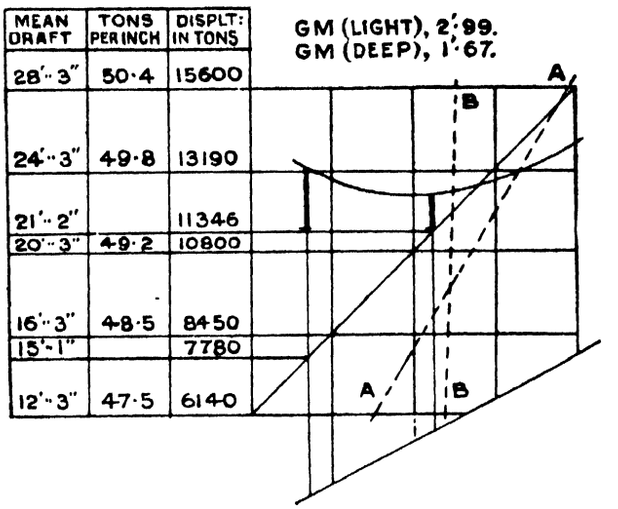


FIG. 4.—Metacentric Diagram of a Merchant Vessel.

of centres of buoyancy being set up from a line intersecting the water lines at 45°.

Figs. 3, 4 and 5 are the metacentric diagrams for a battleship, a vessel sharply curved at the bilge typical of a large number of merchant steamers, and a sailing ship of "Symondite" (or peg top) section; it will be observed that in the first and second the M curve is slightly concave upwards, and in the third sharply convex.

The buoyancy curve in all cases is nearly a straight line whose inclination at a particular water plane to the horizontal is equal to $\tan^{-1} A h/V$; where A is the water plane area, and h the depth of the centre of buoyancy below the surface. The position of the metacentre at an intermediate water line is obtained from the diagram by drawing a horizontal line at the draught required, and squaring

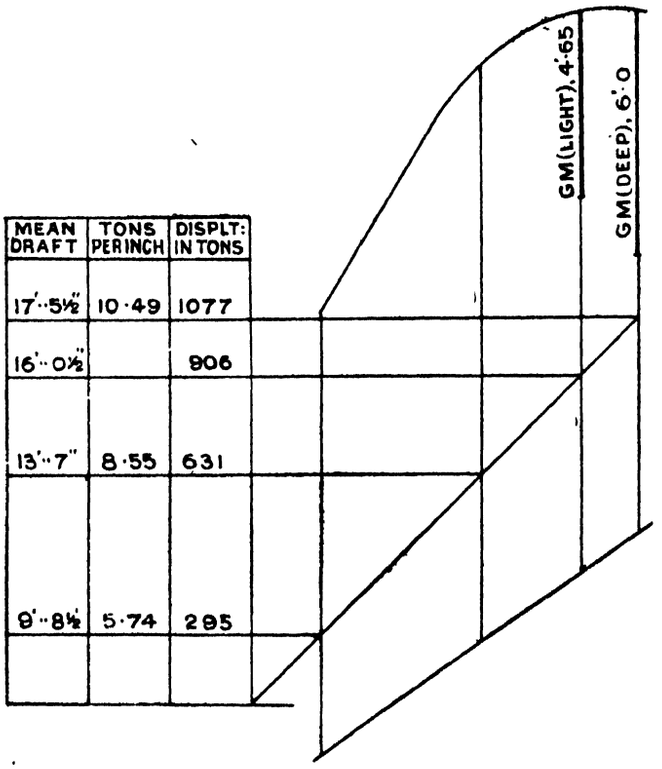


FIG. 5.—Metacentric Diagram of a Sailing Ship of "Symondite" section.

up from its intersection with the 45° line to meet the curve of metacentres.

With these curves are associated (though usually drawn separately) two others known as the curves of *Displacement* and of *Tons per inch* and expressed by AA and BB respectively in the above figures. These have the mean draught of water as abscissa (vertical), and

the displacement in tons and the number of tons required to increase the mean draught by 1 in., respectively, as ordinates (horizontal). The ordinate of the curve of displacement at any water line is clearly proportional to the area of the curve of tons per inch up to that water line.

The properties of the metacentric stability at small angles are used when determining the vertical position of the centre of gravity of a ship by an "inclining experiment"; this gives a check on the calculations for this position made in the initial stages of the design, and enables the stability of the completed ship in any condition to be ascertained with great accuracy.

Inclining experiment.

The experiment is made in the following manner:—

Let fig. 6 represent the transverse section of a ship; let w, w be two weights on deck at the positions P, Q, chosen as far apart transversely as convenient; and let G be the combined centre of gravity of ship and weights. When the weight at P is moved across the deck to Q', the centre of gravity of the whole moves from G to some point G' so that GG' is parallel to PQ' (assumed horizontal) and equal to hw/W where h is the distance moved through by P, and W is the total displacement. The ship in consequence heels to a small angle θ, the new vertical through G passing through the metacentre M; also $GM = GG' \cot\theta = hw/W \cot\theta$, the metacentric height being thereby determined and the position of G then found from the metacentric diagram. In practice θ is observed by means of plumb bobs or a short period pendulum recording angles on a cylinder;[1] the weight w at P, which is chosen so as to give a heel of from 3° to 5°, is divided into several portions moved separately to Q'. The weight at Q' is replaced at P, the angle heeled through again observed; and the weight at Q similarly moved to P' where $P'Q = h = PQ'$, and the angle observed; GM is then taken as the mean of the various evaluations.

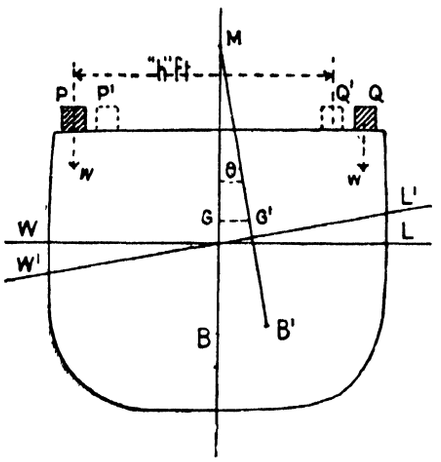


FIG. 6.

In the case of small transverse inclinations it has been assumed that the vertical through the upright and the inclined positions of the centre of buoyancy intersect, or, which is the same thing, that the centre of buoyancy remains in the same transverse plane when the vessel is inclined. This assumption is not generally correct for large transverse inclinations, but is nevertheless usually made in practice, being sufficiently accurate for the purpose of estimating the righting moments and ranges of stability of different ships, calculated under the same conventional system; this is all that is necessary for practical purposes.

Large inclinations.

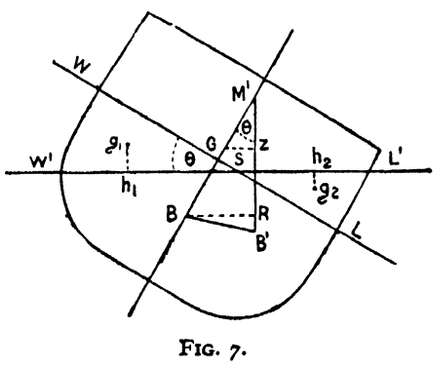


FIG. 7.

With this assumption, there will always be a point of intersection (M' in fig. 7) of the verticals through the upright and inclined centres of buoyancy; and the righting lever is, as before, $GZ = GM' \sin\theta$. In this case, however, there is no simple formula for BM' as there is for BM in the limiting case where θ is infinitesimal; and other methods of calculation are necessary.

The development of this part of the subject was due originally to Atwood, who in the *Philosophical Transactions* of 1796 and 1798, advanced reasons for differing from the metacentric method which was published by Bouguer in his *Traité du navire* in 1746. Atwood's treatment of stability (which was the foundation of the modes of calculation adopted in England until about twenty years ago) was as follows:—

Let WL, W'L' (fig. 7) be respectively the water lines of a ship when upright and inclined at an angle θ, S their point of intersection; B and B' the centres of buoyancy, g_1 and g_2 the centres of gravity of the equal wedges WSW', L'SL, and h_1, h_2 the feet of the perpendiculars from g_1, g_2 on the inclined water line. Draw GZ, BR parallel to W'L', meeting the vertical through B' in Z and R.

The righting lever is GZ as before; if V be the volume of displacement, and v that of either wedge, then

$$V \times BR = v \times h_1 h_2$$

also

$$GZ = BR - BG \sin\theta;$$

whence the righting moment or

$$W \times GZ = W\left\{\frac{v}{V} h_1 h_2 - BG \sin\theta\right\}.$$

This is termed Atwood's formula. Since BG, V and W are usually known, its application to the computation of stability at various angles and draughts involves only the determination of $v \times h_1 h_2$. A convenient method of obtaining this moment was introduced by F. K. Barnes and published in *Trans. Inst. N.A.* (1861). The steps in this method were as follows: (*a*) assume a series of trial water lines at equal angular intervals radiating from S' the intersection of the upright water line with the middle line plane; (*b*) calculate the volumes of the various immersed and emerged trial wedges by radial integration, using the formula

$$v = \tfrac{1}{3}\int_0^\theta d\phi \int r^3 dx,$$

where r, ϕ are the polar co-ordinates of the ship's side, measured from S' as origin, and dx an element of length; (*c*) estimate the moment of transference of the same wedges parallel to the particular trial water line by the formula

$$v \times h_1 h_2 = \tfrac{1}{3}\int_0^\theta \cos(\theta - \phi) d\phi \int r^3 dx,$$

adding together the moments for both sides of the ship; and (*d*) add or subtract a parallel layer at the desired inclination to bring the result to the correct displacement. The true water line at any angle is obtained by dividing the difference of volume of the two wedges by the area of the water plane (equal to $\int r dx$, for both sides) and setting off the quotient as a distance above or below the assumed water line according as the emerged wedge is greater or less than the immersed wedge. The effect of this "layer correction" on the moment of transference is then allowed.

The righting moment and the value of GZ are thus determined for the displacement under consideration at any required angle of heel.

A different method of obtaining the righting moments of ships at large angles of inclination has prevailed in France, the standard investigation on the subject being that of M. Reech first published in his memoir on the "Construction of Metacentric Evolutes for a Vessel under different Conditions of Lading" (1864). The principle of his method is dependent on the following geometrical properties:—

Let B', B" (fig. 8) be the centres of buoyancy corresponding to two water lines W'L', W"L" inclined at angles θ, $\theta + d\theta$, to the original upright water line WL, $d\theta$ being small; and let g_1, g_2 be the centres of gravity of the equal wedges W'TW", L'TL". The moment of either wedge about the line g_1g_2 is zero, and the moments of W'L'A and of W"L"A about g_1g_2 are therefore equal; since these volumes are also equal, the perpendicular distances of B' and B" from g_1g_2 are equal, or B'B" is parallel to g_1g_2.

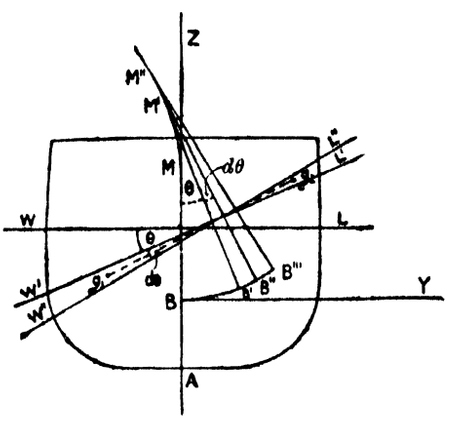


FIG. 8.

The projection on the plane of inclination of the locus of the centre of buoyancy for varying inclinations with constant displacement is termed the *curve of buoyancy*, a portion BB'B" of which is shown in the figure. On diminishing the angle $d\theta$ indefinitely so that B" approaches B' to coincidence, the line B'B" becomes, in the limit, the tangent to the curve BB'B", and g_1g_2 coincides with the water line W'L'; hence the tangent to the curve of buoyancy is parallel to the water line.

Again, if the normals to the curve at B', B" (which are the verticals corresponding to these positions of the centre of buoyancy) intersect at M', and those at B", B"' (adjacent to B") at M", and so on, a curve may be passed through M', M", . . . , commencing at M, the metacentre. This curve, which is the evolute of the curve of buoyancy, is known as the ***metacentric curve***, and its properties were first

[1] Such an instrument is described by Froude for recording the "relative" inclination of a ship amongst waves, *Transactions of Institution of Naval Architects*, 1873, p. 179. The pendulum should have sufficient weight and the arm carrying the pen may be about 4 ft. long. If the cylinder be fitted with a clock recording the time the natural period of the ship will also be obtained.

investigated by Bouguer in his *Traité du Navire*. The points M′M″, . . . on the curve are now termed *pro-metacentres*.

If ρ represent the length of the normal B′M′ or the radius of curvature of the curve of buoyancy at an angle θ, then $\rho.d\theta = ds$ the length of an element of arc of the B curve. In the limit when $d\theta$ is indefinitely small, $\frac{ds}{d\theta} = \rho$. Using Cartesian co-ordinates with B as origin and By, Bz, as horizontal and vertical axes, we have—

$$\frac{dy}{d\theta} = \frac{ds}{d\theta}\cos\theta - \rho\cos\theta, \quad . \quad . \quad . \quad . \quad (1)$$

$$\frac{dz}{d\theta} = \frac{ds}{d\theta}\sin\theta = \rho\sin\theta; \quad . \quad . \quad . \quad . \quad (2)$$

whence

$$y = \int_0^\theta \rho.\cos\theta.d\theta;\ z - \int_0^\theta \rho.\sin\theta.d\theta,$$

and the righting lever $GZ = y\cos\theta + (z - BG)\sin\theta$.

The radius ρ is (as for the upright position) equal to the moment of inertia of the corresponding water-plane about a longitudinal axis through its centre of gravity divided by the volume of displacement; the integration may be directly performed in the case of bodies of simple geometrical form, while a convenient method of approximation such as Simpson's Rules is employed with vessels of the usual ship-shaped type. As an example in the case of a box, or a ship with upright sides in the neighbourhood of the water-line, if $BG = a$ and $BM = \rho_0$, then $\rho = \rho_0 \sec^3\theta$; whence

$$y = \int_0^\theta \rho\cos\theta.d\theta = \rho_0\tan\theta,$$

$$z = \int_0^\theta \rho\sin\theta.d\theta = \tfrac{1}{2}\rho_0\tan^2\theta,$$

and

$$GZ = (\rho_0 - a)\sin\theta + \tfrac{1}{2}\rho_0\tan^2\theta.\sin\theta;$$

which relations will also hold for a prismatic vessel of parabolic section. It is interesting to note that in these cases if the stability for infinitely small inclinations is neutral, *i.e.* if $\rho_0 = a$, the vessel is stable for small finite inclinations, the righting lever varying approximately as the cube of the angle of heel.

The application of the preceding formulae to actual ships is troublesome and laborious on account of the necessity for finding by trial the positions of the inclined water-lines which cut off a constant volume of displacement. To avoid this difficulty the process was modified by Reech and Risbec in the following manner:—Multiply equations (1) and (2) by V.$d\theta$, V being the volume of displacement; we then have—

$$d(Vy) = I\cos\theta.d\theta, \quad . \quad . \quad . \quad . \quad (3)$$

$$d(Vz) = I\sin\theta.d\theta, \quad . \quad . \quad . \quad . \quad (4)$$

where I is the moment of inertia of the inclined water-line about a longitudinal axis passing through its centre of gravity. These formulae have been obtained on the supposition that the volume V is constant while θ is varying; but by regarding the above equations as representing the moments of transference horizontally and vertically due to the wedges, it is evident that V may be allowed to vary in any manner provided that the moment of inertia I is taken about the longitudinal axis passing through the intersection of consecutive water-lines. In particular the water-lines may all be drawn through the point of intersection of the upright water-line with the middle line, and the moments of inertia are then equal to $\frac{1}{3}\int r^3dx$ for both sides of the ship, r being the half-breadth along the inclined water-line; the increase in volume is the difference between the quantity $\int d\theta \int \frac{1}{3}r^3dx$ for the two sides of the ship.

If V_a, V_0 be the volumes of displacement at angles a and $_0$ respectively,

$$V_a - V_0 = \int_0^a d\theta\left[\int_{\text{difference}} \tfrac{1}{2}r^2dx\right], \quad . \quad . \quad . \quad (5)$$

and substituting in (3) and (4) and integrating,

$$V_a y = \int_0 d\theta\left[\int_{\text{sum}} \tfrac{1}{3}r^3dx\right]\cos\theta, \quad . \quad . \quad . \quad (6)$$

$$V_a z = \int_0^a d\theta\left[\int_{\text{sum}} \tfrac{1}{3}r^3dx\right]\sin\theta. \quad . \quad . \quad . \quad (7)$$

On eliminating V_a in (5), (6) and (7), y and z can be found.

This is repeated at different draughts, and thus V_a, y and z are determined at a number of draughts at the same angle, enabling curves of y and z to be drawn at various constant angles with V for an abscissa; from these, curves may be obtained for y and z with the angle a as abscissa for various constant displacements; GZ being equal to

$$y\cos a + (z - a)\sin a.$$

From the foregoing it is evident that the elements of transverse stability, including the co-ordinates of the centre of buoyancy, position of pro-metacentre, values of righting lever and righting moment, depend on two variable quantities—the displacement and the angle of heel. The righting lever GZ is in England selected as the most useful criterion of the stability, and, after being evaluated for the various conditions, is plotted in a form of curves—(*a*) for various constant displacements on an abscissa of angle of inclination, (*b*) for a number of constant

Curve of stability.

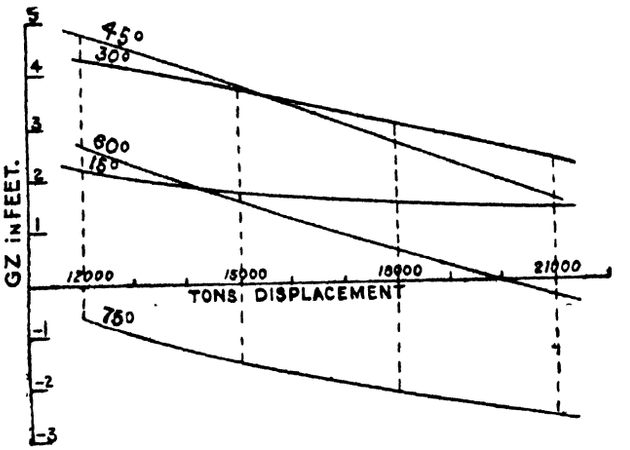


FIG. 9.—Cross Curves of Stability of a Battleship.

angles on an abscissa of displacement. These are known as *curves of stability* and *cross curves of stability* respectively; either of these can be readily constructed when the other has been obtained; which process is utilized in the method now almost universally adopted for obtaining GZ at large angles of inclination, a full description being given in papers by Merrifield and Amsler in *Trans. I.N.A.* (1880 and 1884). The procedure is as follows:

1. The substitution of calculations at constant angle for those at constant volume. A number of water-lines at inclinations having a constant angular interval (generally 15°) are drawn passing through the intersection S′ of the load water-line with the middle line on the body plan. Other water-lines are set off parallel to these at fixed distances above or below the original water-line passing through S′.

2. The volumes of displacement and the moments about an axis through S′ perpendicular to the water-line are determined for each draught and inclination by means of the Amsler-Laffon integrator,

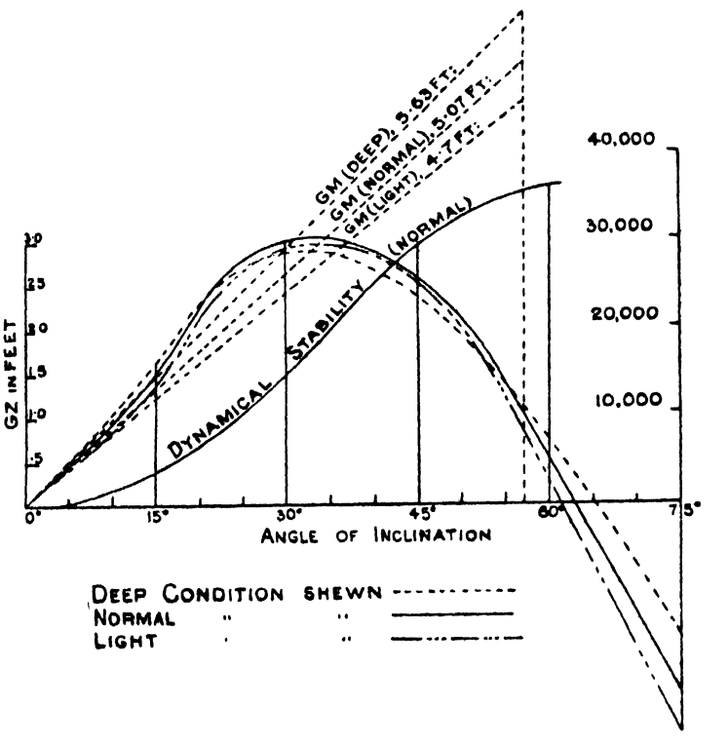


FIG. 10.—Curves of Stability of a Battleship.

the pointer of this instrument being taken in turn round the immersed part of each section.

3. On dividing the moments by the corresponding volumes, the perpendicular distance of the centre of buoyancy from the vertical through S′ is obtained, *i.e.* the value of GZ, assuming G and S′ to coincide.

4. For each angle in turn "cross curves" of GZ are drawn on a base of displacement.

5. From the cross curves, curves of stability on a base of angle of inclination can be constructed for any required displacement, allowance being made for the position of G by adding to, or subtracting from, each ordinate, the quantity GS′ sin a according as G is below or above S′.

A typical set of cross curves of stability for a battleship of about 18,000 tons displacement is shown in fig. 9. It will be observed that the righting levers decrease with an increase of displacement; and this is a general characteristic of the cross curves for ships of ordinary

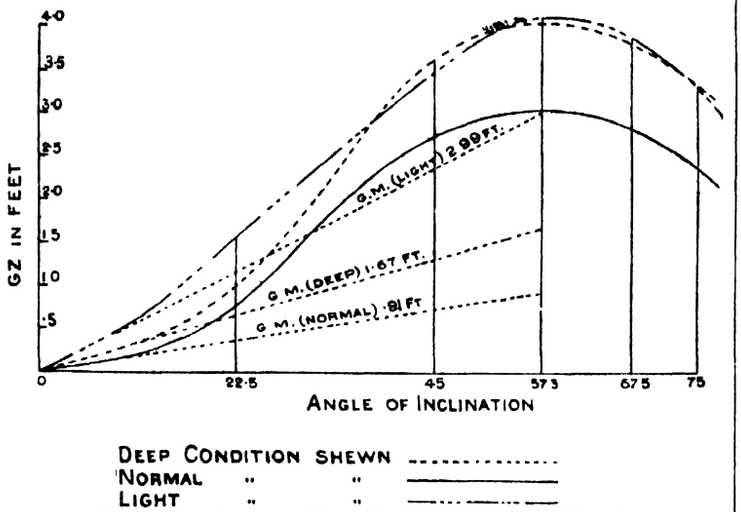


FIG. 11.—Curves of Stability of a Merchant Vessel.

form. The additional weights that constitute the difference between light and deep load (*i.e.* cargo, coal, stores and water) are generally placed low down, and thus the position of the centre of gravity is usually lower when loaded than when light, causing an increase of stability which frequently more than compensates for the loss of stability indicated by the cross curves.

The stability curves for the same vessel are reproduced in fig. 10. It is customary in warships to draw separate curves for three conditions: (*a*) normal load, *i.e.* fully equipped with bunkers about half full, and reserve feed tanks empty; (*b*) deep load with all bunkers and tanks full; (*c*) light with all coal, water (except in boilers), ammunition, provisions and consumable stores removed.

The curves for a cargo or passenger ship are generally drawn for the condition when light, when fully laden with passengers or with a

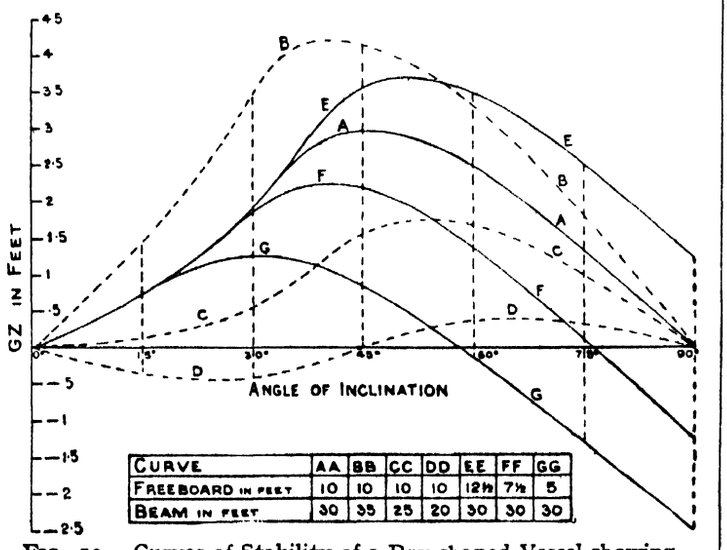


FIG. 12.—Curves of Stability of a Box-shaped Vessel showing the influence of beam and freeboard.

homogeneous cargo, and sometimes for an intermediate condition; typical curves are given in fig. 11.

Stability curves are obtained on the assumptions—

1. That all openings in the upper deck, forecastle and poop (if any) are covered in and made watertight; and the buoyancy of any erections above these decks is generally neglected.

2. That the side of the ship is intact up to the upper deck, all side scuttles, ports or other openings being closed.

3. That all weights in the ship are absolutely fixed.

4. That no changes of trim occur during the inclination.

In some cases curves are drawn (*a*) with forecastle and poop intact, (*b*) with these thrown open to the sea, the latter condition being more commonly considered.

The slope of the stability curve for small angles, the maximum righting lever with the angle at which it occurs, and the range or the inclination at which the stability vanishes are of particular interest, inasmuch as the curve depends principally on these features; and the effect on them, particulars of variation of freeboard, breadth and position of centre of gravity, is considered below.

The stability curve AA (fig. 12) is drawn for a box-shaped vessel of draught 10 ft., freeboard 10 ft. and beam 30 ft.; with C.G. in the water-plane. The curves EE, FF, GG are drawn for the same vessel, but with freeboard altered to 12½, 7½ and 5 ft. respectively; it will be observed that freeboard has no influence on the stability at small angles, but has a marked effect on the range and maximum righting lever. An increase of freeboard is generally accompanied by a rise in the position of the centre of gravity; this is not included in the curves, but would actually reduce

Effect of freeboard.

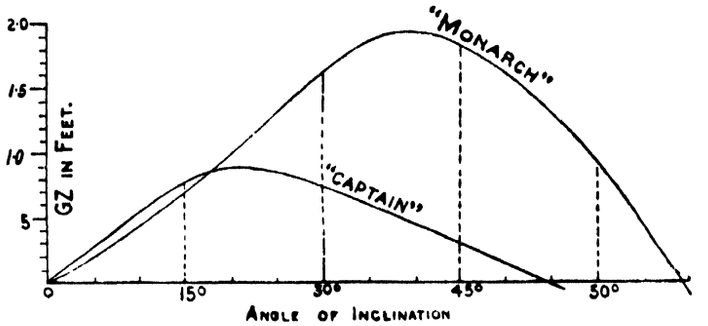


FIG. 13.—Curves of Stability of "Monarch" and "Captain."

the stability to some extent. The effect of freeboard on the range and on the safety of ships is also illustrated by a comparison between the curves of stability (fig. 13) of the armoured turret ships "Monarch" and "Captain," the latter of which was lost at sea in 1870. These vessels were similar in construction and dimensions except that the freeboard of the "Monarch" was 14′ 0″ and that of the "Captain" 6′ 6″; the smaller freeboard of the "Captain" was associated with a slightly lower position of the centre of gravity and a greater metacentric height. The stability curve of the "Captain" in consequence rises rather more steeply than that of the "Monarch" up to about 14° when the deck edge is immersed; the righting lever then rapidly declines, and vanishes at 54½°, in contrast to the "Monarch's," where the maximum righting lever is doubled and range augmented 1·3 times by the additional freeboard. For the influence of the range in enabling a ship to withstand a suddenly applied force see "Dynamical Stability."

Again, for the box-shaped vessel previously considered, if the breadth is modified successively from 30 ft. to 35, 25 and 20 ft., other features remaining unaltered, the curves of stability then obtained are represented by BB, CC and DD in fig. 12. It is seen that alteration in beam affects principally the stability levers at moderate angles of inclination, while at 90° inclination the curves all intersect. Since at small angles GZ=GM.θ (in circular

Effect of beam.

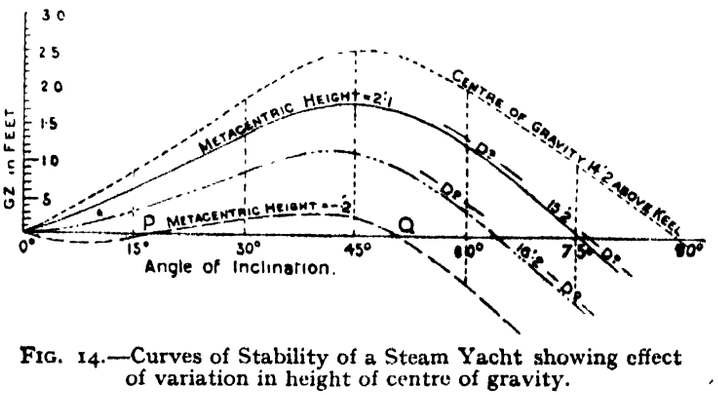


FIG. 14.—Curves of Stability of a Steam Yacht showing effect of variation in height of centre of gravity.

measure) approximately, the initial slope of the curve is proportional to GM, and the tangent to this curve at the origin can be drawn by setting by the value of GM as an ordinate to an angle of one radian (57·3°) as abscissa, and joining the point to the origin. (See figs. 10 and 11.) The height of the metacentre above the centre of buoyancy will, *caeteris paribus*, vary with the cube of the breadth, and an increase of beam will result in a large increase of stability at moderate angles.

Finally the effect of an alteration in the vertical position of the centre of gravity is illustrated by the three stability curves of a steam yacht in fig. 14, where the centre of gravity is successively raised 1 ft. In the condition corresponding to the fourth and lowest curve, the GM is negative (— 2 ft.) and so also are the righting levers up to 15° when the curve crosses the axis; from 15° to about 52° the GZ is positive, but above

Effect of position of C.G.

that value it again becomes negative. In this case the stability is unstable at the upright position, and the ship will roll to an angle of 15° on either side where the equilibrium is stable. This peculiarity is not uncommon in merchant steamers at light draught. Ample stability at large angles and good range is provided in such cases by high freeboard; but, apart from any considerations of safety, water ballast is used to lower the centre of gravity to a sufficient extent to avoid excessive tenderness.

Geometrical properties. The properties of the loci of centres of buoyancy and of metacentres were fully investigated by Dupin in 1822, including also the surfaces into which these curves develop when admitting inclinations about transverse and "skew" axes. It has been shown that the tangent to the curve of buoyancy at any point is parallel to the corresponding water-line; and assuming that the ship is only free to turn in a plane perpendicular to the axis of inclination, the positions of equilibrium are found by drawing from the centre of gravity all possible normals to the buoyancy curve, or equally, all possible tangents to its evolute, the metacentric curve, since the condition to be satisfied is, that the centres of gravity and buoyancy shall lie in the same vertical. Again, when the curve of statical stability crosses the axis, making an acute positive angle as at P in fig. 14, the values of GZ on either side of P are such as to tend to move the ship towards the position at P, and the equilibrium at P is stable. Similarly, when the curve crosses the axis "negatively," as at the origin and Q, the equilibrium is unstable. Since the angle of intersection cannot be either positive or negative twice in succession, on considering rotation in one direction only, it follows that positions of stable and unstable equilibrium occur alternately and the total number of positions of equilibrium is even.

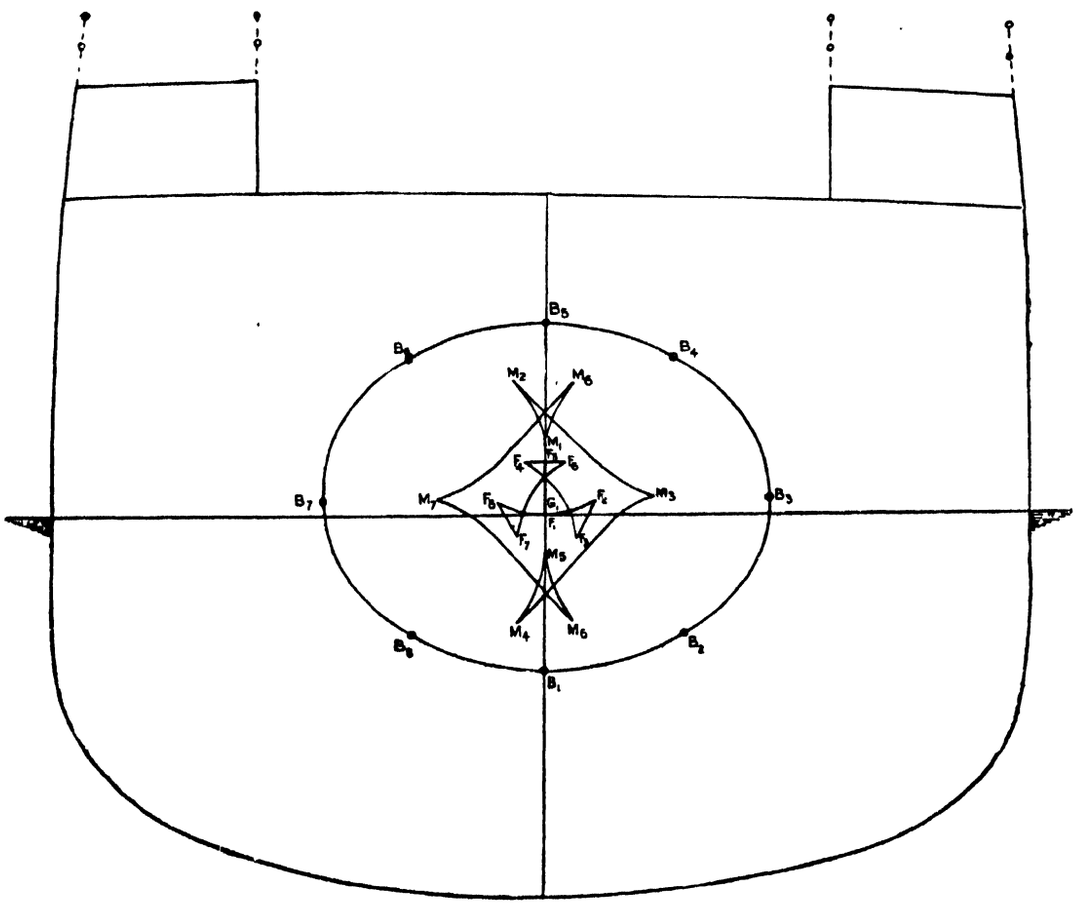


FIG. 15.—Metacentric, Buoyancy and Flotation Curves of "Serapis."

The radius of curvature of the curve of buoyancy is equal to I/V, and is always positive. The curve, therefore, has no re-entrant parts or cusps, is continuous and has no sudden changes in direction; parallel tangents (or normals) can be drawn through two points only (corresponding to inclinations separated by 180°), which property is shared by its evolute, the metacentric curve. On the other hand, the moment of inertia I varies continuously with the inclination, attaining maximum and minimum values alternately; and the metacentric curve, therefore, contains a series of cusps corresponding to the values of I when $dI=0$, which will generally occur at positions of symmetry (*e.g.* at 0° and 180°), near the angles at which the deck edge is immersed or emerged, and at about 90° and 270°.

The curves of buoyancy and flotation and the metacentric curve for H.M. troopship "Serapis" are shown with reference to the section of the ship in fig. 15, and on an enlarged scale for greater clearness in fig. 16.[1] It will be seen that the metacentric curve contains eight cusps, M_1, M_2, . . . M_8. Assuming the ship to heel to starboard, M_1 corresponds to the upright position, M_2 to the immersion of the starboard topsides and emersion of the port bilge; M_3 corresponds to 90° of heel, M_4 to the complete immersion of the deck and the emersion of the starboard bilge. M_5 corresponds to the bottom-up position and similarly for M_6, M_7 and M_8. There are also 6 nodes, of which P and Q are on the middle line. By means of those curves, the effect of a rise or fall in the position of the ship's centre of gravity can readily be traced. The positions of equilibrium correspond to the normals that can be drawn from G to the buoyancy curve, or equally to the tangents drawn to its evolute the metacentric curve. For stable equilibrium G lies below M, *i.e.* generally between B and M; and for unstable equilibrium, similarly, B is between G and M. In the ship under consideration, G_1 was the actual centre of gravity, and G_1M_1 corresponds to the upright position of stable equilibrium. As the vessel heels over, equilibrium (this time unstable) is again reached at about 90°, and a third position (stable) is obtained when the vessel is bottom up, G_1M_5 being then the metacentric height. A fourth (unstable) position is obtained at about 270°, after which the original position G_1M_1 is reached, the vessel having turned completely round. For this position of G_1 therefore, there are four positions of equilibrium, two of which are stable and two unstable; and this is also true for all positions of G between M_1 and M_5.

If G lies at G_4 between M_5 and the point P, there are six positions of equilibrium, alternately stable and unstable. If G is below P as at G_5, there are two positions of equilibrium of which the upright only is stable. A self-righting life-boat exactly corresponds to this condition, the vessel being capable of resting only in the original upright position. If G is above Q, on the other hand, as at G_3, there are again only two positions of equilibrium, the vessel being unstable when upright. If G is at G_2 there are again six positions of equilibrium; the upright position is unstable, but a stable position is reached at a certain angle on either side. This phase is often realised in merchant ships when light, as already stated (*vide* fig. 14). When G is exactly upon one of the branches of the metacentric curve, the equilibrium is neutral; if it is at M_1 the ship is stable for finite inclinations, and if at Q unstable; similarly for M_5 (except that the neutral state is then reached at 180°) and for P.

In all the above cases it will be observed that the positions of stable and unstable equilibrium are equal in number and occur alternately. There are two exceptions:—

1. When the moment of inertia of the water plane changes abruptly so that the B curve receives a sudden change of curvature. This is possible with bodies of peculiar geometrical forms, and two positions of M then correspond to one position of the body; if G lies between them, the equilibrium is stable for inclinations in one direction and unstable for those in the opposite direction, and is then termed "mixed."

2. When the equilibrium is neutral, this condition may be regarded as the coincidence of two or more positions of equilibrium alternately stable and unstable. The ship may then be either stable, unstable or neutral for finite inclinations; in exceptional cases she may be stable in one direction and unstable in the other, resembling to some extent the condition of "mixed equilibrium."

Another curve whose properties were originally investigated by Dupin is the *curve of flotation* $F_1F_2F_3$ . . . (fig. 15), which is the envelope of all the possible water-lines for the ship when inclined transversely at constant displacement. Since, as previously shown, consecutive water-planes intersect on a line passing through their

[1] The curves of buoyancy and flotation and the metacentric curve for various forms, including that of H.M.S. "Serapis," were obtained by practical investigation by the writer in 1871. The results showed that Dupin's investigations, which were apparently purely theoretical, had not fully disclosed certain features of the curves, such as the cusps, &c.

centre of gravity, or, as it is termed, the centre of flotation, the curve of flotation will be the locus of the projections of the centres of flotation on the plane of the figure, which curve touches each water-line.

From consideration of the slope of a ship's side around the periphery of a water-line, Dupin obtained the following expression for ρ', the radius of curvature of the curve of flotation,

$$\rho' = \frac{\int y^2 \tan \alpha \, . \, ds}{\text{area of water-plane}} \text{ for both sides,}$$

where ds is an element of the perimeter, α the inclination of the ship's side to the vertical, and y its distance from the longitudinal axis

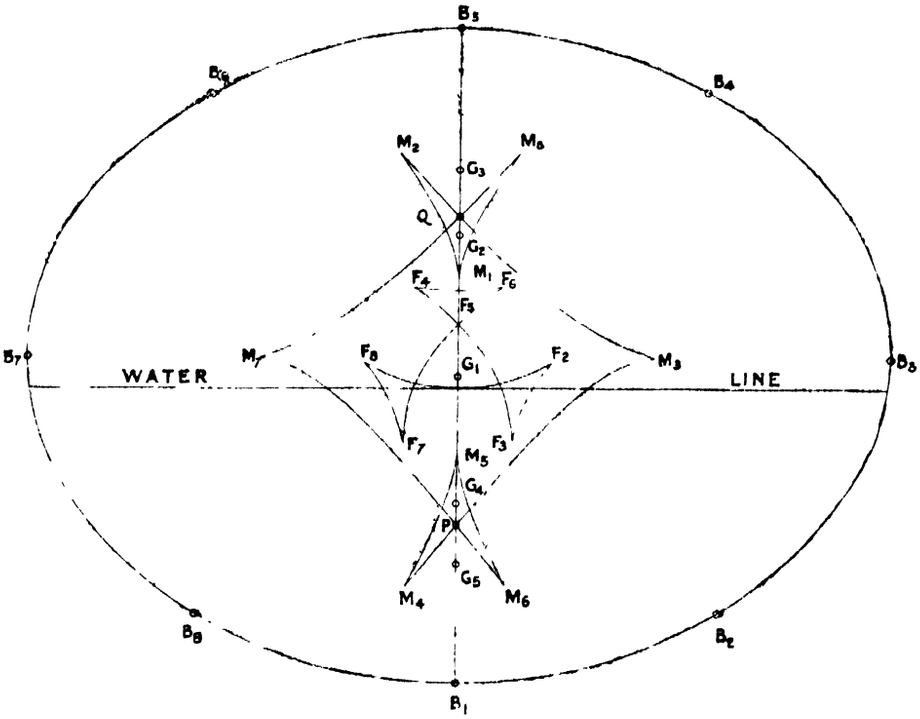


FIG. 16.

through the centre of flotation. M. Emile Leclert, in a paper read at the Institution of Naval Architects, 1870, proved the equivalence of the above formula to the two following, which are known as Leclert's Theorem:

$$\rho' = \rho + V\frac{d\rho}{dV} \text{ and } \rho' = \frac{dI}{dV},$$

where I and V are respectively the moment of inertia of the water-plane and the volume of displacement, and ρ is the radius of the curve of buoyancy or B'M'. Independent analytical proofs of the formulae were given in the paper referred to; and (*Trans. I.N.A.*, 1894) a number of elegant geometrical theorems in connexion with stability, given by Sir A. G. Greenhill, include a demonstration of Leclert's Theorem as follows (in abbreviated form):

Let B, B_1 (fig. 17) be the centres of buoyancy of a ship in two consecutive inclined positions, and F, F_1 the corresponding centres of flotation. Draw normals BM, B_1M, meeting at the pro-metacentre M, and FC, F_1C, meeting at the centre of curvature C. Produce FB, F_1B_1 to meet at O; join OM, MC.

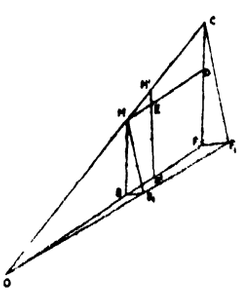


FIG. 17.

Then BM, CF and B_1M, CF_1 are respectively parallel, and ultimately also BB_1, FF_1; hence the triangles MBB_1, CFF_1 are similar and

$$\frac{BM}{CF} = \frac{BB_1}{FF_1} = \frac{OB}{OF},$$

so that O, M and C are collinear.

If the displacement V be now increased by dV, changing B to B', and M to M', then since the added displacement dV may be supposed concentrated at F, B' will lie on OBF, and it may be shown similarly as before that M' lies on OC. Further, considering the transference of moments, $BB' \times V = BF \times dV$.

Draw MED parallel to BF, then

$$\frac{dV}{V} = \frac{BB'}{BF} = \frac{ME}{MD} = \frac{M'E}{CD} = \frac{d\rho}{\rho' - \rho};$$

$$\therefore \frac{d\rho}{dV} = \frac{\rho' - \rho}{V} \text{ or } \rho' = \rho + V\frac{d\rho}{dV},$$

giving Leclert's first expression; also, since $\rho = \frac{I}{V}$,

$$\frac{dI}{dV} = \rho + V\frac{d\rho}{dV} = \rho',$$

which is Leclert's second expression for ρ'.

The value of ρ' at the upright can be obtained from the metacentric diagram by the following simple construction. Let M and B be the metacentre and the centre of buoyancy for a water-line WL on the metacentric diagram (fig. 18); draw the tangent to the B curve meeting WL at Q, and through Q draw QR to meet MB and parallel to the tangent to the M curve at M. Let BP = h, and area of water-line be A. Then

$$PQ = h \cot \theta = h\frac{V}{Ah} = \frac{V}{A};$$

also

$$MR = BM - (BP + PR) = \rho - \frac{V}{A}(\tan \theta + \tan \phi).$$

If D be the draught,

$$\tan \theta + \tan \phi = -\frac{d\rho}{dD} = -A\frac{d\rho}{dV},$$

whence

$$MR = \rho + V\frac{d\rho}{dV} = \rho';$$

the curve of flotation being concave upwards if R is below M.

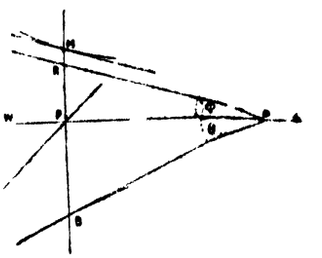


FIG. 18.

For moderate inclinations from the upright, the buoyancy of the added layer due to a small additional submersion will act through the centre of curvature of the curve of flotation; this point may be regarded as that at which any additional weight will, on being placed on a ship, cause no difference to the values of the righting moment at moderate angles of inclination. The curve of flotation, therefore, and its evolute bear similar relations to the increase or decrease of the stability of a ship due to alteration of draught, as the curves of buoyancy and of pro-metacentres do to the actual amount of the stability.

The curve of flotation resembles the curve of buoyancy in that not more than two tangents can be drawn to it in any given direction, but it differs in that its radius of curvature can become infinite or change sign. It contains a number of cusps determined by $\rho' = \frac{dI}{dV} = 0$. These occur in an ordinary ship-shape body at positions: (1) at or near the angles at which the deck is immersed or emerged (four in number); and (2) at or near the angles 90° and 270°. There are, therefore, six cusps in the curve of flotation of an ordinary ship; they are shown in figs. 15 and 16 by the points F_2, F_3, F_4, F_6, F_7, F_8.

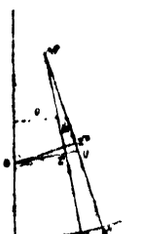


FIG. 19.

The following relations between the curves of buoyancy and of pro-metacentres and the curve of statical stability are of interest, and enable the former curves to be constructed when the latter have been obtained. If GZ', GZ" (fig. 19) are the righting levers corresponding to inclinations θ, $\theta + d\theta$, where $d\theta$ vanishes in the limit; B', B", the centres of buoyancy, M' the pro-metacentre; produce GZ' to meet B"M' in U.

Then, neglecting squares of small quantities,

$$d(GZ') = Z'U = M'Z' \, . \, d\theta,$$

or vertical distance of M' above $G = \frac{d(GZ')}{d\theta}$.

Also M'B' = M'B";
hence

$$Z''B'' - Z'B' = MZ' - MZ'' = Z''U = GZ' \, . \, d\theta,$$

or

$$GZ = \frac{d(B'Z')}{d\theta},$$

i.e. the vertical distance (B'Z') of G over B is equal to $\int GZ \, . \, d\theta$.

It follows that by differentiating the levers of statical stability and finding the slope at each ordinate the vertical distance of M' over G is obtained, and M' may be plotted by setting up this value from Z' above GZ' drawn at the correct inclination; also that by integrating the curve of statical stability and finding its area up to any angle, the vertical separation of G and B' is obtained, and B' may be plotted by setting down this value increased by BG below Z'.

The work done in inclining a ship slowly so as to maintain a constant displacement (and avoid communicating any unnecessary movement or disturbance to the water) is given by the expression $\int_0^\theta M.d\theta$ where M is the moment resisting the inclination. This may be written

Dynamical stability.

$$W \times \int_0^\theta GZ.d\theta;$$

and it has been shown above that this is equal to the weight multiplied by the vertical separation of the centres of gravity and buoyancy. This is otherwise evident since the work is the sum of that done against the forces acting on the ship, viz. the weight and the buoyancy; these are respectively equal to W × rise of G, and W × fall of B, giving the value W.(Z'B' – BG) as before.

The *dynamical stability* of a ship at any angle is defined as the work done in inclining the ship from the upright position; and its value is conveniently obtained by integrating the curve of statical stability as stated above. The dynamical stability can thus be calculated at various angles and a curve obtained, whose ordinates represent work done in foot-tons. The curve of dynamical stability is drawn for a battleship (normal condition) in fig. 10, and is there shown in relation to the curve of statical stability; it will be seen that the dynamical stability increases continuously until the righting moment vanishes, when it becomes a maximum.

A formula for the dynamical stability of a ship at any angle was given by Canon Moseley in a paper read before the Royal Society in 1850. Experiments on models made under his direction at Portsmouth Dockyard showed that the actual work in quickly inclining to a moderate angle agreed closely with that calculated in the case of a model of circular section; but considerable divergence was obtained with a model of triangular section owing to the motion of the water set up, and also, probably, to the variation in displacement during the roll.

The existence of large righting couples at moderate angles of heel is of greater importance in a sailing ship than in a steamship, since in the former it determines the amount of sail that can be safely carried under known weather conditions and thereby influences the speed. A sailing ship in motion is subjected to the wind-pressures on the sails and the upper works of the ship, and to the water-pressures on the hull. When the ship is in steady motion, these forces are equal and opposite; and, so far as the stability is concerned, it is sufficient to determine the transverse resultant of the wind-pressure on the sails, and its moment, the water-pressure on the hull affecting only the speed and leeway of the ship.

Sailing ships.

The pressure on the sails depends on their form and area, their position, and the apparent velocity of the wind, *i.e.* the velocity relative to the ship. The pressure of the wind on the hull is obtainable similarly to that on the sails, but is usually neglected as the heeling moment is small. Experiments have been made to determine the wind-pressure on plates by Dines, Langley, Eiffel, Stanton and others; and the results of the experiments are briefly as follows—

The normal pressure R in pounds on a plate of area A square feet exposed to face normally a wind of velocity V feet per second is given by the formula $R = KAV^2$, where K is a coefficient depending on the form and area of the plate. For a square or circular plate of about 1 sq. ft. in area K is about ·0014, corresponding to a pressure of 1 lb per sq. ft. at about 16 knots. The coefficient increases slightly for larger dimensions of the plate. It has also been found that a departure from the square or circular form involving an increase in perimeter for the same area causes an increase in the mean pressure. An alteration from the plane to the concave, analogous to the "bellying" of sails, is accompanied by a slight increase in the pressure per square foot of projected area; but for any large amount of concavity the increase is more than counterbalanced by the decrease in the projected area.

No simple law exists connecting the normal pressure on a plate exposed obliquely to the wind with the angle of incidence; it is found that the results for air exhibit a close agreement with those for water after allowing for the difference of density between the two fluids. At small angles of incidence up to about 20°, or even 40° (varying with the shape of the plate), the pressure varies directly as the angle; beyond this limit it is slightly diminished, afterwards increasing or decreasing to a value which is almost constant for the remaining angles up to and including 90°. The centre of pressure for oblique impact lies between the leading edge and the centre of gravity of the area. In a plate 1 ft. square, it lies 0·3 ft. from the leading edge at 10° inclination and 0·4 ft. at 30° inclination, gradually approaching the centre of the plate as the angle of inclination is increased. A slight curving or concavity of the plate does not appear to have much influence on the normal component of the wind-pressure.

The wind-pressure on the sails of a ship cannot be calculated with any degree of precision because existing information is insufficient to take account of (*a*) the variety in area and shape of the sails used; (*b*) the different positions in which the sails may be placed relative to the wind and to each other; and (*c*) the interference of adjacent sails with each other. On the other hand, conclusions based on these experiments are of value both in assisting in an intelligent appreciation of the effects of changes in the sail areas, sail positions, and in the form of rig, and in forming a comparison between the various qualities of speed, stability and general behaviour of vessels with which experience has been obtained.

The stability of a sailing vessel is usually estimated by assuming all plain sail to be placed in a fore and aft direction and to be subject to a normal pressure of 1 lb per sq. ft., corresponding to a wind of about 16 knots. The resultant pressure of the wind is supposed to act through the centre of gravity of the total sail area (termed the *centre of effort*). The resultant pressure of the water on the hull, which is equal and opposite to the wind-pressure, is assumed to pass through the centre of gravity of the area of the immersed middle line plane (termed the *centre of lateral resistance*). If *h* be the vertical distance between these points in feet, A the sail area in square feet, and α the angle of heel, the moment causing the heel is (on these assumptions)

$$\frac{Ah}{2240} \text{ foot-tons}$$

and the righting moment is approximately

$$W \times GM \sin \alpha.$$

Hence

$$\sin \alpha = \frac{Ah}{2240 . W \times GM}.$$

The reciprocal of this quantity or

$$\frac{2240 . W \times GM}{Ah}$$

is a measure of the capability of the ship to stand up under her canvas and is termed the *power to carry sail*. Its value varies with different sizes and classes of ships and boats. It is relatively small in small boats and small yachts owing to the practicability of reducing the angle of heel by movable ballast; and a low value is also permissible in large yachts on account of their great range of stability. In boats and yachts it varies from 3 to 4 and in full-rigged sailing ships from 15 to 20.

The stability of sailing vessels at large angles of inclination varies considerably with the class of vessel. In racing yachts and other completely decked sailing boats whose ratios of beam to depth and draught are comparatively small, initial stability is obtained by lowering the centre of gravity with ballast fitted on the keel, and the range then extends to considerably over 90°; on the other hand, a number of half-decked or open sailing boats immerse their gunwales when inclined to a moderate angle. With reference to this, Mr Dixon Kemp in his *Yacht Architecture* remarks that the deck edge should not be immersed at an angle of heel less than 20°; some small centre-board boats whose gunwales are awash at 12° or 15° cause anxiety. With full-rigged sailing ships this angle is commonly 20° to 25°.

The effect of a sudden gust of wind on a sailing ship is obtained by equating the work done on the ship by the gust to her dynamical stability; and the angle at which this equality holds will be the extreme angle of heel, assuming the ship to be originally upright and at rest. Since the dynamical stability is represented by the area of the statical stability curve it is convenient to represent this angle in relation to this latter curve. The effects of the resistance and inertia of the water and any change of displacement are neglected; the wind-pressure is assumed constant during the roll, in accordance with the results of experiments on oblique plates (the maximum angle of roll being supposed less than 50°); the modification of the pressure due to the motion of the sail is also neglected.

Let OPQ (fig. 20) be the curve of statical stability, the ordinates representing righting moments, and let the heeling couple due to the gust be represented by OS. If N be the extreme angle of heel, draw SPUR parallel to the base, cutting the curve at P, R; and PM, NQ perpendicular. The work done by the wind is the area OSUN and is equal to the dynamical stability of the ship or the area OPQN. Hence the areas OPS, PQU are equal, and the extreme angle of heel is determined by this equality. If P and Q lie on the initial and approximately straight portion of the curve, the extreme angle of heel ON is about twice that of the steady angle OM corresponding to the strength of the gust. The area QUR represents the reserve dynamical stability when the wind is blowing with strength corresponding to OS; the intercepts of the ordinates below SPUR doing work against the force of the wind, leaving the segments above SPR available for absorbing the kinetic energy possessed by the vessel at the position of steady heel PM. As the strength of the gust is increased the points P and Q travel farther along the curve until P', Q' are reached, such that the areas P'Q'Q, OTP' are equal; the vessel will then come momentarily to rest at Q' and will be in unstable equilibrium, any increase in the wind-pressure causing her to capsize. It follows that a ship sailing in a wind of sufficient strength to cause a moderate angle of heel equal to OM' will be on the point of capsizing if the wind should happen to drop and afterwards return suddenly with its

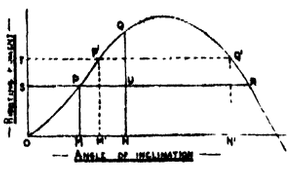


FIG. 20.

former force. A more dangerous, though improbable, case in which a gust of wind strikes the ship just as she has completed a roll to windward can similarly be investigated; it is found that the safe angle of steady heel under this condition is considerably less than that represented by OM'. It thus appears that it is of the greatest importance that sailing vessels should possess large dynamical stability in order to provide against the risk of capsizing due to fluctuations in the wind-pressure. Although the neglect of the wind and water resistances in the above investigation materially modifies the quantitative results, the general conclusions point to the necessity for sufficient range and freeboard however large the righting levers may be at small inclinations.

The centres of effort and of lateral resistance have not the same longitudinal position, consequently a horizontal couple is produced which turns the vessel either into the wind or away from it. In the former condition the vessel is said to be "ardent," and in the latter to be "slack." In order that a vessel may be quick in going about and yet not require too large a helm angle on a straight course, she should be slightly "ardent," *i.e.* the true centre of effort should be slightly abaft the true centre of lateral resistance. The assumed and true positions of these centres differ to some extent, and on making allowance for this it is found that in the majority of vessels possessing slight ardency the assumed C.E. lies slightly *before* instead of *abaft* the assumed C.L.R. In small sailing boats the points are usually very near together; but in a large number of sailing ships, including H.M. sloops, their distance apart is about ·05 L, and in yachts about ·02 L, where L is the length.

It may be noted in this connexion that the area of sail spread and the size of the ship are often connected by the coefficient $\frac{A}{W^{\frac{2}{3}}}$ known as the *Driving Power*. The value for small sailing boats and for yachts is about 200, and for full-rigged sailing ships from 80 to 100 (including plain sail only).

Longitudinal stability.

The method of estimating the righting moment of a ship when inclined from a position of equilibrium through a small angle in the longitudinal plane is exactly analogous to that used in the case of small transverse inclination, and similar propositions are true in both cases, viz.:—

1. Consecutive water-lines intersect about an axis passing through the centre of flotation.

2. The height of the longitudinal metacentre M above the centre of buoyancy is equal to the moment of inertia about this axis divided by the volume of displacement of the ship.

3. The righting moment at any small angle of inclination θ (circular measure) is equal to

$$W . GM . \theta.$$

In fig. 21 let WL be the water-line corresponding to the positions G and B, and conceive a longitudinal movement of a portion of

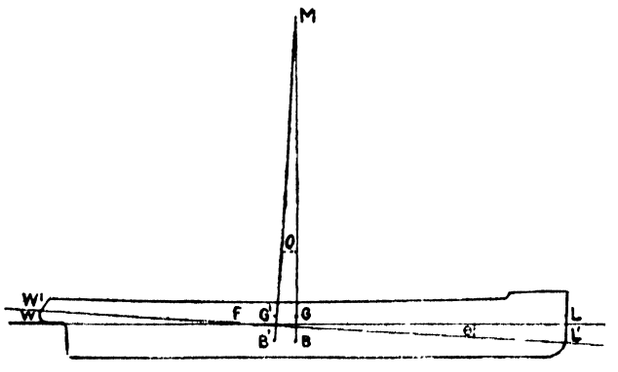


FIG. 21.

the weights in the ship causing G to move horizontally to G'. If G' be abaft G the ship will alter trim by the stern until B moves to B' vertically beneath G' and the water-line changes to W'L', intersecting WL at the centre of flotation F.

If L be the length of the ship between the draught marks, the change of trim (WW'+LL') is equal to $L.\theta$, and the moment changing trim is $W.GG'$ or $W.GM.\theta$; the change of trim in inches (other linear dimensions being in feet) is therefore

$$W \times GG' \div \frac{W \times GM}{12L}.$$

The change of trim due to any horizontal movement of weights is therefore equal to the moment of the shift of weight divided by the quantity

$$\frac{W \times GM}{12 \times L}$$

which is the moment required to change trim one inch. Since the longitudinal moment of inertia of the water-plane includes the cube of the length as a factor, the longitudinal BM is usually large compared with BG, and the moment to change trim 1 in. in foot-tons is nearly equal to

$$\frac{W \times BM}{12 \times L} = \frac{W \times I}{12 \times L \times V} = \frac{I}{420L},$$

which is approximately constant for moderate variations of draught.

If a weight of moderate amount w tons be placed at a distance of a feet abaft the *centre of flotation* F, the bodily sinkage in inches is $\frac{w}{T}$, the moment changing trim by the stern is wa foot-tons, and the change of trim is therefore $\frac{wa}{M}$ where T is the "tons per inch" and M the moment to change trim 1 in. If b be the distance of F abaft the middle of length, the draughts forward and aft are increased respectively by

$$w\left(\frac{1}{T}-\frac{a}{M}\cdot\frac{L+2b}{2L}\right)$$

and

$$w\left(\frac{1}{T}+\frac{a}{M}\cdot\frac{L-2b}{2L}\right) \text{ inches.}$$

Stability when damaged.

A ship provided with water-tight compartments is liable to have water admitted into any of them on account of damage received, or may require to carry water or other fluid in bulk as ballast or cargo. The effect of this addition on the draught and the stability is therefore of interest. There are three cases:—

1. When the water completely fills a compartment;

2. When the water partially fills a compartment up to the level of the water-line, remaining in free communication with the sea; and

3. When a compartment is partially filled with water without any communication with the sea.

In the first case the water is regarded as a weight added to the ship; the mean sinkage is obtained from the displacement curve, the change of trim from the "moment to change trim," and the angle of heel from the metacentric diagram, or (for large angles) the cross curves. In general, if the compartment filled is low in the ship, the stability is increased; if high, it is diminished.

In the second case, assume in the first place the compartment to be amidships, so that no heel or change of trim occurs, and to be moderate in size, so that the sinkage is moderate in amount.

Let ABCD (fig. 22) be such a compartment bounded by water-tight bulkheads sufficiently high to prevent water reaching adjoining

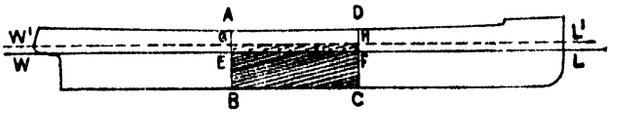


FIG. 22.

compartments. Let the water-lines be WEFL, W'GHL', before and after bilging; let A, a be the area of the whole water-plane WEFL and of the portion EF within the compartment respectively, in square feet; and let v be the volume contained in EBCF diminished by the volume of any solid cargo in the compartment. The buoyancy is reduced by an amount v by bilging, and the amount added through sinking must be equal to the amount so lost. If x be the sinkage in feet, then

$$v = x(A - a),$$

so that the mean sinkage is equal to the buoyancy lost divided by the area of the intact water-plane. In the event of the compartment being so situated as to cause heel and change of trim, the mean sinkage is first determined as above, and the effect of heel and change of trim superposed.

To obtain the heel produced, the position of the centre of flotation for the intact portion of the water-plane is found, and thence the vertical and horizontal positions of the new centre of buoyancy are deduced by taking account of the buoyancy lost through bilging, and then regained by the layer between the two water-planes. The moment of inertia of the intact water-plane is found about an axis through the new centre of flotation and thence the height of the new metacentre M' determined. The heel θ (assumed small) is found by equating the horizontal shift of B to sin θ × the vertical distance of M' above G, both being equal to the moment causing heel divided by the displacement. In a similar manner the change of trim is obtained. If the compartment bilged is large so that considerable changes in its area and that of the ship at the water-line result, the sinkage and alteration in stability are found by a tentative process, closer approximations to the final water-line being successively made.

An investigation of the stability when bilged at or near the water-line is of special importance in warships owing to their liability to damage by gunfire in action, with the consequent opening up of a large number of compartments to the sea. Calculations are made of the sinkage and stability when the unarmoured or lightly armoured parts of the ship are completely riddled; the stability should be sufficient to provide for this contingency.

The third case, where the ship is intact but has compartments partially filled with water or other liquid, is of frequent occurrence. Practical illustrations occur in connexion with the filling and

emptying of water-ballast and oil-fuel tanks, and particularly in the case of ships fitted to carry large quantities of oil in bulk.

Let fig. 23 represent the section of a vessel fitted with a tank PQRS partly full of water. Let WL, *wl* be the upright water-lines

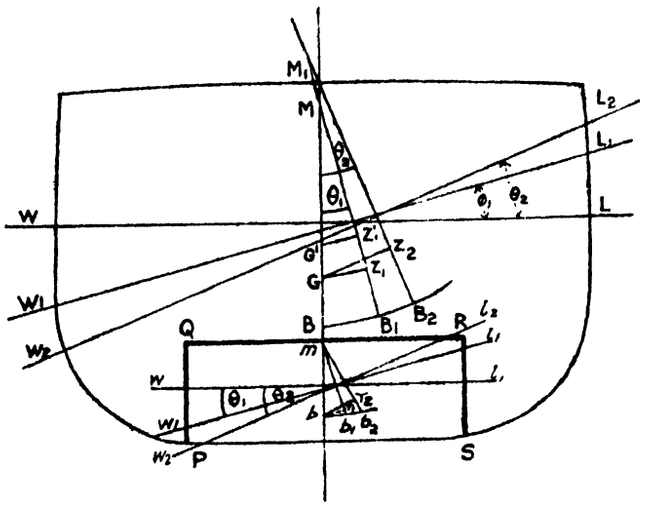


FIG. 23.

of the vessel and tank, G the centre of gravity of the vessel and water combined, B the centre of buoyancy of the vessel, and *b* the centre of gravity of the water.

As the ship is inclined successively through angles θ_1, θ_2, . . . the centre of buoyancy B moves along the curve of buoyancy to B_1, B_2, . . the normals at which are tangential to the metacentric curve $M_1 M_1$, . . . those at small angles passing through the metacentre M. If the water in the tank could be kept from moving as the inclination proceeded, G would be fixed in the ship, and the righting levers would be GZ_1, GZ_2, . . . those at small angles being equal to GM sin θ. Actually, if the inclination be slowly performed, the water-level in the tank changes successively to w_1l_1, w_2l_2, . . . maintaining a level surface at all times; its centre of gravity moves to b_1, b_2, . . . thereby causing a corresponding alteration in the combined centre of gravity G. Drawing br_1, br_2, . . . perpendicular to the verticals through b_1, b_2, . . . and calling *w*, W the weights of the water and of the water and ship combined, then at the angle θ_2 the line of action of the weight *w* has moved through a distance br_2 and the righting moment of the ship is diminished by an amount $w \times br_2$. It is evident that the movement of the centre of gravity of the water in the tank is the same as would be the movement of the C.B. of a ship having the same form as the tank and water-lines corresponding to *wl*, w_1l_1, w_2l_2, &c. The values of the levers br_1, br_2 . . . can therefore be obtained by a process similar to that used for obtaining the righting levers of the ship; cross curves and thence ordinary stability curves being drawn for various heights of water and inclinations. If θ_1 be a small angle of inclination, the line of action of the weight b_1m will be such as to pass through the metacentre *m* corresponding to the water-line *wl*, and determined by the formula $bm = \frac{i}{v}$ where *i* is the moment of inertia of the water-plane *wl* about a longitudinal axis through its centre of gravity and *v* the volume of water contained. The moving weight *w* at *b* may therefore be replaced by an equal weight fixed at *m*, which is the virtual centre of gravity of the water; and the centre of gravity G of ship and water is likewise raised to a virtual position G′ where

$$GG' = \frac{w}{W} \cdot bm = \frac{v}{V} \cdot \frac{i}{v} = \frac{i}{V}.$$

If the tank contain a fluid of specific gravity ρ the virtual rise of the centre of gravity is $\frac{\rho i}{V}$. The loss of stability at small angles due to the mobility of the water is thus independent of the quantity in the tank, but is proportional to the moment of inertia of its free surface. It is possible for a small quantity of water with an extensive free surface to render a ship unstable in the upright condition; the angle to which this large loss of stability extends depends, however, on the quantity of water in the tank, for the extent of the sideways movement of the centre of gravity G of ship and water is minute if the tank be either nearly empty or nearly full, and the loss of stability at all angles above a small amount will then be inappreciable; the loss at moderate angles is usually a maximum when the tanks are about half full.

The assumption made above, viz. that the ship is inclined so gradually as to maintain a level water surface in the tank, is by no means in accordance with the actual circumstances during rolling; waves are then set up in the water, causing it to wash from side to side, so that the loss of stability may be either more or less than the amount calculated. To avoid danger of capsizing in still water, large tanks in a ship are filled or emptied in succession as far as possible, so that not more than one or two are partly full at the same time. Water-tight longitudinal partitions are also fitted in wide tanks in order to reduce the moment of inertia of the free surface. On the other hand tanks, partly filled with water, have been fitted and found effective in certain ships in order to reduce the rolling oscillations among waves. (See § ROLLING.)

Stability in any direction.

Hitherto the stability of a ship has been considered only with reference to inclinations about either a longitudinal or transverse axis. These are the only cases which it is necessary to deal with in practice for the purpose of ascertaining the probable qualities as regards stability of a vessel by comparing the elements of its stability in the design stage with those of existing ships whose qualities have been tested by experience. For the exact theoretical consideration of the stability of a ship or any floating body, however, it is necessary to take account of the true line of the action of the buoyancy and not merely of its projection on the plane of inclination. The development of this part of the subject has largely been due to M. Dupin in his *Mémoire de la stabilité des corps flottants* and to M. Guyou in his *Théorie du navire*. If a ship is inclined in all possible positions, keeping the displacement constant, the locus of the centre of buoyancy is a closed surface which is known as the surface of buoyancy; the curve of buoyancy for two-dimensional inclinations being the projection on the plane of rotation of the corresponding points on the surface of buoyancy. Similarly the envelope of all the water-planes is defined as the surface of flotation. The stability of a ship in all positions is known when (*a*) the forms and dimensions of the surface of buoyancy, and (*b*) the position of the centre of gravity relative to it, have been obtained; the former depends entirely on the geometrical form of the ship and on the constant volume of displacement assumed, and the latter has reference only to the arrangement and magnitude of the component weights of the structure and lading. For an infinitesimal inclination the line joining the centres of buoyancy when upright and inclined is parallel to the water-plane and the tangent plane to the surface of buoyancy is therefore parallel to the water-plane, *i.e.* it is horizontal, and the normal to the surface is vertical. If the initial position is one of equilibrium, the centre of gravity must lie on the normal. To determine the effect of a small disturbance from the position of equilibrium, it is necessary, as in the particular inclinations already considered, to find the line of action of the buoyancy for adjacent positions, *i.e.* to trace the normals to the surface of buoyancy. Consecutive normals to this surface will not, in general, intersect; but, from the properties of curvature of surfaces, there are two particular directions of inclination for which adjacent normals to the surface will intersect the original normal, these directions being perpendicular to one another and parallel to the principal axes of the indicatrix of the surface of buoyancy.

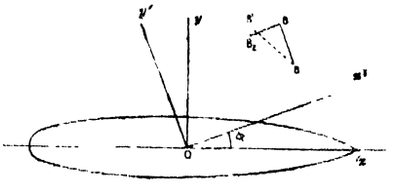


FIG. 24.

If fig. 24 be a plan of the water-plane, Ox' the axis of inclination passing through O the centre of flotation, Oy' and Oz perpendicular axes in and at right angles to the plane of flotation, then, from a consideration of the wedges of immersion and emersion for a small inclination θ, the travel of the centre of buoyancy B becomes:—

$$\frac{\theta}{V}\int\int y'^2 \cdot dx' \cdot dy' \text{ (or } BB_1 \text{ in fig. 24) parallel to } Oy'$$

$$\frac{\theta}{V}\int\int x'y' \cdot dx' \cdot dy' \text{ (or } -B_1B_2) \text{ parallel to } Ox'$$

and

$$\tfrac{1}{2} \cdot \frac{\theta^2}{V}\int\int y'^2 \cdot dx' \cdot dy' \text{ (or } B_2B') \text{ parallel to } Oz.$$

These may be written:—

$$\frac{\theta}{V} \cdot I_x'; \ \frac{\theta}{V} \cdot P; \text{ and } \frac{\theta^2}{2V} I_x' \text{ respectively}$$

where I_x' is the moment of inertia of the water-plane about Ox', and P the product of inertia about Ox', Oy'. If the principal axes of inertia of the water-plane Ox, Oy make an angle ϕ with Ox', Oy', and if, from B as origin, axes Bx, By, Bz are drawn parallel to Ox, Oy, Oz, then the co-ordinates of B′ are as follows:—

$$x = -B_1B_2 \cos\phi - BB_1 \sin\phi = \frac{\theta}{V}(P\cos\phi - I_x' \sin\phi);$$

$$y = BB_1 \cos\phi - B_1B_2 \sin\phi = \frac{\theta}{V}(I_x' \cos\phi + P \sin\phi),$$

$$z = B_2B' = \frac{\theta^2}{2V} \cdot I_x'.$$

Also

$$I_x' = I_x \cos^2\phi + I_y \sin^2\phi;$$
$$P = (I_x - I_y) \sin\phi \cos\phi;$$

where I_x, I_y are the principal moments of inertia of the water-plane. Hence

$$x = \frac{\theta}{V} \cdot I_y \cdot \sin\phi;$$

$$y = \frac{\theta}{V} \cdot I_x \cdot \cos\phi;$$

$$z = \tfrac{1}{2}\frac{\theta^2}{V}(I_x \cos^2\phi + I_y \sin^2\phi).$$

Eliminating θ and ϕ, the locus of the centre of buoyancy for small inclinations of the ship becomes the elliptic paraboloid

$$2z = \frac{x^2}{I_y/V} + \frac{y^2}{I_x/V}.$$

The equation to the indicatrix referred to axes parallel to Bx, By is therefore

$$\frac{x^2}{I_y/V} + \frac{y^2}{I_x/V} = \text{constant};$$

and the indicatrix is therefore similar and similarly situated to the momental ellipse of the water-plane, and the surface of buoyancy is everywhere synclastic and concave to all points within it. The quantities I_y/V and I_x/V are evidently equal to BM_x and BM_y (referring to inclinations about Oy and Ox respectively); and the indicatrix and momental ellipse become

$$\frac{x^2}{BM_y} + \frac{y^2}{BM_x} = \text{constant}.$$

The angle ψ that BB_2 (the projection of BB' on the plane of the indicatrix) makes with xO is given by

$$\tan\psi = -\frac{y}{x} = \frac{I_x}{I_y} \cdot \cot\phi;$$

hence the direction is conjugate to that of the axis of rotation with respect to the indicatrix.

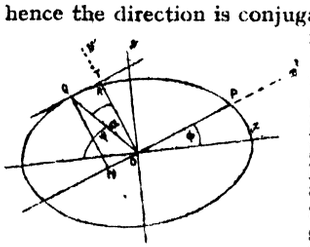


FIG. 25.

This is illustrated in fig. 25, where the ellipse shown is the indicatrix; OPx' the axis of inclination, OQ the conjugate radius, and $ORMy'$ the perpendicular on the tangent. Draw QN parallel to OM to meet OP. The triangle OMQ is similar to BB_1B_2; and they can be made equal by giving a suitable value to the constant in the indicatrix equation. In that case QN is the projection on the plane of the figure of the normal to the surface at B^1, and the shortest distance between the normals at B and B^1 is equal to $ON = MQ = B_1B_2 = \frac{P\theta}{V}$, since ON or the axis of inclination is perpendicular to them both. Also, the length $B'M$ of the normal at B' intercepted between B' and the foot of the common perpendicular is equal to $\frac{QN}{\theta}$ since θ is the angle between the normals at B and B'; it follows that

$$B'M' = \frac{BB_1}{\theta} = \frac{I_x'}{V},$$

an expression analogous to that obtained before for the case of small inclinations in the direction of the principal axes of the water-plane. It is worthy of note that the radius of curvature ρ of the normal section of the surface of buoyancy through Oy' is, in general, less than BM; the latter being equal to $\frac{OM^2}{2z}$, and ρ being equal to $\frac{OR^2}{2z}$; ρ is also obtainable by Euler's equation—

$$\frac{1}{\rho} = \frac{\cos^2\phi}{BM_x} + \frac{\sin^2\phi}{BM_y},$$

becoming equal to BM for inclinations about the principal axes. Similarly the radius of curvature of the normal section through Q is, in general, greater than BM.

If the centre of gravity G of the ship is coincident with B, the arm of the righting couple is OM or $\frac{I_x'}{V} \cdot \theta$; and there is also a couple of lever ON or $\frac{P}{V} \cdot \theta$ in a perpendicular vertical plane. The resultant couple lies in a plane containing OQ, having a lever equal to

$$OQ \text{ or } \frac{\theta}{V}\sqrt{I_x'^2 + P^2} \text{ or } \frac{\theta}{V}\sqrt{I_x^2\cos^2\phi + I_y^2\sin^2\phi}.$$

In the general case when G is situated at a distance a above B, the righting lever becomes $\left(\frac{I_x'}{V} - a\right)\theta$, and the perpendicular couple is unaltered. The resultant couple can be readily found, but in this case it bears no simple relation to the indicatrix, as before; it may be shown, however, that the plane of the couple is conjugate to the axis of inclination with respect to the confocal ellipse

$$\frac{x^2}{\frac{I_y}{V} - a} + \frac{y^2}{\frac{I_x}{V} - a} = \text{constant}.$$

In the case when GM = 0, the ship being in neutral equilibrium for that direction of inclination, the resultant couple is parallel to the axis Ox', *i.e.* perpendicular to the plane of the indicatrix.

Numerical values of the metacentric height GM, the angle of obliquity α or QOM $\left(\text{equal to } \tan^{-1}\frac{P}{I_x' - aV}\right)$ and the angle ψ are given in the following table for a ship whose transverse GM is 4 ft., longitudinal GM 400 ft., and BG 10 ft.:—

ϕ	0°	1°	5°	10°	20°	30°	40°	50°	60°	70°	80°	90°
GM	4′	4·1	7′	10′	50·4′	103′	168′	237	300	354	388	400′
α	0°	60°	78·5	76·8°	68·5°	59°	49·3°	39·5°	29·7°	19·8°	9·9°	0°
ψ	90°	29·0°	0·5°	3·2°	1·5°	1·0°	0·7°	0·5°	0·3°	0·2°	0·1°	0°

The greatest angle of obliquity (α) occurs in this case when ϕ is about 52½° and the plane of the couple is nearly coincident with the middle line plane for all angles of ϕ greater than about 30°. It follows that if a weight is moved obliquely across the ship the axis of rotation is approximately longitudinal, except when the line of movement is nearly fore and aft; and in the latter case a small deviation from a fore and aft direction produces a large change in the position of the axis of rotation.

The direction of the axis of rotation is above expressed with reference to the position of the inclining couple in relation to the indicatrix of the surface of buoyancy; as, however, the couple is assumed small, the direction of the axis and the amount of inclination may equally be obtained by resolving the couple in planes perpendicular to the principal axes and superposing the separate inclinations produced by its components.

It has been shown above that the positions of equilibrium are found by drawing all possible normals to the surface of the buoyancy, and the condition for stability for an inclination in any direction is that the centre of gravity shall lie below the corresponding metacentre. The height of the metacentre varies with the moment of inertia of the water-plane about the axis of inclination, and the maximum and minimum heights are associated with the maximum and minimum moments of inertia, which again correspond to inclinations about the least and greatest axes of inertia respectively. If the centre of gravity lies below the lowest position of the metacentre (the transverse metacentre in the case of a ship when upright) the equilibrium is stable for all inclinations, and the condition is referred to as one of *absolute stability*; if it lies above the highest metacentre, the condition is one of *absolute instability*; if it lies between the highest and lowest metacentres, the condition is one of *relative stability*, the ship being stable for inclinations about a certain set of axes, and unstable otherwise.

The foregoing remarks apply to a vessel whose axis of inclination is fixed so that the component couple perpendicular to the plane of inclination is resisted. If, on the other hand, the vessel is free to move in all directions the resultant couple does not in general tend to restore the original position of equilibrium, although the component in the plane of inclination complies with the conditions above stated for absolute stability. If m_1 and m_2 be the greatest and least values of GM, the ratio of the component couples perpendicular to and in the plane of inclination, or $\tan\alpha$ (fig. 25), is greatest when $\tan\phi = \sqrt{\frac{m_1}{m_2}}$; and then $\tan\alpha = \frac{m_1 - m_2}{2\sqrt{m_1 m_2}}$. If m_2/m_1 be small, this ratio is large, being equal to 4·95 in the numerical example above. In such cases the extent of the movement that can result from a small initial disturbance cannot be readily determined by a statical method, but the investigation of the work done in moving the vessel from one position to another appears to meet this difficulty.

This process is employed by M. Guyon in his *Théorie du navire*, the stability of a ship in any condition being treated throughout from the dynamical standpoint. He proved that:—

1. For changes of displacement, without change in inclination, the potential energy of a system consisting of a floating body and the water surrounding is a minimum when the weight of the body is equal to its displacement.

2. For changes of direction, without change of displacement, the potential energy of the system is equal to the weight of the body, multiplied by the vertical resolute of BG; when this distance is a minimum or a maximum the stability is respectively stable or unstable. A statical proof of this has been given in the two-dimensional case.

The potential energy is thus equal to the dynamical stability

increased by an arbitrary constant. If from any point B_1' of the surface of buoyancy (fig. 26) a tangent plane be drawn, the perpendicular upon it, GN, is proportional to the potential energy, and the stability of the body is thus the same as that of the surface of buoyancy regarded as a solid capable of rolling on a horizontal plane. The locus of the foot of the perpendicular N is called the "podaire" (shown dotted in the figure); this surface resembles the surface of buoyancy in its general shape, and touches it when GB is normal, *i.e.* at positions of equilibrium B_1, B_2, B_3, B_4; it has the property that a radius GN drawn from G is always vertical when the body is in the position corresponding to N, and has a length proportional to the potential energy.

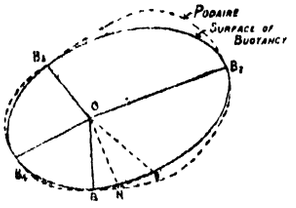


FIG. 26.

If the ship or body be supposed to move under no external forces, and the effect of any change in the displacement be neglected, the kinetic energy of the system can be expressed by $\Sigma mv^2/2g$, and the total energy by $(W \times GN) + \frac{1}{2g} . \Sigma mv^2$; the latter is constant when there are no resistances, and steadily decreases if resistances are in operation. Neglecting resistance, when the body is momentarily at rest, $W \times GN$ becomes $W.l$, where l is a linear quantity; and throughout the motion GN is less than l by $\frac{1}{2gW}\Sigma mv^2$. The effect of resistance is gradually to decrease l or the maximum value of GN; and it may be exhibited graphically by the following conception. Imagine a sphere of water, with centre at G, to be originally entirely within the podaire and then to be capable of expanding until the whole surface is submerged. It will first touch the podaire at the minimum normal, and will then form a small lake round it; similar lakes will form later at all other positions of absolute stability. Positions of absolute instability will be touched externally by the sphere, and if the water recede a little, will form small islands. At positions of relative stability the water will in general divide the surface into two parts meeting at an angle (fig. 27), and become one or the other of the branches XX', YY' according as the size of the sphere is slightly increased or diminished. Let the radius GN to the podaire along the edge of the water be represented by l; from the energy equation the radius for any other position of the body moving without external forces is less than l, and the position lies within the lake so bounded. The diminution of l due to resistances has the effect of gradually drying the lake. If the body is originally placed near a position of absolute stability, the small lake on drying will leave the body in or very near that position. On the other hand, if the body is placed at rest near a position of absolute instability, the water in drying will necessarily cause the body to move farther and farther from that position. Finally, if moving near a position of relative stability, the body will move freely from side to side until the drying has proceeded so far that separate branches XX' or YY' are obtained; when this occurs, the body will be fenced, as it were, on one side or the other, and will oscillate until a position of absolute stability is finally attained.

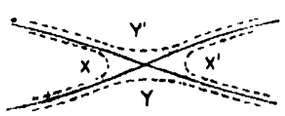


FIG. 27.

With regard to the surface of flotation it has been shown that in order that the displacement shall remain constant, consecutive waterlines must intersect on a line passing through the centre of gravity of the waterline or the centre of flotation. If the inclination take place from a given position in all possible directions, the lines of intersection with the original water-plane will all meet at the centre of flotation, which must, therefore, lie in the envelope of the water-planes, or the surface of flotation. The surface is therefore the locus of the centre of flotation for all possible inclinations. Since the curvature of the curve of flotation, which is the projection of the centre of flotation for inclinations about an axis perpendicular to the plane of projection, may change sign, the surface can also undergo similar changes in curvature and may be synclastic in certain parts and anti-clastic or saddle-shaped in others.

The relation between the surface of flotation and the stability of the ship is similar to that established in the two dimensional cases, *i.e.* the projection on the plane of inclination of the curve corresponding to the inclination has a centre of curvature whose height is a measure of the increase or decrease of stability caused by an alteration in displacement; the investigation, however, of the general case and the extension of Leclert's theorem to oblique inclinations contain no features of special interest or importance.

Rolling of Ships.

The action of the waves upon a ship at sea is such as to produce rolling or angular oscillations about a horizontal longitudinal axis, pitching or angular oscillations about a horizontal transverse axis, and heaving or translational oscillations in a vertical direction; also horizontal translations and rotations about a vertical axis which are not generally of an oscillatory character and will not materially affect the rolling. It is convenient when considering rolling to neglect the influence of the other accompanying oscillations, whose effect in most cases is slight in magnitude although complex in character.

Unresisted rolling.

The ship is in the first place conceived to be rolling in still water without any resistances operating to diminish the motion. The equation of motion for moderate angles of inclination, within which the arm of the righting couple is approximately proportional to the angle of heel (*i.e.* $GZ = m \times \theta$), is

$$\frac{d^2\theta}{dt^2} = -\frac{g}{\epsilon^2} m . \theta, \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where ϵ is the radius of gyration of the ship about the axis of rotation, m the metacentric height, θ the angle of inclination and g the acceleration produced by gravity. From this the time deduced for a single oscillation, from port to starboard, or vice versa, is

$$T = \pi\sqrt{\frac{\epsilon^2}{m.g}}, \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

showing that the time of oscillation varies directly as the radius of gyration, and inversely as the square root of the metacentric height.

The value of T is generally about 10 seconds in a large Atlantic liner, 7 to 8 seconds in a battleship, and 5 to 6 seconds in second-class cruisers and ships of similar type. In a large modern warship ϵ is about one-third the breadth of the ship.

For unresisted rolling of ships among waves the theory generally accepted is that due to Froude (see *Trans. Inst. Nav. Arch.*, 1861 and 1862). Before his work, many eminent mathematicians had attempted to arrive at a solution of this most difficult problem, but for the most part their attempts met with scanty success; wave-motion and wave-structure were imperfectly understood, and the forces impressed on a ship by waves could not be even approximated to. Froude's theory is based on the proposition that, when a ship is among waves, the impressed forces on her tend to place her normal to a wave sub-surface, which is assumed to be the surface passing through the ship's centre of buoyancy, and which is regarded as the effective wave surface, as far as the rolling is concerned. As in water at rest the ship is in equilibrium when her masts are normal to the surface of the water, so in waves she is in equilibrium when her masts are normal, instant by instant, to the effective surface of the wave that is passing her. When she at any instant deviates from this position, the effort by which she endeavours to return to the normal depends on the angle of deviation, in the same manner as the effort to assume an upright position, when forcibly inclined in still water, depends on the angle of inclination. Hence her stability (*i.e.* her effort to become vertical) in still water measures her effort to become normal to the wave at any instant on a wave. Froude made the assumptions that the profile of the wave was a curve of sines, and that the ship was rolling broadside on in a regular series of similar waves of given dimensions and of given period of recurrence. He was aware that the profile of the wave would be better represented by a trochoid, but in his first paper he gave several reasons why he preferred the curve of sines. He also assumed that the ship's rolling in still water was isochronous, and that the period of the rolling was given by $T = \pi\sqrt{\frac{\epsilon^2}{m.g}}$, as obtained theoretically. On these assumptions the equation of motion is obtained by substituting, for the angle of inclination in still water, the instantaneous angle between the ship and the normal to the wave-slope, and thus becomes

$$\frac{d^2\theta}{dt^2} = -\frac{gm}{\epsilon^2}(\theta - \theta_1) = -\frac{\pi^2}{T^2}(\theta - \theta_1), \quad . \quad . \quad . \quad (3)$$

where θ = angle of ship's masts to the vertical, and θ_1 = angle of normal to wave-slope to the vertical at the instant considered. θ_1 has to be expressed in terms of time, and is given by $\theta_1 = \Theta_1 \sin\frac{\pi t}{T_1}$, where Θ_1 is the maximum wave-slope, T_1 is the half period of the wave, *i.e.* half the time the wave takes to travel a distance equal to its length, and t is the time dating from the mid-trough of the wave. Equation (3) can therefore be written—

$$\frac{d^2\theta}{dt^2} = -\frac{\pi^2}{T^2}\left(\theta - \Theta_1 . \sin\frac{\pi}{T_1}t\right), \quad . \quad . \quad . \quad (4)$$

which is the general differential equation of the unresisted motion of a ship in regular waves of constant period. The solution of this equation is—

$$\theta = C_1 . \sin\frac{\pi}{T}t + C_2\cos\frac{\pi}{T}t + \frac{\Theta_1}{1 - \frac{T^2}{T_1^2}}\sin\frac{\pi}{T_1}t, \quad . \quad . \quad (5)$$

where C_1 and C_2 are constants depending on the initial movement and attitude of the ship.

The last term of this expression,

$$\frac{\Theta_1}{1 - \frac{T^2}{T_1^2}} \cdot \sin\frac{\pi}{T_1}t,$$

represents the forced oscillations imposed on the ship by the passage of the series of waves during the time t; and the first and second terms,

$$C_1 . \sin \frac{\pi}{T} t + C_2 . \cos \frac{\pi}{T} t,$$

are the same as the free oscillations of the ship in still water.

Equation (5) indicates, therefore, that the ship performs oscillations as in still water, but has superposed on these a series of oscillations, governed by the wave-slope and the relation existing between the period of the ship and that of the wave. The equation shows that there will be innumerable phases, and of these three are worthy of notice.

(*a*) In the case in which the ship's period T is equal to the semi-period T_1 of the wave, equation (5) becomes indeterminate. The correct solution to equation (4) is then—

$$\theta = C_1 \sin \frac{\pi}{T} t + C_2 \cos \frac{\pi}{T} t - \frac{\pi}{2T} \Theta t \cos \frac{\pi}{T} t. \quad . \quad (6)$$

It is seen that at each successive wave crest and hollow the range of the oscillation is increased, so that the ship under these conditions would inevitably capsize but for the effect of the resistances and the departure from synchronism at large angles of roll.

(*b*) When $\frac{T}{T_1} = 0$, in which case the ship is assumed to be quick in her movements, or the period of the wave is infinitely long as compared with that of the ship, the equation (5) becomes—

$$\theta = \Theta_1 \sin \frac{\pi}{T_1} t,$$

that is to say, the ship will behave very much as a thin flat board does on the surface of a wave, her masts being always perpendicular to the surface.

(*c*) If we choose the initial conditions in equation (5) so that the coefficients C_1 and C_2 are zero, then the equation will become—

$$\theta = \Theta . \frac{1}{1 - \frac{T^2}{T_1^2}} \sin \frac{\pi}{T_1} t.$$

Since θ_1, the slope of the wave, is equal to $\Theta_1 \sin \frac{\pi}{T_1} t$, the ratio of the ship's angle to the vertical to the angle that the normal to the wave-slope makes with the vertical, or θ/θ_1,

$$= \frac{1}{1 - \frac{T^2}{T_1^2}} = \text{constant}.$$

That is to say, the ship forsakes her own period and takes up "forced" oscillations in the period of the wave. Under these conditions the ship's masts will lean towards the wave-crest if T is greater than T_1, and from the wave-crest if T is less than T_1.

Froude in his first paper further showed how the successive angles of a ship's rolling may be exhibited graphically, and he touched on the influence of resistance in reducing rolling. The following is the summary he gave in 1862 of the conclusions he had reached:

"(i.) All ships having the same 'periodic time,' or period of natural roll, when artificially put in motion in still water, will go through the same series of movements when subjected to the same series of waves, whether this stability in still water (one of the conditions which govern the periodic time) be due to breadth of beam, or to deeply stowed ballast, or to any such peculiarity of form as is in practical use.

"This statement would be almost rigorously true if the oscillations were performed in a non-resisting medium, or if the surface-friction and keel-resistance, by which the medium operates to destroy motion, were of the same equivalent value for all the ships thus compared. It requires, however, to be modified in reference to the circumstance that of two ships having the same periodic time in still water, the comparative forms may be such that the one shall experience such resistance in a higher proportionate degree than the other, and the necessary modification may be expressed in terms of their relative behaviour when set in motion in still water. The vessel which is the more rapidly brought to rest by resistance in still water will in the greater degree resist the accumulations of angle imposed on her by consecutive wave-impulses, and will the more fall short of the maximum angle which both would alike attain if oscillating in a non-resisting medium.

"(ii.) The condition which develops the largest angles of rolling is equality in the periodic times of the ship and of the waves; and this is true alike for all ships, whether their scale of resistance, as above referred to, be large or small.

"(iii.) That ship will fare the best which, *caeteris paribus*, has the slowest periodic time.

"(*a*) The waves which have a periodic time as slow as hers will have a greater length from crest to crest than those of quicker period; and, on the whole, long waves are relatively less steep than short ones. Now it is the steepness of the waves in a wave-series, not their height simply, which governs the rate at which angles of rolling will accumulate in a given ship when exposed to it.

"(*b*) Of two ships one of which has periodic time rather slower than the waves in a given ratio, the quicker ship will accumulate the larger angles.

"(*c*) It will require a heavier or a more continued gale to rear waves which have the lengthened period.

"(*d*) When the gale has continued so long that the largest waves have outgrown the period of the ship, she will not thereby have been released from the operation of waves having her own period, since the larger waves carry on their surface smaller waves of every intermediate period (this, at least, I believe to be the case).

"(*e*) When the gale has ceased and the sea is going down, the slower the period of the ship the sooner she will be released from waves of as slow a period.

"(iv.) There are two, and only two, methods of giving a slow period to a ship:

"(*a*) By increasing her 'moment of inertia,' as by removing her weights as far as possible from her centre of gravity; an arrangement which for the most part can only be accomplished to a limited extent.

"(*b*) By diminishing her stability under canvas. This can always be accomplished in the construction of a ship, and generally in her stowage, to any degree consistent with her performance of her regular duties, by simply raising her weights. Were we to raise these so high as to render her incapable of standing up against the action of the wind on her sails, the steepest waves would pass under her without putting her in motion.

"Thus the enormous weights carried by the armour-plated ships, extended laterally to the greatest possible distance from the centre of gravity, and raised high above it, serve in both respects to moderate, not to enhance, this tendency to roll; and when it is said that with the weights thus placed, and once put in motion, a ship 'must roll deep (deep, though easy),' it should be remembered that those very relations of force and momentum, which show how difficult it must be to check her motion when once it has been impressed on her, show also that it must be equally difficult to impart that motion to her in the first instance. The difficulty of starting her has a priority in point of time over the difficulty of stopping her, and prevents it from being felt by limiting the motion which would have called it into play.

"(v.) The conditions which govern pitching may be noticed here, though they have not been discussed in the paper.

"Were it possible, by concentrating her weights or by extending her plane of flotation, to give to the ship a period indefinitely quick for both longitudinal and transverse oscillations, as compared with that of such waves as are large enough to put her in motion, she would acquire no cumulative oscillation, but would float always conformably to the mean surface of the wave which passes under her.

"But this condition, which is so unapproachable in practice in reference to transverse oscillations that the attempt to approach it will but develop the evils pointed out in (iii.), is of necessity so closely approached in practice in reference to longitudinal oscillations, that those evils can only be escaped by approaching it as closely as is possible. The plunging of a ship whose weights are extended far fore and aft is but an incipient development of those phases of oscillation which have their proper development in transverse motion only. The best that can be desired in reference to longitudinal motion is that the ship's period, for longitudinal oscillation, shall be as quick as possible, and her position always as conformable as possible to the mean surface of the passing waves.

"I have insisted here, more prominently than in the body of the paper, on the circumstance that a total loss of stability, using that word in the ordinary sense of power of carrying sail, implies the possession of absolute stability, as regards rolling motion due to wave-impulse, because it has been pointed out to me that the attention of readers should be more strongly directed to it, not indeed as representing a practically available possibility, but as serving best to force the mind, by contact with an extreme conclusion immediately deducible from the theory, to appreciate its fundamental principles. And the proposition thus certainly furnishes a crucial test of whether the principles have been appreciated or not, and it supplies also a ready means of testing the theory by a crucial experiment. I must, in addition, express my own confident belief that any one who will try the experiment fairly will find the proposition so fully verified that he will feel obliged to admit that the theory which leads to so paradoxical yet true a conclusion deserves at least a careful study. But the more practically useful aspect of the theory is that which presents to view the varying phases of cumulative oscillation which a ship tends to undergo when exposed to various types of wave-series; the phases depending on the relation which her natural period of rolling, when set in motion in still water, bears to the period of wave-recurrence, and on the maximum steepness of each individual wave of the series—phases, in fact, which she would actually undergo but for the effect of surface-friction and keel-resistance; the nature and value of which conditions, as well as the nature and necessity of experiments for their determination, have been pretty fully dealt with in the body of the paper.

"I will here only add a synoptical statement of the principal features of those phases, given in a rather more complete form than in that part of the paper which referred to them, though they are pretty fully exhibited by the diagrams.

"By a 'complete phase' is meant that series of oscillations which the ship undergoes counting from the time when, for a moment, she is stationary and upright in a similar position, and is about to

recommence an identical repetition of the movements she has just completed.

"For the benefit of those who may glance at the appendix before they read the paper, I will mention that T is the number of seconds occupied by the ship in performing a single oscillation in still water, starboard to port, or vice versa. T_1 is the number of seconds occupied by the wave in passing from hollow to crest, or crest to hollow. Θ_1 is the number of degrees in slope of the steepest part of the wave; and p/q is the ratio T/T_1, with the numerator and denominator converted into the lowest whole numbers that will express the ratio, where, however, it must be noticed that for $T/T_1 = 1$, p/q must be taken as the limit of such a form as $\frac{9999999}{1000000}$. Then—

"(i.) The ship will complete the phase in the time $= 2qT$.

"(ii.) In completing the phase the ship will pass through the vertical position $2p$ times, or $2q$ times, according as p or q is the smaller number.

"(iii.) The ship will pass through the vertical position at the middle of the phase.

"(iv.) On either side of the middle of the phase there must occur, as equal maximum oscillation, the maximum in the phase, say Θ, which will approximately (but never in excess) $= \pm\Theta_1 \frac{q}{q-p}$.

"(v.) From these propositions it appears that if we compare two cases, in one of which the value of T/T_1 is the reciprocal of its value in the other, the phase will in each case consist of the same number of oscillations similarly placed; but in that one in which the period of the wave is slower than the period of the ship, the angles of oscillation will be the larger in the ratio p/q or q/p, whichever is the greater. The following table expresses the results of the above propositions, as exhibited in the diagrams, based on the assumption that the period of the ship is in every case T = 5", and that the maximum slope of the wave $\Theta_1 = 9$ degrees:

Ship's Period, or T.	Wave's Period, or T_1.	T/T_1.	T/T_1, reduced to Lowest Whole Numbers $= p/q$.	Time of Complete Phase $= 2qT$.	No. of Times Ship passes Vertical Position during Phase.	Approx. Outside Value of Θ, the Maximum Angle reached during Phase.
5"	5"	1	$\frac{9999999}{1000000}$	Infinite.	Infinite.	Infinite.
5"	6·25"	0·8	4/5	50"	8	45 deg.
5"	4"	1·25	5/4	40"	8	36 ,,
5"	10"	0·5	1/2	20"	2	18 ,,
5"	2·5"	2	2/1	10"	2	9 ,,
5"	9"	0·55	11/20	90"	10	20 ,,
5"	2·77"	1·8	9/5	50"	10	11 ,,

The assumption made in equation (1) that

$$G_Z = m.\theta$$

is true if the sections of the ship in the vicinity of the water-line are concentric circular arcs; and is approximately true generally for small angles of inclination as long as m is not small. If m be small, the relation does not generally hold.

In a wall-sided ship,

$$GZ = \sin\theta(m + \tfrac{1}{2}a\tan^2\theta),$$

where the BM is denoted by a; whence the equation for rolling through small angles becomes—

$$\frac{d^2\theta}{dt^2} + \frac{mg}{\epsilon^2}\theta + \frac{ag}{2\epsilon^2}\theta^3 = 0,$$

where θ^3 and higher powers of θ are neglected.

Sections of other forms lead to a similar equation, but with different coefficients of θ^3; the above equation is therefore typical of all others. This condition has been worked out fully by Professor Scribanti,[1] who obtained a solution in the following form:

$$T = \frac{2\pi}{\Theta}\sqrt{\frac{I}{J}}\cdot\left[1 - \left(\frac{1}{2}\right)^2 . l^3 + \left(\frac{1.3}{2.4}\right)^2 l^6 - \ldots\right],$$

where Θ^* is the maximum angle of roll. J is defined as the moment of inertia of the water-plane expressed in foot-ton units, *i.e.* is equal to W.a, where W is the displacement in tons. I is the mass moment of inertia of the ship about its axis of oscillation, and $l = \frac{\Theta^2}{\Theta^2 + 4\frac{m}{a}}$. Some numerical results for $\frac{T_m}{T}$, where T_m is the period found by the usual "metacentric" formula and Θ is 12°, are:

a	10 ft.	10 ft.	16 ft.
m	3 ft.	4 in.	$\frac{3}{8}$ in.
$\frac{T_m}{T}$	1·04	1·31	2·98

[1] *Trans. Inst. Naval Arch.*, 1904.

When the metacentric height is zero, the formula becomes—

$$T = 1{\cdot}107\frac{\pi}{\Theta}\sqrt{\frac{I}{J}} = \frac{5{\cdot}25}{\Theta}\sqrt{\frac{\epsilon^2}{ga}}.$$

Resisted rolling.

It has been assumed in the foregoing that the rolling in still water and among waves is unresisted; it remains to take into account the resistances which always operate during rolling. In still water these cause a degradation of the amplitude until the ship finally comes to a position of rest; and when a vessel is rolling among waves they cause a similar degradation of amplitude.

The earliest investigations of resisted rolling in *still* water were made by Froude in England, and by Bertin, Duhil de Bénazé, Risbec and Antoine in France. The method adopted was actually to roll the ship in still water and observe how the amplitude decreased roll by roll. Men were caused to run from side to side of the ship, their runs being so timed as to add to the angle of roll on each successive swing until the maximum angle obtainable was reached, when all movement on board was stopped, and the ship allowed to roll freely of herself until she came to rest. During this free movement a complete record of her angular motion was registered by means of a short-period pendulum and an electric timer, and from this a curve of "declining angles" was constructed, in which abscissae represented number of rolls and ordinates extreme angles of roll to one side of the vertical. From this curve another curve was constructed, which was termed a "curve of extinction," in which the abscissae represented angles of roll and the ordinates the angle lost per swing. Figs. 28 and 29 give examples of these curves obtained from experiments with H.M.S. "Revenge."[2] Having obtained such curves, Froude proceeded to investigate the relation between the degradation of the amplitude and the resistances which cause it. He assumed that the resistance to rolling varied partly as the angular velocity, and partly as the square of the angular velocity, thus obtaining the following equation for the angular motion of the ship:

$$\frac{W\epsilon^2}{g}\cdot\frac{d^2\theta}{dt^2} + K_1\frac{d\theta}{dt} + K_2\left(\frac{d\theta}{dt}\right)^2 + W.m.\theta = 0.$$

If K_2 is zero, a complete solution is—

$$\theta = A e^{\frac{-K_1 g}{2W\epsilon^2}t}\sin\left(t\sqrt{\frac{mg}{\epsilon^2} - \frac{K_1^2 g^2}{4W^2\epsilon^4}} + \beta\right), \quad \ldots \quad (7)$$

where A and B are arbitrary, and the period T_r of resisted rolling is given by

$$T_r = \frac{\pi}{\sqrt{\frac{mg}{\epsilon^2} - \frac{K_1^2 g^2}{4W^2\epsilon^4}}} = \frac{T}{\sqrt{1 - \frac{K_1^2 g}{4W^2\epsilon^2 m}}}.$$

It appears, therefore, that the period is slightly increased and the amplitude progressively diminished by the resistance. In actual cases where K_2 is necessarily included in the differential equation, the complete solution cannot be conveniently expressed analytically, but it can be determined in effect either by any method of approximate quadrature or by a process of "graphic integration." The diminution of amplitude can also be approximately obtained by

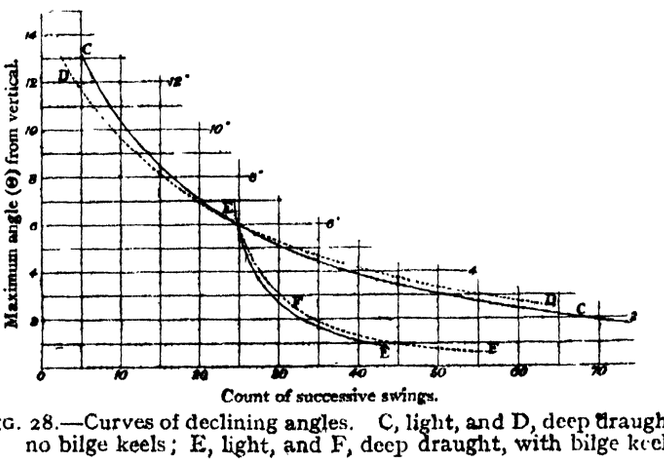


FIG. 28.—Curves of declining angles. C, light, and D, deep draught, no bilge keels; E, light, and F, deep draught, with bilge keels.

assuming the motion to be simple harmonic with amplitude Θ and by equating the work done by the resistances during the roll to the loss of dynamical stability—W. m. Θ × decrement. The differential equation for the curve of extinction is thus obtained, and is—

$$-\frac{d\Theta}{dn} = a.\Theta + b.\Theta^2,$$

where Θ = extreme angle (in degrees) reached at any particular oscillation, n the number of oscillations, and a and b are coefficients equal to

$$\frac{K_1\pi^2}{2Wm\Gamma} \text{ and } \frac{4}{3}\cdot\frac{\pi}{180}\cdot\frac{K_2\pi^2}{Wm\Gamma^2}$$

[2] Given by Sir W. H. White, F.R.S., in a paper read before the Institution of Naval Architects in 1895.

respectively. Froude gave his reasons for expecting the resistance to vary partly as the first and partly as the second power of the angular velocity. The latter part he considered would be due to surface-friction and the head resistance of keels and deadwood, and the

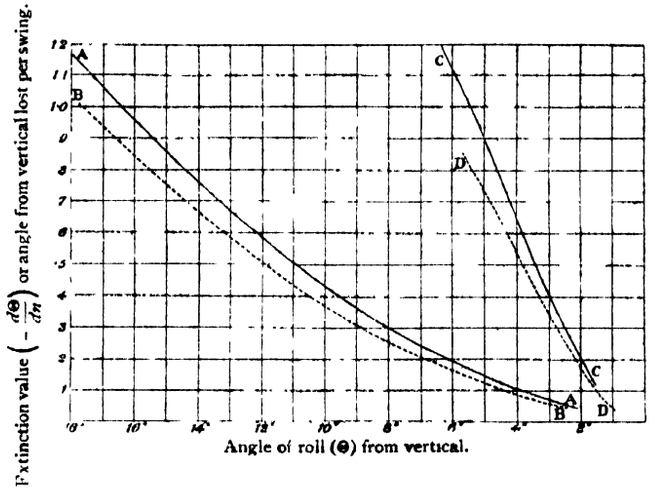


FIG. 29.—Curves of extinction. A, light, and B, deep draught, no bilge keels; C, light, and D, deep draught, with bilge keels.

former to the resistance caused by the creation of a small wave at each roll, which, by travelling away from the ship, would cause dissipation of energy. Froude's views have been confirmed by the accuracy with which the expression $-\frac{d\Theta}{dn} = a \cdot \Theta + b \cdot \Theta^2$ may be made to fit the curve of extinction of practically any ship by the judicious selection of the coefficients a and b. M. Bertin has, however, preferred an expression equivalent to $-\frac{d\Theta}{dn} = b \cdot \Theta^2$, while other French investigators have preferred an expression equivalent to $-\frac{d\Theta}{dn} \quad a \cdot \Theta$.

On substituting the value of a in equation (7) it becomes—

$$\theta = Ae^{\frac{at}{T}} \sin\left(\frac{\pi t}{T}\sqrt{1 - \frac{a^2}{\pi^2}} + \beta\right). \quad . \quad . \quad . \quad . \quad (8)$$

a simplified form of the equation for resisted rolling when the coefficient b is neglected.

For the "Revenge" the following equations represent the curves of extinction given in fig. 29:

For *deep draught*:

without bilge keels $-\frac{d\Theta}{dn} \quad \cdot 0123\Theta + \cdot 0025\Theta^2$

with ,, ,, $-\frac{d\Theta}{dn} = \cdot 065\ \Theta + \cdot 017\ \Theta^2$

For *light draught*:

without bilge keels $-\frac{d\Theta}{dn} = \cdot 015\ \Theta + \cdot 0028\Theta^2$

with ,, ,, $-\frac{d\Theta}{dn} = \cdot 084\ \Theta + \cdot 019\ \Theta^2$

(Θ in all cases being measured in degrees and not in circular measure).

The large increase in the b coefficient after bilge keels had been fitted has given rise to considerable discussion. Mr R. E. Froude had experimented with a deeply submerged plane oscillating in water, and he found that at a speed of 1 foot per second the resistance per square foot was 1·6 lb. Using this figure to calculate the work per swing from an extreme angle of 6°, the head-resistance of the bilge keels is found to account for about one-fourth the energy lost in a single swing due to the increased value of the b coefficient in the above formula. The energy abstracted in this particular case is thus about four times greater than the theoretical head-resistance of the bilge keels. This discrepancy has been observed in many cases, and it appears that when bilge keels are added to a ship they become effective, not merely as flat surfaces moving with the ship and experiencing direct resistances, but also by indirectly influencing the stream-line motions which would exist about the oscillating ship, if there were no bilge keels. Another cause of the difference is that the bilge keels during the early portion of the swing set into motion a large mass of water, only a small proportion of whose energy is returned to the ship towards the end of the roll. This condition is accentuated when the vessel is in motion ahead, and owing also to the increase of other resistances at high speeds, a more rapid extinction is then obtained. It appears from experiments made on H.M.S. "Revenge" and on a torpedo boat destroyer that the extinction at a given angle of roll is given by a linear formula $-d\theta \quad \alpha + \beta V$, where α and β are coefficients independent of the speed V [1]

Froude attacked the problem of resisted rolling in an inverse manner, endeavouring to ascertain "what wave-series is required to keep the given ship at a given range of steady rolling with any assigned period, including the effect of resistance." Subsequently he treated the problem in a direct manner by the process of "graphic integration," an exact method of determining the motion of a ship, the elements of the ship's rolling in still water and the wave-series acting upon her being given.[2] Some interesting developments of the process were made by Sir William White in a paper read before the Inst. Nav. Arch. in 1881 on the "Rolling of Sailing Ships," in which the action of the wind on the sails and the variation of the virtual weight of the ship on the wave are included. The effect of wind-pressure in heeling a ship is very much greater when she is at the crest of a wave than when she is at the trough, because her virtual weight is less. This must be taken into account when dealing with sailing vessels; the reduction of virtual weight, and therefore of righting moment, at the crest of a wave being very considerable, although the heeling moments due to the wind suffer no such reduction.

The differential equation for rolling among waves including the effect of resistances varying as the first power of the angular velocity is—

$$\frac{W\epsilon^2}{g}\frac{d^2\theta}{dt^2} + K\frac{d\theta}{dt} + W_m\left(\theta - \Theta_1 \sin\frac{\pi}{T_1}t\right) = 0,$$

which becomes on substitution (K being expressed in terms of a)—

$$\frac{d^2\theta}{dt^2} + \frac{2a}{T}\frac{d\theta}{dt} + \frac{\pi^2}{T^2}\theta = \frac{\pi^2}{T^2}\cdot\Theta_1 \sin\frac{\pi}{T_1}t.$$

The general solution is—

$$\theta = Ae^{\frac{-at}{T}} \sin\left(\frac{\pi t}{T}\cdot\sqrt{1 - \frac{a^2}{\pi^2}} + \beta\right) + A_1\Theta_1 \sin\left(\frac{\pi t}{T_1} - \beta_1\right), \quad . \quad (9)$$

where

$$A_1^2 = \frac{1}{\left(1 - \frac{T^2}{T_1^2}\right)^2 + \frac{4a^2}{\pi^2}\frac{T^2}{T_1^2}} \text{ and } \beta_1 = \tan^{-1}\frac{2aTT_1}{\pi(T_1^2 - T^2)}$$

and A and β are arbitrary.

The first term represents a free oscillation of the ship, which in time dies out, leaving a forced oscillation in the period of the waves. From observations on rolling, however, it is found that, owing to the departure from exact uniformity in the waves encountered, a ship seldom, if ever, completely forsakes her own natural period of rolls; for each slight alteration in the wave period T_1 introduces afresh terms involving the free oscillations of the ship. In the synchronizing conditions where $T = T_1$, the forced oscillation is represented by

$$\theta = -\frac{\pi}{2a}\Theta_1 \cos\frac{\pi t}{T},$$

the amplitude being limited entirely by the resistance; the phase is $\frac{\pi}{2}$ before that of the wave slope. The vessel is then upright in mid-height, and inclined to its maximum angle on the crest and in the hollow of the wave. The maximum amplitude Θ is given by $\frac{\pi}{2}\cdot\Theta_1 - a\cdot\Theta$. Since the right-hand term represents the decrement of roll due to resistance, the left-hand side must represent the increment of roll due to the wave in this synchronizing steady motion. If this latter relation be assumed to hold when the resistance to motion is represented by the more general decremental equation, then the maximum amplitude Θ is given by

$$\frac{\pi}{2}\Theta_1 = a\cdot\Theta + b\cdot\Theta^2.$$

In 1894 and 1895 M. Bertin, at the Institution of Naval Architects, extended this relation to cases in which T_1 is not equal to T, obtaining at the same time not simply the angles of steady rolling for these cases, but the maximum angles passed through on the way to the steady condition; to these maximum angles he gave the name of "apogee" rolls.

In 1896, at the Institution of Naval Architects, Mr R. E. Froude investigated the probable maximum amplitude of roll under the influence of a non-synchronous and non-harmonic swell. He imagined three identical ships, A, B and C, the first rolling in still water, and the two others placed in the same swell assumed recurrent in period $2T_1$, but not necessarily harmonic. Assuming resistance to vary as $\frac{d\theta}{dt}$, then denoting the vessels by suffixes, the effective wave slope by θ_1, and constants by K, K′ and K″,

$$\frac{d^2\theta_A}{dt^2} + K\frac{d\theta_A}{dt} + K'\theta_A = 0;$$

$$\frac{d^2\theta_B}{dt^2} + K\frac{d\theta_B}{dt} + K'\theta_B = K''\theta_1;$$

$$\frac{d^2\theta_C}{dt^2} + K\frac{d\theta_C}{dt} + K'\theta_C = K''\theta_1.$$

[1] See papers on this subject read before the Institution of Naval Architects in 1900 by Professor Bryan and in 1905 and 1909 by Mr A. W. Johns.

[2] See *Trans. Inst. Naval Arch.*, 1875.

If at any instant

$$\theta_A = \theta_C - \theta_B \text{ and } \frac{d\theta_A}{dt} = \frac{d\theta_C}{dt} - \frac{d\theta_B}{dt}$$

it follows that

$$\frac{d^2\theta_A}{dt^2} = \frac{d^2\theta_C}{dt^2} - \frac{d^2\theta_B}{dt^2};$$

whence the above three relations hold at the successive instants and consequently for all time. Hence the rolling of C differs from that of B in having the free oscillations of A in still water superposed upon it. If, therefore, it is possible to obtain any one motion in the swell, any other motion due to a different phase relation between ship and wave slope can be at once determined. A convenient motion in the swell to form a basis for obtaining other motions is the forced oscillation proper to the swell, *i.e.* the particular oscillation that is recurrent in the period of the swell. The amplitude of roll at any instant is therefore the sum of the amplitudes due to the forced oscillation and to an arbitrary free oscillation in still water. If the latter component be regarded as perfectly arbitrary there is no limit to the angle of roll obtained by postulating suitable initial conditions; to determine the practical limitation of rolling, however, it may reasonably be assumed that at or near the commencement of the motion there will be a brief period of no roll, and that the maximum angle of roll obtained will occur at no great interval of time after this period. At the instant when there is no roll, the forced and free oscillations are equal in magnitude and opposite in phase, and the period of maximum (termed the "criterion") amplitude Θ_c will occur as soon as the two components are in phase; the time interval between the two conditions is nT, where $n = \pm\frac{T_1}{T - T_1}$.

It is assumed also that during the above interval—(1) the effect of the swell was sensibly the same as that of a simple harmonic wave, A being the amplitude of the forced oscillation (and of the initial free oscillation); (2) the extinction equation of the free oscillation $-\frac{d\Theta}{dn} = a\Theta + b\Theta^2$ can be replaced by the simple form $-\frac{d\Theta}{dn} = E\Theta$, where $E = a + b\Theta_c$ approximately; this has been implied by the absence of terms containing $\left(\frac{d\theta}{dt}\right)^2$ in the differential equation above.

The amplitude of the free oscillation during the maximum roll is, from equation (8) Ae^{-ne}; whence

$$\Theta_c = A(1 + e^{-ne}).$$

Also, from equation (9), the forced oscillation is given by

$$\Theta_1 = A\sqrt{\left(1 - \frac{T^2}{T_1^2}\right)^2 + \left(\frac{2}{\pi} \cdot \frac{T}{T_1} \cdot E\right)^2}$$

From these equations Θ_1 can be determined if T, T_1, a, b and Θ_C are given; conversely if Θ_C is known, Θ_1 can be tentatively obtained.

The following table gives the criterion angle (Θ_C) and the angle of steady roll (A) for the "Revenge," both without and with bilge keels, obtained on the above-mentioned assumptions:

Maximum Wave-Slope, 3 Degrees.

	$\frac{T}{T_1} = 1{\cdot}3$. $n = 3{\cdot}33$.		$\frac{T}{T_1} = 1{\cdot}2$. $n = 5$.		$\frac{T}{T_1} = 1{\cdot}1$. $n = 10$.		$\frac{T}{T_1} = 1{\cdot}0$. $n = \infty$.	
	Criterion Angle.	Angle of Steady Roll.	Criterion Angle.	Angle of Steady Roll.	Criterion Angle.	Angle of Steady Roll.	Criterion Angle.	Angle of Steady Roll.
	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.
"Revenge" (deep draught), with no bilge keels	8·25	4·35	12·25	6·8	21·2	13·9	41·1	41·1
"Revenge" (deep draught), with bilge keels	6·6	4·24	8·6	6·4	11·55	10·8	14·85	14·85

Among the conclusions reached by Mr R. E. Froude in the case of a ship rolling in a uniform swell were:

However non-uniform initially, the rolling ultimately falls into the uniform forced oscillation; it does so the sooner, *caeteris paribus*, the higher the resistance, and with the fewer "cycles" or alterations of amplitude of rolling, the more nearly synchronous the swell with the ship. The amplitude of the ultimate uniform rolling is an approximate mean of the alternate maxima and minima of the precedent non-uniform rolling. If the rolling starts from zero, the maximum amplitude falls short of twice the ultimate uniform amplitude, the more so the higher the resistance and the more synchronous the swell; and in a synchronous swell the maximum amplitude cannot exceed the ultimate uniform amplitude, unless it does so initially.

In two papers by Captain and Professor Kriloff of St Petersburg, read before the I.N.A. in 1896 and 1898, the whole motion of the ship, including pitching and rolling, is dealt with; every variation which can reasonably be conceived is taken into account in these papers.

Of the various appliances adopted to reduce rolling, the most important and successful are bilge keels. Some reference has already been made to the influence they exert on the rolling of ships, as illustrated by H.M.S. "Revenge," in which there was one bilge keel on each side, 200 ft. in length and 3 ft. in depth, tapered at the extreme ends. The great value of bilge keels in diminishing rolling was pointed out by Froude and demonstrated by him in 1872 by experiment with the "Perseus" and the "Greyhound," which were alike in every essential respect, except that the former was not provided with bilge keels and the latter was. The general conclusion was that the rolling of the "Greyhound" was only about one-half that of the "Perseus." ***Methods of reducing rolling.***

Bilge keels were usual in warships until, in the design of the "Royal Sovereign" class, it was decided not to fit them, owing to the large dimensions of the vessels and the difficulties in certain circumstances of docking them if provided with bilge keels. Ultimately one of the class, the "Repulse," had them fitted for purposes of comparison, and the effect on her rolling was so marked that it was resolved to fit them to all the ships of the class. Before fitting them on the "Revenge," a careful programme was drawn up of experiments to be made before and after the bilge keels were fitted; and on carrying out this programme some valuable results were obtained. The experiments were made at Spithead, in smooth water; the general effect of the bilge keels was to reduce the rolling to one-third of its former amount. When, instead of having no motion in the line ahead, the ship had a speed of 12 knots, an even greater reduction in the rolling was observed. Their effect on other qualities of ships is on the whole beneficial, and in general little, if any, reduction in speed has resulted from their use. The experience of Great Britain with regard to bilge keels has been repeated in America. Bilge keels were omitted for the same reasons as they were in the "Royal Sovereign" class; they were afterwards fitted in the U.S.S. "Oregon," experimental investigation being made both without and with them, and the general conclusion arrived at was that the rolling was diminished by two-thirds by the adoption of the bilge keels.

A method for reducing rolling of ships in a sea-way by the use of water-chambers was devised by the writer in 1874 in connexion with the design of the "Inflexible," which was expected to be a bad roller. It consists in fitting one or more tanks across the ship of such shape that when filled to a suitable height with water the motion of the water from side to side as the vessel rolls is such as to retard the rolling. Let fig. 30 represent a series of transverse sections of a ship fitted with a water-chamber, in various positions in rolling from port to starboard; and suppose the water to move so as to be most effective in quelling rolling. Let G represent the centre of gravity of the ship including the water in the chamber, g the centre of gravity of the water in the chamber, and B the centre of buoyancy of the ship; and let the arrows over the sections indicate the direction in which the ship is rolling at the instant considered. In position No. 1 suppose the ship to have reached the extreme heel to port and to be on the point of commencing the return roll, then g should have reached the middle line on its way down towards the port side and the righting couple will be that due to the angle of heel, supposing the water to be a fixed weight amidships. In the position No. 2 the ship has performed part of the roll back towards the upright; the water will have moved farther down the incline, so that g will be some distance from the middle line on the port side as shown, and therefore G will also have moved out from the middle line on the port side; hence the righting couple will be less than what would correspond to the angle of heel if the water were a fixed weight amidships. In position No. 3 the ship has just reached the upright and will be moving with the maximum angular velocity; the water will have moved still farther down the incline, and g will be at a greater distance from the middle line on the port side, and therefore G will have moved farther out from the middle line, whereas B will have returned to the middle line; so that the weight of the ship and the upward pressure of the water will form a couple tending to retard the ship's rotation, although she is for the moment in the upright position. In the position No. 4 the ship is heeling over to starboard and the centre of gravity of the water is returning towards the middle line; but it and G are still on the port side, and the righting couple is therefore greater than that corresponding to the angle of heel of the ship and a fixed centre of gravity amidships. In the position No. 5 the ship has momentarily

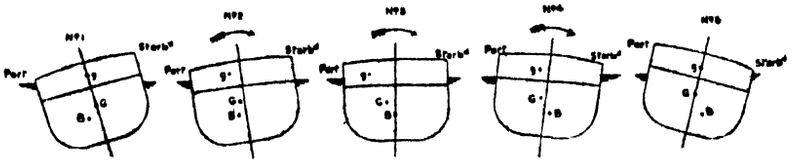


FIG. 30.

come to rest at the end of the starboard roll, the centre of gravity of the water should have again reached the middle line, and the righting couple should be neither increased nor diminished by the water-chamber, except in so far as it affects the displacement and the vertical position of the centre of gravity. The same process is repeated on the ship's roll back from starboard to port. Thus the water-chamber reduces the angle of roll of the ship chiefly by modifying the righting couple acting upon her throughout the rolling; it increases the righting couple which opposes the motion as the ship heels over, thereby reducing the amount of the heel, and on the return roll it lessens the righting couple and causes the ship to move more slowly than she otherwise would, so that she acquires less angular momentum on reaching the upright, and therefore tends to roll less deeply the other way.

Two water-chambers were originally contemplated in the old *Inflexible*, but the space occupied by one of these was required for other purposes, and only one, the smaller of the two, which was 51 ft. long (across the ship), and 14 ft. wide (fore and aft), was finally fitted. This was shown to reduce the rolling by about 25 %. Several ships have since been fitted with this device.[1]

In addition to trials at sea to ascertain the diminution of roll by this means, still-water rolling experiments were carried out in the "Edinburgh" and compared with the results obtained with a model water-chamber on a linear scale of $\frac{1}{20{\cdot}5}$, loaded so that its period and stability corresponded to those of the ship. A close agreement was observed between the behaviour of the model and the ship; and this enabled the experiments to be carried out over a larger range of conditions than would have been practicable with the ship alone. The model was supported on knife edges and connected to a paddle partially immersed in the water of a tank; this was adjusted to represent to scale the natural extinction of roll in the ship without

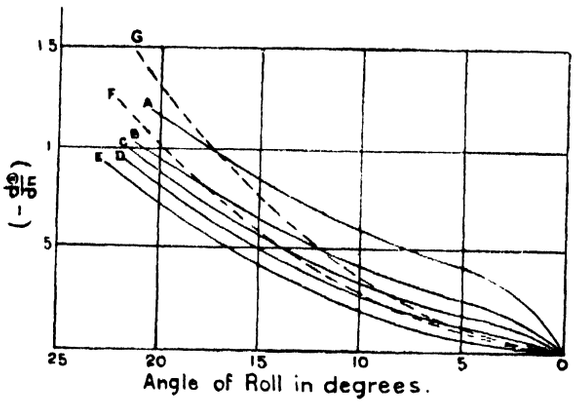


FIG. 31.

the water-chamber. The length of the chamber (in the ship) was 16 ft.; and widths of 43 ft., 51½ ft. and 67 ft. were successively given to it. The displacement of the ship was about 7500 tons; the period 10 seconds; and the metacentric height 7·52 ft. On experimenting with different depths of water, it was found that the maximum extinctive effect at all angles of roll was obtained with the depth at which the period of motion of the water from side to side of the tank is equal to the period of the ship. The best depths were found to be 2·3 ft. and 3·35 ft. with breadths of 43 ft. and 51½ ft. respectively, thus agreeing closely with the theoretical formula, $v = \sqrt{gh}$, for the speed of a solitary wave across the water-chamber. In these circumstances the water rushed across the tank in a breaking wave or bore, and consumed energy in its passage and through its violent impact with the sides of the tank. With other depths, the motion of the water, at moderate angles, took the form of a slope gently alternating from side to side at small angles of roll; and the effect was practically non-extinctive. With the critical depth the growth of the resistance to rolling commenced almost at zero angle; but, with other depths, the extinction was nearly nil, until a certain angle of roll was attained, whose amount increased with the departure from the critical depth. At the larger angles of roll, the disadvantage of the departure from the critical depth was not marked. The resistance of the chamber increased considerably with the breadth; the value of the 51½-ft. chamber was roughly twice and that of the 67-ft. chamber three times that of the 43-ft. chamber.

In order to compare the effect of water-chambers with that of other methods of extinction, it is observed that the resistance due to the former increases slowly at large angles of roll. The effectiveness of bilge keels, on the other hand, increases rapidly as the angle of roll increases. It was found that, with 12° roll, the resistance of the water-chamber was equivalent to that of 2 ft. of additional bilge keel; but at 17½° the water-chamber was relatively about half as effective. With 3° of roll, however, the water-chamber was about 9 times as effective as the additional bilge keel. Fig. 31 shows the comparative rates of extinction under the various conditions.[2]

Water-chambers have been successfully employed to limit the rolling motions at sea in ships of the old "Inflexible," "Edinburgh" and "Admiral" classes, and in other warships and merchant vessels.

Sir John Thornycroft devised an arrangement for overcoming the rolling motion of a ship amongst waves, consisting of a weight carried from side to side so as always to oppose the heeling couple caused by the wave slope. The weight was automatically worked by apparatus controlled by two pendulums (or their equivalent), one of which—a long period pendulum—remained vertical, and the other—a short-period pendulum—placed itself perpendicular to the effective wave slope. The gear was fitted on a yacht of about 230 tons displacement, the moving weight being 8 tons; and the net effect in this case was to reduce the rolling by about one-half. (See *Trans. Inst. Nav. Archs.* 1892.)

An interesting application of the gyroscope to the diminution of rolling was devised by Dr O. Schlick, and fitted by him to the S.S. "See-bar." The principle of its action, the details of the gear, and a description of the trials are given in papers read before the Inst. Nav. Archs. in 1904 and 1907. Particulars of the "See-bar" were: length 110 ft., breadth 11·7 ft., draught 3·4 ft., displacement 50 tons, metacentric height 1·64 ft., and period of double roll (gyroscope at rest) 4·14 seconds. The fly-wheel of the gyroscope was one metre in external diameter, weighed 1100 lb, and it was run at 1000 revolutions per minute; its axis was initially vertical, and the casing containing the wheel was capable of revolving about a horizontal athwartship axis, the centre of gravity of the apparatus lying slightly below this axis. A brake was fitted to control the longitudinal oscillations of the casing. When the wheel was revolving and the axis held by the brake, no effect was produced upon the motion of the ship; but when the axis was allowed to oscillate freely in the middle-line plane the period of roll was lengthened to 6 seconds, but no other extinctive effect was obtained. By suitably damping the longitudinal oscillations of the gyroscope, however, by means of the brake, a large extinctive effect upon the rolling was experienced; and during the trials made, the apparatus stopped practically all rolling motion.

Pitching and heaving.

The equations for the pitching motions of a vessel are identical in form with those for rolling; and the preceding remarks are, in general, equally applicable to pitching. In a large number of ships the period for pitching is approximately one-half of that for rolling; but the angles attained are considerably less. Where control over the longitudinal positions of weights is possible, *e.g.* in small sailing vessels, weights are removed as far as possible from the ends in order to shorten the period, the safety of short ships and boats being secured when the deck is maintained as nearly as possible parallel to the wave slope (*v.* remarks by Froude *ante*).

The single period for heaving and dipping oscillations is equal to $\pi\sqrt{\frac{12W}{g\overline{1}T''}}$ when W is the displacement in tons, and T″ the tons per inch immersion. When proceeding across waves of apparent semi-period T_1, forced heaving oscillations of semi-amplitude $a\frac{T_1^2}{T_1^2 - T^2}$ are obtained, where T is the single period of dip, and $2a$ is the vertical distance between the statical positions of the ship on crest and in trough of wave. These oscillations combine with the free dipping oscillations due to the circumstances of the initial motion, the resultant motion being of interest in connexion with the longitudinal bending moments in the ship caused by the waves. (See section *Strength*.)

Pitching or rolling is frequently the cause of dipping oscillations, and the motion is then termed uneasy; this action may be of importance in ships whose sides near the water-line have a considerable slope to the vertical, since any rolling motion is then accompanied by vertical oscillations of the centre of gravity. It may also be shown that forced dipping oscillations of considerable amplitude are obtained when the period of roll (or pitch) in such cases approximates to twice the dipping period; the complex nature of the resistances attending the motion of the ship has, however, prevented a complete investigation being made.

Interference also occurs between the rolling and pitching movements of a ship, when the centres of gravity of the wedges of immersion and emersion for moderate angles of heel are separated by a considerable distance longitudinally; and occasionally uneasy rolling of a peculiar character is caused thereby.

Resistance.

The resistance of a ship in steady motion, or the force exerted by the surrounding water on the hull, opposing its progress, is equal and opposite to the thrust of the propellers. The ship is subjected to a system of balanced forces, each of which is in some degree affected by the others. It is convenient, however, first to confine attention to the resistance of the hull, assuming the

[1] See paper on "A Method of Reducing the Rolling of Ships at Sea" in *Trans. Inst. Nav. Archs.* 1883.

[2] See paper entitled "The Use of Water-Chambers for Reducing the Rolling of Ships at Sea," *Trans. Inst. Nav. Archs.* 1885.

propeller to be removed, and the ship to be towed through undisturbed water. Under these conditions the power expended in towing the vessel is termed the *effective horse power*, and is considerably less than the indicated horse power exerted by the propelling engines at the same speed. The relation between the effective and indicated horse powers, and the effect of the propellers on the resistance of the ship will be discussed under *Propulsion*, below.

If a body of "fair" form, *i.e.* without abruptness or discontinuity in its surface, moves uniformly at a considerable depth below the surface of an incompressible and perfect fluid, it can be shown that no resistance is experienced, and the uniform motion will, *ceteris paribus*, continue indefinitely. The motion of the fluid is extremely small, except in the close vicinity of the body. A clearer conception of the interaction of fluid and body is obtained by impressing upon the whole system a velocity equal and opposite to that of the body, which then becomes motionless and is situated in a uniform stream of the fluid. The particles of fluid move in a series of lines termed "stream lines"; and the surface formed by all the stream lines passing through a small closed contour is termed a "stream tube." If a denote the area of a stream tube, assumed sufficiently small for the velocity v at a point within it to be sensibly uniform across a section, then, since no fluid is leaving or entering the tube,

$$a.v = \text{constant}$$

throughout its length. The motion of the fluid is also subject to Bernoulli's energy quotation—

$$\frac{p}{w} + \frac{v^2}{2g} + h = \text{constant},$$

p, w and h being respectively the fluid pressure, the density and the height above a fixed datum.

The remaining conditions affecting the flow and determining the forms of the stream lines are purely geometrical, and depend on the form of the body.

The motion in a perfect fluid flowing past bodies of a few simple mathematical forms has been investigated with success, but in the general case the forms of the stream lines can only be obtained by approximate methods. It is evident that the flow is in all cases reversible since the equations are unaltered when the sign of v is changed; on the other hand any resistance must always oppose the motion, and therefore, as stated above, there can be no resistance under these conditions.

Components of resistance. The circumstances attending the motion of a ship on the surface of the sea (or that of a stream of water flowing past a stationary vessel) differ from those hitherto assumed; and resistance is experienced through various causes. Frictional resistance results from the rubbing of the water past the surface of the hull; eddy resistances are caused by local discontinuities, such as shaft brackets; and resistance due to wind is experienced on the hull and upper works. Moreover, the stream-line motion, as will be shown later, causes a diminution in the relative velocity of the water at the ends of the ship; from the energy equation above, it is evident that the pressure is increased, resulting in an elevation of the surface of the water at those places. A wave is thus formed at the bow and stern, requiring an expenditure of energy for its maintenance and entailing additional resistance.

Of these components of resistance, that due to eddy making is usually small; eddying is caused by blunt beginnings or endings, particularly the latter, in the water-lines and underwater fittings. Air resistance also is generally of small importance; in the "Greyhound" (unrigged) it constituted 1·4 % of the total resistance at 10 knots in calm weather, and in a large Atlantic liner at 25 knots it absorbs about .4 % of the total power. In the case of average ships, unrigged or with moderate top-hamper, the proportion of air resistance is probably less than the latter value. The effect of wind and rough weather on the speed of ships is also largely due to the action of the waves and other motion of the sea, the additional effect of which is indeterminate.

The difference between the total resistance and that due to skin friction is termed the residuary resistance; from the foregoing remarks it appears that it consists principally of the resistance due to wave-making. Since the action of the waves is such as to distort the stream lines near the hull, and the form of the waves is in turn affected by the frictional wake, the frictional and wave-making resistances of a ship are to some extent mutually dependent. It is convenient, however, to neglect the interaction of these constituents, and to assume that the whole resistance is obtained by simple summation of its component parts as calculated independently. Considerable justification for this assumption is furnished by the close agreement between the results of experiments on models and on ships, where the proportion of frictional to total resistance is greatly different.

Wake. Since the action and the reaction of the water pressure on the hull of a ship are equal and opposite, forward momentum is generated in the water at such a rate that the increase of momentum per second is equal to the total resistance. The water participating in the forward movement is termed the *wake*; the portion of the wake in the vicinity of the propellers is found to have considerable effect upon the propulsion of the ship. Experiments were made by Mr Calvert (*Trans. Inst. N.A.* 1893) to determine the wake velocity with a model of length 28½ ft. and displacement 2·9 tons. The extent of the wake was measured at various positions in the length, and its maximum velocity was observed to be 0·67 times the speed of the ship. Abreast the screw the mean velocity ratio over an area of the same breadth (3·66 ft.) as the ship and of depth equal to the draught (1·55 ft.) was 0·19, of which about 0·05 was ascribed to frictional resistance. In *Rep. Brit. Assoc.* 1874 is contained an investigation by Froude of the extent of the frictional wake and its velocity distribution based on the equality of the resistance to the momentum added per second. It may be here observed that for any ship propelled in the ordinary manner at uniform speed the momentum generated in the sternward race from the propeller is equal and opposite to that of the forward wake due to the hull. The motion of the water as a whole thus consists of a circulatory disturbance advancing with the ship, and having no linear momentum.

Frictional resistance. The whole of the resistance at low speeds, and a considerable proportion of it at higher speeds, is due to surface friction, *i.e.* to the eddying belt surrounding the hull which is caused by the tangential frictional action between the water and the outside skin. It is nearly independent of the form of the vessel; and is conveniently estimated from the results of experiments made by towing in a tank planks coated with various surfaces. The most important of such experiments were those made by Froude in the experimental tank at Chelston Cross, Torquay. The object was to obtain the laws of variation of resistance with the speed, the length, and the quality of the surface. A dynamometric apparatus by which the planks were towed was used to register the resistance, the planks were given a fine edge at each end to avoid eddy making, and were fully immersed in order that no waves should be formed. The results are given in the *Reports of the British Association*, 1872 and 1874. In the following extract n is the index of the speed at which the resistance varies, A the mean resistance per square foot of surface over the length stated, and B the resistance per square foot at the after end of the plank; both A and B refer to a velocity of 10 ft. per second in fresh water.

Length of Surface in Feet.

	2 ft.			8 ft.			20 ft.			50 ft.		
	n.	A.	B.	*n.*	A.	B.	*n.*	A.	B.	*n.*	A.	B.
Tinfoil . . .	2·16	·30	·295	1·99	·278	·263	1·90	·262	·244	1·83	·246	·232
Paraffin . .	1·95	·38	·370	1·94	·314	·260	1·93	·271	·237	..	..	..
Varnish . .	2·00	·41	·390	1·85	·325	·264	1·85	·278	·240	1·83	·250	·226
Fine sand . .	2·00	·81	·690	2·00	·583	·450	2·00	·480	·384	2·06	·405	·337
Calico . . .	1·93	·87	·725	1·92	·626	·504	1·89	·531	·447	1·87	·474	·423
Medium sand .	2·00	·90	·730	2·00	·625	·488	2·00	·534	·465	2·00	·488	·456
Coarse sand .	2·00	1·10	·880	2·00	·714	·520	2·00	·588	·490	..	..	..

These results are in accordance with the formula—

$$R = fwS \cdot \frac{V^n}{2g};$$

R being the frictional resistance, S the area of surface, V the speed, w the density of the water, f a coefficient depending on the nature and length of the surface, and n the index of the speed; the values of f and n can be readily obtained from the above table. It is seen that the resistance varies as the density of the water, but is independent of its pressure; it diminishes as the length of the surface increases, on account of the frictional wake, which reduces the velocity of rubbing between the water and the surface towards the after end. The index n is 1·83 for a varnished surface equivalent to the freshly painted hull of a ship. The results of Froude's experiments are closely corroborated by similar experiments undertaken by the late Dr Tideman.

When applying the data to ships of length greater than 50 ft., the coefficient B, denoting the resistance 50 ft. from the bow, is assumed to remain unaltered at all greater distances astern. The velocity of rubbing is assumed equal to the speed of the ship, any slight variation due to stream-line action being neglected. The wetted surface S, when not directly calculated, can be estimated with sufficient accuracy by the formula—

$$S = 1{\cdot}7LD + \frac{V}{D}$$

where V is the volume of displacement, L the length, and D the mean draught.

Wave resistance. The resistance due to wave making, although inconsiderable at low speeds, is of importance at moderate and at high speeds; it constitutes the greater portion of the total resistance in fast ships.

By impressing, as above, a suitable velocity on the whole system of ship and water, the problem is reduced to one of steady motion in a stream flowing past a stationary ship. The stream tubes, originally of uniform width, become broader on approaching the bow of the ship, and attain their greatest breadth close to the stem. Proceeding aft, the tubes contract, and near amidships they become smaller than they were originally; an enlargement in the tubes again takes place near the stern. The changes in size and velocity in the stream tubes lead to corresponding alterations of pressure in accordance with the energy equation, which alterations appear as elevations and depressions of the surface forming what is termed the statical wave system. If this were a permanent system, no resistance to the motion of the ship would be caused thereby. The surface disturbance, however, is subject to the dynamical laws underlying the propagation of waves; in consequence the wave formation differs from the "statical wave," the crest lagging astern of the "statical" wave crest, and the ship being followed by a train of waves whose lengths are appropriate to the speed attained. The energy within the wave system travels backward relative to the ship at one-half its speed; the resistance experienced by the ship is due to the sternward drain of the wave energy which requires work to be done on the ship to replace that absorbed by the waves.

The form of the wave system is not susceptible of complete mathematical investigation; but the circumstances are approximately realized and the conditions considerably simplified when the actions of the bow and stern of the vessel are each replaced by the mathematical conception of a "pressure point." This consists of an infinitely large pressure applied over an indefinitely small region of the water surface; it is assumed to move forward in place of the ship through still water, or, equally, to be stationary in a uniform stream. The resulting wave system has been investigated by Lord Kelvin and others. It is found to consist of a local disturbance surrounding the pressure point and depending on the pressure distribution combined with a series of waves which are confined within two straight lines drawn backwards through the pressure point and making angles of about 20° $\left(\tan^{-1}\frac{1}{2\sqrt{2}}\right)$ with the line of motion. The waves within this region extend indefinitely astern with crests crossing the line of motion perpendicularly. The crest lines are slightly curved, convex to the pressure point, and at the bounding lines form cusps whose tangents are inclined to the line of flow at an angle of about 36° $\left(\tan^{-1}\frac{1}{\sqrt{2}}\right)$. The crest lines afterwards curve forward towards the pressure point. The distance apart of the transverse wave crests is equal to the length l of wave appropriate to the speed v, as expressed in the formula $v^2 = gl/2\pi$. These results are of interest since they are in agreement in many respects with those of actual observation for ships and models. In fig. 32,

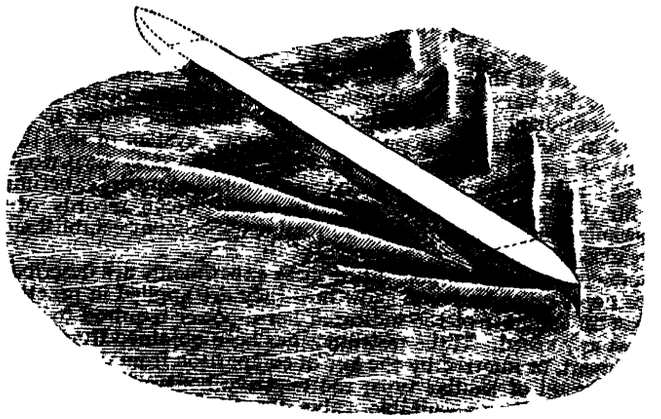


FIG. 32.

reproduced from a paper in the *I.N.A.* 1877, read by Froude, is shown the bow-wave system obtained from a model, which is also illustrative of that produced by ships of all types. It appears therefore that two types of waves accompany a ship—(1) diverging waves having sharply defined crests placed in echelon, the foremost wave alone extending to the ship; (2) transverse waves limited in breadth by the diverging crests and reaching the sides of the vessel throughout its length. These compare with the crest lines obtained in the above hydrodynamical investigation; the transverse and diverging waves correspond to the different portions of the crest lines which are separated by the cusps.

Since the bow diverging waves are not in contact with the ship except at the bow, the energy spent in their maintenance travels away from the ship and is lost. A diverging wave system of similar form but of smaller dimensions attends the passage of the stern; and the resistance due to the diverging systems of waves is therefore the sum of its components at the bow and stern, following a regular although unknown law, increasing with the speed, and depending considerably on the shape of the bow and stern.

On the other hand the interference between the transverse bow and stern wave systems produces a stern wave in contact with the ship; the resistance due to the resultant transverse wave system depends therefore on the phase relation between the waves of the component systems. The effect of interference on the wave resistance was investigated by Froude (*Trans. I.N.A.* 1877) by means of experiments on a series of models having the same entrance and run, but in which the length of parallel middle body was varied. At constant speed curves of residuary resistance on a length base consisted of humps and hollows, whose spacing was constant and approximately equal to the wave length appropriate to the speed; the amplitude of the fluctuation diminished as the length increased. For a given length the residuary resistance in general increased at a high power of the speed; but it was also subject to a series of fluctuations whose magnitude and spacing increased with the speed. The results of these experiments were fully analysed in 1881 by Mr R. E. Froude, who showed that a reduction in the resistance occurred when the trough of the bow wave coincided with the crest of the component stern wave, the resultant wave system being of relatively small dimensions. Conversely, the resistance was abnormally increased when the crests of the bow and stern systems coincided. The fluctuation in the resistance thereby obtained was smaller when the length of middle body became greater, owing to the greater degradation of the bow-wave system at the stern through viscosity and lateral spreading. For very considerable lengths of middle body, the height of the bow wave system at the stern was insufficient to produce interference or affect the resistance.

The speed in knots (V) of a wave is related to the length in feet (l) by the formula $V^2 = 1{\cdot}8l$. If L′ be the distance apart of the component bow and stern waves (which is generally rather greater than the length of the ship), relatively small resistance would be anticipated when V^2 is approximately equal to 3·6 L′ or any odd submultiple of 3·6 L′; on the other hand when V^2 was not greatly different from 1·8 L′, or any submultiple of 1·8 L′, abnormal wave resistance would be developed. This result is to a great extent confirmed by experience with ships of all classes; for economical propulsion at a speed V, the length L of a ship should be generally equal to or slightly less than V^2, corresponding to the "favourable" value of about 1·2 of the ratio $\frac{V^2}{L'}$; torpedo-boat destroyers and similar vessels of extremely high speed constitute an exception, the value of the ratio $\frac{V^2}{L}$ being then frequently as great as 4, which approximately coincides with the highest "favourable" value of $\frac{V^2}{L'}$.

Law of comparison.

The foregoing description of the resistance experienced by ships through wave making makes it evident that the conditions underlying wave resistance are too complex to enable its amount to be directly estimated as is possible in the case of frictional resistance. Experiments also show that there is no simple law connecting wave resistance with size, form or speed. The effect of size alone, *i.e.* the scale of the experiment, can, however, be eliminated by means of the "principle of similitude" enunciated by Newton, which is applicable with certain limitations to all dynamical systems. The extension of this principle forms the foundation of all methods employed practically for estimating the residuary resistance and horse power of ships. The principle states that in two geometrically and mechanically similar systems, whose linear dimensions vary as the squares of the velocities of the corresponding particles, and whose forces vary as their masses, the motions of the two systems will be similar. A proof of this theorem follows at once from the equations of motion for any particle. The law of comparison, which is the application (originally made by Froude) of the principle of similitude to the resistance of ships, is enunciated as follows:

"If the linear dimensions of a ship be n times those of its model, and the resistances of the latter be R_1, R_2, R_3, ... at speeds V_1, V_2, V_3, ..., then the resistances of the ship at the 'corresponding speeds' $V_1\sqrt{n}$, $V_2\sqrt{n}$, $V_3\sqrt{n}$, ... will be R_1n^3, R_2n^3, R_3n^3, ... and therefore the effective horse powers at corresponding speeds are increased in the ratio $n^{\frac{3}{2}}:1$."

It is necessary to ensure that the conditions underlying the principle of similitude are satisfied by all the components of resistance, when the law of comparison is employed for the purpose of obtaining the ratio between the total resistances of two ships at corresponding speeds. Residuary resistance, consisting of that caused by wave making, eddies, and air resistance, is attributable to normal pressures on various surfaces caused by changes of velocity in the water or air. It appears from Bernoulli's energy equation that the pressures per unit area are proportional to the square of the velocity, *i.e.* at corresponding speeds, to the linear dimensions. The total pressures are therefore proportional to the cube of the linear dimensions, *i.e.* to the masses, thus complying with the primary condition regarding the force ratios. Frictional resistance, which varies with the length of surface and as the 1·83 power of the speed, does not satisfy this condition. In the application of the law of comparison to ships and

models where the linear ratio is considerable, the residuary resistance alone should be compared by that means, the frictional resistance being independently calculated for ship and model from the results of Froude's experiments. The law may, however, be extended without appreciable error to total resistance when the corresponding linear dimensions of the ships compared are not greatly different.

If it be assumed that the residuary resistance of a ship is capable of being expressed as the sum of a number of terms of the form W^mV^n, where W is the displacement, it appears from the law of comparison that $6m+n=6$ for each term of the expression; and in the construction of approximate formulae of this type for residuary resistance, the indices m and n must satisfy this equation. The values of the indices are found to vary irregularly with the speed and type of ship; at uneconomical speeds n may be equal to or greater than 5, and at "favourable" speeds its value may be as low as 1·5, 4 being an approximate mean value for n at moderate speeds. A fact pointed out by Professor Biles in a paper read before the Institution of Naval Architects in 1881 is interesting in this connexion. When the resistance of a ship varies as the 6th power of the speed, an increase in the displacement by a proportionate enlargement of dimension will not cause an increase in the resistance for the same speed; and if the resistance varied as a higher power of the speed than the 6th, the resistance would actually be reduced by increasing the displacement.

The accuracy of the law of comparison was verified by the "Greyhound" resistance experiments carried out by Froude on behalf of the Admiralty (*Trans. I.N.A.*, 1874).

The "Greyhound" was a twin-screw sloop 170 ft. long and of about 1160 tons displacement; the trials were made over a range of speeds extending from 3 to 12½ knots, and with varying draught and trim. She was towed from the end of a spar 48 ft. in length projecting over the side of the towing vessel, H.M.S. "Active"; this ensured that the wave system and wake of the "Active" were prevented from reaching the "Greyhound" and influencing her resistance. A dynamometric apparatus was placed in the bow of the "Greyhound," and arranged so as to record the horizontal component of the tension in the tow rope; by this means the ship's resistance was measured under various conditions and her effective horse-power obtained. A "log ship" or small board, ballasted to sink a few feet and remain normal to the direction of the pull, was attached to the end of a log line which was allowed to run freely out over the end of a spar during the trials. The slip of the "log ship" having been obtained during independent trials, the speed of the "Greyhound" was estimated from the log-line readings with fair accuracy. From these results curves of resistance on a base of speed were constructed for various conditions of draught and trim; the frictional resistance was estimated from the experiments on planks, and curves of residuary resistance were obtained. A model of the "Greyhound," on a scale of $\frac{1}{7\frac{1}{2}}$ full size, was also towed in the experimental tank under conditions corresponding to those of the ship; as with the ship, the total resistance was measured, that due to friction was calculated, and the residuary resistance of the model was obtained. It was found, by assuming a particular value for the unknown frictional coefficient of the "Greyhound," that a close agreement occurred between the residuary resistances of ship and model. This coefficient corresponded to that for a mixture of ⅛ calico and ⅞ varnish, which was probably equivalent to the condition of the ship's bottom during the trials.

Similar experiments were carried out by Mr Yarrow (*Trans. I.N.A.*, 1883) on a torpedo boat 100 ft. long; it was found that the residuary resistance of the boat was then about 3 % in excess of that deduced by the law of comparison from experiments on a model.

As a result of the "Greyhound" trials, the accepted method of estimating the horse-power required for a new ship is by running a scale model under corresponding conditions in an experimental tank fitted and equipped for the purpose. The law of comparison is applied to the residuary resistance, or, if used for the total resistance, a "frictional correction" is made (see below). In 1871 Froude constructed a tank and suitable apparatus at Torquay on behalf of the British Admiralty. In 1885, six years after his death, the ground occupied by the Torquay tank was required for building purposes, and a new tank was constructed at Haslar, near Portsmouth, from the designs and under the supervision of Mr R. E. Froude, such improvements being added as experience at Torquay had shown to be desirable. At both these tanks models of propellers as well as of ships were experimented upon, besides a variety of matters connected with the general subject.

Model experiments.

Similar establishments have now been instituted by several foreign governments and by two private firms in Great Britain, Messrs Denny at Dumbarton and Messrs John Brown at Clydebank. The experimental tank now under construction at Teddington should prove an important and useful addition to the number of such installations in this country. It is intended to be used for general research and to be available also for undertaking such private work as may be required by shipbuilding firms. Its inception is due to a committee composed largely of members of the Institution of Naval Architects, and the cost of installation is being defrayed by Mr A. F. Yarrow. The tank will form a part of the National Physical Laboratory, and its general control will be in the hands of officers of the laboratory.

The Admiralty experimental tank at Haslar is nearly 400 ft. long, 20 ft. wide and 9 ft. deep. The main experimental carriage spans the whole width of the tank, and carries a secondary railway on which the subsidiary carriages, which carry the experimental apparatus of different kinds, are adjusted in position. The main carriage runs on rails on the side walls, and can travel the whole length of the tank; it is driven at various speeds by a wire rope from a stationary engine of ample power. Ordinary speeds range from 100 to 800 ft. per minute, while an extreme speed of 1200 ft. per minute can be obtained; the speeds are regulated by a highly sensitive governor. The models, generally from 10 to 14 ft. long, are made of hard paraffin wax, somewhat over 1 in. in thickness; they are cast in a mould, with an allowance of about ¼ in. for finishing. The model is shaped accurately by being placed bottom up on the bed of a machine in which a pair of revolving cutters, one on each side of the model, cuts out on its surface a series of level lines, whose contours are precisely similar to those on the drawing of the ship whose model is under treatment. When all the level lines have been cut in, the model presents the appearance of a series of steps, the bottom angles of which correctly represent the true form the model should possess. The paraffin ridges between these level lines are trimmed off by the use of suitable tools and the outside surface made quite smooth with flexible steel scrapers. The model is ballasted to its required displacement and saddled with a frame, which carries the guiding attachment and also the towing-rod, and is then placed below the dynamometer. The towing-rod at its forward end is then in a position to impart horizontal forces by a hard steel surface to a knife-edge on the dynamometer lever within the model at about the level of the water surface. There are various delicate arrangements with knife-edge adjustments, which result in the horizontal forces being transmitted through a spiral spring, the extensions of which are multiplied by a lever and recorded by a pen on a paper-covered cylinder, distance and time being simultaneously recorded. The speed and resistance corresponding to each experiment are deduced from these elements, a most necessary condition being that the speed shall be uniform throughout each experiment. By somewhat similar arrangements on a subsidiary carriage, the action of model screw propellers is tested either in undisturbed water or behind a model, the speed, rate of rotation, rotary resistance and thrust being measured.

An interesting account by Dr Glazebrook of some experimental tanks in various countries, together with particulars of some improvements in their equipment, appears in *Trans. I.N.A.*, 1909.

Experimental results.

Of the very large number of experimental results that have now been obtained from the trials of ships' models in the tanks referred to above, comparatively few have been made public. In connexion with the Torquay and Haslar tanks some few of the reports by the elder Froude and Mr R. E. Froude have been published by order or permission of the Board of Admiralty, chiefly through the Institution of Naval Architects. Amongst these may be mentioned the "Greyhound" experiments recorded in 1874; the "Merkara" results in 1876; experiments on the effect produced on the wave-making resistance of ships by varying the length of parallel middle body, in 1877; results obtained from models of three merchant liners in 1881; papers in 1888 and 1892 on the "constant" system of notation of results of model experiments, used at the Admiralty Experimental Works; and some results of a systematic series of model experiments by Mr R. E. Froude appeared in 1904. Some records of the experiments made at private and foreign experiment establishments have also appeared.

Some of the most important of these experiments are described in these notes; it remains to show how they are applied in practice to obtain an estimate of the indicated horse-power required to drive a ship at any speed. If the resistance has been obtained from a model experiment, or inferred by the law of comparison from data obtained with a vessel of similar type, the effective horse-power is known; and by assuming a suitable value for the propulsive coefficient (vide *Propulsion*) the indicated horse-power is determined.

If model experiments or data for exactly similar ships are unavailable, the method of estimating the power which is probably most commonly used is one involving a relation between I.H.P., displacement, and speed, which is expressed by the formula—

$$\frac{(\text{Speed})^3 \times (\text{Displacement})^{\frac{2}{3}}}{\text{I.H.P.}} = C,$$

C being called the Admiralty coefficient. The value of C varies considerably at different speeds even for the same ship. For it to be constant, the I.H.P. must vary as the cube of the speed; if resistance varied as the square of the speed and I.H.P. as resistance and speed, the condition of constancy would be fulfilled. Actually, owing to variations in the index of the speed to which the resistance is proportional, in the length and form of the ship and in the machinery and propellers, this method of estimating I.H.P. can only be used with great caution, care being taken that the values of C selected for comparison are taken from ships of fairly similar type, and of corresponding lengths and speeds.

Another means of obtaining approximate estimates of the power

required for ships of ordinary types is from curves of resistance drawn on a base of simple functions of the speed, length and displacement, the curves being faired through the spots obtained from a large number of results of model experiments with different classes of ships. Curves of this character have been constructed by Mr D. W. Taylor and Mr A. W. Johns (*Trans. I.N.A.*, 1907); the former series expresses the residuary resistance per ton of displacement in terms of $\frac{V^2}{L}$ and $\frac{W}{L^3}$; the latter gives the residuary horse-power divided by $W^{\frac{7}{6}}$ in terms of $\frac{V^2}{L}$ and the prismatic coefficient $\frac{\text{Volume of Displacement}}{\text{Area of Immersed Midship Section} \times \text{Length}}$; the frictional resistance is calculated independently by Froude's or Tideman's tables.

To furnish data for estimating the I.H.P. of vessels covering a considerable range of type, a series of experiments on systematically varied forms of hull were made by Mr R. E. Froude. The results were published by him in the *Trans. I.N.A.*, 1904; and are given in figs. 40 to 51.

The forms of hull dealt with may be primarily divided into two groups, A and B, differing in Beam and Draught ratio; $\frac{\text{Beam}}{\text{Draught}}$ being equal to 2·59 and 3·48 for A and B respectively. Each group is further divided into 6 types, differing in block coefficients, and the table following gives particulars of the coefficients for the models tried: –

	Stern snubbed, forward body as Type 1.			Bow snubbed, after Body as Type 3.		
Type.	1.	2.	3.	4.	5.	6.
Block coefficients or $\frac{\text{Volume of Displacement}}{\text{Length} \times \text{Breadth} \times \text{Draught}}$	·495	·505	·516	·522	·529	·542
Largest section coefficient or $\frac{\text{Area of immersed midship section}}{\text{Breadth} \times \text{Draught}}$	·951					

The hull characteristics for A are shown in figs. 33 and 34,[1] and the mode of presenting these indicates the way in which the several types were formed, each being obtained from the type 1 model by successively cutting back its stern and bow. This cutting back is termed snubbing. A curve of areas of transverse sections is given (fig. 35, Plate I.) as well as the sheer draught. The lines of group B can be derived from A, by altering beam and draught scales in the ratio of $\frac{66}{57}$ and $\frac{17·6}{20·4}$ respectively. Each of the 12 forms which embodied these lines was the generator of a series, differing only in length proportion.

The curve of areas is an important item in the hull characteristics. Experiment shows that the resistance of a hull of given curve of areas, beam and water-line entrance, is practically unaltered however the lines are varied (so long as they are kept ship-shape, and no unfair features are introduced). It follows, therefore, that although the data correspond to a given type of lines, yet (consistently with the preceding conditions) they are capable of application over a wider field than at first sight seems likely, covering variations of draught, form of profile and transverse sections.

Regarding the foregoing statement of permissible variations of lines, alteration in $\frac{\text{Beam}}{\text{Draught}}$ ratio has some effect. Comparison of the two groups A and B gives the effect of the variation in the $\frac{\text{Beam}}{\text{Draught}}$ ratio tried; and it is found that (*caeteris paribus*) increasing $\frac{\text{Beam}}{\text{Draught}}$ by 34 % (*i.e.* from 2·59 to 3·48) increases the E.H.P. by about 4 %. A brief and approximate statement of the results of some experiments with models of varying $\frac{\text{Beam}}{\text{Draught}}$ ratio, by Lieut.-Colonel G. Rota, R.I.N. (see *Trans. I.N.A.*, 1905), is that beyond a value of $\frac{\text{Beam}}{\text{Draught}} = 2·5$ an increase of 10 % in $\frac{\text{Beam}}{\text{Draught}}$ causes about 1 % to 2·5 % increase in resistance (the lower value being appropriate to the higher speeds, and vice versa). This result accords with that deduced from the A and B groups.

By the aid of the law of comparison (and a correction for skin friction), the information provided can be used to obtain the E.H.P. for any size of ship of form included in the experiments (or covered by the possible extensions, *vide supra*). The I.H.P. follows by using a suitable propulsive coefficient. An example is given below as an illustration. In practical application it is important to notice that the lengths used in reckoning the proportions must be the total length of immersed form (*i.e.* of the curve of areas) and not the distance between perpendiculars arbitrarily placed.

The data are here given (figs. 40-51, Plates III.-VI.) in the form of curves of E.H.P. for ships of 1000 tons displacement, plotted for a given speed on a base of immersed length. The range in abscissae shows the amount of variation in length proportion tried in the experiments; and as regards speed range the group B is for generally higher speeds than group A. The curves may be termed standard E.H.P. curves.

The block coefficients of the forms dealt with are lower than those of the greater proportion of merchant ships, and hence the data are not directly applicable to these. At higher speeds, however, the E.H.P. might be approximately estimated from these curves, by assuming a further degree of snubbing appropriate to the required block coefficient; but at speeds which correspond to those of ordinary merchant ships (which are the lower speeds given in the diagrams) the effect of snubbing is variable, and depends really upon the actual speed-length ratio $\left(i.e. \frac{V}{\sqrt{L}}\right)$ of the ship we are dealing with.

In this connexion it may be noted that the diagrams not only afford a means of determining the I.H.P. of a given ship, but they may also be used in designing, and so enable the best form to be chosen, to fulfil the given conditions of displacement and speed, &c. For example, suppose a ship of given displacement is required to obtain a given speed, with a given maximum E.H.P. (or I.H.P. assuming an appropriate propulsive coefficient). First bring the given particulars to the proper scale for 1000 tons displacement (*n*, the ratio of the linear dimensions, is equal to $\left(\frac{1000}{\text{Displ.}}\right)^{\frac{1}{3}}$ and hence E.H.P. becomes $\left(\frac{1000}{\text{Displ.}}\right)^{\frac{7}{6}}$ and speed $\left(\frac{1000}{\text{Displ.}}\right)^{\frac{1}{6}}$ times the given values). An E.H.P. curve for the given speed is easily interpolated on the diagrams, and we can at once obtain for the given E.H.P. (1) the length for each type, (2) the type which gives the most suitable length, (3) the economy resulting from any additional length, (4) the type for a given fixed length which gives the speed with least E.H.P., and (5) by inspection at lower speeds, how alternative forms compare at these speeds. The following points may commend themselves, from consideration of an instructive comparison shown in fig. 4, where for the B group, E.H.P. curves for types 1, 3 and 6 are drawn together. In drawing conclusions, it must be clearly remembered that the E.H.P.'s, speeds and lengths are for a standard displacement, viz. 1000 tons; and so in applications for different displacements, these quantities all undergo a numerical change, dependent upon the change in displacement. The first point is the effect of length on E.H.P.; this is most marked at high speeds; and even at low speeds, for the shorter lengths the E.H.P. begins to increase rapidly with decrease in length. At these low speeds if, on the other hand, the length be increased beyond a certain point, no economy at all results, but the reverse. The reason for this is clear. At the low speed-length ratio we are considering, the wave-making resistance is practically nil, the resistance being almost entirely due to skin friction and eddy making, &c. It is obvious that by continually reducing the transverse dimensions of a ship of constant displacement, we increase the wetted skin (in the limit when the transverse scale is zero the surface is infinite); hence the resistance due to skin friction increases, and so therefore does the total resistance. This point would be more evident if the diagrams had been continued to a greater length and lower speed. A second point is the effect of alteration in block coefficient. At all speeds above 20 knots, snubbing within the limits shown is beneficial as regards performance. At lower speeds the effect depends on the length. Since it is at these lower speeds the ordinary type of merchant ship works, we may say that the effect of snubbing is doubtful for these, and depends upon the speed-length ratio. A better result might be obtained in such cases if the method of increasing the block coefficient were by the insertion of parallel middle body and not by an extension of snubbing. (For fuller information on this point see Mr R. E. Froude's 1904 I.N.A. paper.) A third point is the effect of change in speed. For a given length, the rate of increase of E.H.P. with speed grows with the speed, but increases least for the more snubbed type. As an instance consider group B, types 1 and 6 at a length of 300 ft. (see fig. 36, Plate I.). The following table gives the increase in E.H.P. for the corresponding changes in speed, and the index of the speed, representing the variation of E.H.P. with speed. The figures in columns (4) and (5) are the means obtained from the individual pairs of speeds; at intermediate speeds these may have different and constantly changing values:—

[1] These lines differ from those tried in the models which are given in *Trans. I.N.A.*, 1904 (*q.v.*). Those now given have the same curve of areas and beam, but are modified in respect of draught, profile and shape of transverse sections, these latter being filled out so as more closely to represent modern forms. However, a model has been tried recently, embodying the modifications, and the results found to be practically identical with those obtained for the original lines.

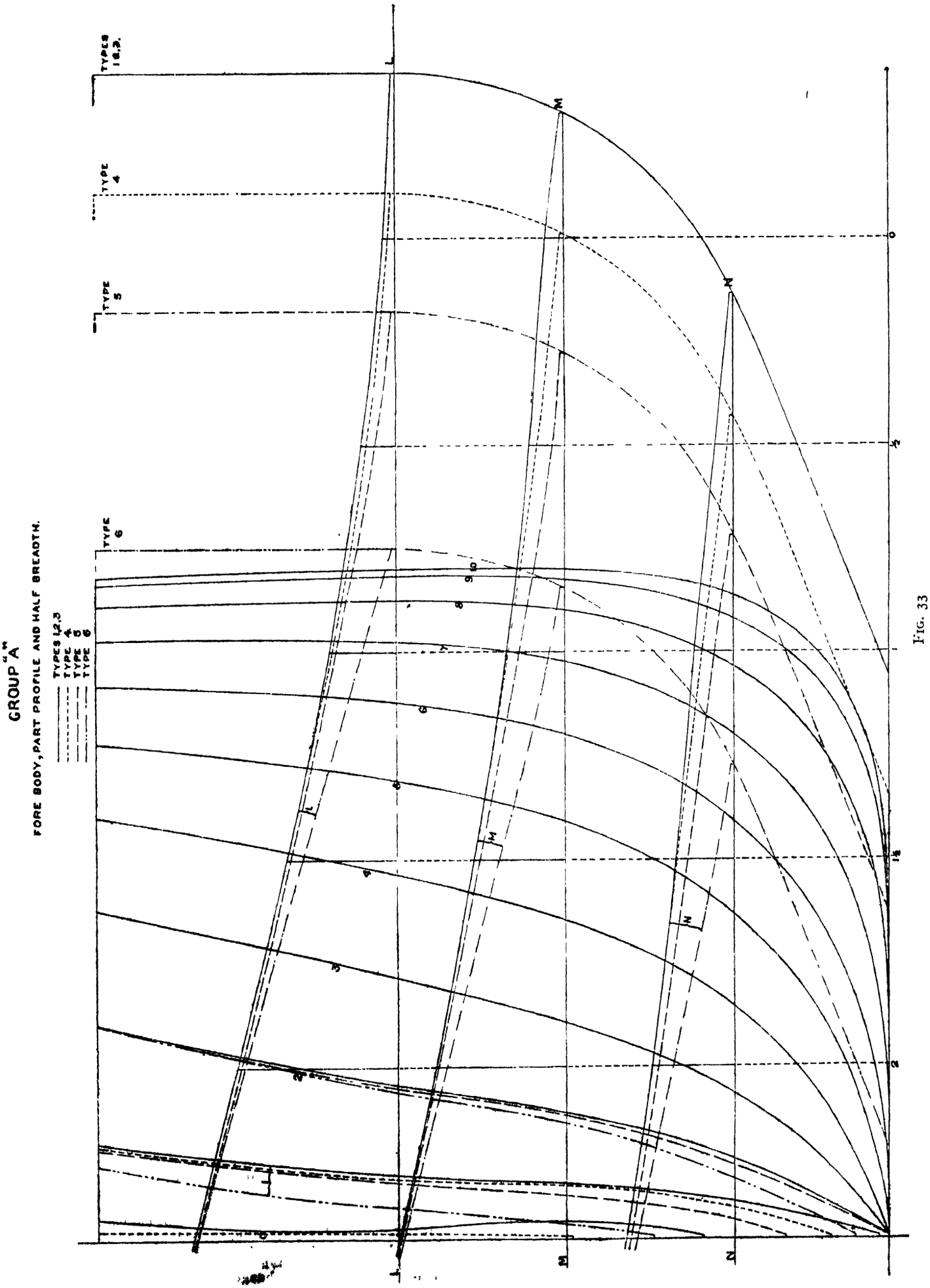

GROUP "A"
FORE BODY, PART PROFILE AND HALF BREADTH.
TYPES 1,2,3
TYPE 4
TYPE 5
TYPE 6
TYPES 1,2,3
TYPE 4
TYPE 5
TYPE 6
L
M
N
0
½
1
1½
2

FIG. 33

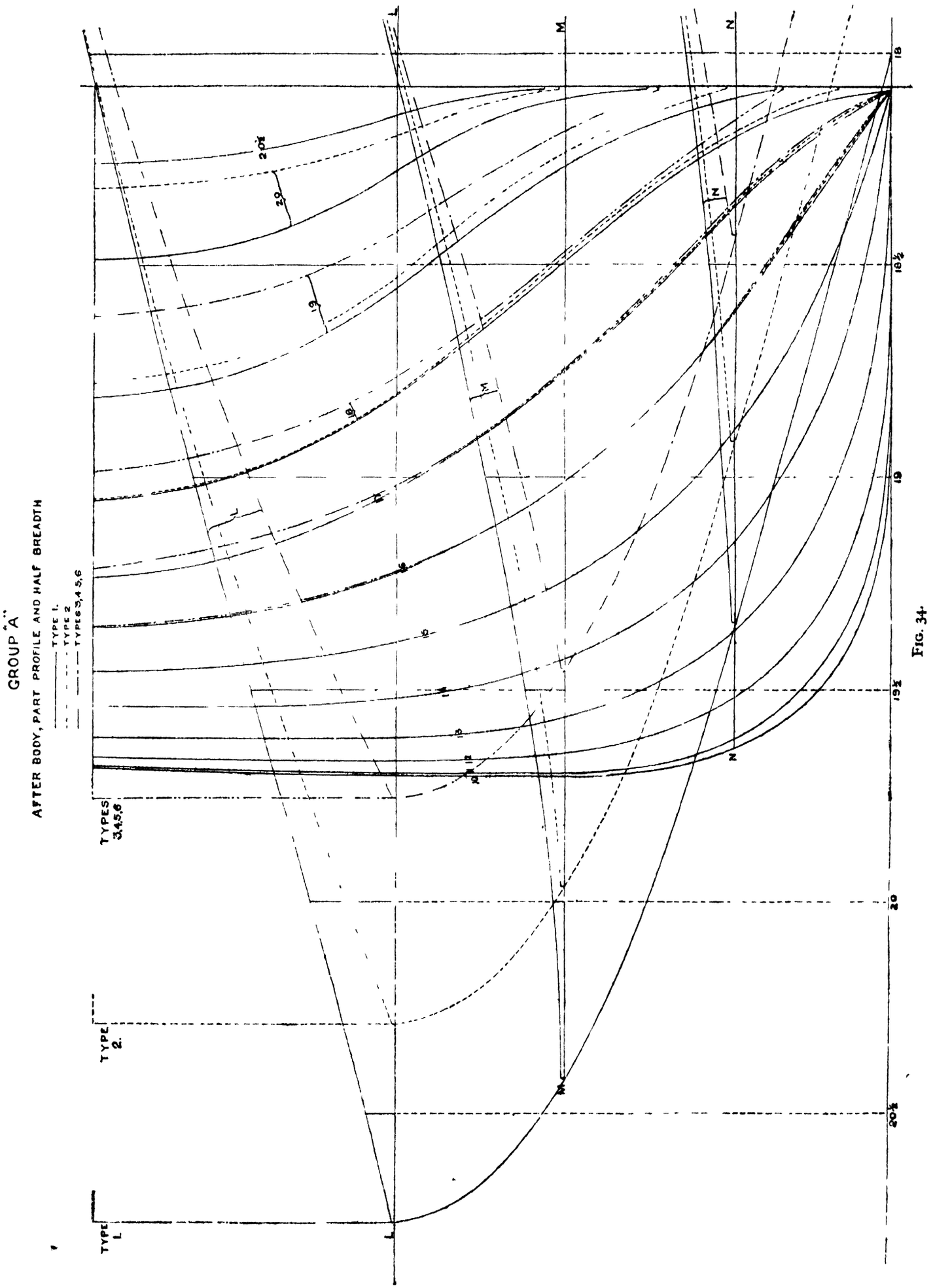

GROUP "A"
AFTER BODY, PART PROFILE AND HALF BREADTH
TYPE 1.
TYPE 2
TYPES 3,4,5,6
TYPES 3,4,5,6
TYPE 2.
TYPE 1.
L
M
N
20½
19
18½
18

FIG. 34.

Change of Speed.	Corresponding Change in E.H.P.		Corresponding Index of Speed.	
Types (1) and (6).	Type (1).	Type (6).	Type (1).	Type (6).
14-16 knots	245 E.H.P.	273 E.H.P.	3·1	3·0
22-23 ,,	760 ,,	950 ,,	5·3	4·9
25-26 ,,	890 ,,	820 ,,	4·0	4·1

The variation of the rate of growth of I.H.P. (or E.H.P.) with the speed is a result of the interference of the bow and stern wave systems, and is dependent upon the speed-length ratio (*vide* "Wave Resistance," above). A good illustration is afforded by taking the case of a vessel such as a torpedo-boat destroyer, which is run over a considerable range of speed. Fig. 37, Plate II. shows, for such a vessel, three curves plotted to a base of speed, the ordinates being respectively—I.H.P., $\frac{\text{I.H.P.}}{(\text{speed})^2}$, $\frac{\text{I.H.P.}}{(\text{speed})^3}$. The second of these is of course a curve of resistance, and the rapid rise and fall of the rate of growth of resistance manifests itself in this resistance-curve by a very marked hump between 15 and 25 knots speed. The third curve, that of $\frac{\text{I.H.P.}}{(\text{speed})^3}$, is interesting as affording, by its slope at different points, a very good indication of this rate of growth. Up to about 13 knots this curve is not far from being horizontal, indicating that till then the resistance is varying about as the square of the speed. The rate of growth increases from this point till it reaches a maximum at 15 knots, and then falls off till at about 20 knots the resistance once more varies as the square of the speed. From this point onward the resistance increases at a less rate than the square of the speed.

It has been previously noted that the skin friction part of the E.H.P. does not obey the law of comparison; this is on account of variation of f with length, and the index of the speed being different from 2. The coefficient f varies much more rapidly at the smaller lengths, and hence for these the skin friction correction is more important for a given change in length. For such lengths as are dealt with in ships, *e.g.* 100 ft. and upwards, and such lengths as we should deal with in applying the data that are now given, it has been found possible to express the correction for skin friction very accurately by the curves in fig. 38, Plate II. These indicate the absolute correction that must be applied to the E.H.P. deduced for the given displacement from the standard curves when interpreted by the law of comparison, and are drawn for a series of displacements on a base of speed; the correction for any odd displacement can be easily interpolated. An addition must be made for displacements under, and a deduction for displacements over, the standard 1000 tons.

The following example illustrates this point and the method of using the standard curves:—

A vessel $320' \times 35\frac{1}{2}' \times 13' \times 2135$ tons is being designed; to construct an E.H.P. curve, for speeds 11–22½ knots. The proportions ($\frac{\text{Beam}}{\text{Draught}}$ ratio and block coefficient) of the design are most closely approximated to by type 2, group A (320′ being the immersed length). First find the length l for a similar vessel of 1000 tons displacement; $l = \frac{320}{(2{\cdot}135)^{\frac{1}{3}}} = 248{\cdot}5$ ft., and then from fig. 41 read off ordinates representing E.H.P. for the given speeds of the 1000-ton standard ship. These figures are converted into those appropriate for the design, by the law of comparison. If v and e are the speed and E.H.P. for the 1000-ton ship, and V and E corresponding quantities for the design, then $\frac{V}{v} = (2{\cdot}135)^{\frac{1}{6}} = 1{\cdot}135$; and $\frac{E}{e} = (2{\cdot}135)^{\frac{7}{6}} = 2{\cdot}424$; using these ratios we get a table thus:

As read from the Standard Curves at a Length = 248·5 Ft.		As converted by Law of Comparison for 2135-Tons Design.		Correction to Col. 4 for Skin Friction: read from Figure.	Col. 4-Col. 5 = E.H.P. Corrected.
		Col. 1 × (1·135 = $\frac{V}{v}$)	Col. 2 × (2·424 = $\frac{E}{e}$)		
Knots.	E.H.P.	Knots.	E.H.P.	E.H.P.	E.H.P.
10	150	11·35	364	16	348
12	275	13·62	667	29	638
14	475	15·89	1151	42	1109
16	740	18·16	1794	55	1739
17	940	19·30	2278	61	2217
18	1285	20·43	3115	67	3048
19	1825	21·56	4423	74	4349
20	2590	22·70	6278	80	6198

The curve shown in fig. 39, Plate II. results from plotting col. (6) to a base of speed given by col. (3). Since the propulsive coefficient varies with the speed, it is preferable to take the E.H.P. from the curve and convert to I.H.P., using an appropriate coefficient, than to use a common coefficient by plotting a curve of I.H.P.

In the results hitherto recorded the depth of water has been supposed sufficient to prevent the disturbance attending the motion of a vessel on the surface from extending to the bottom; in these circumstances the resistance is unaffected by a moderate change in the depth. Conditions, however, frequently arise in which vessels are run at high speeds in comparatively shallow water; and a marked alteration is then observed in the resistance and power corresponding to a particular speed. An investigation of the effect of shallow water on resistance is therefore of importance and interest; and a brief account of this part of the subject is here appended. ***Shallow water.***

The change from deep to shallow water modifies the shape of the stream lines, many of which in deep water are approximately in planes normal to the surface of the hull; those in shoal water tend to lie more nearly in horizontal planes, owing to the reduced space under the bottom of the ship. In consequence, the velocity in the stream tubes in the vicinity of the ship is increased, and the changes of pressure and the "statical" wave heights are exaggerated. This causes an increase in the frictional resistance as the depth of water becomes less; but the effect on the residuary resistance is more complicated.

Firstly, the length l of the waves corresponding to a speed v is increased from that expressed by

$$v^2 = \frac{gl}{2\pi}$$

to be in accordance with the formula

$$v^2 = \frac{gl}{2\pi} \tanh \frac{2\pi h}{l}$$

which applies to shallow-water waves for a depth h. When the depth h is equal to $\frac{v^2}{g}$, the length of wave is infinite, and the wave becomes of the type investigated by Scott Russell in canals, and termed a "solitary wave" or a "wave of translation." When the depth of water is less than $\frac{v^2}{g}$ no permanent wave system of speed v can exist. These changes in the wave length considerably affect the wave pattern and alter the speeds at which interference between the bow and stern systems has a favourable or unfavourable effect on the efficiency of propulsion.

In the second place the amount by which the speed of travel of the energy of the wave falls short of the speed of the ship is expressed by

$$\frac{v}{2}\left(1 - \frac{4\pi h/l}{\sinh \frac{4\pi h}{l}}\right).$$

In deep water this difference of speed is $\frac{v}{2}$; in shallow water it diminishes, becoming zero at the critical depth producing a wave of translation.

Thirdly, the local disturbance immediately surrounding the ship is increased in shallow water, theoretical investigation showing that, at the critical depth above referred to, it becomes indefinite or is only limited by its own viscosity and eddying resistance. In still shallower water, the amount of disturbance is reduced as the departure from the critical depth becomes greater.

Finally, the increase of the frictional resistance due to the higher velocity of rubbing is further modified by the large dimensions of the wave accompanying the ship; the particles of a wave in very shallow water are moving appreciably in the direction of travel, which might lead to a reduction in the frictional resistance.

From these considerations it appears impossible to obtain, a priori, the net effect of shallow water on the resistance, owing to the divergent character of the component effects producing the final result. This difficulty is confirmed by the inconsistency of the readings frequently obtained during experiments in shallow water, pointing to instability in the conditions then existing.

A number of experiments have been carried out in shallow water with both ships and models; the most important are those by Constructor Paulus (*Schleswig-Holstein District Club*, 1904), Captain Rasmussen, Mr Yarrow, Herr Popper and Major Rota, many of which are recorded in the *I.N.A. Transactions*. A summary of the conclusions drawn from them is appended:—

1. The minimum depth of water that has no appreciable influence on the resistance increases with the speed and, in some degree, with the dimensions of the ship.

2. At constant speed the resistance is, in general, greatest at the critical depth of water $\left(\frac{v^2}{g}\right)$. It is concluded, therefore, that the increase of resistance due to the enhanced dimensions of the wave then accompanying the ship is more than sufficient to counteract the gain resulting from the diminished drain of energy from the wave system astern.

3. At high speeds, when a considerable portion of the resistance is due to wave-making, the total resistance diminishes at depths lower than the critical depth, and is frequently less in very shallow water than in deep water.

4. The "humps" in the curves of resistance on a base of

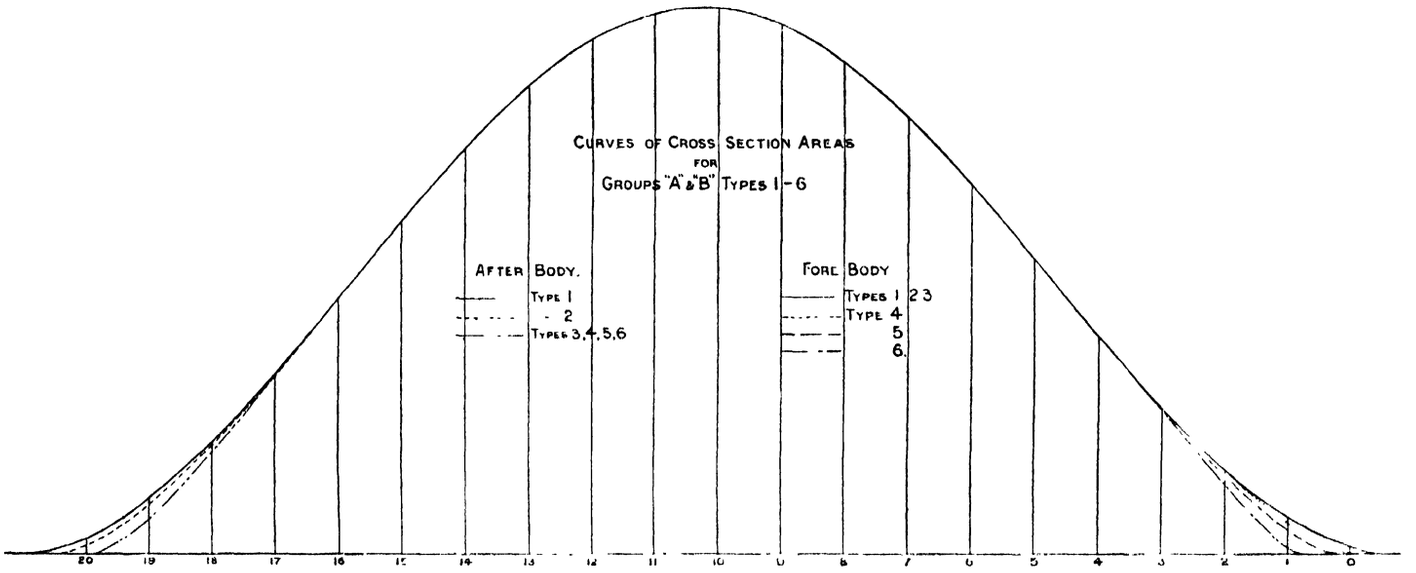
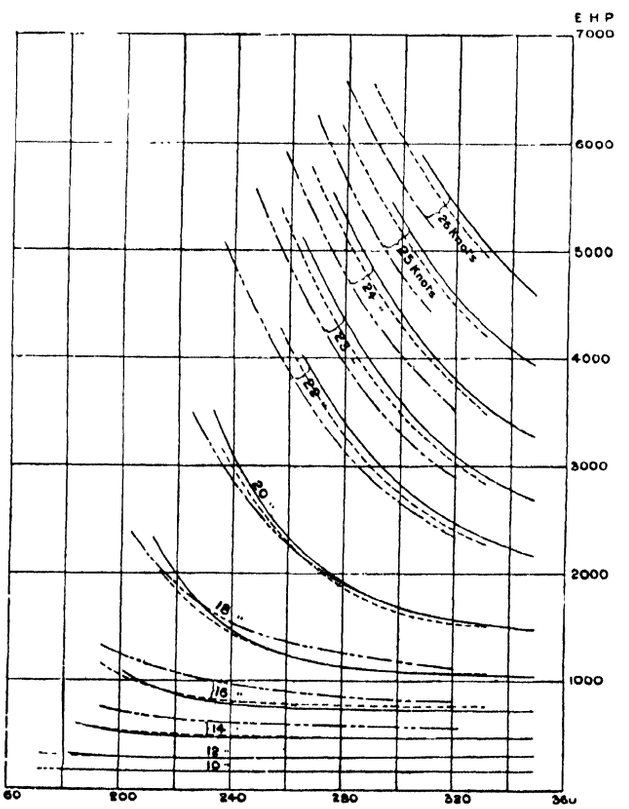


FIG. 35.—If length for 1,000-ton Ship be assumed 240 feet, then maximum ordinate of above curves represents—

270·9 square feet for Type 1
274·7 " " " 2
266·0 " " " 3
295·5 " " " 4
262·1 " " " 5
255·1 " " " 6

and for other lengths the number of square feet varies inversely as the length



Immersed length in feet.

FIG. 36.—Group B Comparison of Types.

Type 1. ————
" 3 - - - - - - - -
" 6. —— - - ——

SHIPBUILDING

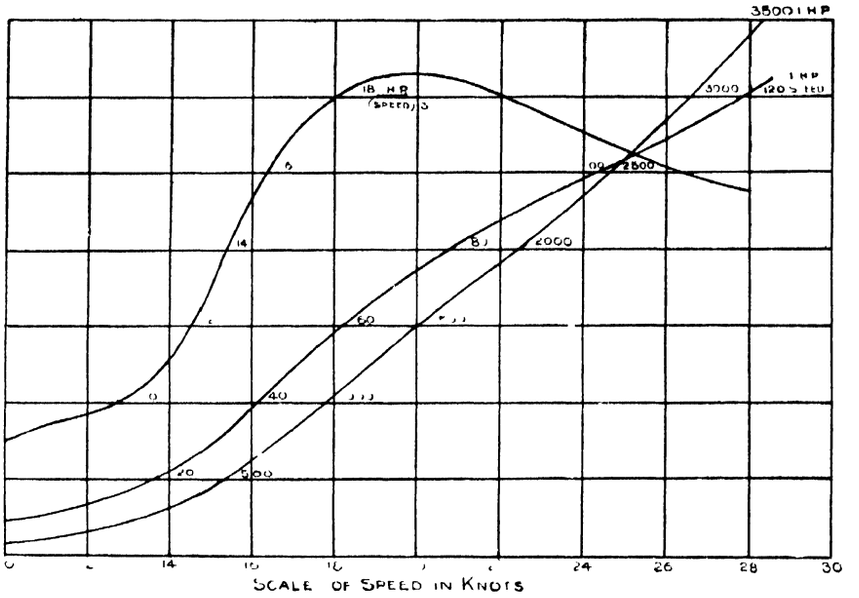


FIG. 37

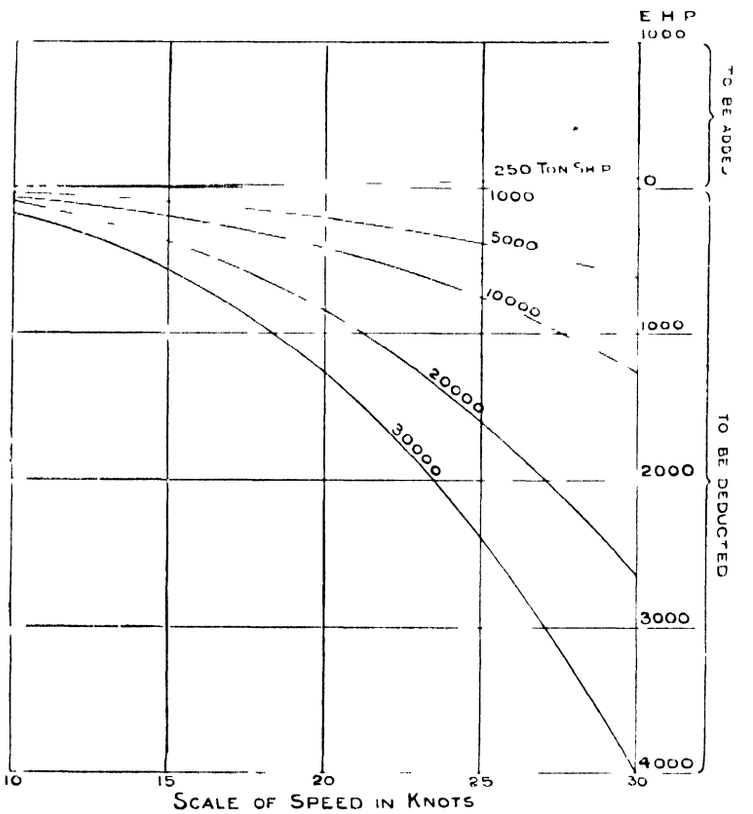


FIG. 38.—Curves of Surface Friction Correction.

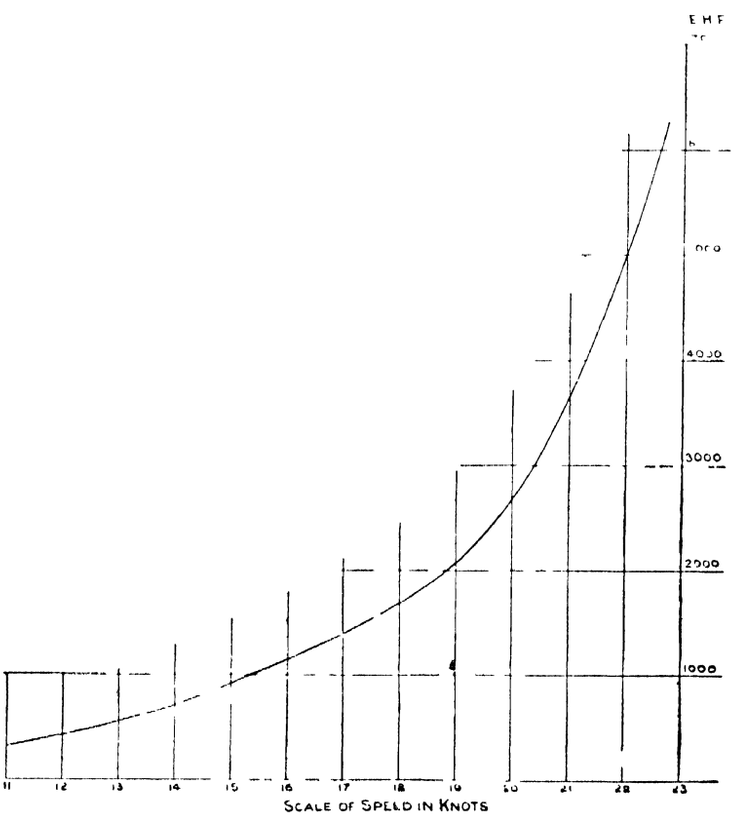


FIG. 39.—Estimated Curve of E.H.P. for Vessel 320′ × 35½′ × 13′ × 2,135 Tons

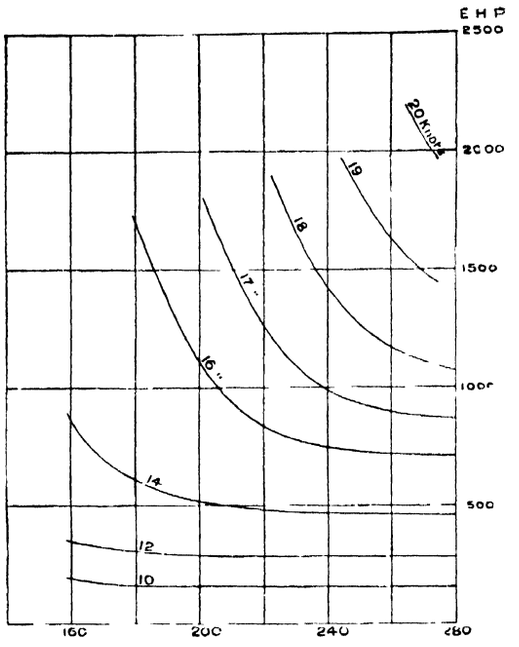


FIG. 40.—Curves of E.H.P. for 1,000 ton Ship. Group "A." Type 1. Block Coefficient .495

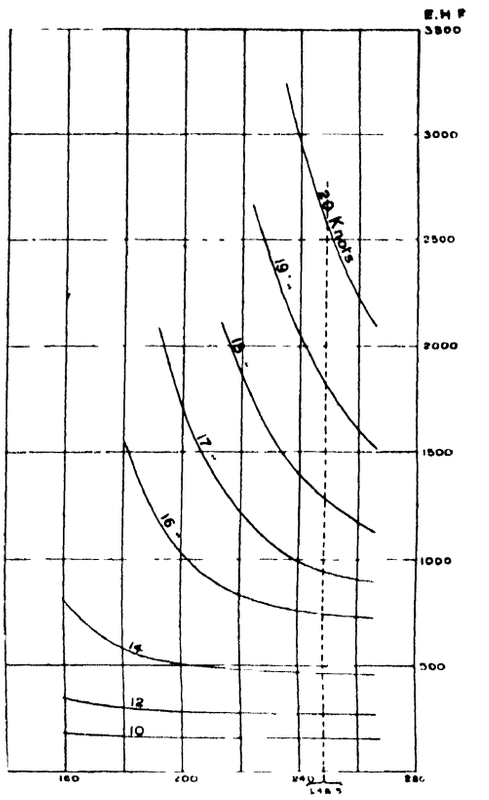


FIG. 41.—Curves of E.H.P. for 1,000 ton Ship. Group "A." Type 2. Block Coefficient .505

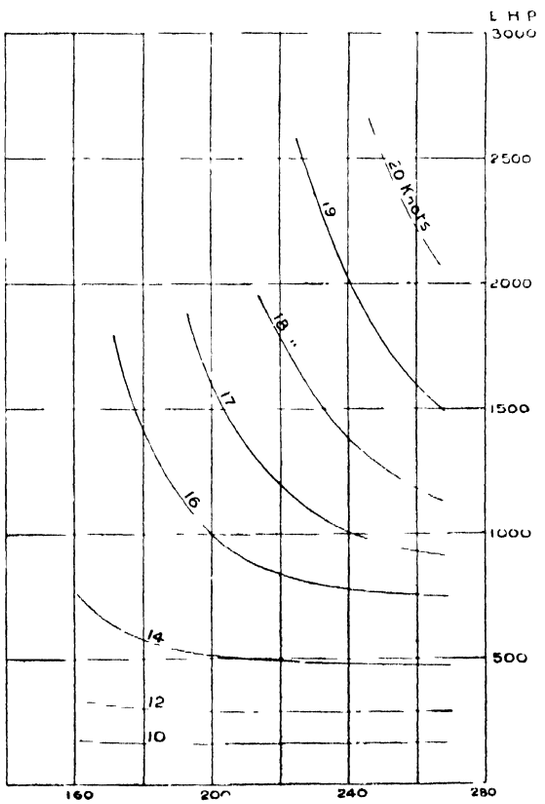


FIG. 42.—Curves of E.H.P. for 1,000-ton Ship. Group "A." Type 3. Block Coefficient .516.

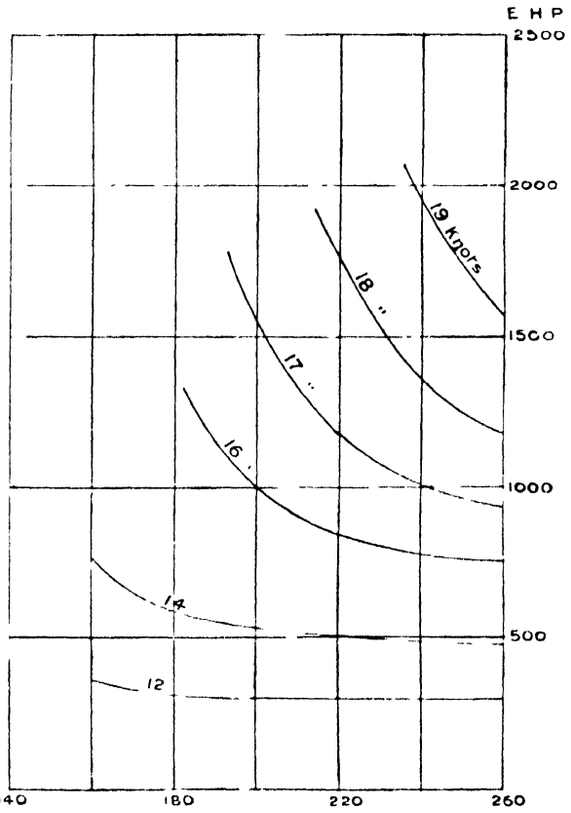


FIG. 43.—Curves of E.H.P. for 1,000-ton Ship. Group "A." Type 4. Block Coefficient .522

SHIPBUILDING

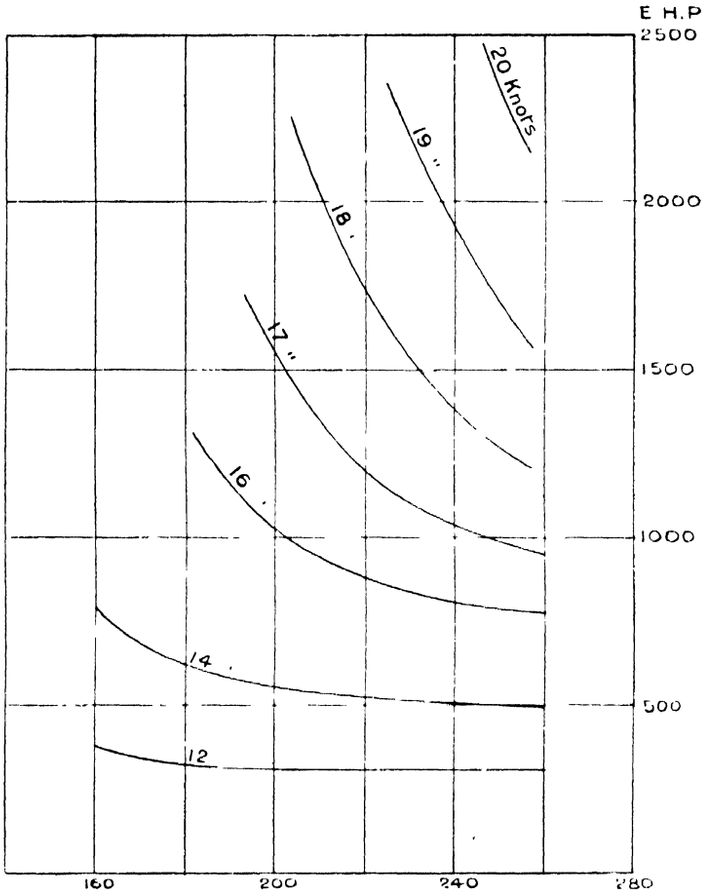


FIG. 44.—Curves of E.H.P. for 1,000 ton Ship
Group "A" Type 5 Block Coefficient .570

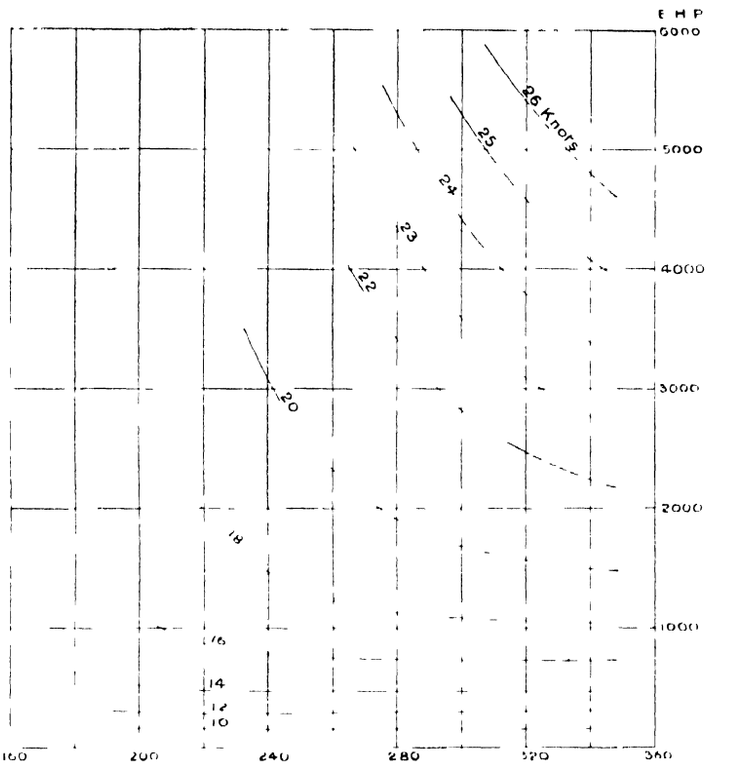


FIG. 46.—Curves of E.H.P. for 1,000 ton Ship
Group "B" Type 1 Block Coefficient .505.

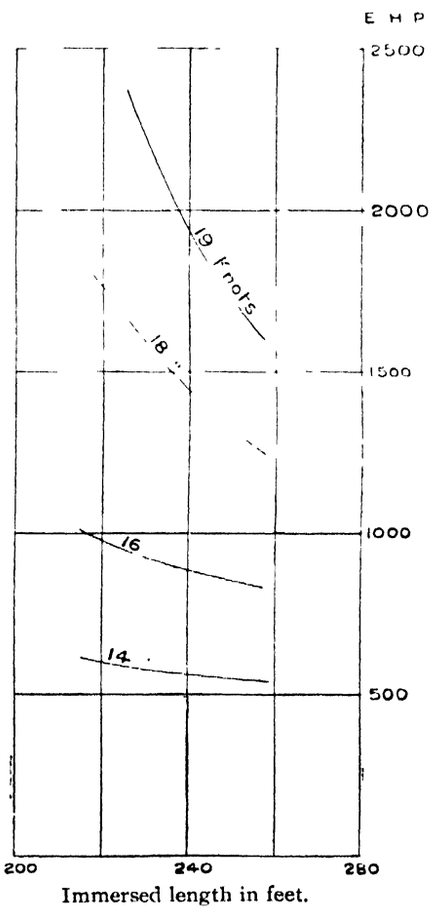


FIG. 45.—Curves of E.H.P. for 1,000-ton Ship
Group "A." Type 6 Block Coefficient .542.

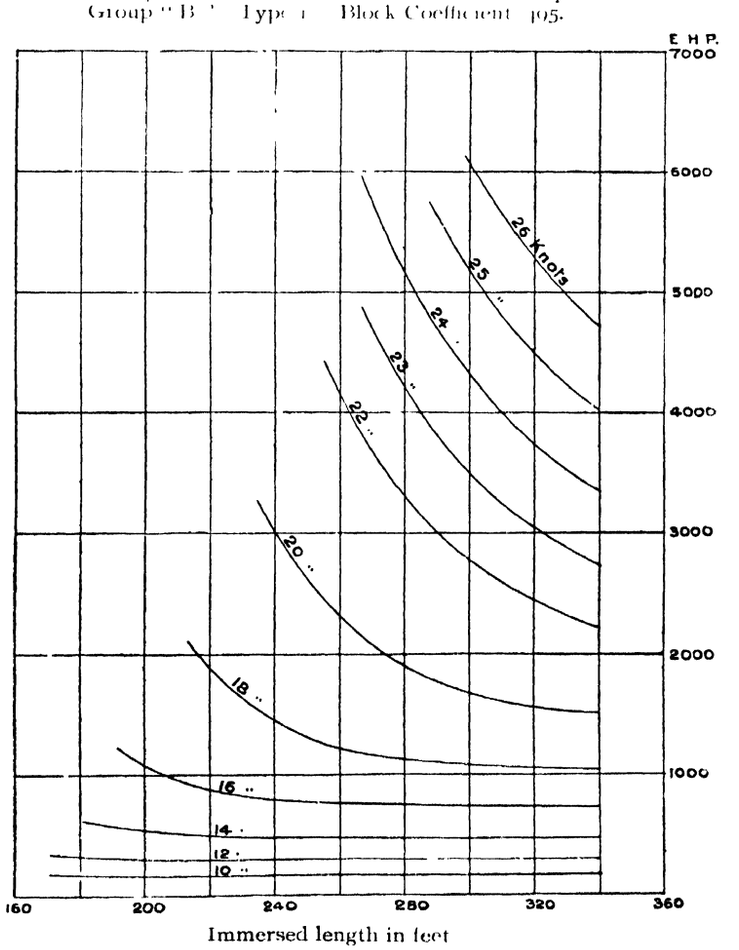


FIG. 47.—Curves of E.H.P. for 1,000-ton Ship.
Group "B." Type 2 Block Coefficient .505.

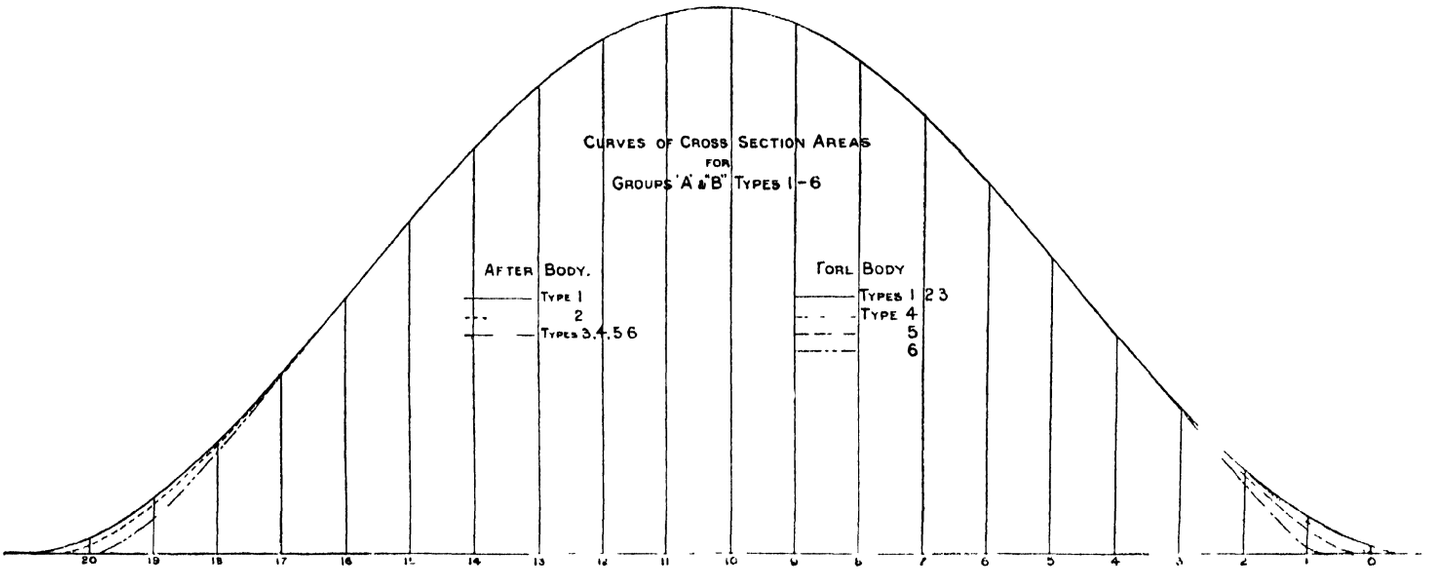


FIG. 35 If length for 1,000 ton Ship be assumed 240 feet, then maximum ordinate of above curves represents—

279·9	square	feet	for	Type 1
274·7	,,	,,	,,	2
269·0	,,	,,	,,	3
265·5	,,	,,	,,	4
262·1	,,	,,	,,	5
255·4	,,	,,	,,	6

and for other lengths the number of square feet varies inversely as the length

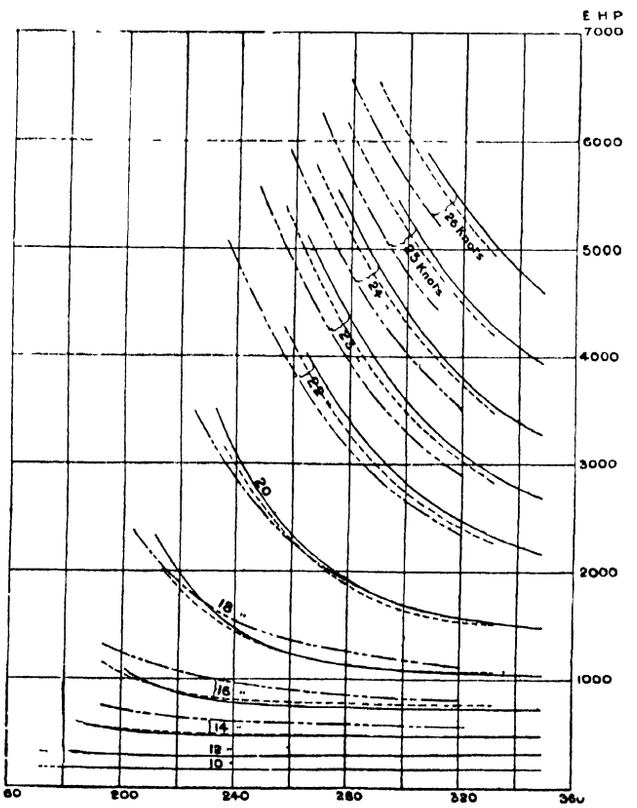


FIG. 36 —Group B Comparison of Types.

Type 1 ——————

,, 3 - - - - - - - -

,, 6 —— - - ——

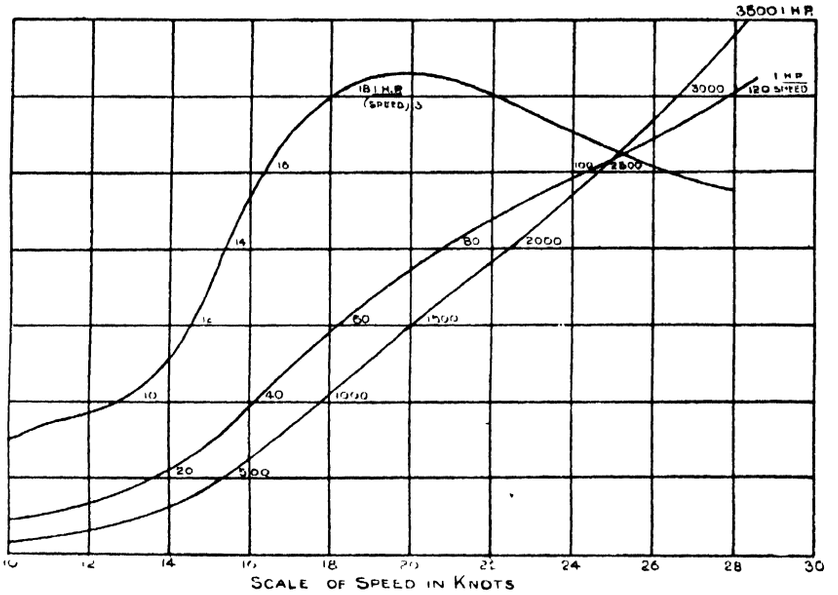


FIG. 37.

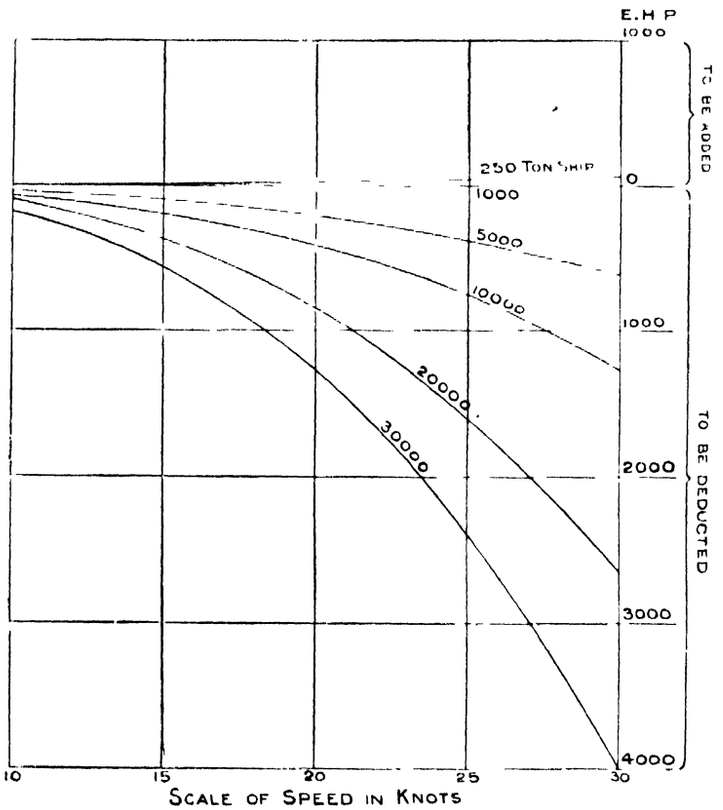


FIG. 38.—Curves of Surface Friction Correction.

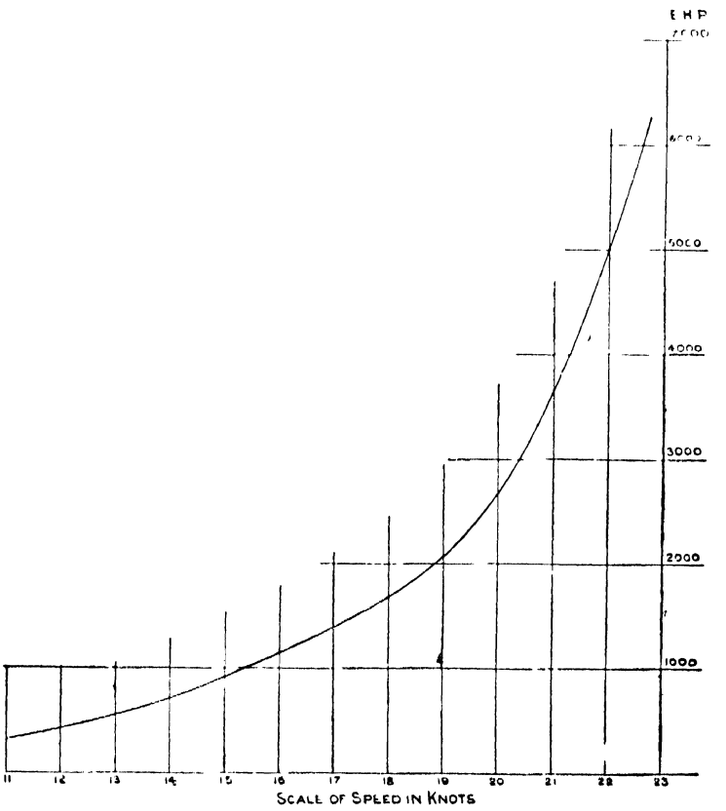


FIG. 39.—Estimated Curve of E.H.P. for Vessel 320′ × 35¼′ × 13′ × 2,135 Tons.

speed occur at lower speeds in shallow water, and are more pronounced; the resistance is occasionally reduced when the speed is increased.

5. The changes of resistance produced by shallowness are accompanied by corresponding changes in the speed of revolution of the engines and in the trim of the vessel. These are illustrated by the curves in fig. 52, Plate VI., which are taken from a paper read before the I.N.A. by the writer in 1909, giving the results of some trials on H.M. torpedo-boat destroyer "Cossack."

The data obtained from the various shallow water experiments are capable of extension to ships of similar types by the application of the law of comparison at corresponding depths (proportional to the linear dimensions) and at corresponding speeds. The influence of shallow water on the speed of a large number of ships can be thus obtained; but the data at present available are insufficient to enable a general law, if any exists, to be determined.

A further modification in the conditions arises when a ship proceeds along a channel of limited breadth and depth. Some interesting experiments were made in this connexion by Scott Russell on the resistance of barges towed in a narrow canal. He obtained (by measuring the pull in the tow rope) the resistance of a barge of about 6 tons displacement, for a mean depth of the canal of about 4½ ft., as follows:

Speed in miles per hour .	6·19	7·57	8·52	9·04
Resistance in pounds . .	250	500	400	280

At the critical speed (8·2 m. per hour) corresponding to the depth, the resistance was in this case reduced; and at a higher speed a further reduction of resistance was observed. It is stated that the boat was then situated on a wave of translation extending to the sides of the canal, and which was capable of travelling unchanged for a considerable distance; the resistance of the boat was then almost entirely due to skin friction.

When the speed of a ship is not uniform, the resistance is altered by an amount depending on the acceleration, the inertia of the ship and the motion of the surrounding water. In the ideal conditions of a vessel wholly submerged in a perfect fluid, the force producing acceleration is the product of the acceleration with the "virtual mass," which is the mass of the vessel increased by a proportion of the displacement; *e.g.* for a sphere, one half the displacement added to the mass is equal to the virtual mass. The effect of acceleration on a ship under actual conditions is less simple; and the virtual mass, defined as the increase of resistance divided by the acceleration of the ship, varies considerably with the circumstances of the previous motion. The mean value of the virtual mass of the "Greyhound," obtained by Froude from the resistance experiments, was about 20 % in excess of the displacement. This value is probably approximately correct for all ships of ordinary form, and is of use in estimating the time and distance required to make a moderate alteration in speed; the conditions during the stopping, starting and reversing of ships are generally, however, such as to make this method inapplicable.

Acceleration.

Propulsion.

The action of a marine propeller consists fundamentally of the sternward projection of a column of water termed the propeller race; the change of momentum per unit time of this water is equal to the thrust of the propeller, which during steady motion is balanced by the resistance of the ship.

Assuming in the first place that the passage of the ship does not affect and is uninfluenced by the working of the propeller, let V be the speed of the ship, v that of the propeller race relative to the ship, and m the mass of water added to the propeller race per second. The thrust T is then equal to $m(v - V)$, and the rate at which useful work is done is TV or $mV(v - V)$. Loss of energy is caused by (*a*) shock or disturbance at the propeller, (*b*) friction at the propeller surface, (*c*) rotational motions of the water in the race, and (*d*) the astern motion of the race. Of these (*a*), (*b*) and (*c*) are capable of variation and reduction by suitable propeller design; though unavoidable in practice, they may be disregarded for the purpose of obtaining the theoretical maximum efficiency of a perfect propeller. The remaining loss, due to the sternward race, is equal to $\frac{1}{2}m(v - V)^2$; whence the whole energy supplied to the propeller in unit time is expressed by $\frac{1}{2}m(v^2 - V^2)$ and the efficiency by $\frac{2V}{V + v}$. The quantity $v - V$ is commonly termed the *slip*, and $\frac{v - V}{v}$ the *slip ratio*; the latter expression being denoted by s, the theoretical maximum efficiency obtained on this basis becomes $\frac{1 - s}{1 - \frac{1}{2}s}$. It appears, therefore, that the maximum efficiency should be obtained with minimum slip; actually, however, with screw propellers the losses here disregarded entirely modify this result, which is true only to the extent that very large slip is accompanied by a low efficiency. The foregoing considerations show that, with a given thrust, the larger m the quantity of water acted upon (and the smaller, therefore, the slip), the higher is the efficiency generally obtained.

The type of propeller most nearly conforming to the fundamental assumption is the jet propeller in which water is drawn into the ship through a pipe, accelerated by a pump, and discharged aft. The "Waterwitch" and a few other vessels have been propelled in this manner; since, however, the quantity of water dealt with is limited for practical reasons, a considerable sternward velocity in the jet is required to produce the thrust, and the slip being necessarily large, only a very low efficiency is obtained. A second type of propeller is the paddle, or stern-wheel which operates by means of floats mounted radially on a circular frame, and which project a race similar to that of the jet propeller. Certain practical difficulties inherent to this form of propulsion render it unsuitable or inefficient for general use, although it is of service in some ships of moderate speed which require large manœuvring powers, *e.g.* tugs and pleasure steamers, or in vessels that have to run in very shallow water. The screw, which is the staple form of steamship propeller, has an action similar in effect to the propellers already considered. Before proceeding to discuss the action of screw propellers, it is desirable to define some of the terms employed. The product of the revolutions and pitch is often called the speed of the propeller; it represents what the speed would be in the absence of slip. Speed of advance, on the other hand, is applied to the forward movement of the propeller without reference to its rotation; and is equal to the speed of the ship or body carrying the propeller. The difference between the speed of the propeller and the speed of advance is termed the slip; and if the two former speeds be denoted by v and V respectively, the slip is $v - V$ and the slip ratio (or properly the apparent slip ratio) $\frac{v - V}{v}$. This notation corresponds to that previously used, $v - V$ being then defined as the absolute velocity of the race; it is found with propellers of the usual type, that zero thrust is obtained when $v = V$, provided that the "conventional" pitch, which for large screws is approximately 1·02 times the pitch of the driving surface, is used in estimating v. The pitch divided by the diameter is termed the pitch ratio.

The theories formulated to explain the action of the screw propeller are divisible into two classes—(i.) those in which the action of the screw as a whole is considered with reference to the change of motion produced in the water which it encounters, the blade friction being, however, deduced from experiments on planes; and (ii.) those in which the action of each elementary portion of the blade surface is separately estimated from the known forces on planes moved through water with various speeds and at different angles of obliquity; the force on any element being assumed uninfluenced by the surrounding elements, and being resolved axially and circumferentially, the thrust, turning moment, and efficiency are given by summation. Professor Rankine in *Trans. Inst. Nav. Archs.*, 1865, assumed that the propeller impressed change of motion upon the water without change of pressure except such as is caused by the rotation of the race. In Sir George Greenhill's investigation (*Trans. Inst. Nav. Archs.*, 1888) it is assumed conversely that the thrust is obtained by change of pressure, the only changes of motion being the necessary circumferential velocity due to the rotation of the screw, and a sufficient sternward momentum to equalize the radial and axial pressures. These two theories are both illustrative of class (i.); and this idea was further developed by Mr R. E. Froude in 1889, who concluded that the screw probably obtained its thrust by momentarily impressing an increase of pressure on the water which eventually resulted in an increase of velocity about one-half of which was obtained before and one-half abaft the screw. A lateral contraction of the race necessarily accompanies each process of acceleration. These general conclusions have been in some degree confirmed by experiments carried out by Mr D. W. Taylor, *Proceedings of the (American) Society of Naval Architects, &c.*, 1906, and by Professor Flamm, who obtained photographs of a screw race in a glass tank, air being drawn in to show the spiral path of the wake.

In *Trans. Inst. Nav. Archs.*, 1878, Froude propounded a theory of the screw propeller illustrative of the second class above mentioned, the normal and tangential pressures on an elementary area being deduced from the results of his own previous experiments on obliquely moving planes. He was led to the following conclusions regarding maximum efficiency:—(1) The slip angle (obliquity of surface to the direction of its motion) should have a particular value (proportional to the square root of the coefficient of friction); and (2) when this is so, the pitch angle should be 45°. The maximum efficiency obtained from this investigation was 77 %. This theoretical investigation, though of importance and interest, does not exactly represent the actual conditions, inasmuch as the deductions from a small element are applied to the whole blade, and, further, the considerable disturbance of the water when a blade reaches it, owing to the passage of the preceding blade, is ignored.

The most complete information respecting the properties of screw propellers has been obtained from model experiments, the law of comparison which has been shown to hold for ship resistance being assumed to apply equally to screw propellers. No frictional correction is made in obtaining the values for large screws from the model ones; as stated by

Experimental results.

Mr R. E. Froude in 1908, it is probable that the effect of friction would be in the direction of giving higher efficiencies for large screws than for small. The results obtained with ships' propellers are in general accordance with those deduced from model propellers, although the difficulties inherent to carrying out experiments with full-sized screws have hitherto prevented as exact a comparison being made as was done with resistance in the trials of the "Greyhound" and her model. Results of model experiments have been given by Mr R. E. Froude, Mr D. W. Taylor, Sir John Thornycroft and others; of these a very complete series was made by Mr R. E. Froude, an account of which appears in *Trans. Inst. Nav. Archs.*, 1908. Propellers of three and four blades, of pitch ratios varying from 0·8 to 1·5, and with blades of various widths and forms were successively tried, the slip ratio varying from zero to about 0·45. In each case the screw advanced through undisturbed water; the diameter was uniformly 0·8 ft., the immersion to centre of shaft 0·64 ft., and the speed of advance 300 ft. per minute. Curves are given in the paper which express the results in a form convenient for application. Assuming as in Froude's theory that the normal pressure on a blade element varies with the area, the angle of incidence, and the square of the speed, the thrust T would be given by a formula such as

$$T = a\,R^2 - bR$$

where R is the number of revolutions per unit time.

On rationalising the dimensions, and substituting for R in terms of the slip ratio s, the "conventional" pitch ratio p, the diameter D, and the speed of advance V, this relation becomes:

$$T = \frac{a}{p^2} D^2V^2 \frac{s}{(1-s)^2}.$$

From the experiments the coefficient a was determined, and the final empirical formula below was obtained—

$$T = D^2V^2 \times B \frac{p+21}{p} \times \frac{1{\cdot}02s(1-{\cdot}08s)}{(1-s)^2}$$

$$\text{or } H = {\cdot}003216\, D^2V^3 \times B \cdot \frac{p+21}{p} \times s\frac{(1-{\cdot}08s)}{(1-s)^2}$$

where H is the thrust horse-power, R the revolutions in hundreds per minute, V is in knots, and D in feet. The "blade factor" B depends only on the type and number of blades; its value for various "disk area ratios," *i.e.* ratio of total blade area (assuming the blade to extend to the centre of shaft) to the area of a circle of diameter D is given in the following table:—

Disk area ratio . .	·30	·40	·50	·60	·70	·80
B for 3 blades elliptical	·0978	·1050	·1085	·1112	·1135	·1157
B for 3 blades, wide tip	·1045	·1126	·1166	·1195	·1218	·1242
B for 4 blades, elliptical	·1040	·1159	·1227	·1268	·1294	·1318

The ratio of the ordinates of the wide tip blades to those of the elliptical blades varies as $\frac{1}{4} + \frac{2r}{D}$, where r is the radius from centre of shaft.

Curves of propeller efficiency on a base of slip ratio are drawn in fig. 53; these are correct for a 3-bladed elliptical screw of disk area ratio 0·45; a uniform deduction from the efficiency obtained by the curves of ·02 for a 3-bladed wide tip and ·012 for a 4-bladed elliptical screw must be made. Efficiency corrections for different disk area ratios have also to be applied; for a disk ratio of 0·70 the deductions are ·06, ·035, ·02 and ·01 with pitch ratios of 0·8, 1·0, 1·2 and 1·4 respectively; for other disk ratios, the deduction is roughly proportional to (disk ratio − 0·45), a slight increase in efficiency being obtained for low values of the disk ratio. A skew-back of the blades to an angle of 15° was found to make no material difference to the results.

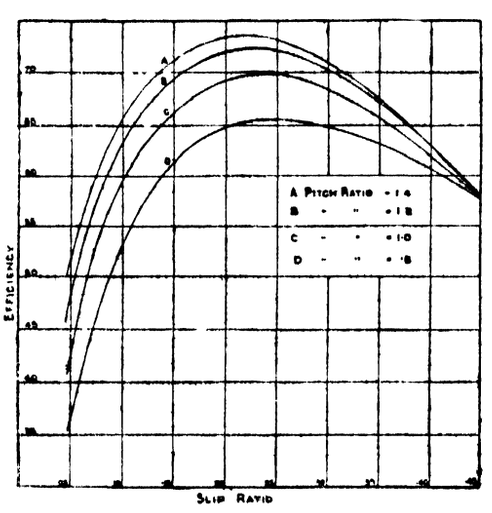


FIG. 53.—Curves of Screw Propeller Efficiency.

Hitherto, the theoretical and experimental considerations of the screw have been made under the convention that the propeller is advanced into undisturbed or "open" water, which conditions are very different from those existing behind the ship. The vessel is followed by a body of water in complex motion and the assumption usually made is that the "wake," as it is termed, can be considered to have a uniform forward velocity V′ over the propeller disk. ***Interaction between ship and screw.***

If V be the speed of the ship, the velocity of the propeller relative to the water in which it works, *i.e.* the speed of advance of the propeller is V − V′. The value of the wake velocity is given by the ratio $\frac{V'}{V-V'} = w$, which is termed the *wake value*.

The propeller behaves generally the same as a screw advancing into "open" water at speed V − V′ instead of at speed V and the real slip is $v - (V - V') = v\,\frac{V}{1+w}$. The real slip is greater than the apparent slip v − V, since in general w is a positive fraction; and the real slip must be taken into account in the design of propeller dimensions.

On the other hand the influence of the screw extends sufficiently far forward to cause a diminution of pressure on the after part of the ship, thereby causing an increase in resistance. The thrust T, given by the screw working behind the ship, must be sufficient to balance the tow-rope resistance R and the resistance caused by the diminution in pressure. If this diminution of pressure be expressed as a fraction t of the thrust exerted by the screw then $T(1-t) = R$.

The power exerted by the propeller or the thrust horse-power is proportional to T × (V − V′); the effective or tow rope horse-power is R × V, and the ratio of these two powers $\frac{RV}{T(V-V')} = (1-t)(1+w)$ is termed the *hull efficiency*.

It is evident that the first factor $(1+w)$ represents the power regained from the wake, which is itself due to the resistance of the ship. As the wake velocity is usually a maximum close to the stern, the increase of w obtained through placing the screw in a favourable position is generally accompanied by an increase in t; for this reason the hull efficiency does not differ greatly from unity with different positions of the screw. Model screw experiments with and without a ship are frequently made to determine the values of w, t, and the hull efficiency for new designs; a number of results for different ships, together with an account of some interesting experiments on the effect of varying the speed, position of screw, pitch ratio, direction of rotation, &c., are given in a paper read at the Institution of Naval Architects in 1910 by Mr W. J. Luke.

The total propelling efficiency or propulsive coefficient (p) is the ratio of the effective horse-power (RV) to the indicated horse-power, or in turbine-driven ships to the shaft horse-power as determined from the torque on the shaft. In addition to the factor "hull efficiency," it includes the losses due to engine friction, shaft friction, and the propeller. Its value is generally about 0·5, the efficiencies of the propeller and of the engine and shafting being about 65 and 80 % respectively. The engine losses are eliminated in the propulsive coefficient as measured in a ship with steam turbines; but the higher rate of revolutions there adopted causes a reduction in the propeller efficiency usually sufficient to keep the value of the propulsive coefficient about the same as in ships with reciprocating engines.

The table on the following page gives approximate values of w, t, and p in some ships of various types.

Cavitation.

The action of a screw propeller is believed to involve the acceleration of the water in the race before reaching the screw, which is necessarily accompanied by a diminution of pressure; and it is quite conceivable that the pressure may be reduced below the amount which would preserve the natural flow of water to the screw. This would occur at small depths of immersion where the original pressure is low, and with relatively small blade-areas in relation to the thrust, when the acceleration is rapid; and it is in conjunction with these circumstances that so-called "cavitation" is generally experienced. It is accompanied by excessive slip, and a reduction in thrust; experiments on the torpedo-boat destroyer "Daring," made by Mr S. W. Barnaby in 1894,[1] showed that cavitation occurred when the thrust per square inch of projected blade area exceeded a certain amount (11½ lb). Further trials have shown that the conditions under which cavitation is produced depend upon the depth of immersion and other factors, the critical pressure causing cavitation varying to some extent with the type of ship and with the details of the propeller; the phenomenon, however, provides a lower limit to the area of the screw below which irregularity in thrust may be expected, and the data for other screws (whether model or full-size) become inapplicable.

[1] *Trans. I.N.A.* 1897 (vol. xxxix.).

Type of Ship.	Number of Screws.	Propulsive Coefficient, p.	Wake Value, w.	Thrust Deduction, t.	Hull Efficiency.	Remarks.
Battleship (turbine driven)	4	·47[1]	·15	·12	1·01	Inner screws
			·20	·16	1·01	Outer screws
Battleship (older types)	2	·47	·14	·17	·95	
First-class cruiser	2	·53	·10	·10	·90	..
Second ,,	2	·48	·06	·10	·95	..
Third ,,	2	·48	·05	·08	·97	..
Torpedo-boat destroyer	2	·62	·01	·02	·97	..
Mail steamer (turbine)	4	·46	·30	·17	1·08	Inner screws
,, ,,			·22	·20	·98	Outer screws
Cargo vessel	2	..	·20	·14	1·03	..
Sloop	1	·45	·21	·17	1·00	..
Submarine (on surface)	2	..	·16	·10	1·04	..
,, (diving)	2	..	·20	·12	1·05	.

The above figures refer to full speed and are affected by alteration of speed.

[1] Higher values have been obtained for the propulsive coefficients of the most recent turbine-driven ships.

Strength.

The forces tending to strain a ship's structure include (1) the static forces arising from the distribution of the weight and buoyancy when afloat, and the weight and supporting forces when in dock or ashore; (2) the dynamic forces arising from the inertia of the ship and its lading under the accelerations experienced in the various motions to which the ship is liable, such as rolling and pitching in a sea way; and (3) local forces and water pressures incidental to (*a*) propulsion and steering, and (*b*) the operation of the various mechanical contrivances which it carries.

The straining actions of the forces, due to the distribution of the weight and buoyancy of the ship at rest and to the inertia of the ship in motion, constitute the only part of the problem of the strength of the structure which can be considered theoretically with any generality; the character of the internal reactions arising in the structure is so complex, that simplifying assumptions have always to be made in order to enable them to be calculated.

The results of theoretical calculations as to the general structural strength of ships are therefore of value for comparative purposes and to some extent for the approximate estimation of stresses actually liable to occur in the structure. The comparison of the theoretical calculations with the results of experience forms an invaluable guide to the proper distribution of material. In making such a comparison the necessity of providing sufficient strength, on the one hand, and of keeping down the weight, on the other hand, has to be borne in mind; the latter point being especially important in a ship, since its economical performance is roughly dependent on the difference between the weight of the structure and the total available displacement.

Longitudinal bending. The greatest straining actions, to which vessels of ordinary forms and proportions are subject, are due to inequalities in the longitudinal distribution of the weight and the buoyancy. Let WWW (fig. 54) represent the weight, and BBB ... the buoyancy per foot run of a ship plotted along the length AC; over the lengths A*a*, *bc*, *de* fC the weight is in excess of the buoyancy; while from *a* to *b*, *c* to *d*, *e* to *f*, it is in defect. A curve LLL, whose ordinates are equal to the differences between those of WWW and BBB, is termed a curve of loads, and represents the net load of the ship regarded as a beam subject to longitudinal bending. Shearing forces are produced whose resultant at any transverse section is equal to the total net load on either side of the section; they are represented by the "shearing force" curve FFF..., whose ordinate at any transverse section is proportional to the area of the "loads" curve LLL... up to that section. Similarly, on plotting the areas of the shearing force curve as ordinates, a "bending moment" curve MMM is obtained which gives the bending moment at any section. Symbolically, if w, F, M represent the load, shearing force, and bending moment, and x the co-ordinate of length,

$$w = \frac{dF}{dx} \text{ and } F = \frac{dM}{dx}.$$

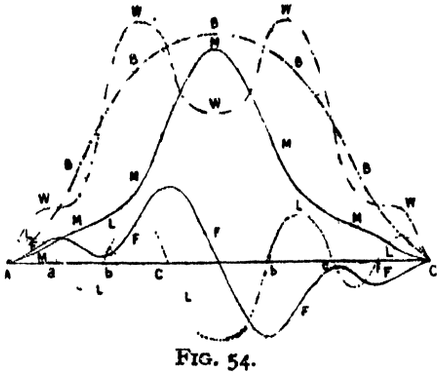


FIG. 54.

The conditions of equilibrium, viz. (*a*) that the total weight and buoyancy are equal, and (*b*) that the centre of gravity and the centre of buoyancy are in the same vertical transverse section, ensure that the end ordinates of the shearing force and bending moment curves are zero.

These curves are usually constructed for three standard conditions of a ship, viz. (i.) in still water; (ii.) on a trochoidal wave of length equal to that of the ship and height $\frac{1}{20}$th of the length, with the crest amidships; and (iii.) on a similar wave with the trough amidships. The curve of weight is obtained by distributing each item of weight over the length of the ship occupied by it and summing for the whole ship. Such a condition of the ship as regards stores, coal, cargo, &c., is selected, which will produce the greatest bending moment in each case. The ordinates of the curve of buoyancy are calculated from the areas of the immersed sections, the ship being balanced longitudinally on the wave in the second and third conditions. The shearing force and bending moment curves are then drawn by successive integration of the curve of loads. Typical curves are shown in figs. 55 to 59 for a first-class cruiser on wave crest, a torpedo-boat destroyer on wave crest (bunkers empty) and in trough (bunkers full), and a cargo vessel on wave crest (hold and bunkers empty) and in trough (hold and bunkers full). From these curves it is seen that the maximum bending moment occurs near amidships; its effect in figs. 55, 56 and 58 is to cause the ends to fall relatively to the middle, such a moment being termed "hogging"; the reverse or a "sagging" moment is illustrated in figs. 57 and 59. Curves of a similar character are obtained in the still-water condition, but the bending moments and shearing forces are then generally reduced in amount.

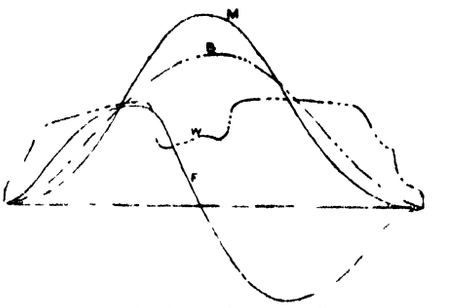


FIG. 55.—Cruiser of 14,000 Tons on Wave Crest.

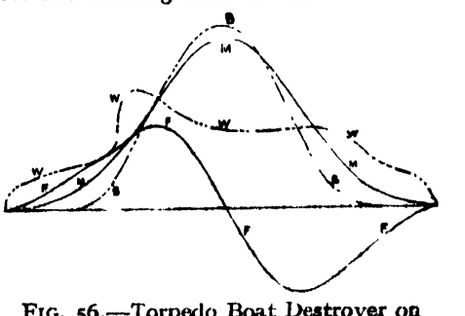


FIG. 56.—Torpedo Boat Destroyer on Wave Crest.

The maximum bending moment is frequently expressed as a ratio of the product of the ship's length and the displacement; average values for various types of ships are tabulated below:—

Class of Ship.	$\frac{W \times L}{\text{Maximum B.M.}}$	Whether Hogging (on Wave Crest) or Sagging (in Wave Hollow).
Mail steamer	From 25 to 30	H
Cargo vessel	From 30 to 35	H
Battleship (modern)	About 30	H
Battleship (older types)	About 40	H
First-class cruiser	About 32	H
Second-class cruiser	About 25	S
Scout	About 22	H
Torpedo-boat destroyer	About 22	H
	From 17 to 25	S
Torpedo boat	About 23	H
	About 23	S

The stresses at a transverse section due to bending are obtained from the usual formula $\frac{M}{I}=\frac{p}{y}$, where M is the bending moment, I the moment of inertia of the section about the neutral axis, y the distance from the neutral axis of the point at which the stress is required, and p the intensity of stress. In calculating I, a deduction from the area of plating in tension is made for rivet holes, and only the continuous longitudinal portions of the structure are assumed effective in resisting bending.

The stresses obtained by this method undergo considerable variation with class and size of ship. As regards the former, it is evident that the actual straining actions upon a ship necessarily vary with the type; and the stresses allowable, as calculated on a uniform basis of applied forces, must vary accordingly. The variation due to size is less obvious, but it is clear that the larger the ship, the less is the probability of encountering waves as long as herself; and, moreover, the proportion of height to length of the largest waves is generally less than that assumed. For these reasons greater calculated stresses are allowable in large ships than in small ships or in those of moderate size. The limiting stress frequently adopted for small ships is 6 tons per sq. in., which may be increased for portions in tension to 8 tons with high tensile steel; on the other hand, the calculated stresses in the largest vessels frequently exceed 8 tons compressive and 10 tons tensile.

The above method is that now universally adopted for comparing the stresses in ships caused by longitudinal bending; although imperfect, it affords a reasonable basis of comparison between the longitudinal strengths of vessels, especially when, as is generally the case, the comparison is made between two ships of similar type. The relation between stress and strain has therefore to be investigated, which involves the experimental determination of the modulus of elasticity of the structure.

The assumptions on which the theory of bending is based are:

(*a*) At any transverse section the material lying on the neutral surface, which passes through the C.G. of the effective sectional material, is neither extended nor compressed.

(*b*) The material is homogeneous; and the layers comprised between adjacent surfaces parallel to the neutral surface act independently. (This is probably more nearly the case in a ship than in a beam of solid section.)

(*c*) The material situated at a distance y from the neutral surface is compressed (or extended) longitudinally by an amount $\frac{y}{\rho}$ of its original length; where $1/\rho$ is the curvature of the neutral surface if originally straight, or the alteration of curvature if originally curved.

(*d*) The stress is proportional to the strain and equal to $\frac{Ey}{\rho}$, E being Young's modulus for the material. It follows that the resultant longitudinal force across a section is zero, and the moment of the internal forces about the neutral axis (*i.e.* about the trace of the neutral surface in the section) is $\frac{EI}{\rho}$, which is equal and opposite to the external bending moment M.

(*e*) Taking axes – Ox longitudinal, Oz vertical, since ρ is large, $\frac{1}{\rho}$ may be replaced by $\frac{d^2z}{dx^2}$, and

$$E\frac{d^2z}{dx^2}=\frac{M}{I} \text{ or } Ez=\int\int\frac{M}{I}\,dx\,dx,$$

giving the deflection z at any point.

The validity of the theory as applied to a ship was tested and confirmed in 1903 at Portsmouth Dockyard when experiments were made on H.M.S. "Wolf" by Professor J. H. Biles for the Committee on Torpedo-Boat Destroyers (see *Trans. Inst. Nav. Archs.*, 1905). The principal dimensions of the "Wolf" are—length 210 ft., breadth 21·7 ft., draught 5·3 ft., and displacement 360 tons, with a coal capacity of 80 tons. Two sets of experiments were made—(i.) under a hogging moment when supported in dock on two cradles 10 ft. wide, spaced 26 ft. apart centre to centre, and equidistant from the ship's centre of gravity, bunkers empty; (ii.) under a sagging moment when supported by similar blocks 120 ft. apart, bunkers full. The distribution of weight and buoyancy had previously been determined for each case so that the pressures on the blocks and the bending moments caused thereby could be accurately obtained. When thus supported the water-level in the dock was gradually lowered; and for successive water-levels spaced 6 in. apart the extension or compression of the plating was measured at various points of the structure by Stromeyer's strain indicators; the vertical deflections at various points of the length were also recorded. The observations were repeated several times, and the following are the general results:

(*a*) In the sagging condition the neutral axis was actually situated 7·55 ft. above the keel; the calculated distance was 7·8 ft. deducting rivet holes in parts in tension, and 7·7 ft. without such deduction. In the hogging condition the observed height was 7·2 ft., those calculated as before being 7·5 ft. and 7·6 ft. All shell and deck plating, gunwale and keelson angles, and the side girders and angles were included in the calculation for the moment of inertia. The calculated and observed positions of the neutral axis are thus in fairly close agreement.

(*b*) The actual vertical distribution of strain over a transverse section was approximately in accordance with the linear law assumed in the theory of bending.

(*c*) The modulus of elasticity E was obtained by equating the sum of the moments about the neutral axis of the stresses deduced from the observed strains to the bending moment.

(*d*) The value of E was also deduced from the deflections by means of the formula

$$Ez=\int\int\frac{M}{I}\,dx\,dx;$$

and its value under a sagging moment is in agreement with that found by (*c*). Under a hogging moment the mean value obtained from the deflection is less than that from the strain, showing that the curvature obtained from the deflections is greater than that to which the structure is actually bent.

The table at the top of the following page shows the values obtained for E, the modulus of elasticity.

By observing the deflections of two vessels when loaded with ballast, the following values for E were obtained by T. C. Read and G. Stanbury (*Trans. Inst. Nav. Arch.*, 1894), and are given for purposes of comparison:

Principal Dimensions of Vessel.	Load in Tons.	Deflection in Inches.	Value of E deduced.
347′ × 45′ – 6″ × 27′ – 2″	5000	2·31	11,000
300′ × 41′ – 6″ × 21′ – 2″	1800	·62	

After the experiments the "Wolf" was sent to sea in rough weather with the object of comparing the stresses then observed with those calculated under the standard conditions on trough or crest. The strains at various portions of the structure were again measured with Stromeyer's indicators, and the stresses deduced from

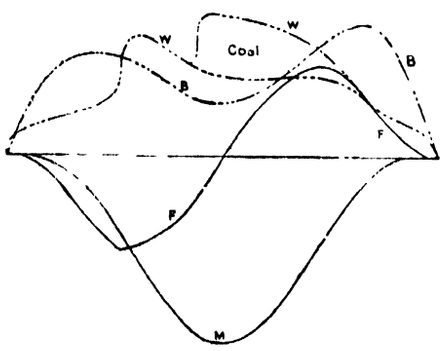


FIG. 57.—Torpedo-Boat Destroyer in Wave Trough.

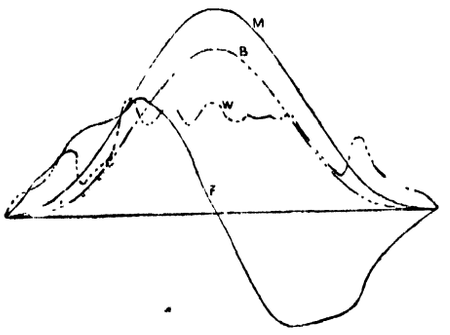


FIG. 58.—Cargo Vessel of 12,000 Tons on Wave Crest.

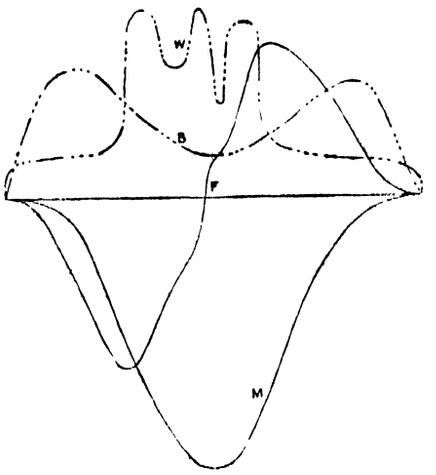


FIG. 59.—Cargo Vessel of 12,000 Tons in Wave Trough.

Draught of Water.	Sagging.				Hogging.			
	Maximum Compressive Stress.	Maximum Tensile Stress.	E by Strain Indicator.	E by Deflection over the whole length.	Maximum Compressive Stress.	Maximum Tensile Stress.	E by Strain Indicator.	E by Deflection over the whole length.
Feet.								
6	1·7	2·3	12,100	11,800	1·0	·9	..	..
5	2·9	3·7	12,100	12,000	2·7	2·6	16,000	11,800
4	4·1	5·4	11,400	11,400	4·2	4·0	15,100	10,800
3	5·2	6·6	11,400	11,500	5·3	5·0	13,000	10,400
2	6·0	7·7	10,800	11,100	6·1	5·8	12,700	9,600
1	6·5	8·4	10,700	10,600	6·6	6·4	12,700	9,900
Dry	6·7	8·6	10,200	10,300	6·8	6·6	11,800	9,800

Note.—The maximum stresses above are approximate, and are recorded in order that the variation of E with the stress in the material may be seen. Tons per square-inch units are employed.

the values for E found from the dock experiments. The maximum stresses were as follows :—

Condition.	Stress—Tons per Square Inch.	
	Keel.	Deck.
Maximum observed stresses when hogging	2·9 C.	2·0 T.
Maximum observed stresses when sagging	5·4 T.	2·5 C.
Calculated stress (sagging) when in a wave hollow of height $\frac{1}{20}$th length	7·1 T.	5·3 C.

C. = Compressive. T. = Tensile.

It appears from these experiments that (at least in ships of similar character to H.M.S. "Wolf") the stresses corresponding to any particular external conditions closely agree with those calculated from the usual theory of bending; on the other hand the waves encountered during the sea trials were such that the maximum stress then obtained was considerably less than that in the condition assumed for the standard calculations. Finally, the material of the ship was subjected in dock to a tensile stress of nearly 9 tons and a compressive stress of nearly 7 tons per sq. in. without distress.

While dealing with longitudinal bending, some of the refinements suggested for calculating stresses among waves may be cited, although the additional labour involved in their application has prevented their introduction in general practice.

Since the distribution of pressure in the water of a wave system differs from that in still water, the buoyancy of a vessel or the resultant vertical thrust of the water is then not equal to the weight of the water displaced; and the position of the ship when in equilibrium and the stresses upon it are changed in consequence. By assuming the pressure at any point of the water to be in accordance with the trochoidal theory of wave motion and undisturbed by the intrusion of the ship, the equilibrium position can be obtained and the modified stresses evaluated. This process was first applied to ships by Mr W. E. Smith (*Trans. I.N.A.*, 1883), who obtained the arithmetical sum of the sagging and hogging moments on vessels placed in the trough and on the crest of a wave, thereby eliminating the effect of the distribution of weight; and compared it with the sum of the moments as ordinarily obtained. The correction for the ships considered involved a reduction of the bending moment to about $\frac{8}{9}$ of the value calculated in the ordinary manner, and in a torpedo-boat destroyer a reduction of about 10 % has been obtained. This reduction increases as the draught and fullness of the ships are increased, and the bending moment on a square-bilged ship deeply immersed is almost uninfluenced by wave motion, since the reduction in orbital motion at considerable depths below the surface ensures the bottom of a fairly deep ship being in comparatively undisturbed water.

In the foregoing the vessel is assumed to occupy at every instant a horizontal position on the wave with the correct displacement; a ship proceeding perpendicularly to the crests of a wave system will, however, undergo heaving and pitching oscillations which lead to a further modification in the bending moment obtained (see paper by T. C. Read, *Trans. I.N.A.*, 1890). Considering first the effect of pitching only, imagine the ship at her proper displacement (allowance being made for the altered buoyancy of the wave system as before), but momentarily out of her correct trim; the longitudinal restoring couple, due to the wedges of immersion and emersion, is balanced by the moment of the reversed mass-accelerations of the component parts. If the ship is longitudinally symmetrical about her midship section, one half of the moment of the restoring forces and one half of the moment of the reversed mass-accelerations about amidships are due to the forward end, and one half to the after end. These moments are therefore equal and opposite for each half of the ship and have no influence on the midship bending moment. It appears, therefore, that in the majority of ships whose departure from longitudinal symmetry is slight, pitching has little effect on the amount of the maximum longitudinal bending moment; nevertheless it considerably increases the bending moments near the ends.

The effect of heaving is investigated by obtaining the positions of equilibrium of the C.G. of the ship when on wave crest and in wave trough; intermediate positions of equilibrium are assumed to be given by $y = a \sin \frac{\pi t}{T_1}$ where T_1 is the apparent semi-period of the wave. On taking into account the mass of the ship, assumed originally stationary, the height of the C.G. above its mean position becomes

$$a \times \frac{T_1^2}{T_1^2 - T^2}\left\{\sin \frac{\pi t}{T_1} - \frac{T}{T_1} \sin \frac{\pi t}{T}\right\},$$

where $T = \pi \sqrt{\frac{W}{g p}}$ = period of dip in still water;

W is the displacement, and p the tons per foot immersion; the resistance to vertical motion being neglected. When T and T_1 are nearly equal, allowance has to be made for the resistance by using a process of graphic integration. On applying the correction to two vessels, and comparing the bending moments in their positions of the wave, given by the formula, with those in the equilibrium position, the effect on the maximum hogging moment was found small; but the sagging moment of a moderately fine vessel was increased by over 20 %, and that of a full vessel by about 10 %.

Allowance has also been made for the effect of the superposed heaving, pitching and rolling oscillations undergone by a ship moving obliquely across the crests of a wave system (see papers by Captain Kriloff, *Trans. I.N.A.*, 1890 and 1898).

The maximum calculated stress on vessels inclined to considerable angles of heel has been found in some instances to be slightly greater than that for the upright condition; and the stress on the material towards the ends is then usually more nearly equal to that amidships.

In addition to the direct stresses on keel, bottom, and upper works resulting from longitudinal bending, shearing stresses are experienced which in some cases are of appreciable magnitude. The intensity of shear stress in the side plating is equal to $\frac{F A\bar{z}}{2tI}$; where F is the shearing force over the transverse section, $A\bar{z}$ the moment about the neutral axis of the sectional area above or below a horizontal line through the point considered, and t the thickness of side plating. This stress is usually greatest at or near a quarter of the length from either end and at the height of the neutral axis, since here F and $A\bar{z}$ respectively attain their maximum values. In some cases the thickness of plating and arrangement of riveting have to be specially considered in relation to these shearing stresses.

Transverse bending.

The stresses due to transverse bending are not, in general, capable of definite determination; as, however, they are frequently severe when the ship is in dry dock, and may also attain considerable magnitude during heavy rolling, a means of comparing the transverse strength of vessels is of some interest. A transverse bulkhead forms a region of almost infinite transverse stiffness, and it is therefore difficult in ships internally subdivided by numerous bulkheads, to determine how far the stresses at intermediate sections are influenced by the neighbouring bulkheads. In many vessels carrying cargo, however, in which transverse bulkheads are widely spaced, a section midway along a hold may be so far removed from all bulkheads as to be uninfluenced by their local support; and the following method has been proposed for comparing the transverse strengths of such ships:

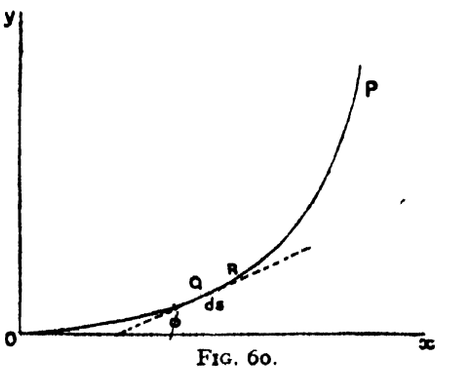


FIG. 60.

A frame and a strip of plating one frame space in width are regarded as a stiff inextensible bar subjected to the known external forces and to the unknown tension, shearing force, and bending moment, at any fixed point.

Let OP (fig. 60) be a portion of the framing under consideration, O being the keel, and Ox, Oy, horizontal and vertical axes.

On consideration of the forces on the arc OQ, which are in

equilibrium, the tension T, shearing force F, and bending moment M, at Q can be algebraically expressed in terms of its coordinates (x, y), the water or other external pressures on OQ, and the values of T, F and M at O (T_0, F_0, M_0).

Neglecting the effects of T and F on the element QR, it follows from the equations of bending that

$$M = EI\left(\frac{d\phi'}{ds} - \frac{d\phi}{ds}\right)$$

where ϕ and ϕ' are the respective inclinations of the element QR to Ox before and after the strain caused by bending, and ds is the length of QR. Due to the effect of M on QR, the bar at the point P (x_1, y_1) is rotated through an angle $d\phi' - d\phi$ and moved through distances—

$$(y_1 - y)\ (d\phi' - d\phi) \text{ and } (x_1 - x)\ (d\phi' - d\phi)$$

in directions parallel to Ox and Oy respectively. On integrating along OP the total movement of P due to the bending of all such elements as QR in OP is obtained; when P is moved round the complete section so as to return to O, where the total movement is zero, it follows, on subtraction and reduction, that

$$\int \frac{M}{I} ds = 0; \quad \int \frac{Mx}{I} ds = 0; \quad \int \frac{My}{I} ds = 0;$$

the integrations being taken completely round the section. It is assumed in the foregoing that rigid connexions are made at discontinuities, such as deck edges, in order to prevent any alteration in the angle due to strain.

The values of $\frac{M}{I}$, $\frac{Mx}{I}$, $\frac{My}{I}$ can be calculated at varying points and expressed in terms of T_0, F_0, M_0; by using a method of approximate quadrature, T_0, F_0, M_0 are found by solving the 3 equations obtained, and M is deduced giving the corresponding stress at any point. In applying this method to the determination of the stresses caused by rolling, the centrifugal forces on each element are included in the external forces when estimating M.

This method of estimating the transverse strength of ships is due to Dr Bruhn, who in *Trans. I.N.A.*, 1901, 1904 and 1905, gives illustrations of its application.

Local stresses. In addition to the stresses due to longitudinal and transverse bending, which are distributed over the whole or a considerable part of the structure, local stresses are experienced including those caused by water-pressure; forces on sails, masts and rigging; reactions of moving parts of machinery; heavy blows from the sea on side, deck and upper works; anchor, cable and mooring gear, and blast from gun-fire. General methods are usually inapplicable to such cases; the support provided is determined by experience and by the particular requirements. The stresses in bottom plating due to water-pressure are of small amount where the curvature is appreciable, since the plating, by compression, directly resists any tendency towards change of curvature; in a deep flat-bottomed ship, on the other hand, resistance to water-pressure is chiefly due to the bending of the plating, the slight extension having little influence. The plating is supported at the transverse and longitudinal frames, and, to some extent, at the edges. The close spacing of transverse frames usually adopted in merchant ships reduces the stress to a small amount; but in large warships, whose frame spacing varies from 3 to 4 ft., it is probable that the flat plating near the keel amidships is subjected to considerable stress, although, as experience shows, not beyond the limits of safety. In fine ships special provision is frequently made to prevent the side plating near the bow from panting due to the great and rapid fluctuation of water-pressure when pitching.

Uniformity of stress. The material of the structure is arranged so that the distribution of stress over any localized section of material is maintained as uniform as possible in order that the ratio of maximum to mean stress may not be unduly large. For this reason abrupt discontinuities and sudden changes of section are avoided, and "compensation" is introduced where large openings are cut in plating. The corners of hatchways in ships whose upper decks are subjected to considerable tension are frequently rounded, since failure of the material near the square corners of such hatchways has been known to take place, pointing to the existence of abnormal stress intensities, which are also evident from theoretical considerations. Similarly, local stiffening required for the support of a heavy weight or for resisting the blast of gun-fire is reduced in sectional area at the ends, or continued for a length greater than absolutely necessary, to ensure an even distribution of stress.

Vibration. Among the stresses to which a ship is subjected are those caused by its mode of propulsion. The stresses due to the reactions of the moving parts of the machinery are, in general, of small amount, but owing to their periodic character vibrations are induced in the structure which are frequently of sufficient magnitude to cause considerable inconvenience and even damage.

It is known that when a periodic force of frequency n is applied to a structure capable of vibrating naturally with frequency p, the amplitude of the forced vibrations assumed by the structure is inversely proportional to $\sqrt{(p^2 - n^2)^2 + K^2}$,

where K is a coefficient depending on the resistance to vibration. If the period of the force synchronizes or nearly synchronizes with the natural period of the structure, the amplitude is considerable, but otherwise it is of relatively small amount. If, therefore, the natural period of vibration has been found for a ship, the causes of vibration at various speeds can be readily traced, since marked vibration is usually attributable to a synchronizing source.

Vibration in a steamship is due to various causes, the principal of which are:—

1. The reciprocating parts of the engines, if unbalanced, cause vibrating forces and couples in a vertical plane and of two frequencies, one equal to, and the other twice, the speed of revolution, the latter being due to the secondary action introduced by the connecting rod. In twin-screw ships torsional oscillations in transverse planes may also result when the engines are working in opposite phase.

2. The rotating parts of the engines cause vertical and horizontal oscillations of frequency equal to the speed of revolution.

3. The variation in the crank effort tends to cause torsional oscillation of the same frequency, particularly in single or two-cylinder engines.

4. Vibrations, principally at the stern, may result from an unbalanced screw; these are similar to those caused by the rotating parts of the machinery.

5. A screw propeller which experiences uneven resistance during its revolution is the cause of vibrations, whose frequency is the product of the revolution and the number of blades. Such resistances occur when (1) the blades pass too close to the hull; (2) when the screw breaks the surface of the water; and (3) when the supply of water to the propeller is imperfect, due either to "cavitation" or to the screening effect of shaft and propeller supports.

The natural vibration of a ship's structure (irrespective of local vibrations) is analogous to that of an unsupported rod of suitable dimensions, the principal difference being that the vibrations in the rod are undamped and those in the ship are damped rapidly through the communication of the motion at the hull surface to the surrounding water. A thin uniform rod vibrating laterally has a minimum frequency (per minute) equal to $1210\sqrt{\frac{EI}{WL^3}}$; in this mode of vibration there are two nodes situated at a distance ·224 L from either end. Vibrations of a higher order having three, four or more nodes are also possible, the frequencies increasing approximately in the ratio 1 : 2·8 : 5·4, &c. The complex variation of the weight, inertia and modulus in a ship prevent a corresponding result being obtained by direct mathematical investigation; recourse is therefore made either to direct experiments on ships, or to a "dynamic model." The instrument used for measuring and recording vibrations consists of a weight suspended, and held laterally in position, by springs, so as to have a long period of oscillation; pens or pencils attached to the weight record the vibrations upon revolving cylinders fixed to the vessel and fitted with time records. The formula (of the same form as that for a rod)

$$N = c\sqrt{\frac{EI}{WL^3}},$$

where N is the frequency per minute, was used by Dr Schlick for the vibration of ships; the value of c found by him for vertical vibrations varied from 1600 in very fine vessels to 1300 in those having moderately full lines. The nodes were found to be at about a third of the length from the stem and about a quarter of the length from the after perpendicular. The frequency with three nodes was slightly more than twice that of the primary vibrations. Horizontal and torsional vibrations were also observed; their minimum frequency is, however, generally considerably more than that of the vertical vibrations, and they are therefore generally of much smaller amplitude. (See papers in *Trans. Inst. Nav. Archs.* from 1884 to 1901, by Dr O. Schlick, and in 1895 by Mr A. Mallock.) The "dynamic model," suggested by Mr Mallock, forms a convenient means of approximately investigating the positions of the nodes and the frequencies of vibration of a ship. The formula given above suggests that by making a model of material whose modulus E and density ρ are known, and on a linear scale of $\frac{1}{n}$, then if N_s, N_m refer to ship and model,

$$\frac{N_s}{N_m} = \frac{1}{n}\sqrt{\frac{E_s}{E_m} \cdot \frac{\rho_m}{\rho_s}}.$$

This relation is unaffected if the lateral distribution of material is changed in the model, provided that I_m and the weight of the model per foot run are unaltered at each point in the length; the model is therefore made solid and of rectangular or other convenient section, so that

$$I_m = \frac{I}{n^4} \cdot I_s \text{ and } W_m = \frac{I}{n^3} \cdot \frac{\rho_m}{\rho_s} \cdot W_s;$$

the weight being also similarly distributed in a longitudinal direction to that in the ship. The model is supported at points, whose positions are obtained by trial, giving the highest frequency for the mode of vibration considered; these points are the nodes corresponding to the free vibrations when the model is unsupported, and the influence of the supports is thus eliminated. On comparison with the results obtained in a ship, the reliability of such model experiments has

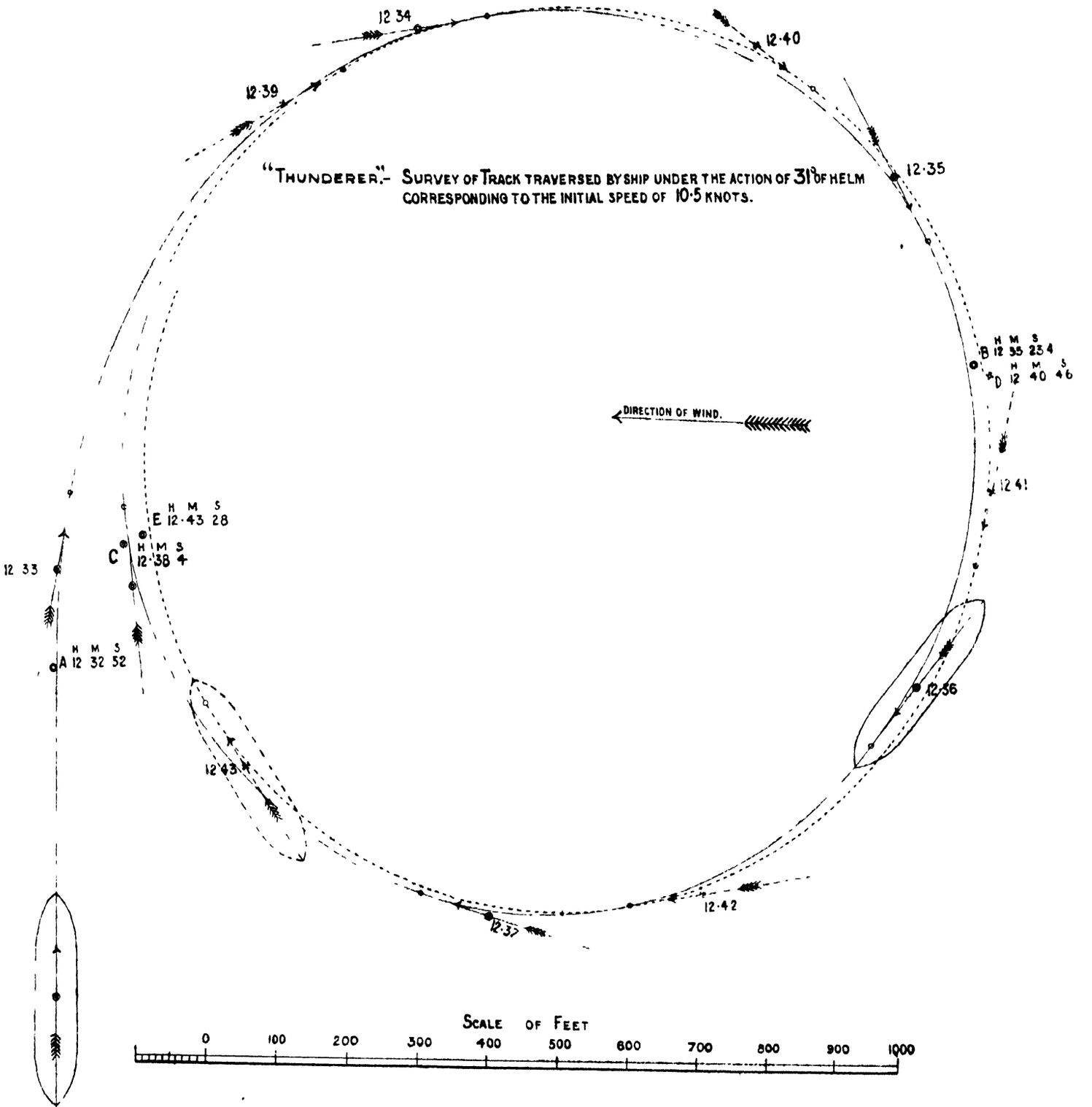


FIG. 61.

The curve given is that described by the pivoting point. The first time round is shown in a drawn line, the second time round in a dotted line.

	h.	m.	s.
A, Position of ship's centre of gravity when helm is half over . .	12	32	52
B, Position of ship's centre of gravity after she had turned through the first 180°	12	35	23·4
C, Position of ship's centre of gravity after she had turned through the second 180°	12	38	4
D, Position of ship's centre of gravity after she had turned through the third 180°	12	40	46
E, Position of ship's centre of gravity after she had turned through the fourth 180°	12	43	28

Speed on final circle, 7·14 knots.
Diameter of final circle, 1240 ft.
Tactical diameter, 1315 ft.
Time of turning through 180°, 2 min. 31 sec.

been verified in a few cases, the value adopted for E_s being that for a riveted structure or about 10,000 tons per square inch. In some model experiments made in air and in water, the frequency in the latter case was found to be reduced, and owing to the rapid damping of the free vibrations and to a virtual increase in the mass-inertia caused by the concomitant motion of the surrounding water, which occurs in the ship and not in the model when vibrated in air, there must be a difference in the results. A second difference is due to the ratio of depth to length in a ship being sufficient to make the term for rotational inertia appreciable, which factor is neglected in the formulae for a thin bar and the dynamic model. The extent to which such results require modification cannot be determined until further experiments have been made.

Finally it appears that vibration in a ship can generally be avoided only by removing its cause; the addition of further stiffening to the structure with the object of reducing vibration has not infrequently had the opposite effect, the natural frequency being brought more nearly into synchronism with that of the disturbing force.

The adoption of the steam turbine obviates many of the causes producing vibration referred to above, leaving only those due to the forces resulting from inequalities in the working or position of the propellers.

Steering.

The information available on the steering and manœuvring qualities of ships is largely due to the results of the methodic trials made with H.M. ships. These include observations of the paths when turning under different angles of helm, at various speeds, with and without assistance from the propellers, and with variation in certain features of the hull which influence the steering, such as the addition of bilge keels, change of draught or trim, and the omission of the after deadwood.

One of the first attempts at plotting the curve traversed by a ship under the action of her rudder, and the position of the ship at any instant with reference to that curve, was made by the writer in 1877 with H.M.S. "Thunderer" (see Appendix XIII. to Report of "Inflexible's" Committee).[1] The position of the ship was fixed at numerous intervals with reference to the line of advance by observing simultaneously (*a*) the direction of her head and (*b*) the angles of the base of a triangle, whose apex was a floating object within the approximate circle in which she turned, and whose base was the line between two observers at fixed points on the deck, one forward and the other aft; these angles in conjunction with the base fixing the distance of the middle line plane of the ship from the floating object. The data were observed for different speeds and with different angles of rudder, and with and without the turning effect of the screws.

Fig. 61 gives the plotted positions of the ship continued for two complete turns with 31° of helm when going ahead initially at 10·5 knots. The straight line which becomes curved at the point A is the initial course of the ship. The short lines give the positions of the ship when turning at intervals of a minute; and the curve drawn touches the positions successively occupied by the middle line of the ship. It will be seen that the bow of the ship is nearer the centre of the circle, or curve in which she turns, than the stern. The vessel may be regarded as going ahead and turning or pivoting about a point well forward in her middle line; this is termed the "pivoting point," the middle line being, at this point, a tangent to the curve concentric with and similar to that described by her centre of gravity. In the "Thunderer" the pivoting point was situated about 50 ft. abaft the stem.

Similar information for a more modern ship is given in fig. 62 for the Japanese battleship "Yashima" when turning under 32° of helm with an initial speed of 17·5 knots.[2] AAA is the locus of the pivoting point O, and BBB that of the ship's centre of gravity. The bow of the ship is directed inwards with reference to the latter curve; the angle between the middle line plane and the tangent to the curve BBB is termed the "drift angle."

The distance between the pivoting point and the ship's centre of gravity is equal to $\rho \sin \phi$, where ρ is radius of curvature of BBB and ϕ is the drift angle. The value of ϕ is about 23° in the "Yashima," and about 10° in the "Thunderer"; and the pivoting point O of the former ship is situated very near the fore end of the vessel. CCC is the path of the outer edge of the stern and represents the clear space required when turning.

In both ships the path is spiral in form until about 16 points (180°) have been turned through, and it then becomes approximately a circle. The maximum distance that the ship's centre of gravity travels in her original direction after the helm is put over is termed the "advance," and the "tactical diameter" is the perpendicular distance between the original line of advance and the ship's position after turning through 16 points.

[1] Similar experiments had been made by M. Risbec on the "Elorn" (*Revue maritime et coloniale*, 1876).

[2] See "The Steering Qualities of the 'Yashima,'" *Trans Inst. Nav. Archs.*, 1898.

For an approximate investigation of the forces in operation during the turning of a ship, the motion may be divided into three stages: (*a*) when the rudder is first put over and the pressures on the hull are those necessary to produce angular acceleration; (*b*) when the accelerative forces are combined with those caused by the resistance of the ship to rotation; and (*c*) when finally turning uniformly in a circular path. The characters of the forces acting during the states (*a*) and (*c*) can be ascertained, and the type of motion under the complex conditions represented by (*b*) will consist of a gradual replacement of the motion at (*a*) by that at (*c*).

Nature of forces when turning.

Initially, on putting the helm over, the change in the stream line motion at the stern produces a pressure upon the rudder normal to its plane. If the rudder is unbalanced, there is generally an additional pressure upon the after deadwood caused by the widening of the stream lines approaching the rudder. The resultant of these pressures on rudder and deadwood is a force P at the stern which may be resolved longitudinally and transversely into R and Q, where R tends to reduce the speed of the ship and Q to move the stern outwards (fig. 63). The proportion of the force P due to the deadwood is unknown, but it is small in recent warships in which the after deadwood is considerably cut away; the portion due to the rudder pressure can be calculated from the results of experiments on plates moving obliquely through water. If A is the area of the rudder in square feet, θ the angle of helm and V the relative velocity in knots with which the water impinges on the rudder (assumed equal to the speed of the ship increased by the slip of the screw),

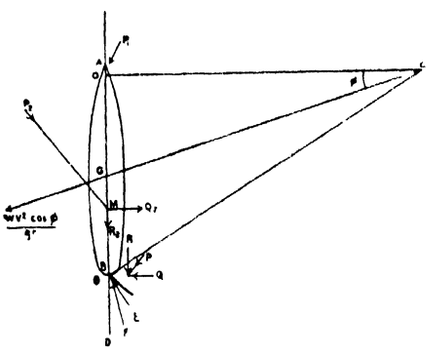


FIG. 63.

$$\text{then P (in tons)} = k.\ AV^2 \sin\theta, \text{ approximately}$$

where the mean value of k for small inclinations is $\frac{1}{87}\frac{1}{0}$ for a square rudder and about $\frac{1}{87}\frac{1}{0}$ for a rectangular rudder of breadth twice its depth (k also varies with the angle of incidence; when the latter is greater than about 35°, the above formula becomes inapplicable). The convergence of the stream lines at the stern due to the angle of run, and the oblique and variable motion of the water caused by the screw propellers, modify the value of k, as applied to the determination of the rudder pressure; but it is evident that with ships of fairly similar types the force causing initial turning varies with the shape of the rudder and approximately as its area, the angle of helm and the square of the speed.

The initial angular motion of the ship is due to the action of the component Q of the pressure on the rudder and deadwood, which is equivalent to a force Q at the centre of gravity tending to produce a lateral translation of the ship as a whole and a couple Q.BG tending to rotate the ship about the centre of gravity. Both the lateral and angular movements of the ship are accompanied by the motion of a mass of water, which may be regarded as virtually increasing the mass and moment of inertia of the ship. Denoting these quantities, thus increased, by W and I respectively, the initial lateral acceleration of the ship is equal to $\frac{Q}{W}$, and its lateral speed at the end of a short interval of time Δt, during which Q and W may be supposed to have remained constant, is $\frac{Q}{W} . \Delta t$. At the same instant and under similar hypotheses the angular velocity about the centre of gravity is $\frac{Q . BG}{I} . \Delta t$. Hence a point O forward in the middle line of the ship taken so that $GO . \frac{Q . BG}{I} . \Delta t = \frac{Q}{W} . \Delta t$ or $GO = \frac{I}{W . BG}$ is, at the instant considered, at rest except for the motion of the ship ahead, which is due to the original speed of the ship before putting the rudder over, somewhat reduced by the action of the component R of the rudder pressure during the time Δt. The instantaneous centre of the motion of the ship must therefore be somewhere in the perpendicular at O to the middle line of the ship, the point O thus corresponding to the "pivoting point" as previously defined for the steady motion of the ship in a circle.

The actual position of O cannot be calculated, as it depends on the values of I and W, which are different from, and not expressible in terms of, the moment of inertia I′ and mass W′ of the ship itself; but from the method by which it is determined it is clearly forward of the centre of gravity; and so far the investigation is confirmed by observation, which shows that the first effect of putting the rudder over is to cause the stern of the ship to swing towards the side to which the helm is moved to a much greater extent than the bow moves towards the opposite side.

If the time Δt be supposed to become infinitesimal, and the effect

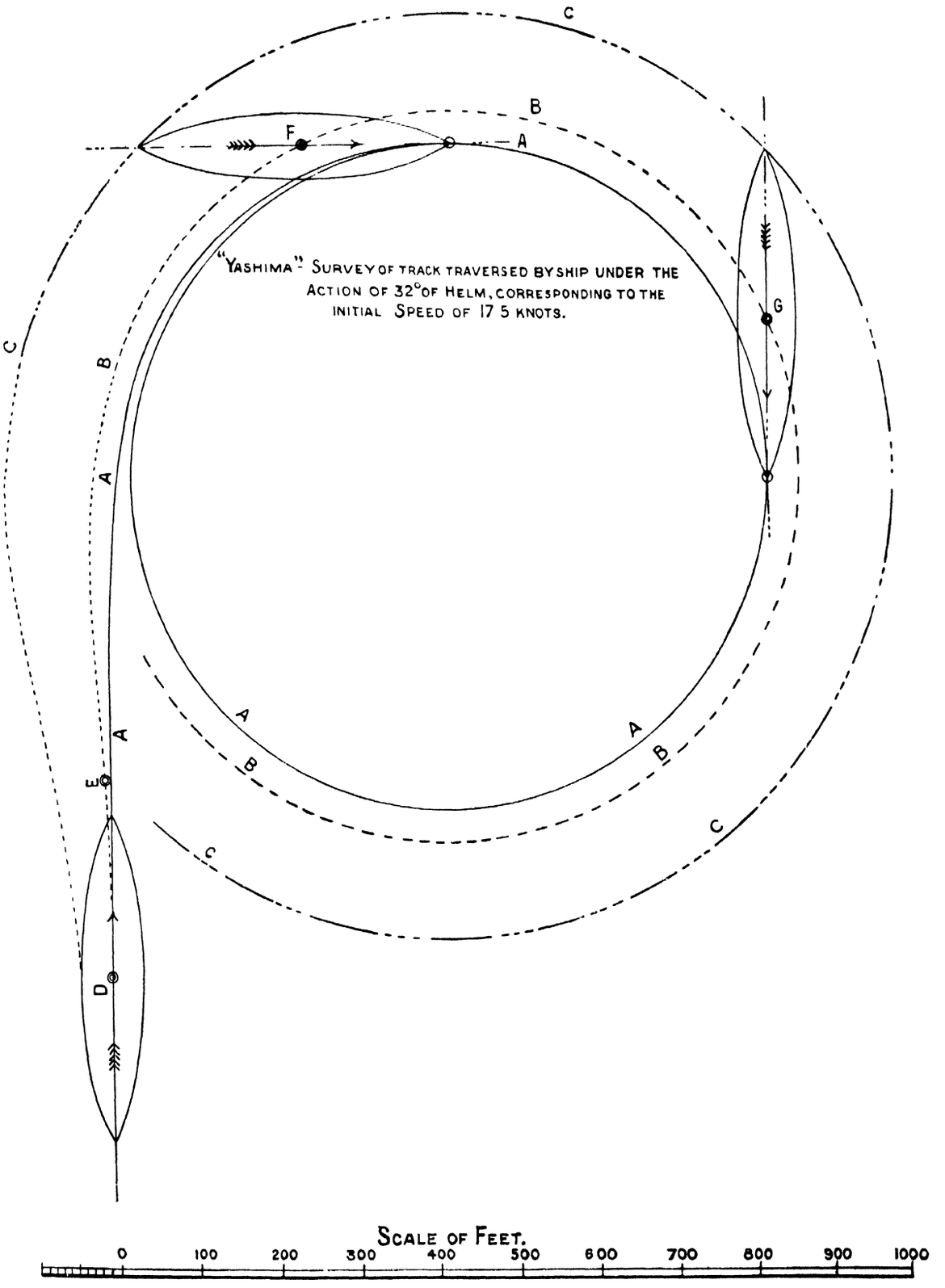


FIG. 62.

A, A, A, Curve described by pivoting point.
B, B, B, Curve described by centre of gravity
C, C, C, Curve described by outer edge of stern
D, Position of ship's centre of gravity when helm commenced to move over.
E, Position of ship's centre of gravity when helm had reached 32°
F, Position of ship's centre of gravity when vessel had turned through 90°. Time from D, 49½ sec
G, Position of ship's centre of gravity when vessel had turned through 180°. Time from D, 1 min. 20 sec.

of putting over the rudder be regarded as an impulse (measured by the finite product $P \cdot dt$), delivered at the stern of the ship normal to the rudder, the resistance of the water to the rotation of the ship may be neglected, and the instantaneous centre of the turning motion (as distinguished from the motion ahead) is the point O on a straight line GB perpendicular to the direction of the impulse, and such that $GO \cdot GB = \frac{I'}{W}$, an expression for the position of O of the same form as obtained before.

In this case $\frac{I'}{W} = k^2$, where k is the radius of gyration of the ship about a vertical axis through the centre of gravity, and the point O is obtained by the geometrical construction shown in fig. 64, given by Professor W. M. Rankine, where $GL = k$ and is perpendicular to GB, and the angle BLO is a right angle.

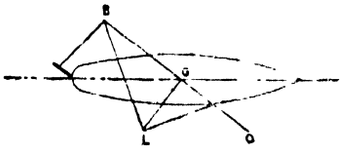


FIG. 64.

The value of I is dependent on (1) the distribution of weight in the ship, being large when heavy weights are situated near bow and stern, (2) the length of the ship, and (3) the underwater form near the ends, being relatively large in fine ended vessels with large areas of deadwood. W is also dependent on the shape of the ship underwater.

The handiness of a ship or her readiness to respond to slight alterations in helm is mainly dependent on the relation between $Q \times BG$ the moment of rudder pressure for a given angle, and I the virtual moment of inertia. If I is comparatively large, the vessel will turn slowly under helm until, gathering way, the rapidity of its angular motion becomes so large that reverse helm may be required to limit the change of course to that desired. Unhandiness is usually experienced at low speeds (Q being then small) and also in shallow water when I is increased by the restriction in the flow of water from one side of the ship to the other. Improvement in the handiness in these circumstances has been obtained in certain ships with unbalanced rudders by filling in the after deadwood, the loss from the increased inertia being more than compensated by the greater turning moment due to the pressure on the after deadwood.

When the ship is turning steadily in a circle, if C (fig. 63) is the centre of rotation, and CO perpendicular to the middle line of ship, the motion is equivalent to a progression ahead with speed V (which is considerably less than the initial speed), combined with a rotation about the "pivoting point" O, which is generally situated slightly abaft the bow; the drift angle ϕ is given by the relation

$$OG = OC \tan \phi.$$

The time of turning through 180° is $\frac{\pi r}{V}$ where r is the radius OC.

The forces acting upon the ship are now—the pressure P on rudder and deadwood (if any), the centrifugal force $\frac{WV^2 \cos \phi}{gr}$, the thrust of the propellers, and the pressures on the hull. The last named consist of forces P_1 outwards before O, and P_2 inwards abaft O; of these P_1 is usually negligible in amount; P_2 cannot be directly estimated, but since work is done against it by the transverse motion of the after part of the ship, a reduction of speed results whose amount is largely dependent on the obliquity of motion at the centre of gravity, that is on the drift angle ϕ. Under full helm the ratio of the steady speed when turning to the initial speed is often about 60 or 70 %; but in some quickly turning ships it is less than 50 %. Of the remaining forces, the transverse component $\frac{WV^2 \cos^2 \phi}{gr}$ of the centrifugal force is known since the final diameter of turning $2r$ is approximately the same as the tactical diameter. To obtain P, it is to be observed that the water impinges on the rudder in a direction BF intermediate between BE (perpendicular to BC) due to the ship's motion and BD due to the form at the stern; if BF is assumed to bisect the angle DBE, the effective rudder angle is approximately $\theta - \phi$. The pressure on the rudder is therefore less than when helm is first put over and is further reduced on account of the diminution in the speed of the ship.

From experiments made with the object of measuring P when turning steadily, it is found that the pressure recorded was about one-fourth of the value calculated on the assumption of the ship retaining her original speed and effective rudder angle; when helm had just been put hard over, from one-half to one-third of the theoretical pressure was obtained. (See *Bulletin de l'Association Technique Maritime*, 1897; *American Institution of Naval Archs. and Mar. Eng.*, 1893.) The transverse forces calculated on this basis for a battleship of 15,000 tons displacement when turning steadily under full helm are approximately—centrifugal force 200 tons, pressure on rudder 40 tons, and Q_2, the transverse component of P_2, 240 tons passing through a point on the middle line about 40 ft. abaft the centre of gravity.

The following equations applicable to the state of steady rotation can be obtained from the above considerations, neglecting P_1 and the small couple due to R:

$$Q_2 = Q + \frac{WV^2 \cos^2 \phi}{gr} \quad \ldots\ldots\ldots \text{(i.)}$$

$$Q_2 \times GM = GB \times Q \quad \ldots\ldots\ldots \text{(ii.)}$$

From (i.) it is seen that a small tactical diameter will be obtained when Q_2 is large compared with Q; from (ii.) it follows that the point M (fig. 63) should then be near G. These conditions are realised in a ship whose resistance to leeway is considerable but concentrated about the middle of the length, such, for example, as a yacht having a deep web keel, or a boat with centre board and drop keel. In these instances the vessel may be regarded as virtually anchored by its keel, and the pivoting point brought to a position in close proximity to the centre of gravity. Similarly tactical diameters of vessels of ordinary type are reduced by diminishing the resistance to lateral motion at the after end and by increasing it amidships or forward.

Heel when turning. During the turning trials made with H.M.S. "Thunderer," observations were made of the heel caused by the transverse forces brought into play when turning. On first putting the helm over a small inward heel caused by the pressure of the rudder was observed; as the rotational speed of the ship increased this inclination was succeeded by a steady outward heel, amounting to about 1° at 7 knots speed. The latter is caused by the couple formed by the centrifugal force and the lateral resistance diminished by the (usually) small couple due to the rudder pressure. During some more recent trials carried out on the "Yashima" the angle of heel was 8¾° at full speed. Similar large inclinations are generally found with modern warships having small turning circles and high speeds and whose centres of gravity are also situated high up; at moderate speeds, however, the heel is of small amount. On putting the helm quickly amidships when turning, the opposing couple due to the rudder pressure is removed or reversed and the angle of heel momentarily increased; instances have occurred of ships with small stability and comparatively large "rudder couples" capsizing through this cause.

Types of rudders. The rudders used in ships are of two types:—(1) Unbalanced, shown in figs. 65, 67, 68; and (2) balanced, shown in figs. 66, 67 (at bow) and 69 to 74. An unbalanced rudder is in stable equilibrium when amidships and force has to be applied to the tiller in order to place it at any angle to the middle line. It is supported at its forward edge by means of pintles working in

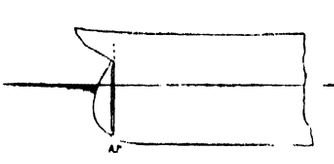


FIG. 65.—Cargo Vessel.

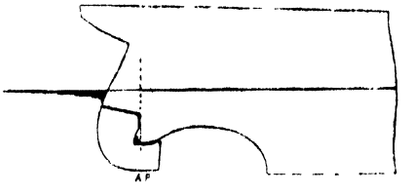


FIG. 66.—Atlantic Liner.

gudgeons on the sternpost; and owing to its simplicity of construction and to its property of returning quickly to the middle line when the tiller is released through any cause, this type is preferred when the force required to put the rudder hard over is sufficiently moderate to enable steering to be performed by hand or by an engine and gear of moderate size when steam steering is admissible.

With high speeds and large manœuvring powers, the unbalanced type is generally unsuitable; and balanced rudders are adopted



FIG. 67.—H.M.S. "Formidable." H.M.S. "Duncan" similar.

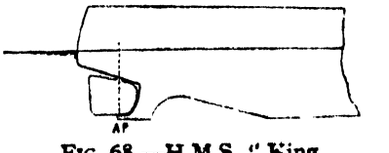


FIG. 68.—H.M.S. "King Edward VII."

in order to reduce the force required and the work done to obtain large angles of helm. A balanced rudder is unstable amidships, and, if left free, comes to rest at a moderate angle on either side of the middle line. Slightly less than one-third of the area is usually placed before the axis; in some ships in which a greater proportion has been put forward, difficulty has been experienced in bringing back the rudder to amidships. As shown in the figures, the method of support has varied in different ships; in many cases a steadying pintle has been placed at the heel or at mid-depth, but in the latest warships the support has necessarily been taken entirely inboard.

In the merchant service, unbalanced rudders of the form shown in fig. 65 are generally fitted; the rudder extends up to, or above, the water-line, and is comparatively narrow longitudinally. Somewhat greater efficiency when using small or moderate angles of helm is obtained with rudders of this shape; as, for a given pressure

on rudder, the turning moment on the rudder head, and the power required for working the rudder are also less. A type of balanced rudder devised by Professor Biles and adopted in some large Atlantic liners is shown in fig. 66.

Broader and shallower rudders are adopted in warships owing to the necessity of keeping the whole of the steering gear below the water-line for protection.

(fig. 74), which had, in addition to the usual rudder at the stern, a double-balanced rudder in the bow, which could be drawn up into recesses in the hull; the two rudders were about 3 ft. apart and when in use worked together.

Experimental results.

The results of the turning trials of some of the principal classes of warships are given in the following table:

Ship or Class.	Displacement in Tons.	Length in Feet.	Area of Immersed Longitudinal Plane divided by Area of Rudder.	Speed in Knots at Commencement of Turn.	Advance in Yards.	Tactical Diameter in Yards.	Tactical Diameter divided by Length.
Dreadnought	17,900	490	37·5	19	490	440	2·7
Lord Nelson	16,500	410	40·5	17	400	370	2·7
King Edward VII.	16,350	425	44·8	16½	450	440	3·1
Formidable	15,000	400	45·2	14½	440	500	3·7
Majestic	14,900	390	47·8	16	450	500	3·9
Minotaur	14,600	490	48·4	19	480	600	3·7
Monmouth	9,800	440	44·4	23½	590	790	5·4
Drake	14,100	500	46·8	23½	700	810	4·9
Diadem	11,000	435	44·5	20½	650	920	6·3
Powerful	14,200	500	50·3	22	800	1120	6·7
Minerva	5,600	350	48·3	18	540	770	6·6
Arrogant	5,750	320	33·5	17	350	380	3·6

Helm angle about 35° in all cases.

The unbalanced type was mainly used in British battleships up to H.M.S. "Formidable" (1901) and "Duncan" (1903) (fig. 67). In the "King Edward VII." class (1905) (fig. 68) the rudder was balanced, about one-fourth of its area being placed before the axis; balanced rudders supported at about mid-depth were fitted in the "Yashima" (1897) and the "Lord Nelson" class (1905) (fig. 69). In H.M.S. "Dreadnought" (1906) and recent battleships, twin-balanced rudders are fitted immediately behind the inner propellers (fig. 70), to obtain additional steering effect from the propeller race, and to enable the ship to be steered from rest in getting under way. Owing to the higher speeds of first-class cruisers, balanced rudders were used; those fitted in "Diadem" and "Powerful" classes (1897–1900) are shown in fig. 71, and for "Cressy," "Monmouth" and "Devonshire" classes (1901–1905) in fig. 72. In "Warrior" and "Minotaur" classes (1907–1908) the rudders are as shown in fig. 69. The older second-class cruisers had rudders and sterns of the type shown for H.M.S. "Powerful" in fig. 71, with the exception of the "Arrogant" class (1898), in which two rudders were fitted in conjunction with a considerable cut-up at the stern in order to obtain increased manœuvring capacity (fig. 73). Recent second-class cruisers have rudders of the type shown in fig. 69.

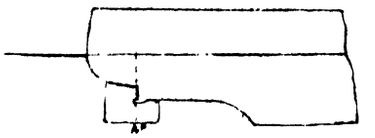
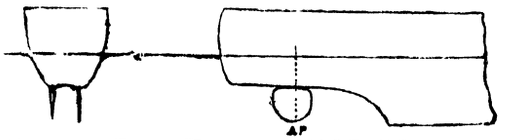


FIG. 69.—H.M.S. "Lord Nelson." "Yashima" and H.M.Ss. "Swiftsure," "Warrior" and "Minotaur" similar.



Section at A.P. FIG. 70.—H.M.S. "Dreadnought."

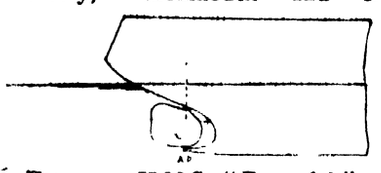


FIG. 71.—H.M.S. "Powerful." H.M.S. "Diadem" similar.

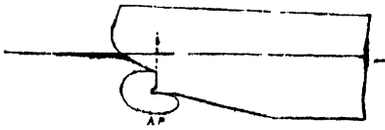


FIG. 72.—H.M.S. "Devonshire." H.M.Ss. "Cressy" and "Monmouth" similar.

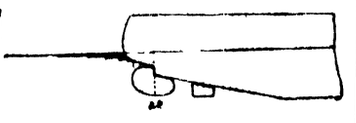


FIG. 73.—H.M.S. "Arrogant."

Auxiliary rudders have been fitted in H.M. ships in a few instances. An interesting example was that of H.M.S. "Polyphemus"

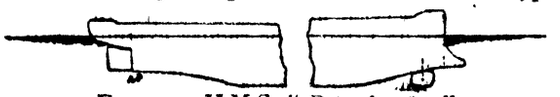


FIG. 74.—H.M.S. "Polyphemus."

In the last column the tactical diameter is expressed in terms of the length of the ship; this ratio enables a rough comparison between the steering capacities of different ships to be expressed. The improvement in turning in modern warships has been due largely to the increase of rudder area in relation to the area of the immersed middle-line plane, which has been made possible by the adoption of balanced rudders. Considerable improvement has also been effected by cutting away the after deadwood; this will be seen on comparing the performances of H.M.Ss. "Monmouth" and "Diadem," and "Drake" and "Powerful"; the former ship of each pair has her after deadwood partially cut away and has a smaller tactical diameter. In the "Yashima" the whole of the deadwood is removed and a very large rudder fitted; her tactical diameter is twice her length.

The rudder area is relatively much less in merchant vessels, where the necessity for a small tactical diameter does not arise.

Experiments have been made to ascertain separate effects of angle of helm, time of putting helm over, and draught and trim of ship.

The effect of variation of helm angle is shown in table below:

Tactical Diameter in Yards at about 12 knots speed.				
Ship.	Battleship.	First-Class Cruiser.	Second-Class Cruiser.	Torpedo-Boat Destroyer.
10° helm	750	1400	1600	700
20° helm	550	1000	1000	500
35° helm	450	750	800	300

In ships having unbalanced rudders and fitted with hand-steering gear considerable time is required to put the helm hard over at full speed; and consequently the tactical diameter and the advance are greater at high speeds than at low speeds. When steam-steering gear is provided the helm can usually be put hard over in from 10 to 20 seconds at any speed; and in modern warships the speed is found to have little influence on the path described when turning. In the case of torpedo-boat destroyers marked increases in the tactical diameter and in the advance occur at high speeds, the cause of which is not fully known. In such vessels of length 270 ft. and displacement 900 tons, the tactical diameter is about 550 yds. at 30 knots and 300 yds. at 15 knots.

A moderate variation in the mean draught has little effect on the course, but additional trim by the stern results in a greater space being required for turning.

By working one propeller ahead and the other astern the space required for turning may be shortened, but the time of turning is frequently increased. The character of the path described depends on the relation between the revolutions of the screws.

In a single-screw ship, with the propeller well immersed, the upper blades experience greater resistance to rotation than the lower blades, since the forward velocity of the frictional wake is greatest at the surface; hence a right-handed screw tends to turn the ship's head to starboard, and requires starboard helm. The reverse is occasionally experienced when the upper portion of the screw is incompletely immersed.

When a ship is going astern manœuvring is performed with some uncertainty, as the rudder is near the pivoting point.

Process of Design

When a shipbuilder is approached for the production of a new ship, he must be informed of the requirements of the case; the kind of trade or service in which the vessel will be engaged; her speed; if she is to be a steam vessel, the distance she must run on ordinary voyages without recoaling; the weight of cargo to be taken or the number of passengers to be carried, and the kind of accommodation required for them. Very frequently these requirements will include certain limits of size, draught, cost, or tonnage, which must not be exceeded. In addition it must be stated in what society, if any, she is to be classed, as this will determine the details of the scantlings to be employed. The shipbuilder will usually have, to guide him, the details of some successful ship or ships previously built to fulfil the same or similar conditions as in the vessel required, and he will probably know what measure of success or popularity the respective features of the vessel or vessels have earned on service. The dimensions can in this case be at once fixed to provide the necessary speed, strength, stability and seaworthiness, and the cost of the vessel determined. If the departures from some similar ship of known and approved qualities are small, the details of the new ship can be inferred directly from those of the similar ship, and modified drawings, specifications, &c., can be rapidly prepared and the building proceeded with. On the other hand, the departures from previous vessels or the usual practice may be very great, in which case much will depend on the shipbuilder's skill and judgment. Outline drawings must first be prepared to the dimensions which may be considered suitable, and the calculations are made on this assumed design. These will include estimate of the weights of the hull, of the machinery, equipment, &c.; and if it is not intended to class the vessel in some registration or classification society, questions of strength will have to be considered. If, however, the vessel is to be so classed, the determination of the structural strength may be omitted, as the scantlings required by the rules of such society are arranged to provide sufficient strength. If the calculations show that the dimensions assumed do not enable the required conditions to be fulfilled, the dimensions must be modified in the direction indicated by the calculations, and the calculations made over again. This process must be continued until a satisfactory result is obtained. As soon as the dimensions obtained for the vessel are found to be appropriate, more complete drawings are put in hand, and the final calculations pertaining to the displacement sheet, weights of hull and equipment, centre of gravity and trim, metacentric diagram and curves of stability and speed, are made. In the design of yachts the views of the owner, especially if he is a yachtsman of experience, must necessarily play an important part.

While the present writer was designing the Royal Yacht "Alexandra" he was commanded on several occasions to wait on the late King Edward VII. to take his instructions. King Edward took a special interest in the design throughout and sketched in his own hand the shapes of the knee of head and the stern. All leading details were shown to him in model and settled by him personally. At an important stage the king consulted the prince of Wales (George V.), whose views as to the principal dimensions were afterwards adopted.

In the case of the construction of large passenger ships the design often originates with the owner's or steamship company's staff, and in some instances naval architects are employed, completed drawings and specifications being handed over to the shipbuilder with the order for the vessel. In other cases shipbuilders work in close connexion with the steamship companies, and the business relations are of a very simple character, the company being content to send an order, with a note of the principal dimensions and type of ship required, leaving the determination of all details of the design in the hands of the builders. The general practice lies between these two extremes. In any case, complete design drawings and detailed specifications are necessary for the shipyard operations, and if not supplied must be prepared by the shipyard staff. Sometimes outline drawings of the vessel on a small scale—including an elevation or side view, one or two plans of the main deck and other parts, and a short description of the vessel—are first prepared, and are called an outline or sketch design; but usually the information which constitutes a design comprises a sheer, profile and plans of each deck on a $\frac{1}{4}$-in. scale, a midship section on a $\frac{1}{2}$-in. scale, and a complete specification.

The sheer drawing gives the outside form of the ship. It consists of an *elevation* showing her longitudinal contour; the positions of the decks; the water-line or line at which she will float, and certain other lines parallel to this and equally spaced below it, which are also called water-lines; a series of vertical lines equally spaced from stem to stern, called "square stations"; and certain other details: of a *body plan* showing the sectional form of the ship at the square stations, supposing her to be cut by transverse planes at these stations: and of a *half-breadth plan* showing the form of the ship at the several water-lines, supposing her to be cut by horizontal planes at the levels of these lines. The profile and plans give all the internal arrangements of the vessel, the holds or spaces set apart for cargo, the passenger accommodation, the positions of the engines and boilers, the accommodation provided for the crew, and other principal fittings. In a warship there are no cargo holds or passenger accommodation, but the distribution of the armament and magazines, the armour, and other arrangements for the protection of the vessel against injury in action are carefully shown, and the appropriation of every portion of the internal capacity of the vessel is clearly indicated. The *midship section* shows the structural arrangements of the vessel, and usually the scantlings of the most important parts. The *specification* is a statement of all the particulars of the vessel, including what is shown on the drawings as well as what cannot be shown on them; the quality of the materials to be used is described, and the scantlings of the same carefully recorded; and it is clearly stated how parts not manufactured by the shipbuilders are to be obtained.

Registration societies.

When first formed the objects of register societies were simply the maintenance of a register in which was recorded for insurance purposes the main particulars of each vessel's hull, machinery, equipment, &c., together with the names of owner, master and builder, as well as a designation or class represented by a symbol, which was intended to give to underwriters an indication of the strength, durability and general seaworthiness of the ship. As a natural sequence it became necessary for the register societies to formulate rules which would indicate to owners and builders the structural conditions that would entitle vessels to the highest class and the minimum rates of insurance. The register societies now provide the shipbuilder not only with a record of all the important features of the ships which are classed, and thus with much of the information which he requires for the design of his vessel, but they also fix the quality and strength of the material to be used, the scantlings of all the parts of the hull, the riveting of the attachments, the equipment of pumps, anchors, cables, &c., the dimensions and details of the principal parts of the machinery, and all the details of the boilers. Classification societies are thus technical bureaux of the highest value to the shipping community, whose rules are a reflex of the most advanced knowledge and whose methods encourage developments in structural design.

The principal registration and classification societies in 1910, and the number of vessels (sailing and steam) classed, were as follows:—

Lloyd's Register of British and Foreign Shipping, having its headquarters in London	10,302	vessels.
British Corporation for the Survey and Registry of Shipping, in Glasgow	710	,,
Bureau Veritas International Register of Shipping, at Paris	4,626	,,
Germanischer Lloyd, at Berlin	2,672	,,
Norske Veritas, at Christiania	1,560	,,
Registro Nazionale Italiano, at Genoa	1,263	,,
Record of American and Foreign Shipping, at New York	1,139	,,
Veritas Austro-Ungarico, at Trieste	1,041	,,
Great Lakes Register	609	,,

Of these societies, *Lloyd's Register*, as at present constituted, has existed since 1834; at that date it superseded two rival institutions having a similar object. The name is traced back to Lloyd's Coffee-house, once situated in Lombard Street, in which underwriters met for business purposes, and from which in 1696 they issued their first publication. The first printed register was issued about 1726, a copy dated 1764 being still extant. The office of surveyors is referred

to in a register book of the date 1781, but there are evidences that in 1768 repairs were superintended by officers of the society. In 1799 surveyors were stationed at twenty-four ports in the United Kingdom. In 1822 the register for the first time recorded a steamship. In 1824 appeared the first "Instructions to Surveyors" as to the carrying out the rules for classification; and in 1834, on the establishment of the present society, precise regulations were issued regarding the survey of steamers. An iron ship was built under survey and received a class in 1837, while the first rules for the construction of iron ships were issued in 1855. In 1851 a composite vessel was classed, but it was not until 1867 that rules for the construction of such vessels were issued. Steel was accepted in 1867, experimentally, steel being then made by the Bessemer process. Steel by the Siemens-Martin process was first used for two small steamers in 1877. Engineer surveyors were first appointed in 1874. The society is voluntarily maintained by the shipping community. Its affairs are managed by a committee of sixty-one members—composed of merchants, shipowners and underwriters—elected to represent the important shipping centres of the country, and there are branch committees at Liverpool and Glasgow. In technical matters affecting the rules for the construction of ships and machinery the committee has the advantage of the co-operation of a body of representatives of prominent shipbuilders, engineers, steelmakers and forgemasters, who are specially elected by the leading technical institutions of Great Britain. The society's rules for steel ships were entirely revised so recently as 1909. The society has a total staff, at home and abroad, of 310 surveyors, of whom 232 are its exclusive servants.

In the case of a new vessel intended for classification, the plans for its construction are in the first place submitted to and approved by the committee; the building proceeds under the supervision of the local surveyor, and when completed, a *character* is assigned to the vessel by the committee upon that surveyor's report. The society issues annually to its subscribers a register book containing particulars of classification of vessels to which classes have been assigned, together with many other details. All merchant vessels in the world of 100 tons and upwards, excluding those trading on the Caspian Sea, and wooden vessels on the Great Lakes of North America, are included in the work. This register contains particulars of the age, build, tonnage, dimensions, ownership, &c., of some 30,000 vessels. The society also publishes yearly a register of yachts, containing full particulars of the yachts of the world and other interesting information, and a register of American yachts, which gives similar particulars of all American and Canadian yachts.

All the public proving establishments in the United Kingdom for the testing of anchors and chain cables are licensed by the Board of Trade to carry out these tests under the control of the committee of Lloyd's Register. The assignment of freeboards of vessels, the survey of refrigerating machinery, electric light installation, &c., all come within the scope of the society's operations.

The *Bureau Veritas* was founded in Antwerp in 1828, one of its principal aims being to make known to underwriters the qualities and defects of ships frequenting Dutch and Belgian ports. In 1832 the headquarters were moved to Paris, and in due time its influence spread to all countries where shipowning or shipbuilding existed; it is now represented in over 250 districts comprising about 1500 ports. In 1851 rules were drawn up for the construction of wood ships, and about 1867 for iron. Rules for steel came later, and also rules for the construction of machinery, and, as circumstances arose, provision was made for special types, such as oil-tank vessels, turret vessels, dredgers, &c., as well as for the testing of materials. These rules have been revised from time to time and recently have been remodelled and extended, so as to apply to vessels up to about 900 ft. in length. Special rules have been issued for vessels intended for navigation in inland waters, for yachts and for motor boats. A staff of surveyors formed part of the organization from the beginning; and in the earlier days the professional experience of the surveyors was the only guide as to what was necessary and sufficient. With the lapse of time, and with increased variety of construction and complication of interests, something more than individual judgment and experience became necessary, and with the Bureau Veritas, as with Lloyd's and other similar societies, definite rules were introduced, and by their means a greater uniformity of practice was attempted and secured.

The *British Corporation* was founded in 1890, and obtained its charter under the Merchant Shipping Acts for the assignment of freeboards; its first rules were issued in 1893. Its inception was due to the enterprise and influence of a number of leading shipowners, shipbuilders and engineers throughout the country, and more particularly in Glasgow and the West of Scotland, the first aim of the founders being to provide an independent society, thoroughly capable of dealing with the complicated questions which were likely to arise under the Load Line Act then coming into operation. The Liverpool Registry, which had once been independent, had been absorbed into Lloyd's Register some years before, and it was thought that the enormous shipbuilding interests of the country demanded the existence of a society whose friendly rivalry with the great society of Lloyd's Register would have a beneficial influence on the shipbuilding of the country. Owing to the comparative absence of small vessels the relatively small number of the vessels on the register represents 2,331,000 tons. The society is controlled by a committee of forty members—shipowners, shipbuilders and underwriters—and, in addition, there is a branch committee in Italy. There is a staff of 135 surveyors distributed over the principal home and foreign ports.

The *Norske Veritas* was established in 1864 by the various marine insurance clubs of Norway. Previously each club had its own separate staff of surveyors, on whose report to their club depended the class of the vessel and the premium to be paid. As ships rose in value and reinsurance became the rule, something had to be done for mutual protection. By the establishment of the *Norske Veritas* one uniform system of classing and valuing was substituted for the older methods. In the matter of rules this society kept pace with the changes of the mercantile marine; it provided, as the occasion required, for the introduction of iron and steel in place of wood, and of steam in place of sails.

The *Germanischer Lloyd* was established in 1867, and reorganized as a joint-stock company in 1889. Its functions are carried out by officers at the central office in Berlin, assisted by a staff of 50 ship and engine surveyors in Germany and 120 at the principal foreign ports, the latter under control of agents, who are mostly consuls. "In all foreign parts in which the *Germanischer Lloyd* has no representative, the German consuls are required by order of their government to exercise the functions of an agent of the *Germanischer Lloyd*."

The *Registro Nazionale Italiano* was formed in 1910 to take over the Registro Italiano, which was founded in 1861. The society has adopted the rules of the British Corporation Registry, has a staff of surveyors in Italy, and has an arrangement with the British Corporation which enables them to utilize the services of the surveyors to that society in British and foreign ports.

The *Record of American and Foreign Shipping* was established in 1867 by the American Shipmasters' Association (now called the *American Bureau of Shipping*), and is the standard American authority. Its rules for the construction and classification of vessels, as published in 1889 and amended in 1900, received the approval of the U.S. Navy Department and of the several boards of American underwriters. It has agents and surveyors in many of the principal ports of the world.

The present rules and tables of most of the above societies apply to construction in steel. If iron is to be used in the construction of vessels, the material must be increased in thickness from 10 % to 25 %, dependent upon the part for which it is to be used and the quality of the iron. In some cases separate tables for steel and iron accompany the rules, and in a few cases the societies provide rules for construction in wood. The latest rules of *Lloyd's Register* provide only for steel ships, but vessels of wood and iron are still classed.

The highest class assigned, upon completion of a ship by the societies referred to, is as follows:—

Lloyd's	✠ 100A	1	✠ L.M.C.
Bureau Veritas	Ⅰ 3/3L	I.I.	
British Corporation	B.S.✻	M.B.S.✻	
Norske Veritas	✠ 1A1	1	✠ M & K.V.
Germanischer Lloyd	✠ 100A		✠ M.C.
Record of Amer. Shipping	✠ A1	M.C.	

The star or cross in each case denotes special survey. In *Lloyd's Register* 100A refers to conformity of scantlings with the tables; the figure 1, to the efficient state of the equipment, including anchors and cables; L.M.C. denotes Lloyd's Machinery Certificate. In the *Bureau Veritas* the large Ⅰ expresses first division of classification (out of three); the two rings around the Ⅰ denote that the ship is divided into a sufficient number of water-tight compartments to enable her to float in still water with any two of them in free communication with the sea. Very few ships in the register have the double ring, but some have a single ring Ⓘ, denoting power to float in still water with any one compartment in free communication with the sea; 3/3 expresses completeness and efficiency of hull and machinery; the letter following 3/3 indicates the navigation for which the vessel is intended; the first 1, that the wood portions of the hull are entirely satisfactory; while the second 1 has the same significance in respect to the equipment of masts, spars, rigging, anchors, chains and boats. In the *British Corporation Register*, **B.S.** signifies conformity with all requirements, these letters standing for British Standard; **M.B.S.** signifies that the machinery also conforms. In the *Norske Veritas* 1A1 denotes compliance with rule requirements as regards the hull. M & K.V. signifies that the vessel has a Norske Veritas certificate for engines and boilers. The third figure 1 denotes the efficient state of the equipment. In the *Germanischer Lloyd* the mark 100A signifies that the ship which bears it is, including her equipment, up to the requirements of the highest class of the society. The figure 4 signifies that the class is to be regularly renewed after special surveys held in periods of four years each. M.C. signifies

that the machinery also conforms with the requirements of the rules and has obtained a separate certificate.

Certain steam vessels obtain a ☐ which encloses the ✠ in front of the class mark. This signifies that the arrangement of the watertight bulkheads is such as theoretically to ensure the floatability of the ship when the sea has access to one or two of her compartments.

The tests for steel material to be used in building the ships, as required by the same societies, may be tabulated as follows :—

	Ultimate Tensile Strength.	Elongation in Length of 8 in.	Temperature Test.
Lloyd's Register	Between 28 and 32 tons per sq. in.	Not less than 20 % for plates ⅞ in. thick and upwards.	Sample heated to a low cherry red and cooled in water at 80° F. and doubled over a radius of 1½ times the thickness of the plate tested.
British Corporation	,, ,,	,, ,,	
Registro Nazionale Italiano	,, ,,	,, ,,	
Norske Veritas	,, ,,	,, ,,	
Bureau Veritas	Between 27 and 32 tons per sq. in.	,, ,,	
Record of American Shipping	Between 58,000 and 68,000 lb per sq. in.	22 % for plates weighing 18 lb per sq. ft. and upwards.	
Germanischer Lloyd	Between 26 and 31 tons per sq. in.	20 % for plates 10 mm. in thickness and upwards.	

For plates less than ⅞ in. in thickness the first four societies in the above table allow an elongation of 16 % ; the *Bureau Veritas* allows an elongation varying between 20 % and 10 % for plates between $\frac{1}{8}$ths and $\frac{7}{16}$ths of an inch in thickness ; the *Record of American Shipping* allows an elongation of 18 % for plates weighing less than 18 lb per square foot ; the *Germanischer Lloyd* allows an elongation of 16 % for plates between 10 mm. and 5 mm. in thickness and 14 % for plates less than 5 mm. in thickness. For steel plates to be flanged cold *Lloyd's Register* and the *British Corporation* require a minimum tensile strength of 26 tons, and for sectional material such as angles, bulb angles and channels the tensile strength may be as high as 33 tons. For rivet steel the tensile strength must be between 25 and 30 tons per square inch, with a minimum elongation of 25 % on a gauge length of eight times the diameter of the bar. Hot and cold bending and forge tests for angle bars are also prescribed.

Board of Trade supervision.

The regulation of certain matters connected with the design of merchant ships falls upon the Marine Department of the Board of Trade. The authority of the Board is the Merchant Shipping Act of 1894, which consolidated previous enactments. These matters include the measurement of tonnage, and provision for the safety and comfort of passengers and crew. The former is discussed in a separate article (see TONNAGE), but it may be mentioned here that the following countries have at various dates accepted the British rules for tonnage : United States, Denmark, Austria-Hungary, Germany, France, Italy, Spain, Sweden, Netherlands, Norway, Greece, Russia, Finland, Hayti, Belgium and Japan. The amount of deduction for propelling power varies in Spain, Sweden, Netherlands, Greece, Russia and Belgium, but option is granted to owners to have the engine-room remeasured under the rules of allowance for engine-room relating to British ships. Special certificates are at present also issued, on application, to vessels trading to Italian ports, as the Italian authorities do not at present recognize certain sections of the Act of 1894 in regard to deductions from tonnage and exemptions from measurement. Special tonnage certificates are also issued for the Suez Canal, where the measurements of ships and deductions from tonnage vary from British rules, and are detailed at length by the Board of Trade in their Instructions to Surveyors.

With regard to safety and comfort the surveyors have to see, among other matters, that the crews are properly accommodated and the passengers not too crowded ; that the boats and life-saving appliances are sufficient ; that the lights and signals are in order ; that the freeboard is sufficient and ship otherwise seaworthy ; that grain cargoes are properly stowed ; and that coal cargoes are adequately ventilated. Any question of doubt as to the strength of passenger vessels has to be referred to the Board of Trade, and in future midship sections, with all particulars marked thereon, are to be submitted in the case of all new steamships building under survey for which passenger certificates are required. A passenger certificate is required whenever a steamer carries more than twelve passengers. In granting it the Board of Trade recognizes five different services, ranging from foreign-going steamers to excursion steamers in smooth water. The Board of Trade rules for scantlings are not published officially.

Load line and freeboard.

A Bill, introduced into parliament in 1869, dealing with the load line question, contained a clause requiring the draught of water to be recorded at which a vessel is floating when leaving port. This Bill did not pass ; but in the following year the Merchant Shipping Code Bill was brought in, containing the same provision, and, in addition, requiring a scale showing the draught of water to be marked on stem and stern post of every British ship. This became law in 1871. The same Act empowered the Board of Trade to record the draught of water of all sea-going ships on leaving port by surveyors duly authorized. In March 1873 a Royal Commission on "Unseaworthy Ships" was appointed by the British government, and one of the questions considered was that of the load line. In the final report in 1874 the conclusion was arrived at that a settlement of a load line should, in the main, be guided by reserve buoyancy as a first consideration. The commissioners were, however, of opinion that an act of parliament, framed to enforce any scale of freeboard, would be mischievous, if not impossible, as would be any universal rule for the safe loading of merchant ships.

In 1874, in a paper read before the Institution of Naval Architects by Mr B. Martell, who was then the chief surveyor to *Lloyd's Register*, tables of freeboard were suggested from data collected at all the principal ports in the United Kingdom. These tables were based on the principle of reserve buoyancy, and were intended to apply to the loading of the various types of sea-going ships then to be dealt with. As an indication of the form of the vessel, it was suggested that a tonnage coefficient of fineness should be used, in order that the tables proposed might be readily adapted to all sea-going ships, whether at that time at sea or in port. In 1875 a short Act was passed, to remain in force only until October of the following year, which embodied as its chief feature the requirement of what was afterwards universally known as the "Plimsoll mark" (after the late Mr S. Plimsoll, M.P., the prime mover in securing legislation for the prevention of overloading in British ships). All British ships were to have the position of the deck shown on the side of the ship, and every foreign-going British ship was to have a circular disk marked below the deck line, indicating the maximum draught to which it was intended to load. The Act in no way fixed the amount of freeboard ; this was left to the shipowner. The provisions of the 1875 Act were confirmed by a more comprehensive Act in 1876, which extended the compulsory marking of the deck line and disk to all British ships, except those under 80 tons engaged in fishing and the coasting trades, also excepting yachts or war vessels. Before this Act was passed the Board of Trade took action, by appointing a committee to consider the possibility of framing rules for the regulation of freeboard. The committee was to be composed of representatives of the Board of Trade, *Lloyd's Register*, and the Liverpool Underwriters' Registry. This attempt to establish an authorized scale of freeboard failed. Meanwhile the subject was not lost sight of ; the collection of data was continued, investigations were carried out, and six years later (in 1882) the committee of *Lloyd's Register* issued freeboard tables, and undertook to assign freeboard, on the basis of the tables issued, on owners making application for the same. In the course of three years 944 vessels had freeboards thus assigned to them, and in the case of 775 of this number the owners voluntarily accepted the freeboards assigned. In December 1883 the Load Line Committee was appointed by the Board of Trade ; and after two years' careful deliberation and investigation, involving much labour, the committee presented its report. This report was accompanied by tables, which agreed closely with those previously issued by *Lloyd's Register* ; and they were accepted by the committee of that society in September 1885. Between 1885 and June 1890 (the latter being the date the Load Line Act was passed) 2850 steam and sailing vessels had freeboards fixed by *Lloyd's Register*, and of these 2520 were taken from the tables. After the passing of the Act in 1890 appointments to assign freeboards were granted to *Lloyd's Register*, *Bureau Veritas* and the *British Corporation*.

In 1893 the original tables were modified with respect to some of the ports in the United States on the Atlantic, the sailing from or to which in the winter was to subject the ship to a few inches additional freeboard. In 1898 they were further modified (*a*) to exempt ships over 330 ft. in length from the additional freeboard just mentioned, and to limit the additional freeboard in smaller ships ; (*b*) to give some concession to turret-deck steamers ; and (*c*) in some other minor matters.

In 1906 the Shipping Laws were amended so that all foreign vessels loading at British ports required to be provided either with a freeboard assigned under the British tables, or under tables of a foreign country which had been certified by the British Board of Trade as being equally effective with the British freeboard tables.

In the same year the British tables were revised throughout in the light of the experiences of previous years of practical administration, by a committee whose members were drawn from the Board of Trade and the three assigning bodies—Lloyd's, British Corporation, and the Bureau Veritas. Important modifications were

made in the freeboards for vessels with complete superstructures or a considerable extent of strong deck erections, and in those for large vessels, with the result that a considerable increase was given to the carrying capacity of British shipping. This was followed by a conference in Hamburg between eight delegates nominated by the British government—being practically the former committee—and eight German delegates. The conference resulted in an adjustment of the German freeboard tables previously in force, and Germany has adopted freeboard tables and regulations which are recognized by the British government in an Order in Council dated 21st November 1908. France and Holland have adopted the British tables, and the load line certificates issued by those countries are recognized in Orders in Council dated 22nd November 1909 and 11th June 1910 respectively. Denmark, Sweden and Spain have also adopted the British tables, and as other maritime nations have the subject under consideration it is confidently expected that the load line regulations will become international. Under the provisions of the Merchant Shipping Act 1906 the British load line regulations now apply to all foreign ships while they are within any port in the United Kingdom.

Loading of grain and timber.

Ships laden with grain have to comply with rules of the Board of Trade, which provide that for single-decked ships there shall either be provision for feeding the hold, or there shall not be more than three-quarters of the hold occupied by grain in bulk, the remaining one-fourth being occupied by grain or other suitable cargo in bags, bales or barrels, supported on platforms laid on the grain in bulk. For ships with two decks, grain in bulk in the 'tween-decks is for the most part prohibited; but certain grains are allowed, provided there are separate feeders for hold and 'tween-decks, or else sufficiently large feeders to the 'tween-decks, and the hatches and other openings there made available for feeding the holds. In ships with two decks longitudinal grain-tight shifting-boards must be fitted where grain is carried either in bags or bulk; these shifting-boards must extend from beam to deck and from beam to keelson, and in the case of bulk grain must also be fitted between the beams and carried up to the very top of the space. The regulations also impose a fine not exceeding five pounds for every hundred cubic feet of wood carried as deck cargo which arrives in a ship, British or foreign, in any port of the United Kingdom between the 31st October and 16th April, provided no unforeseen circumstances, as defined by the Act, intervene. By deck cargo in this section is meant any deals, battens or other wood goods of any description to a height exceeding 3 ft. above the deck.

In 1890 a committee was appointed by the Board of Trade to deal with the spacing and strength of transverse water-tight bulkheads and to make recommendations. The first matter submitted to this committee related to subdivision which should enable a ship to float in moderate weather with any two compartments in free connexion with the sea. The committee, while recommending the above as a standard for sea-going ships of not less than 425 ft. in length, and for cross-channel steamers irrespective of length, suggested less stringent conditions for sea-going ships of shorter length. There was no suggestion of enforcing such subdivision by law; but as a reward for complying some concession was to be allowed, under the Life Saving Appliances Act of 1888, as to the boats or life rafts to be carried. On the presentation of the report the matter was, however, allowed to drop, and the rules of *Lloyd's Register* and the other classification societies are therefore the only rules with practical influence. The subdivision required by *Lloyd's Register* for all steamers comprises a bulkhead at each end of the machinery spaces, and a bulkhead at a reasonable distance from each end of the ship, making four in all. In addition for larger steamers other bulkheads have to be fitted, making the total as follows, namely:—

Length of Steamer.	Bulkheads.
285 ft. to 335 ft.	5
335 „ 405 „	6
405 „ 470 „	7
470 „ 540 „	8
540 „ 610 „	9
610 „ 680 „	10

The positions of these additional bulkheads, and the height to which they are to be carried, are clearly stated, and the rules are given for their scantlings. These scantlings are suitable for purposes of safety in the event of accident; but it is understood that they have to be considerably increased when the bulkhead is also used to withstand frequently the pressure of oil or water ballast; a deflection of the plating which would do no harm in an emergency once encountered would certainly become serious if often repeated in the ordinary service of the ship. The foremost bulkhead of the ship receives the name of *collision* bulkhead, or sometimes *fore-peak* bulkhead; the aftermost, the *after-peak* bulkhead. In sailing ships the collision bulkhead alone requires to be fitted.

Practical

Practical shipbuilding requires a knowledge of the properties of the materials used in the construction of ships, and of the processes by which they are produced or prepared for use, so that they may be suitably selected for the services for which they are intended; also a knowledge of the methods, means and machinery by which, after delivery in the shipyard, the materials are brought to the requisite shape, erected in their proper relative positions, connected together, and completed so as to form a structure which shall fulfil the intentions of the design, whether large or small, merchant ship or warship. The varieties of ships are very great, and are constantly changing, and thus new problems continually present themselves to the shipbuilder. There is also an ever-increasing demand for rapid production, which necessitates a rigorous and constant search for simplification of methods of work, for labour-saving and time-saving machinery, for improved means of handling material in the shipyard, and for workshops and factories which will more completely prepare and finish their various products before despatch to the shipyard.

Structural parts.

Whatever the size of the ship or the type to which she belongs, the general principles of construction remain very much the same in all cases. The following account applies to steel and iron shipbuilding. The exterior parts—the bottom, sides and decks—supply the strength required for the structure as a whole. The bottom and sides are spoken of as the *shell* or *outside plating*, and are, with the decks, kept to the proper shape by means of frames running across the ship, like the rafters in a roof or the ribs in the body. These are called *transverse frames* or *ribs*, and *beams* where they run under the decks. The parts of the frames at the bottom of the ship, where they are made deep and strong to support her when she is docked or grounded, are known as *floors*, while the spaces between these floors are spoken of as the *bilges*. The transverse frames and floors are held upright in their proper relative positions by other frames which run lengthwise in the ship; one at the middle line being called the *centre keelson*, and others fitted at the sides, *keelsons*, *bilge keelsons* and *side stringers*. All the fore-and-aft frames, taken together, are spoken of as the longitudinal framing. Where tanks for carrying water ballast are built into the bottom of the ship, the centre keelson is called the *centre girder*, and the keelsons or bilge keelsons the *side girders*. In large merchant vessels, and in all war vessels, except the smallest classes, an *inner bottom* is provided for increasing the security against injury by grounding, and against ramming and torpedo attack in war vessels, in addition to forming tanks for carrying water, either as ballast or for use in the ship. In such cases the centre keelson is called the *vertical keel*, and the keelsons and girders are called *longitudinals*. When the deep vertical transverse plates forming the floors only extend between the keelsons, girders or longitudinals, and are attached to them by angle bars, the floors are called *intercostal* floors, and the keelsons, girders and longitudinals are said to be *continuous*; on the other hand, when the keelsons, girders or longitudinals extend only between the frames and floors they are called *intercostal* keelsons, girders and longitudinals, and the frames and floors are said to be *continuous*. In war vessels, except the smallest classes, much of the longitudinal framing is continuous; and the transverse framing, for the most part, is *built up* of angle bars upon the outer bottom and under the inner bottom, with short plates, called bracket plates, between them, attached to the longitudinals by short angle bars. Frames built up in this way are called *bracket frames*. In mercantile vessels the transverse frames both within and without the double bottom are usually continuous.

Besides the transverse and longitudinal framing, there are partitions used for dividing up the internal spaces of the ship, which are called *bulkheads*; they are partial, complete, watertight or non-water-tight, as the circumstances of the case require. In warships the transverse bulkheads are so numerous, in order to restrict as much as possible the entrance of water from damage in action, that they go a long way towards providing the necessary transverse strength, and the transverse frames are consequently made of thinner materials and fitted at greater distances apart than they otherwise would be. Transverse frames are from 36 to 48 in. apart in large warships, and from 24 to 33 and sometimes 36 in. in large merchant ships. At the extreme ends of the ship the shell plating on the two sides is attached to forgings

or castings, which are known as the *stem* at the fore end, and the *stern-frame* or *sternpost* at the after end. The stem of a warship is generally made very massive, and projects under the water so as to form the *ram*.

The longitudinal framing is carried right forward and aft when possible, and the ends of the several frames are connected together across the ship by strong plates and angles, which are called *knees* or *breasthooks*, forward; and knees or *crutches*, aft. Additional supports, introduced to enable the vessel to withstand the heavy blows of the sea in bad weather, are called *panting stringers*, *panting knees*, and *panting beams*, panting being the term applied to the movements which occur in the side plating if sufficient strength is not provided. Where the ends of the ship are very full, or *bluff*, the frames are sometimes inclined, or canted out of the transverse plane, so as to be more nearly at right angles to the plating; such are known as *cant* frames. At the stern a transverse frame, called a *transom*, is attached to the upper part of the sternpost to form a base for cant frames of the overhanging part of the stern which is known as the *counter*. To assist the beams and bulkheads in holding the decks in their proper positions, vertical *pillars* are introduced in large numbers; but to avoid the loss of space and inconvenience in handling cargo, ordinary pillars are often dispensed with, and special pillars and deep deck girders are fitted instead.

The steel generally used in shipbuilding is known as *mild* steel. It is very tough and ductile, and differs from the *hard* steel, out of which tools are made, in that it will not take a *temper*, i.e. if heated and plunged into oil or water, the sudden cooling has very little effect upon it, whereas with tool steels a great change takes place, the steel becoming very hard, and usually brittle. This quality of tempering depends chiefly on the amount of carbon in the steel, mild steel containing less than ·25 %. Steel of greater strength than mild steel is used occasionally in certain parts of warships. The extra strength is obtained generally by the addition of carbon, nickel or chromium, coupled with special treatment. The quality of the plates and bars used is tested by cutting off strips about 2 in. wide, and bending them double by hammering, or in a press, until the bend is a semicircle whose diameter is three times the thickness of the strip. The strips are sometimes heated and plunged into water to cool them suddenly before bending, and they may be cut from either side or the end of the plate. Strips are taken occasionally and hammered into various other shapes while hot and while cold, so as to ascertain the general quality of the material. To ensure its tenacity, strips are taken and machined to give a parallel part about 2 in. in width, of at least 8 in. in length. Two centre-punch marks are made 8 in. apart, and the strip is secured in a testing-machine constructed so that the ends can be gripped by strong jaws which do not injure the parallel part. The jaws are then gradually pulled apart, the amount of the pull required to break the strip being registered, and also the extent to which the strip stretches in the length of 8 in. before breaking. The tensile strength varies between 26 and 32 tons per square inch, calculated on the original sectional area of the parallel part before breaking, and the elongation in the 8 in. is about 20 %. The standard strength and elongation required by the principal registration societies have already been given. The steel used for making rivets is similarly tested; and samples of the finished rivets are also taken, and hammered into various shapes, hot and cold, to ensure that the metal is soft and ductile and suitable for the work.

Materials.

The stem, stern-frame, &c., are frequently made of forged iron; but if of steel, they are cast to the form required. These castings are tested by being let fall on hard ground and then slung in chains and hammered all over, when faults of casting are generally discovered by variations in the sounds produced. By this hammering the general soundness of the casting is ensured. To test the quality of the steel in the casting, small pieces, which are cast on for the purpose, are removed and tested in the same manner as just described for the strips cut off from the plates; they are required to give about the same tensile strength, but a little less ductility, say 10 % instead of 20 % elongation in 8 in.

The sections of the iron and steel bars in common use are shown in fig. 75, and are named as follows:—

A. Angle bar.
B. T (Tee) bar.
C. Channel bar.
D. Z (Zed) bar.
E. I bar.
F. Plain bulb bar.
G and H. Angle bulb.
I. T bulb bar.
J. Half-round moulding.
K. Hollow moulding.

The vertical, or central, portion in the I, T and bulb sections is spoken of as the *web*, and varies from about 3 in. to 9 in. in depth; the horizontal parts are called *flanges*; in an angle bar, both parts of the section are called flanges. The flanges vary in width from about 2 in. to 7 in. in the angle bar, and from 3 in. to 6 in. in the others. The thickness varies from about ¼ in. to ¾ in. These dimensions taken together are called the *scantlings* of such material. The thicknesses of the plates in common use generally lie between

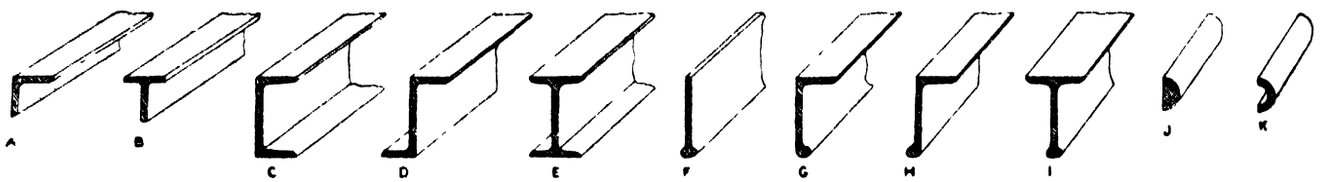


FIG. 75.

¼ in. and 1 in. Thicker or thinner plates are obtainable, but are not often used for merchant ships. These plates are of varying sizes as required, the tendency being to use very large plates where possible, and widths of 5 ft. to 7 ft. are used in lengths of from 40 to 20 ft. Angle bars are used in lengths of from 20 to 80 ft. as required, or as may be limited by the means of transport between the steel works and the shipyard.

The various plates and bars are connected together by means of *rivets* of various forms. Specimens of the common kinds are shown in fig. 76. The heads and points have distinctive names, as follows:—

(A) Countersunk head, chipped flush.
(B) Ordinary countersunk head.
(C) Snap head.
(D) Snap head with conical or swelled neck.
(E) Pan head with conical or swelled neck.
(F) Pan head.
(G) Countersunk point.
(H) Rough hammered point.
(I) Snap point, hand work.
(J) Snap point, machine work.

The pan head rivet (E) with conical or swelled neck is the most commonly used, as it is convenient to handle and gives good sound work. The rough hammered point (H) is also very commonly used, is very effective and is readily worked. The pan head (F) and snap head (C), without cones under the heads, are only used for small

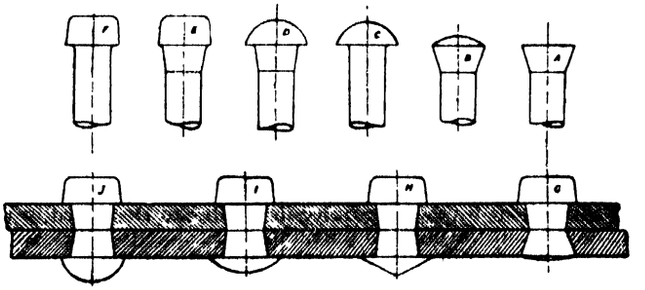


FIG. 76.

rivets; the heads (A), (B), (C), (D), are used where considered desirable for appearance' sake, but (C) and (D) are also adopted when the riveting is done by hydraulic machinery, in which case the snap point J is also used. The countersunk point (G) is used on the outside of the shell, and in other places where flush work is required. The snap point (I), for internal hand riveting, is used where desired for appearance, instead of the rough hammered point. The rivets vary in diameter from about ⅝ in. to 1¼ in., and the lengths are as required to go through the holes and give enough material properly to form the points. The diameter of the rivet is settled according to the thickness of the plates to be connected, being generally about ¼ in. more than the thickness of the separate plates. The distance from centre to centre of the rivets is spoken of as the pitch, and is generally expressed in diameters. For connecting plates and bars in the framing, the pitch of the rivets runs generally to 7 diameters; for securing edges which must be water-tight, the pitch is from 4½ to 5, and, if they are to be oil-tight, 3 to 3½ diameters. In butts and edges of shell-plating the pitch varies from 3½ to 4½ diameters.

In some positions rivets like the above cannot be driven into place and properly hammered up; resort is then made to rivets which have screwed points, called *tap rivets*, shaped as shown in fig. 77. That shown at (B) is used where it is necessary to make the surface flush, but not necessary to remove the rivet for examination of plating; and when hove right up, the square head is chipped off and the surface hammered smooth. In other positions patterns (A) or (C) are used as may be most suitable.

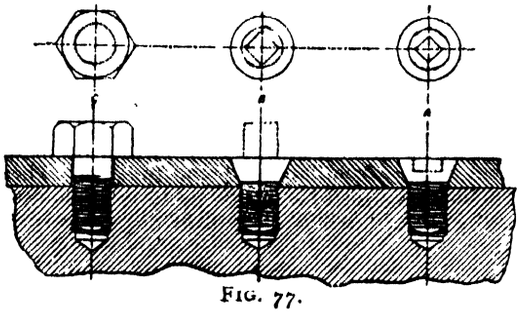


FIG. 77.

Machine tools.

The machines used in the shipyard have been much improved of recent years. The one most used is the punching and shearing machine, on one side of which plates of all thicknesses up to 2 in. may be cut or sheared to any desired form, while on the other side rivet holes may be punched of any required size. Special shears are provided with V-shaped cutters for shearing angle bars, but in some cases the cutters of ordinary shears may be replaced by V-shaped cutters for this purpose. When the plates and bars leave the shearing and punching machine their edges are rough and slightly distorted, to remove which it is necessary in many cases to plane them. This is usually done by special machines provided for the purpose. In the most modern types the cutters are duplicated and the machine arranged to cut both ways. When it is required to cut a square edge on the flange of an angle bar to facilitate caulking, a pneumatic chipping machine of recent introduction is frequently used, but this is more usually done in a planing machine. In shipbuilding a great deal of drilling must be done by hand, but, where it is possible, drilling machines are employed. The most modern forms can drill a number of holes at the same time. For countersunk work it is necessary to make the hole funnel-shaped, as will be seen from fig. 77. This shape is rapidly given to the holes already punched or drilled by means of a special drilling machine, which can be very easily and rapidly manipulated. The use of portable drills, to avoid hand labour, is rapidly increasing, and several types are in use, operated by electric motors, compressed air or flexible shafting. They are carried to any position required. The hole made by a drill is cylindrical, but that made in the process of punching is conical. On one side of the plate its diameter is determined by the diameter of the punch, and on the other by the diameter of the die, which must be greater than that of the punch. This taper tends to produce close and sound riveting, as the joint is closed both by the knocking down of the rivet and by the contraction of the rivet on cooling. On the other hand, the operation of punching injures the steel in the neighbourhood of the hole, and for work subjected to great stress this deteriorated material must be removed by countersinking or by drilling the hole to a larger size, or the quality of the material may be partially restored by annealing. The process of annealing consists in heating the steel to a good red, then allowing it to cool very slowly; during this process parts of the material which have been unduly distressed in working regain their strength by molecular rearrangements in the distressed parts. This process occurs to some extent when hot rivets are introduced into the holes and hammered up. The steel immediately adjacent to the rivet is heated, and afterwards cools gradually as the heat becomes distributed into the body of the plate. In some experiments carried out by the Admiralty in Pembroke Dockyard in 1905, it was found that the effect of punching holes close together, as for a butt-strap, was to diminish the tensile strength of the plates about 10 %; that hot riveting restored about half of this; and that when holes were drilled and countersunk right through, also when holes were punched $\frac{3}{4}$ in. and countersunk right through, so as to enlarge hole to $\frac{7}{8}$ in. in diameter, there was no loss.

In addition to the machines mentioned above, many special appliances have recently been introduced into shipyards for the purpose of economically carrying out definite operations rendered possible by the use of mild steel. Ships built with a bar keel require the garboard strake plates on each side to be flanged on one edge, so as to fit against the bar keel. This flanging was formerly carried out by heating the plates and treating them hot, but now a very powerful machine, called a keel-plate bending machine, and usually worked by hydraulic power, is employed for the purpose with the plate cold. Flanging plates cold has also become general for a variety of purposes. In a bulkhead, stiffening is necessary, and for this purpose angle bars were commonly used; the horizontal stiffeners are now frequently formed by flanging the lower edges of the plates. Instead of fitting an angle bar to connect two plates at right angles to one another, the edge or end of one may be flanged, and half the weight of the angle bar and the rivet work saved. For all such work somewhat lighter flanging machines than the keel-plate bending machine are used; they are generally worked by hydraulic power, but there is no difficulty in driving them by any other means.

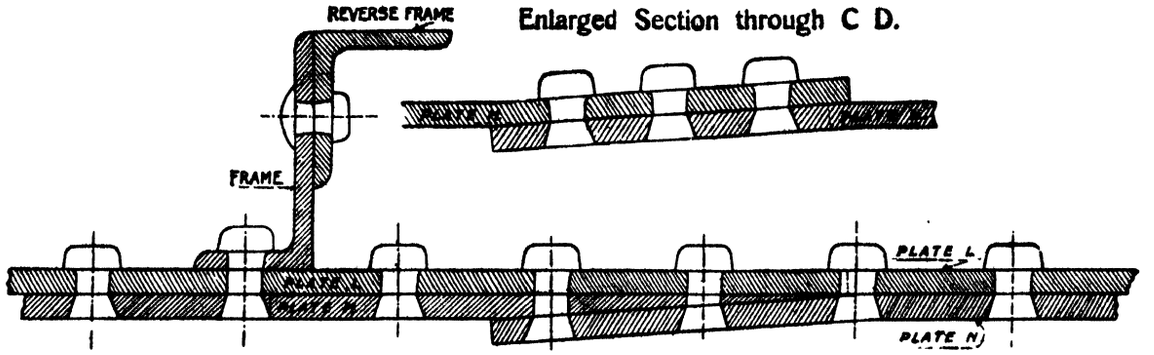
Another modern appliance is the scarfing machine, which is used chiefly in connexion with the lapped butts of shell and other plating. Before its introduction it was usual to bring the ends of the plates together and cover the joint with a short plate called a butt-strap, secured to both plates with a proper arrangement of rivets (see fig. 78). It is now more usual in merchant ships to work overlap butts, some half of the weight of the butt-strap and riveting and other work being saved thereby, although the appearance may not be quite so sightly. The difficulty with this system is that the passing plates on each side have their edges lapped over the ends of the lap-butt, and in order that they may be brought close some machining is necessary; this is called scarfing, *i.e.* slotting away the corner of the projecting butt so as to produce smooth surfaces for the side laps (see section at A B, fig. 78). The machine used for this operation is a slotting machine with two heads, so as to slot both edges of the plate at the same time; it is provided with a table which can be adjusted to the necessary bevel, so that the slotting tools may reduce the thickness of the edges operated on in a gradual taper to a knife-edge. A more recent appliance for reducing weight is the joggling machine. As already described, the usual method of working the shell-plating is by alternate inside and outside strakes of plating, the outside plates overlapping the inside plates, and the space between them and the frames being filled in by slips or liners. These liners throughout the ship amount to a considerable weight, and the object of the joggling is to do away with the necessity for them. This is effected by shaping the outside plates as shown in section *b*, fig. 79. Sometimes the frames are joggled instead of the plates, as shown in section *c*, fig. 79; the inside plate lies in the recessed portion of the frame formed by the joggling process, and the outside plate on the unrecessed portion, its edge lapping over the edge of the inside plate the usual width. The angle bar in this case must be heated, and the hydraulic press is placed so as to be readily accessible for the handling of the part to be heated. The system of joggling the frames has not been adopted to nearly so large an extent as that of joggling the plates.

Frame-bevelling machines appear to be growing in favour. The machine is placed on rails, near to and across the mouth of the frame furnace, so that it can be readily placed in position for the frame bar to be drawn out of the furnace directly through it, and moved to one side when not required. In the machine a series of rollers, which can be inclined to suit the varying bevel required, operate on the bar. The inclination of the roller is varied as the bar passes along, a dial and pointer giving the angle of bevel at each instant. As the bar passes through, the workman, with his eye on the dial, manipulates the machine so as to give it the required bevel. It is afterwards completed on the slabs, the form being taken from the scrive-board in the usual way.

The shipyard should be supplied with modern machinery of the most approved type, in order to produce the best work at economical rates: rolls for straightening and bending plates, for fairing and bending beams and angle bars; shaping and slotting machines; lathes and milling machines; heavy planing machines. It should also have a blacksmith's shop, saw-mills, joiners' shops, &c., all fully equipped for completing, as far as possible, the work of the yard. The workshops and machines should be distributed so that, as far as possible, the material moves steadily along, as the various operations are performed upon it, to its place in the ship. Pneumatic tools are often preferred for light work, such as chipping, drilling, rimering and caulking; they are also occasionally used for riveting, but they are not yet much in favour for this class of work. Hydraulic power is particularly well adapted for heavy presses, such as for keel-plate flanging, for punching and shearing, and especially for punching manholes and lightening holes in plates, and for heavy riveting. It is also very successfully applied for pressing to shape a great variety of small fittings made of steel or iron. For such machines as rolls, ordinary shears and punches, winches, &c., separate steam engines are still frequently fitted, but there is a very marked tendency to replace all these by electric motors. Electric power for driving all the machinery has been introduced into many shipyards. It has many advantages: all the power required in the yard may be generated in one building in any position, containing the boilers, steam engines and electric generators, and the whole may be designed and worked so as to secure great economy. The current is supplied either to motors directly driving the heavier or outlying machines, or to motors driving a line of shafting where the machines are of a lighter character and are arranged in compact groups. Fixed machines can be placed where most convenient for the work, without any reference to the position of the boilers or other machinery, and a large number of machines can be very readily made portable for the lighter classes of work. The power may be transmitted with but little loss, whereas with steam-driven machines at a distance from the boilers, lines of steam piping must be introduced, and loss of power is entailed. The saving which the system of electric driving effects over that of steam driving in the consumption of coal in a large shipyard is considerable, and is claimed by those who have adopted it to be sufficient to justify the large capital expenditure required to convert a shipyard from the latter system to the former.

As the plates, beams, angle bars, Z-bars, &c., are delivered, they must be stored in convenient racks, with marks showing for what

purpose they are intended, so that they can be readily identified and removed without loss of time. When required, they are taken from the racks, and the edges, butts and rivet holes carefully



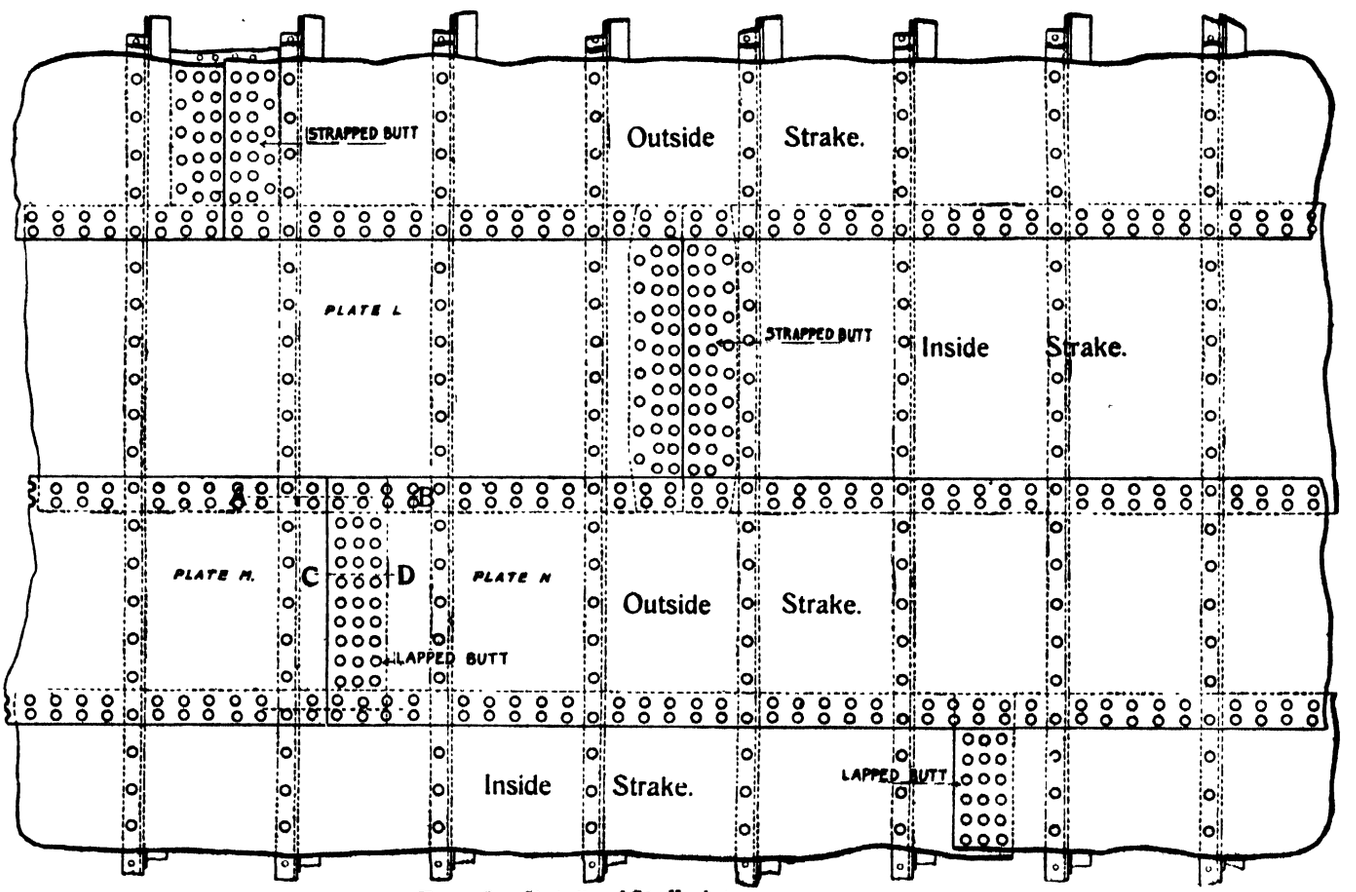


FIG. 78.—Details of Shell-plating.

marked upon them before they are taken to the machines where the shearing, punching, drilling, shaping, &c., are carried out, after which they are taken to their proper position in the ship.

In many shipyards great attention has been given to the questions of the economical handling of the material, and very costly and novel appliances are to be found in these yards for the purpose. As an example mention may be made of the overhead cranes fitted at the Union Ironworks of San Francisco. A framework of wood is built up over the entire building berth, the structure being well braced in all directions for carrying two travelling girder cranes. There are four building berths fitted in this manner, and the latest has a length of 408 ft., a clear breadth of 80 ft., and clear height of 72 ft. A swing crane of 50 ft. spread at each end of the erection increases its effective length to 500 ft. Each of the travelling girders carries a trolley, with motion transverse to the ship; five tons can be so lifted, and parts of the ship's structure not exceeding this weight can be taken from the ground anywhere in the neighbourhood of the structure and conveyed to any desired spot in the ship. The driving power is electric. The longitudinal travel of the girders is 180 ft. per minute; the transverse travel of the trolley and speed of lift, each 90 ft. per minute. A manila rope is used for hoisting, except for plates under the bottom and counter, where a wire rope is used.

Cranes.

At Newport News, in Virginia, the structures are differently arranged, being on the cantilever travelling-crane principle. There are five such structures in the yard; three of them are wood, the last two of steel. The largest is 700 ft. long. One trestle structure, or gantry, serves two building berths, and runs longitudinally between

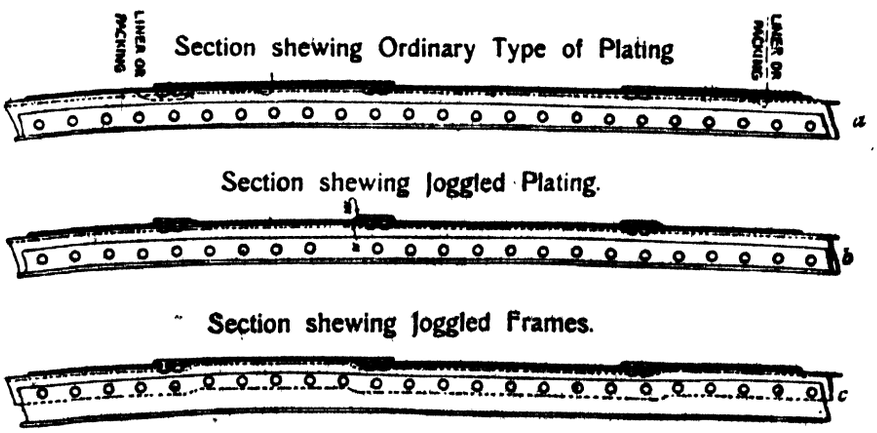


FIG. 79. -Methods of working Shell-plating.

the two. On the gantry is mounted a double cantilever crane, having an effective reach of 95 ft. on each side of the centre; this outreach is sufficient for a ship 70 ft. broad on each side of the trestle. The height of the cantilever above the ground is some 90 ft., the load that can be raised is 15 tons, and if necessary a bulkhead up to that weight can be lifted bodily into place. The speed of lift for this weight is 100 ft. per minute, and for lighter loads 700 ft. per minute. The speed of the trolley along the cantilever is 400 to 800 ft. per minute, and of the whole crane longitudinally is 400 to 700 ft. per minute. All movements are made by electric power. Similar gantries and arrangements are used in other American shipyards. The view shown in fig. 80 (Plate VIII.) represents one of these structures as fitted in Messrs Cramp's shipyard in Philadelphia.

At the yard of Messrs C. S. Swan & Hunter, on the Tyne, similar structures have been erected since 1894; besides carrying cranes, these have standards and stiffening girders, from which ships under construction are shored for fairing. Roofs and sides are fitted to protect the ship, and the workmen engaged in building her, from the weather. The side supports are three in number, and serve for two berths; they are formed of steel lattice-work, with standards mostly 20 ft. apart. The clear height of roof is 83 ft., and clear breadth of berths 68 ft. and 73 ft.; a roadway on the ground level is left free on each side of the berths inside the standards. Two revolving 3-ton electric cranes travel along paths suspended from each roof; their jibs have sufficient radius to lift material from the roadways and deposit it at the centre of the ships building. The longitudinal speed of these cranes is 300 ft. per minute; speed of lift, 100 ft. per minute. A third berth is served by a travelling cantilever crane on top of the adjoining roof. At Messrs Harland & Wolff's yard at Belfast another modification was introduced in 1897 (see fig. 81, Plate VIII.). In this case the structure takes the form of a travelling gantry or bridge over the building berth, the legs running on rails at the ground level. The gantry, which is driven by hydraulic power, has three traversing cranes and four 4-ton swing cranes. It was designed to facilitate the lifting of plates and portions of the structure into position, and also to support the hydraulic riveting machines and other appliances for the carrying out of the work. The success of the appliances, first used in the "Oceanic," has led to a further extension for other ships in hand.

Course of Construction

The first steps taken on the receipt at the shipyard of the design drawings and specifications, which have been generally described on page 957, have for their object the provision of detailed drawings of the structural arrangements, which will enable materials for the various parts to be ordered from the manufacturers, and of information for the guidance of the workmen in erecting the structure.

A wooden model of half of the exterior surface of the ship, called the "half-block" model, is immediately prepared from the sheer drawing, generally to a scale of ½ in. to the foot for a large ship and a somewhat larger scale for a small one, and on its surface are carefully drawn the main frames, the edges and butts of the outer bottom or shell-plating, together with the positions of decks, longitudinals and other features which influence the detailed arrangement of the framing and shell-plating, the particulars of which are fixed by the specification and the midship and other sections. The work on this model is carried out concurrently with the laying off of the ship, which will be described presently, so as to be complete by the time the latter is sufficiently far advanced to enable full-sized measurements of the breadth of the plates to be obtained. The lengths of the plates are then measured from the model and the breadths from the mould loft floor, a small surplus on the net measurements being allowed to provide for inaccuracies; and the whole of the outer bottom plating ordered from the manufacturers. The whole of the framing is also ordered, the lengths of the various parts being measured from the model.

A similar block model is made to the shape of the inner bottom, if one is to be provided, or of the top of the ballast tanks, as the case may be; and in a battle-ship a block model will be made of the protective deck if it should have much curvature or sloping sides. All details of plating, framing, beams, carlings, hatchways, &c., will be shown on these models, and the dimensions of all the parts will be carefully measured off and the material ordered of the manufacturers; the breadths of the plating being obtained as in the case of the outside bottom plating.

For flat or nearly flat surfaces such as flat keel plates, vertical keel, bulkheads, decks, engine and boiler bearers, &c., the detailed arrangements of plating and frames are made on drawings, from which the dimensions are taken for ordering the material from the manufacturers; while the drawings themselves constitute working drawings which are issued for general guidance in building the ship.

Drawings of details of important structural castings or forgings, such as the stem, sternpost and shaft brackets, are also among the earliest taken in hand, but the patterns to which these parts are made, when they are large and complicated castings as in a warship, cannot generally be completed without information obtained from the mould loft floor.

Laying off.

Laying off is the name given to the process of drawing the lines of a ship to full size in plan and elevation in order to determine the exact dimensions of the most important and fundamental parts of the structure. The necessity for drawing to full size arises from the extreme accuracy with which the dimensions of the various parts must correspond with one another in order that when assembled there may be no irregularity or unfairness in the surface of the ship; the methods of ordinary mechanical drawing to a small scale being inadequate for this purpose, on account of the analytically indeterminate nature of the curves which define the form of the ship. The process is carried out on a specially planed and blackened floor, most conveniently of rectangular shape, and of such a size as to take in the full depth of the ship in its width. The building or room in which the floor is situated is called the "mould loft," and is an important adjunct to the shipyard drawing office.

The rationale of the methods of projection of points and lines and rabatment of planes used in laying off is subjected to a detailed examination in the article Geometry, part iii. *Descriptive* (vol. xi), and therefore will not be referred to in this article, which is confined to a description of some of the detailed problems which occur in actual practice, the solutions being often approximations which are found sufficiently exact for practical purposes.

In different localities and in the construction of different types of vessel, the extent to which the process of laying off to full size is employed varies considerably. In some yards laying off on a large scale on paper is relied on almost entirely, and very little full-sized work on the floor is considered necessary. This chiefly applies to ships of stereotyped form, such as ordinary "tramp" steamers, the lines of which have very little curvature for the greater part of their length. In the American Lake shipyards for the cargo vessels employed on the Great Lakes templates are very carefully and ingeniously made for the framing, one set sufficing to mark off all the frames on the greater portion of the ship's length. In a similar way one template is made for each strake of plating and used to mark off the whole of the plates of that strake, a slip mould being used when they begin to depart from the parallel midship body.

The types of vessels in which the greatest complication of structure occurs and in which the highest degree of accuracy in building is necessary are passenger ships and war vessels; the description of the process of laying off, which follows, while generally applicable to all types of vessels, refers more particularly to the practice followed in building war vessels at the British Government Dockyards and at the more important shipbuilding centres in the United Kingdom.

Sheer drawing.

The nature of the Sheer Drawing, with a description of the principal lines shown on it, has been stated on p. 957. Specimen sheer drawings of different types of ships are shown on Plate IX. Fig. 83, Plate IX., is a sheer drawing of the Midland Railway steamer "Londonderry," designed by Professor J. H. Biles, LL.D., of length between perpendiculars 330 ft., breadth moulded 42 ft., depth 25 ft. 6 in., displacement 2200 tons, speed 21·7 knots. Fig. 82, Plate IX., is the sheer drawing of the battleship "Lord Nelson," whose dimensions and other particulars are given in the article on Ship, p. 898. Her form over the midship portion below the water-line and above the turn of the bilge is flattened so as to enable her to be docked in a dock existing at Chatham when she was built, and at the same time to secure the greatest possible beam of ship at the water-line; and the bottom of the ship out to the dotted line in the half-breadth plan is absolutely flat so as to enable her to be docked on two or more lines of blocks whose upper surfaces lie in one plane, thereby reducing the docking strains, a system adopted for the first time in the "Lord Nelson" and in all succeeding vessels of large size in the British Navy since this vessel. In Plate IX. figs. 85 and 87, the half-breadth and body plans of the royal yacht "Alexandra" are given in association with the profile, fig. 84, in place of the usual outline sheer, which is omitted to save space. In each of these sheer drawings the names of the various lines have been added; whereas in ordinary practice only the numbers of the stations in the sheer and half-breadth and of the sections in the body are given. In the sheer drawing, fig. 83, very little more is given in the three plans than the various sections and the traces of the planes, whose intersections with the surface of the ship they are; in such a case the sheer drawing is generally spoken of as *the lines*, and is only used for giving the outside form of the ship,

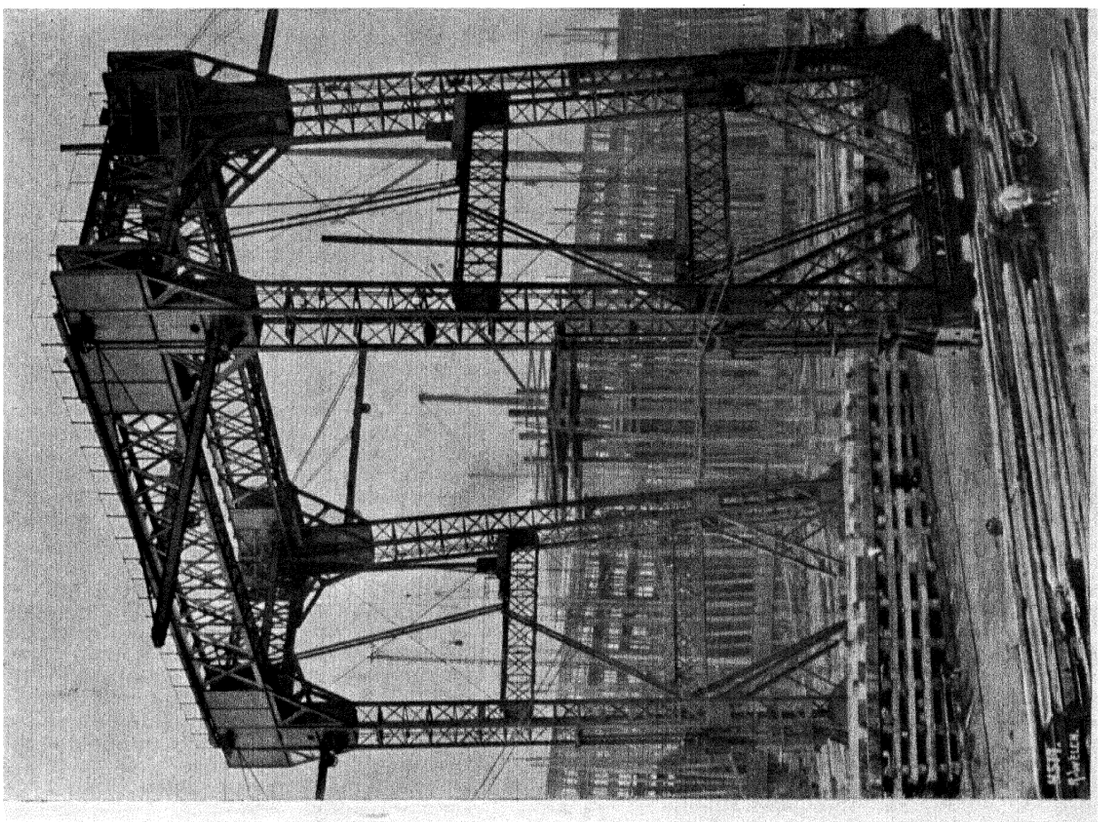


FIG 81.
Gantry at Messrs. Harland & Wolff's Shipbuilding Yard, Belfast.

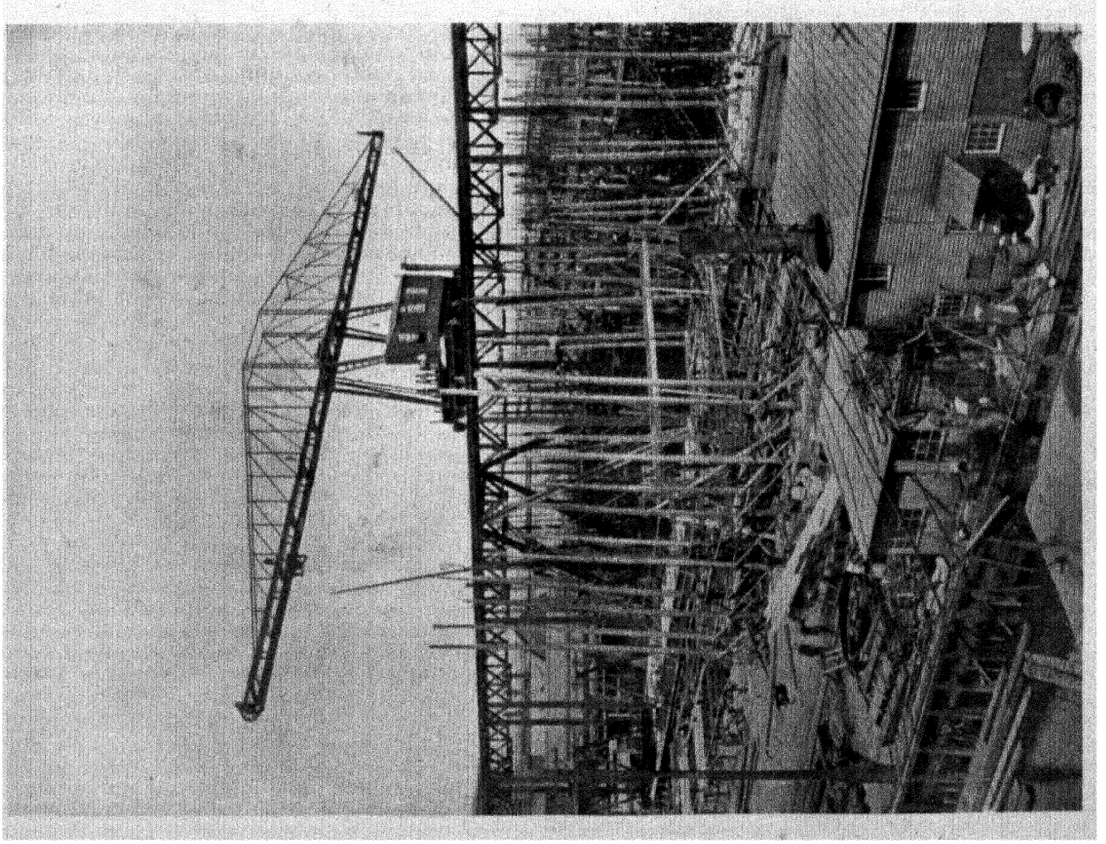


FIG 80.
Gantry at Messrs. Cramps' Shipbuilding Yard, Philadelphia.

other information required for laying the vessel off and making the necessary moulds being usually given on other drawings. The sheer drawing of the "Lord Nelson" contains the information usually given concerning the form of the ship and other features of the design required for laying the vessel off, ordering the material for her construction and afterwards erecting the same in position. In these drawings it has been necessary for the sake of clearness to reduce the number of square stations and water or level lines commonly shown in drawings of this character. The number of these lines is fixed in the preparation of the design by the necessity of accurately defining the surface of the ship so that the intentions of the designer as regards form, displacement, and what may be called the geometrical features of the ship may be realised. In a large warship there are usually 21 square stations shown, including the forward and after perpendiculars, the distance between which defines the nominal length of the ship. The water-lines are 3 to 4 ft. apart. Intermediate square stations and water-lines are frequently introduced where the curvature of the surface of the ship is rapidly altering; as at the ends and below the bilge. It is usual, and obviously sufficient in the sheer drawing as well as in the process of laying off, to show only one-half of the ship on one side of the longitudinal vertical plane of symmetry. Thus, in the half-breadth plan only the port side of the ship is drawn; and in the body plan, for greater clearness, the half ship is further divided, the part forward of the midship section, or square station at the middle of the length of the ship, being shown on the right of the middle line of that plan, and the part aft of the midship section on the left of the middle line.

Other Drawings.—The profile and plans and the midship section have also been described in this article. The profile and plans of H.M. Yacht "Alexandra" are given on plates. Fig. 84, Plate X., is the profile which shows in sectional elevation all the decks, bulkheads, machinery, living spaces, store spaces, &c.; figs. 86, 93, 94, 95 and 96, Plate X., give the plans of the promenade deck, upper deck, main deck, lower deck and hold respectively with important fittings shown upon them; figs. 88, 89, 90, 91 and 92, Plate X., give sections of the ship showing the inboard works at stations E, D, C, B and A on the profile respectively; and on fig. 97, Plate XII., is given the midship section with all the principal scantlings of the framing and plating. Fig. 98, Plate XIII., also gives the midship section of H.M. battleship "Lord Nelson."

Any two of the three plans of the sheer drawing may be taken to represent the "horizontal" and "vertical" planes of Descriptive Geometry, and are theoretically sufficient to define the shape of the vessel completely, but the three plans are practically necessary for the sake of clearness and are always used.

In the design sheer drawing the lines may represent the intersections of planes with the surface of the framing of the ship, or with an imaginary surface having a mean position between the irregularities of the surface of the ship caused by the system of plating adopted. The former system is the more usual in the drawings of steel-built merchant ships, necessitating an allowance on all measured dimensions used in calculating displacement, &c.; the latter system is usual in warships, in which the surface represented by the sheer drawing of a ship plated with raised and sunken plates strakes as described on p. 962, would be an imaginary surface midway between the outsides of the raised and the sunken strakes. A sheer drawing on this latter system is said to show displacement lines in contradistinction to the former system which shows "moulded" or frame lines. In the case of vessels with a plank sheathing over the bottom the surface shown on the sheer drawing is the outside of the planking.

As the primary object of the laying off of the ship is to ascertain the shape of the frames, the surface of the outside of the frames is always that which is laid off on the mould loft floor. If displacement lines are given in the sheer drawing a preliminary process of deriving from them the moulded lines is necessary before laying off on the floor. The process, to be strictly accurate, involves setting in the requisite distance along the normal to the surface shown in the sheer drawing. This is easily done at the midship section, where the normal to the surface lies in the plane of the section and coincides with the normal to the curve of the square station in the body plan, or at the practically vertical parts of the sides of the ship, where the normal to the surface lies in the water plane and coincides with the normal to the water-line in the half-breadth plan. In other positions, however, it would be necessary to rabat a plane containing the normal on one of the planes of reference, set in the required distance along the rabatted normal, find the projections of the point in the frame surface so obtained and of other similar points, and thus obtain the projections of curves on the frame surface, which by their intersections with ordinates and water-lines would give a new set of square stations and water-lines corresponding to the moulded surface of the ship. Such a process, though simple, is more laborious than is necessary in view of the degree of accuracy required, and in practice it is customary to set in normal to each square station a distance slightly greater than the thickness of the plank and plating, the increased distance required being roughly estimated from a consideration of the obliquity of the water-lines, without producing any sensible error.

The frame lines having been obtained, it is customary at some shipyards to "fair" the body on paper on a larger scale than that of the sheer drawing, before laying off on the floor. This saves a certain amount of labour in fairing the full-sized body on the floor, the errors in the body as first copied on the floor, which it is the object of the fairing process to correct, being proportional to the increase in scale in first copying. The process is similar to the full-sized fairing which is described below.

Fairing the body.

A straight line is drawn on the floor parallel to a fixed straight batten nailed to the floor a short distance from the wall of the building to represent the load water-line in the sheer and body plans and in such a position that the whole depth of the ship can be drawn with regard to it within the limits of the floor and clear of the batten, the inner edge of which becomes the base-line of the sheer, half-breadth and body plans. The fore and after perpendiculars of the sheer and half-breadth plans are drawn at right angles to this line and the fixed batten in convenient positions near the ends of the floor, the fore perpendicular on the right and the after perpendicular on the left as in the sheer drawing, and so as to allow the extreme outlines of the stem and stern to be drawn upon the floor together with not less than one-fifth of the length of the sheer and half-breadth plans at each end of the ship. A line perpendicular to the water-line and the fixed batten is drawn, usually near the middle of the floor, to represent the middle line of the body plan. The middle line of the half-breadth plan is usually taken as coinciding with the base-line, the inner edge of the fixed batten. The level or water lines shown on the sheer drawing are drawn in on the floor parallel to the load water-line so as to serve for both the sheer and body plans. Ordinates representing those given in the sheer drawing, which correspond to the sections in the body plan, are drawn in the sheer and half-breadth plans and others are added where desired, so also are additional water-lines between those shown on the sheer drawing and above the load water-line, so that in full-sized drawing on the floor the sections and stations may be sufficiently near for fairing the whole of the external form of the ship. If, as is usually the case, the ship is too long to be laid off in one length on the floor the midship portions of the sheer and half-breadth plans are drawn superposed over the forward and after parts, and are usually contracted longitudinally as will be described presently.

The distances from the middle line along each water-line in the body plan of the original sheer drawing, or of the enlarged body when the process of preliminary fairing has been adopted, to the intersection of the water-line with each section are measured to scale and tabulated. At the lower parts of the body, in the vicinity of and below the "bilge," where the water-lines cut the square stations very obliquely and the points of intersection become somewhat indeterminate, diagonal lines as shown by 1D, 2D in fig. 99 are drawn in the sheer drawing in such positions as to intersect as many as possible of the square stations approximately at right angles, and the corresponding diagonal lines are drawn on the floor. The distances from the middle line of the body plan in the sheer drawing along the diagonal lines to their intersections with the sections are measured and tabulated. It is usually desirable, especially in ships with a great extent of practically flat bottom, to draw bow and buttock lines to include this portion of the surface, such as 1B in the figure, as the diagonals approach more or less closely to bow and buttock lines and shorter measurements are required in transferring the lines; the heights of their intersections with the transverse sections above the base-line being measured and tabulated. The draught of water of the ship at the forward and after perpendiculars is given in the specification enabling the underside of keel in the sheer plan to be drawn in on the floor between the points where the rise of keel commences at the extremities. The flat part of the keel is generally uniform in width for the greater part of the length of the ship, and tapered at the extremities. The line representing its side must be drawn on the floor in the half-breadth plan. The height of keel-line above the base-line at each station in the sheer plan and the corresponding half siding of keel are the co-ordinates of the lower extremity of the corresponding transverse section in the body plan. The lower extremities of the sections are at once fixed in the body plan by the intersections of their horizontal and vertical ordinates transferred from the half-breadth and sheer plans. For the upper endings of the transverse sections in the body plan a level line is generally drawn on the body of the sheer drawing just above the projection of the upper deck edge and the sections at the square stations produced to meet it. The intersections of this water-line with the sections are measured and tabulated.

The whole of this process of measurement and tabulation is frequently done in the drawing office, and the "loftsman" or person who conducts the laying off on the floor is not supplied with the sheer drawing, but only with these tables of "offsets," and similar tables for the lines in the sheer and half-breadth. The process, however, is the same in either case.

The tabulated measurements for the sections of the body plan are then set off full size by means of long measuring staffs on the lines on the floor, corresponding to those in the sheer drawing on which the measurements were taken, and thus give points whose co-ordinates are to those of the corresponding points in the drawing in the ratio of 48:1, if the drawing from which they were taken was to a scale of ½ inch to the foot as is usually the case. A suitable wood batten is then bent or "penned" as nearly as possible through the

series of points on the several water, diagonal and buttock or bow lines corresponding to each square station, being held in position by nails, specially adapted for the purpose, lightly driven into the floor, the batten in each case being adjusted so as to lie in a fair curve. Usually the batten will not under these conditions pass through all the points found for the curve on account of irregularities introduced or magnified in the process of enlarging to full size, and it must be allowed to take up a mean position passing outside some of the points and inside others. All of the sections in the body plan are drawn in with chalk in this way. The section where the greatest breadth of the ship occurs, usually at or near the middle of the length, must have the line parallel to and half the moulded breadth of the ship from the middle line for a tangent, and no section must project beyond this line.

The intersections of each section thus drawn, with the water and other lines, are the vertical projections on the body plan of points, the horizontal projections of which lie in the horizontal trace of the transverse plane at the corresponding square station or ordinate in the sheer and half-breadth plans, and are at the same perpendicular intersection of the bow plane 1B with square station 2, and t_1 is the projection in the sheer of the intersection of water-line 2WL with the same bow plane. The water-lines and diagonals in the half-breadth and the diagonals and bow and buttock lines in the sheer may thus be drawn as fair lines by the help of battens, and if the lines do not pass through all the points obtained by projection from the body plan, the sections in the latter are rubbed out and new ones obtained from the lines in the half-breadth. This process should be repeated until the curves in both plans are fair and the intersections correspond accurately with one another as the projections of points in space.

No frame of the ship, however, is made to the curves of these water and diagonal lines, so that their true shapes are not required for any practical purpose except fairing the body. For the whole length of the ship, except about three to four twentieths at each end, space and labour are therefore saved and greater accuracy is ensured by using the contracted method of fairing. In this method the ordinates of the half-breadth are set only from $\frac{1}{8}$th to $\frac{1}{10}$th of their true distance apart, while the transverse

Contracted method of fairing.

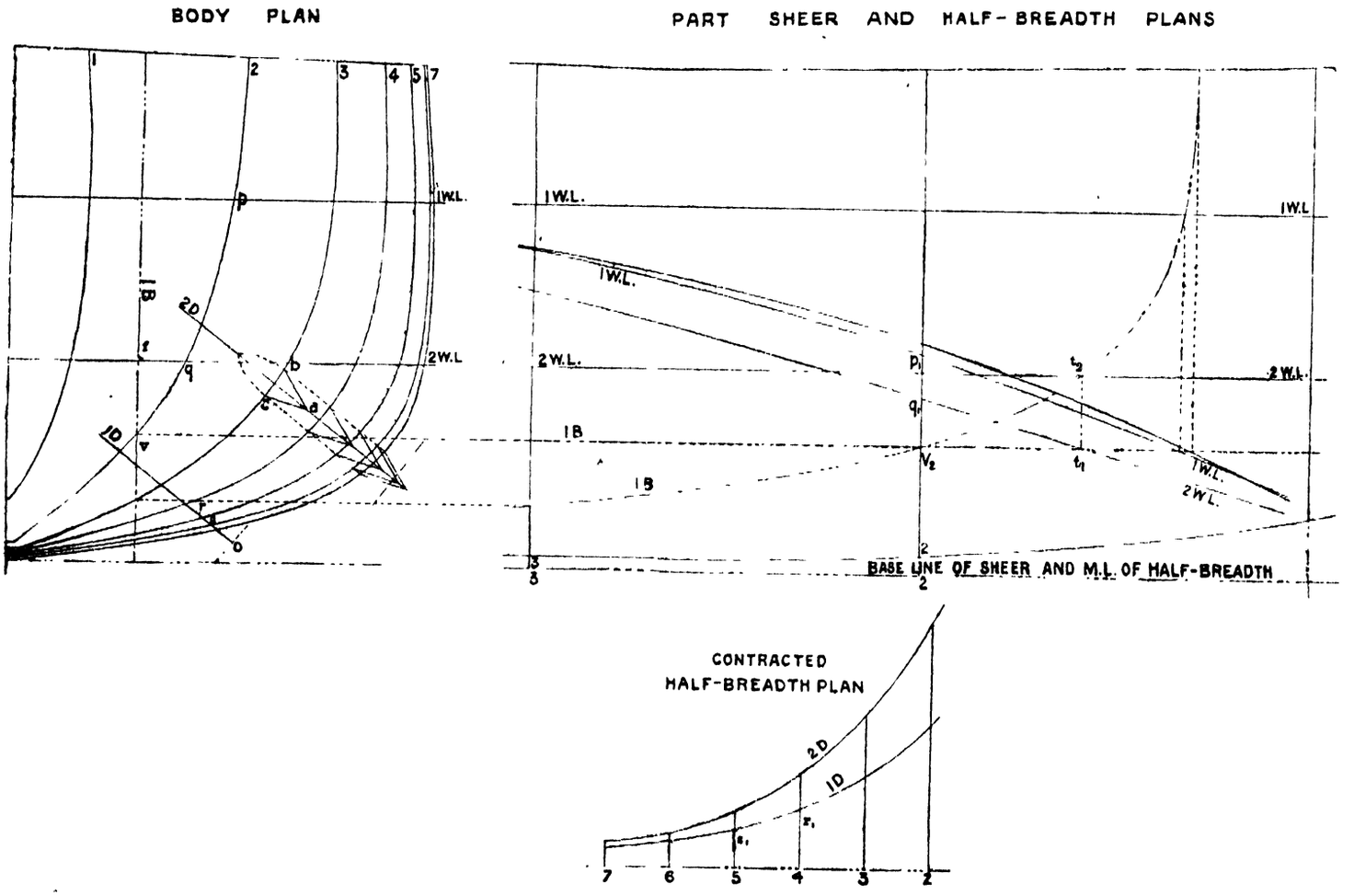


FIG. 99.

distances from the middle line of the half-breadth as the corresponding vertical projections are from the middle line of the body. For example, in fig. 99 p_1 and q_1 are the projections in the half-breadth of the same points of which p and q are projections in the body plan, and are found by making the ordinates of p_1 and q_1 measured from the middle line of the half-breadth plan at square station 2 equal to the perpendicular distances of p and q respectively from the middle line of the body plan. Thus points in the projections in the half-breadth of the water and diagonal lines can be found from the body plan already drawn, and in order that the surface of the ship may be fair, the series of points corresponding to any water or diagonal line must lie on a fair curve. In the case of a diagonal line the distance from the middle line of the body to the intersections of the diagonal with the square stations may be measured along the diagonal, and set off on the corresponding square stations in the half-breadth. This gives the true or rabatted form of the intersection of the diagonal plane with the ship's surface, and this, equally with the projected diagonal, must be a fair curve if the surface is fair. The diagonals are also projected into the sheer plan by measuring the height above the base-line at which each diagonal in the body plan cuts each square station, and setting up this height from the base-line of the sheer plan at the corresponding square station. The projections of the bow and buttock lines in the sheer plan are obtained in a similar manner. Thus in fig. 99 V_2 is projection in the sheer plan of the measurements are made to full size as before, thus making the curvature of the water and diagonal lines sharper throughout the region over which it would otherwise be somewhat flat and indefinite. As the curvature of the contracted level and diagonal lines depends upon the differences between the lengths of the ordinates of the curves and not upon their actual length, a further saving of space is effected by measuring the distances to be set up as ordinates in the half-breadth not from the middle line of the body but from a point selected arbitrarily in each water or diagonal line, generally a few inches outside the midship section. By suitably varying the distances outside the midship section of these arbitrarily chosen points in the different water and diagonal lines, it can be arranged that the curves in the half-breadth do not interfere with one another, an advantage from the point of view of clearness. With the above modifications the process of fairing by the contracted method is precisely similar to that when the ordinates are their full distance apart.

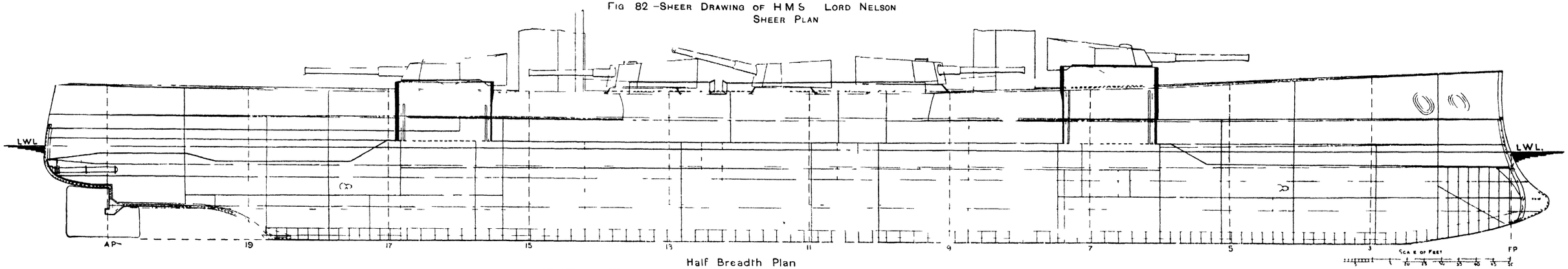
In fig. 88 the diagonals 1D and 2D are shown laid off by the contracted method, the spacing of the ordinates in the contracted half-breadth being $\frac{1}{8}$th of that representing the spacing in the diagram of the uncontracted sheer and half-breadth. In the contracted half-breadth the ordinates $4r_1$, $5s_1$, &c., are equal to the distances Or, Os, &c., measured to sections 4, 5, &c., in the body, O being a point arbitrarily selected in the diagonal 1D.

The principle of contracted fairing is sometimes extended by the

SHIPBUILDING

FIG 82.—SHEER DRAWING OF H.M.S. LORD NELSON

SHEER PLAN



Half Breadth Plan

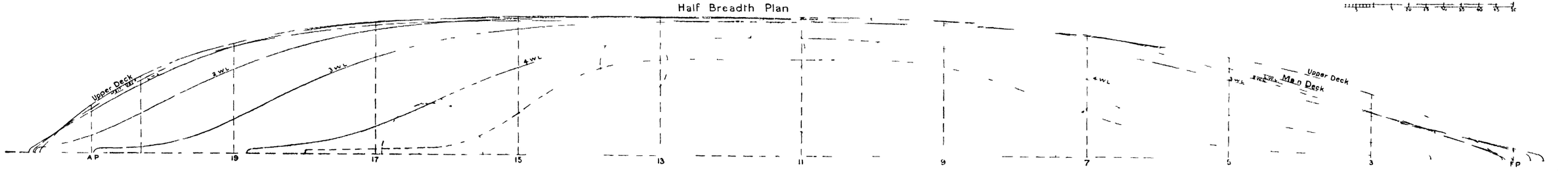
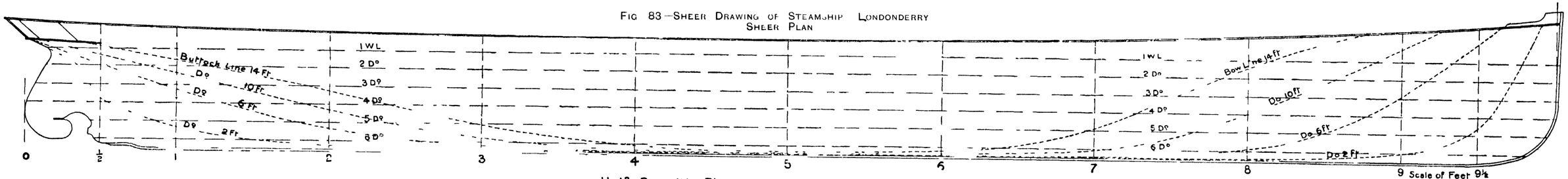
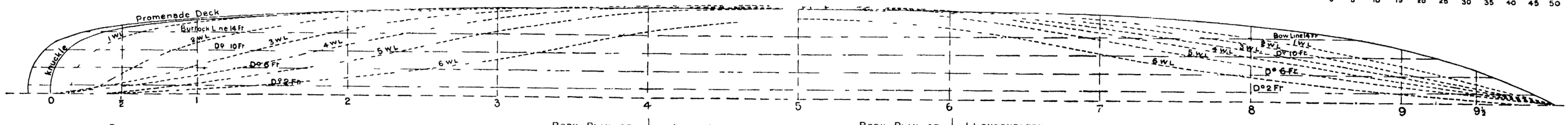


FIG 83.—SHEER DRAWING OF STEAMSHIP LONDONDERRY

SHEER PLAN



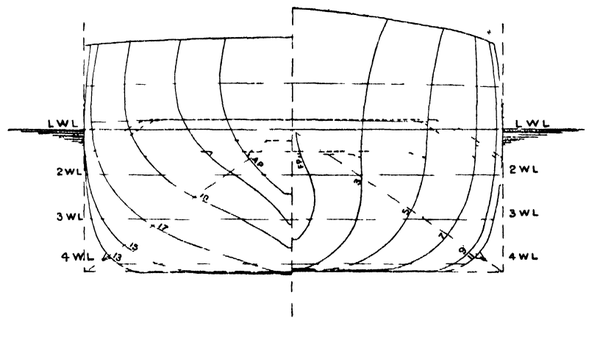
Half Breadth Plan



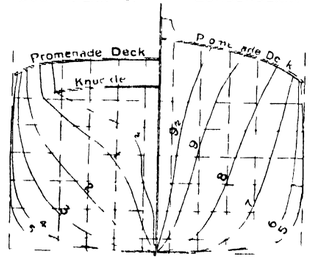
PARTICULARS OF H.M.S. LORD NELSON

Length between perpendiculars	410 feet	Displacement in Tons	16 500
Breadth	79 feet 6 inches	Speed, in Knots	18 5
Depth	43 feet 8 inches.	Built	1908

BODY PLAN OF LORD NELSON



BODY PLAN OF LONDONDERRY



PARTICULARS OF STEAMSHIP LONDONDERRY

Length between perpendiculars	330 feet	Displacement in Tons	2,200
Breadth, Moulded	42 feet.	Speed in Knots	21·7
Depth	25 feet 6 inches	Built	1904

provision of a large drawing-board 4 or 5 ft. broad and long enough to take the whole length of the ship on a scale of $\frac{1}{12}$th full size. The ordinates of the half-breadth and sheer being set off on the board to this scale, any line in which the difference between the greatest and least ordinates does not exceed the breadth of the board can be faired thereon by this contracted method. This allows considerable lengths of the midship parts of diagonals and water-lines, and such lines as decks at middle and side, and any other lines of very flat curvature, to be faired on the board, resulting in a great saving of time and labour, owing to the convenient height at which the board can be placed, and to greater accuracy, as the fairness of the lines can be better seen and judged.

Fairing the ends.

At the forward and after ends of the ship the correct shapes of the water-lines are required in order to determine the shapes of the stem and stern-post, besides which the curvature of these lines is too great to permit of contraction of the abscissa scale. These parts are, therefore, faired by uncontracted water and other lines as already described, except that bow and buttock lines are used to less extent than in the flatter portions of the vessel.

Care must be taken that at the junction of parts of the ship faired

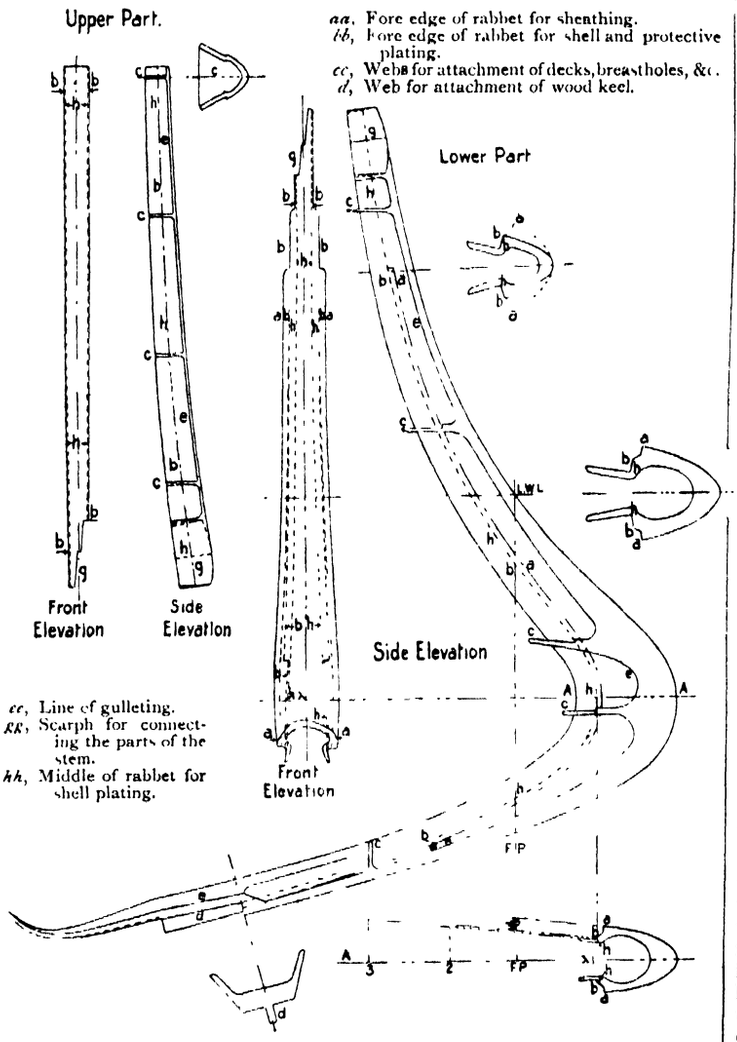


FIG. 100.

by separate processes there shall be a considerable overlap throughout which the water and other lines in the two parts are identical in order to ensure the continuity of the surface.

The detailed drawings of the stem and stern castings already referred to must ensure that these castings shall form a fair continuation of the outside surface of the plating or sheathing. They are perhaps most complicated in the case of sheathed armoured warships where the surfaces of "rabbets" or recesses for housing the bottom and armour plating and the wood sheathing must also conform to the lines of the ship laid off on the floor. A sketch of the stem casting for an armoured, sheathed ship with a ram bow is given in fig. 100, the sections being shown to a greater scale than the elevations for the sake of clearness, except the section at the water-line AA, which is drawn to illustrate the method of ending the water-lines, similar sections being drawn on the floor at the other water-lines. The fore edge of the stem is drawn in full size in the sheer plan on the floor in its correct position relatively to the fore perpendicular and water-lines by measurements taken from the sheer drawing, and the projections of the line of the inner angle of the rabbet for the shell plating, called the "middle of rabbet," marked *h* in the figure, are drawn in the sheer and body plans as fair lines. It should be observed that in the figure *h*, the middle of rabbet and *b*, the fore edge of rabbet of plating are shown in side elevation as coincident lines on account of the smallness of the scale; they will not be generally coincident on a full-sized projection on the floor. The middle of rabbet line is best faired in an expansion drawing. In this method a batten is bent to the curve of the projection of the line in the sheer plan, and the positions of the water-lines where sections of the stem have been shown on the drawing are marked on the batten, which is then allowed to spring straight along a straight line drawn in any convenient position on the floor, and the positions of the water-lines are transferred from the batten to the floor. The distances such as *xh* in the section at AA are measured from each section given in the drawing and set up in full size perpendicular to the straight line on the floor at the positions corresponding to the sections. A fair line through the ends of these perpendiculars will give the distance *xh* at any position in the length of the stem and enable the projections of the middle of rabbet-line to be drawn accurately in the body and half-breadth plans.

To end any water-line such as AA in the half-breadth plan a perpendicular to the middle line of the half-breadth is drawn from the intersection of the line AA, with the projection of the middle of rabbet-line in the sheer plan, and the distance *xh*, taken from the body plan, or direct from the expansion of the middle of rabbet-line, is set out from the middle line of the half-breadth; the point *h* is the ending of the water-line AA required. The water-lines having been drawn and ended in this manner, additional ordinates coinciding with the transverse frames are drawn in the half-breadth plan and their projections obtained and faired in the body plan, in order to define more closely the somewhat twisted surface of the ship in the neighbourhood of the stem. Fairing these frame sections may involve correction and adjustment of the endings of the water-lines, which corrections are made subject to the condition that the projections and expansion of the middle of rabbet-line must remain fair curves. With the middle of rabbet thus fixed in proper relation to the faired surface of the fore end of the ship, the sections of the stem by the water-planes can be reconstructed in the half-breadth plan by the help of the drawing of the stem and of any additional information contained in the specification as to the nature of the fastenings of the plank and plating to the casting and the length of the hood ends. Where the general direction of the stem is considerably out of the vertical, sections of the frame surface by planes normal to the fore edge of the stem are obtained by the help of the closely spaced frame sections, and rabatted on the sheer plane; and sections of the stem casting constructed on them as in the case of the water-lines. In this way as many points as are required are obtained in the various lines in the surface of the stem, viz. the after edge of the casting, and the various angles of the rabbets, and these lines are faired so far as they are continuous in the three plans. The shell and protective plating and plank sheathing are also put on outside the various sections of the frame surface for a short distance in the neighbourhood of the stem, and the surface of the stem forward of the fore edge of the rabbet is faired in with the outside surface of the ship.

Stem mould.

A plain batten mould is made to the outline of the stem in the sheer plan, and the projections of the lines of rabbets and of gulleting, position and shape of webs for connecting to decks and stringers and to the wood keel, lines of rabbets for connecting to keel plates at the lower end and to the tuck plate at the upper end (if the casting is not continued right up to the forecastle deck), the position of the fore perpendicular and load water-line are marked upon it. Sections of the casting taken from the floor are painted on the mould, the centre lines of the sections indicating the position where they are taken, showing more particularly the changes in shape of the casting at such positions as the upper and lower edges of the protective plating and the upper edge of the plank sheathing. The stem mould thus gives complete information for the preparation of the pattern for the casting. The positions of the fore perpendicular and load water-line marked on the mould are transferred to the casting when made, and enable the stem to be erected in its correct position at the ship.

The after end of the ship is faired and the mould for the stern post and other castings prepared in a similar manner. The process of preparing the moulds for the stem and stern post is also generally similar to the above in the case of an unsheathed ship, but the castings are less complicated owing to the absence of the plank sheathing.

Displacement calculation.

The whole of the 21 square stations which constitute the original body plan having been faired as described above, it is usual to calculate the displacement and position of centre of buoyancy of the ship from the lines laid off on the floor to ensure that in the process of fairing no departure of any consequence has been made from the original design. For this purpose the steel plating and wood sheathing, if any there be, must be put on by a process the inverse of that described as taking off the plank. If any serious departure from the original design should be discovered as the result of this calculation, the lines must be corrected and again faired.

Frame lines. The transverse frame lines are the intersections with the frame surface of transverse vertical planes passing through the lines of intersection of the two exterior surfaces of the flanges of the frame angle bars, or of the web and flange of any other type of rolled section which may be used for the frame. The distance between two adjacent frame lines, called the "frame space," is given in the specification, and the positions of the frames relatively to the ordinates are shown in the sheer plan of the sheer drawing. The frame space in a warship is commonly 4 ft. within the limits of the double bottom and 3 ft. forward and aft. In a merchant ship the spacing is usually less. The positions of the planes of the frames are set off along the middle line of the half-breadth plan, the proper scale being used in the contracted half-breadth, and ordinates are drawn to represent their traces in the half-breadth and sheer plans. The projections of the frame lines in the body are obtained from the intersections of the ordinates with the water and diagonal lines in the half-breadth and the bow and buttock lines in the sheer plan in a manner already described in the case of the more widely spaced stations used in fairing the body. These frame lines in the body should require no further fairing if the work has been accurately done when using the original square stations, and they can be at once rased in on the floor.

Cant frames. As already stated, it is usual to dispose the transverse framing of a ship entirely in planes perpendicular to the trace of the load water-plane with the longitudinal plane of symmetry of the ship. This practice leads to a large and varying bevel being given to the frame bars at the ends of a vessel with a very bluff bow or stern, and it becomes a practical question whether it would not be better at such parts to dispose the frames in planes which are more nearly normal to the general surface of the ship and which need not be perpendicular to either of the three planes of reference. The disposal of frames in this way, more usually in planes perpendicular to the half-breadth planes only, when they

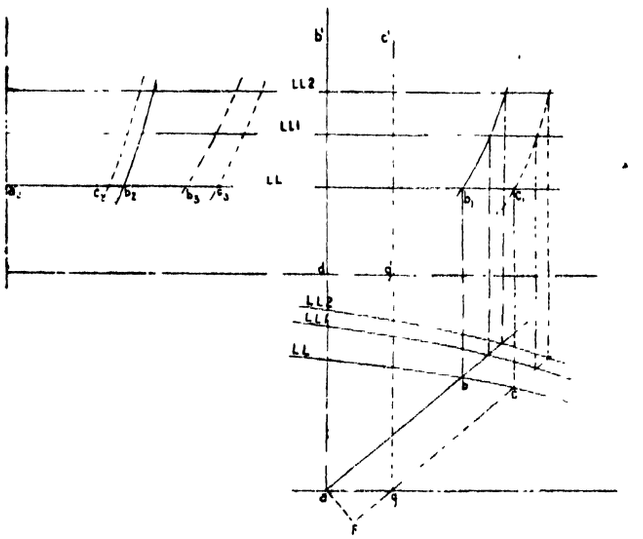


FIG. 101.

are called "cants," is in common use in wood shipbuilding, it being of great economical importance that the timber frames shall be of square or nearly square section, but it is also adopted in iron and steel ships of unusual form or having special features, such for instance as a lifting screw propeller.

To lay off a cant frame or "cant": Let the traces of the *cant* be $a'b'$, ab in fig. 101. Let LL be the projections of a level line in the three plans intersecting ab at b in the half-breadth. Then b_1 in the sheer is the vertical projection of b, and a curve through all such points as b_1 is the projection in the sheer of the shape of the frame or, as it is called, of the moulding edge of the frame. b_2 in the body, where a_2b_2 is equal to the perpendicular distance of b from the middle line of the half-breadth, is a point in the projection in the body plan; and b_3 where a_2b_3 is equal to ab is the position of the point, when the cant plane is hinged about $a'b'$ until it is parallel with the body plane. Hence a curve drawn through all such points as b_3 is the true form of the moulding edge of the cant. To obtain the angle which the surface of the ship makes with the plane of the moulding edge, a plane parallel to that of the moulding edge and distant from it the width of the bevelling board must be laid off in a suitable position in the body plan. Let $g'c'$, gc be the traces of such a plane where af, the normal distance between it and the plane whose traces are $a'b'$, ab, is the breadth of the bevelling board. The vertical projections of c, viz. c_1 and c_2, in the sheer and body are found in the same way as those of b; but in order to obtain the rabatted curve of the bevelling edge in such a position relatively to the moulding edge that the perpendicular distance between the two curves measures the bevelling in the same way that the perpendicular distance between two frame lines of the square body measures their bevelling, it is necessary to first project the bevelling edge on the plane of the moulding edge before rabatting the latter. The whole operation is effected by making a_2c_3 in the body equal to fc in the half-breadth, where af is perpendicular to ab and gc. A curve through all such points as c_3 is the bevelling edge laid off in the position relative to the moulding edge required, the bevellings being taken in a similar manner to those of the ordinary transverse frames.

Spots on the cant can also be obtained from diagonals as follows:—In fig. 102 let DD be the projections of a diagonal

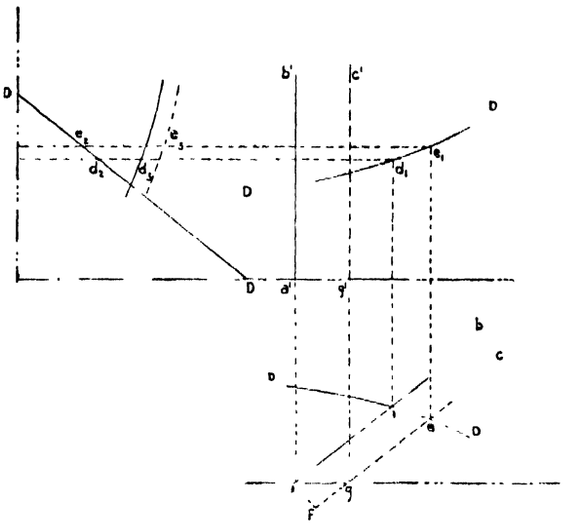


FIG. 102.

line in the three plans cutting the horizontal traces of the moulding and bevelling edges at d and e in the half-breadth. The projections d_1, e_1 in the sheer and d_2, e_2 in the body of the intersections of the diagonal line with the planes of the moulding and bevelling edges are obtained in the same way as in the case of the level line, and the method of obtaining the rabatted positions, when the plane of the moulding edge, with the bevelling edge projected upon it, is turned about $a'b'$ until it is parallel to the body plane, is also analogous; but in this case the corresponding points of the moulding and bevelling edges are in different level planes d_2d_1, e_2e_1. Points in the rabatted curves of the moulding and bevelling edges of the cant may also be obtained from the intersections with bow and buttock lines, as shown in fig. 103, where BB are the projections of the

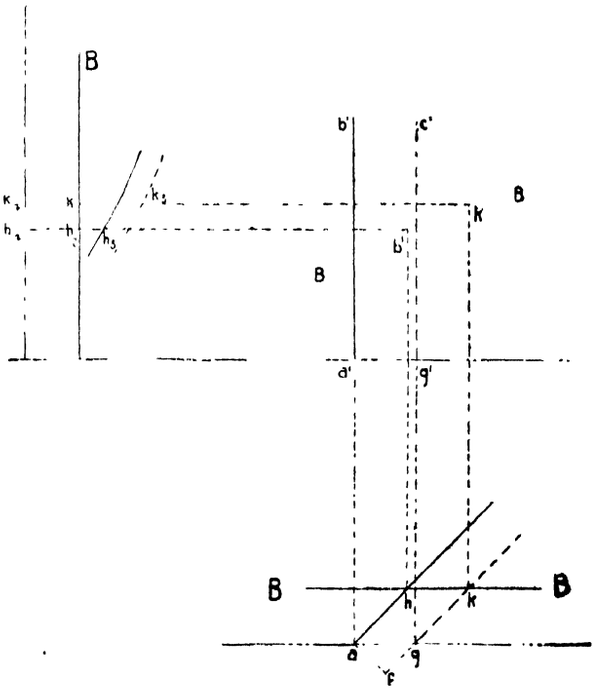


FIG. 103.

bow or buttock line in the three plans. The method is analogous to that described above when using level lines and as shown by the figure, h_3 and k_3 being rabatted positions of points in the moulding

SHIPBUILDING.

FIG. 84. H.M.YACHT "ALEXANDRA"

PROFILE

PARTICULARS

LENGTH BETWEEN PERPS ..... 275 FEET
BREADTH ..... 40 .....
DRAUGHT (EVEN KEEL) ..... 12 FT 6 INS
DISPLACEMENT ..... 2050 TONS

PARTICULARS

SPEED ..... 18·25 KNOTS
SHAFT HORSE POWER . 4,500
SHIP COMPLETED ..... APRIL 1908

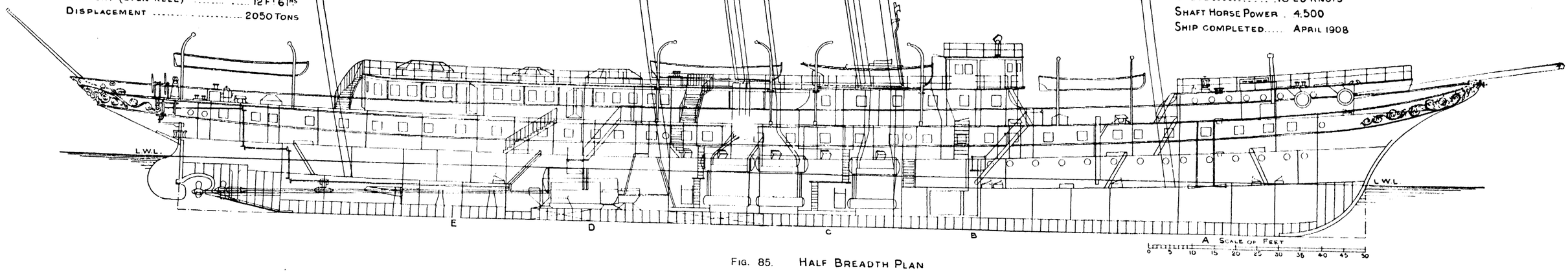


FIG. 85. HALF BREADTH PLAN

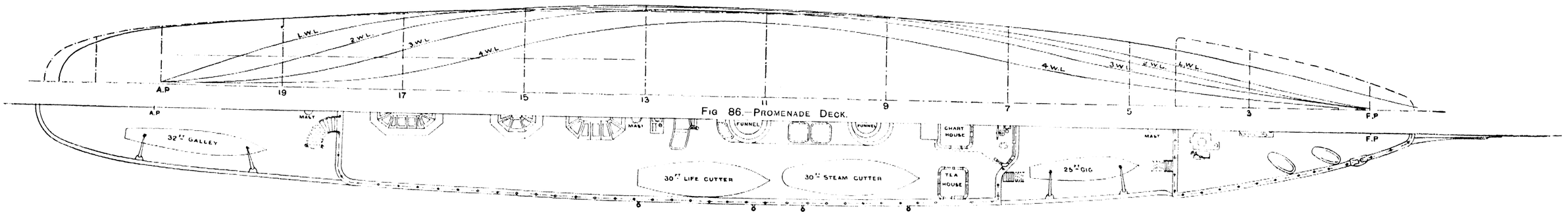


FIG. 86.—PROMENADE DECK.

FIG. 87.—BODY PLAN.

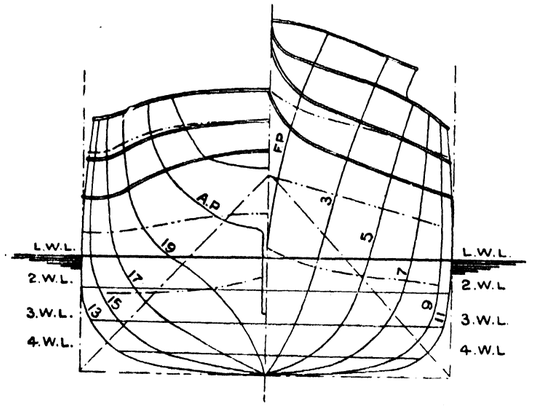


FIG. 88.—SECTION AT E.

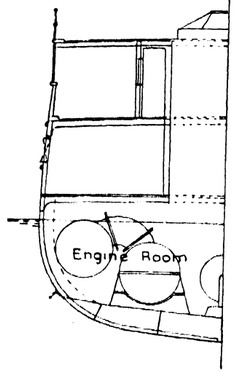


FIG 89.—SECTION AT D.

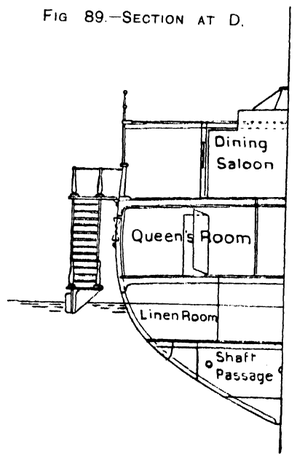


FIG. 90.—SECTION AT C

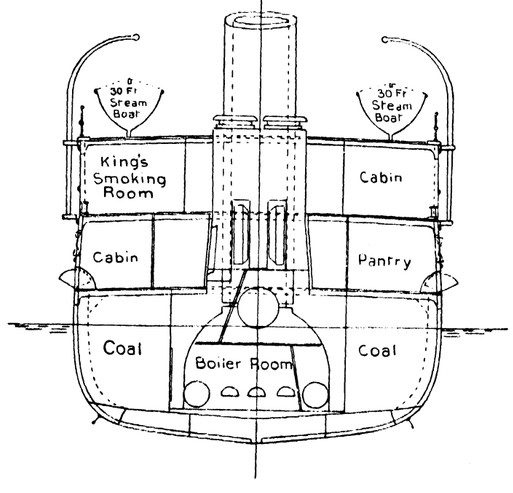


FIG. 91. SECTION AT B.

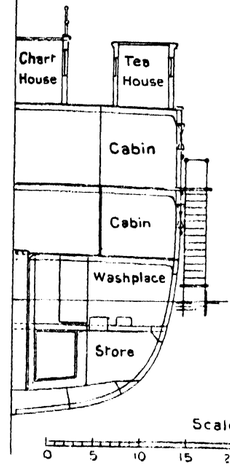
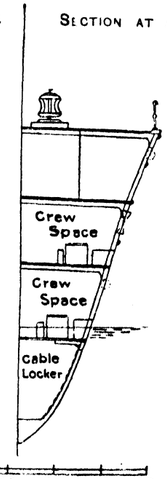


FIG. 92. SECTION AT A



and bevelling edges respectively; where $h_4 h_3$ is equal to ah and $k_4 k_3$ to fk.

In fig. 104 let AB, A'B' be the traces of the plane of the moulding edge of the frame in the sheer and half-breadth plans respectively.

Double canted frame. When, as in the figure, neither trace is perpendicular to the base line, the frame is said to be a double canted frame, or a double cant. Let 1L, 2L, 3L be the projections of level lines in the three plans, P, Q, R in the sheer plan being their point of intersection with AB. The

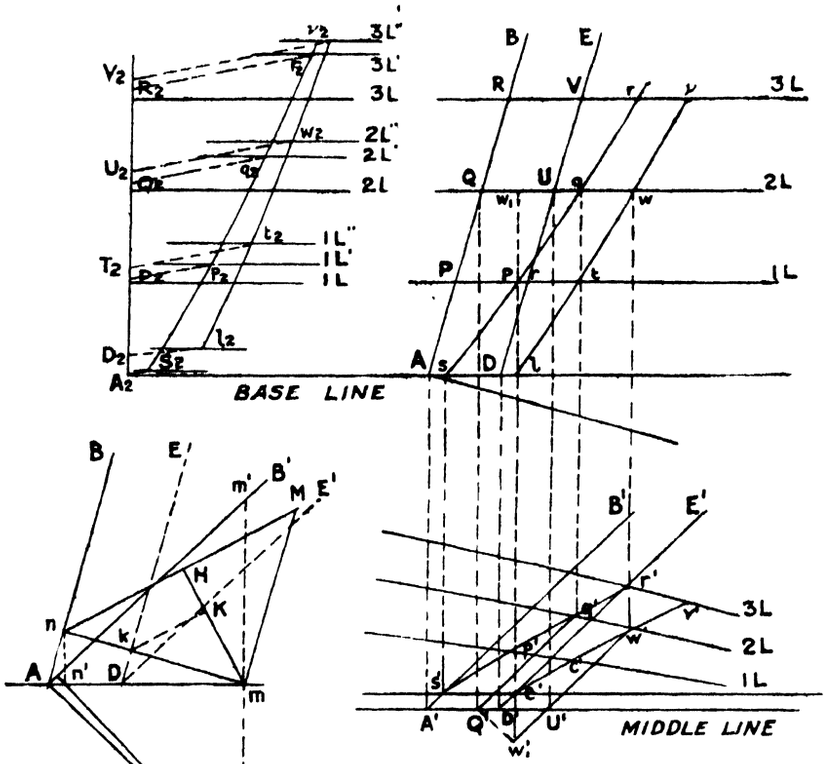


FIG. 104.

FIG. 104A.

horizontal projections of these points are found as indicated in the figure where Q' on the middle line of the half breadth is the horizontal projection of Q. The line $Q'q'$ parallel to A'B' is the horizontal projection of the line of intersection of the double cant plane with the level plane 2L, and q, obtained by the construction shown, is the vertical projection of the point where this line of intersection cuts the surface of the ship, q' being the horizontal projection of the same point. The projections of other points in the intersection of the double cant plane with the surface of the ship are found in a similar manner by the help of other level lines; and the projections s' and s of the ending where the line of half siding of the flat keel cuts the double cant plane are found by the construction indicated. The projections of the moulding edge of the double cant frame $spqr$ in the sheer plan and $s'p'q'r'$ in the half-breadth are thus determined.

The true form of the moulding edge is laid off in the body plan by a double process of rabatment of the double cant plane, first about the trace AB to bring it perpendicular to the sheer plan, and then about a normal to the sheer plan through A to bring it parallel to the body plan, in the following manner. Set off P_2, Q_2, R_2 on the middle line of the body so that their distances from A_2 are equal to AP, AQ, AR measured along the trace AB in the sheer plan. Draw AC in the sheer plan perpendicular to AB and measure the heights parallel to AB of the points p, q and r above AC. Draw level lines 1L', 2L', 3L' in the body plan at distances above the base line equal to these heights, and from the centres P_2, Q_2, R_2 describe circles cutting 1L', 2L', 3L' in p_2, q_2, r_2, &c., so that the radius Q_2q_2 is equal to $Q'q'$, &c. The curve $p_2q_2r_2$ is the true form of the moulding edge of the double cant laid off in the body plan.

The plane of the bevelling edge is parallel to that of the moulding edge and at a perpendicular distance from it suitable for use as the base of a bevelling triangle similar to that which is described for the ordinary frames. The width of the bevelling board is made equal to this perpendicular distance, corresponding to the frame space in the case of the ordinary frames, and the bevelling edge must be laid off so that the normal distance between it and the moulding edge can be used for marking the bevelling in the same way as the normal distance between consecutive frames of the square body is used.

To obtain the traces of the plane of the bevelling edge, in fig. 104a let AB, AB' be the traces of the moulding edge plane; nm drawn perpendicular to AB and mn' perpendicular to the axis are the traces of a plane perpendicular to the plane of the moulding edge and to the vertical or sheer plane. If mM be drawn perpendicular to nm and equal to mn', nM is the intersection of the planes BAB' and nmn' rabatted on to the sheer plane, and mH perpendicular to nM is the rabatted position of a line perpendicular to the plane of the moulding edge. Make HK equal to the chosen distance of the bevelling edge plane from the moulding edge plane; draw Kk parallel to Mn cutting nm in k; through k draw DkE parallel to AB and through D, where DE meets the base line, draw DE' parallel to AB'; then DE, DE' are the traces of the plane of the bevelling edge arranged at the required perpendicular distance from the plane of the moulding edge.

In laying off the bevelling edge it is first projected on to the plane of the moulding edge, and the latter then rabatted into the body plane. To effect this operation the horizontal trace Am'_1, of a plane perpendicular to the double cant plane and intersecting it in the vertical trace AB must be drawn, which is done by the construction shown in fig. 104a, where nm is, as before, perpendicular to AB through any point n in it other than A, and $n'm'_1$, drawn through n', the horizontal projection of n, is perpendicular to AB'. The projections of the traces with the several level planes of the plane of the bevelling edge, such as $U'w'$ and the projections of the bevelling edge $ltwv$ in the sheer plan and $l't'w'v'$ in the half-breadth are obtained in exactly the same way as in the case of the moulding edge. The projections such as $Q'w'_1$, of the traces with the several level planes of the plane whose traces are AB and Am'_1, in fig. 104a are also drawn parallel to Am'_1, through the horizontal projections of P, Q, R, &c. The vertical projection w_1 of the point w'_1, in which $Q_1w'_1$ meets $U'w'$ produced, is found and A_2U_2 set up on the middle line of the body equal to the perpendicular distance of w_1 from AC. A level line 2L'' in the body plan is drawn at a distance from the base line equal to the perpendicular distance of w from AC and a point w_2 found in it such that the radius U_2w_2 is equal to w'_1w' in the half-breadth. w_2 is then the rabatted position of the projection on the plane of the moulding edge of the point in the bevelling edge whose projections are w and w'. Points l_2, t_2 and v_2 corresponding to the projections l and l', t and t', v and v' are found in a similar manner and a curve drawn through $l_2t_2w_2v_2$ is the bevelling edge laid off in the body plan in the correct relation to the laid off position of the moulding edge for the bevellings to be taken.

Additional points in the rabatted shape of the double canted frame may be obtained by the use of diagonals when desired. In

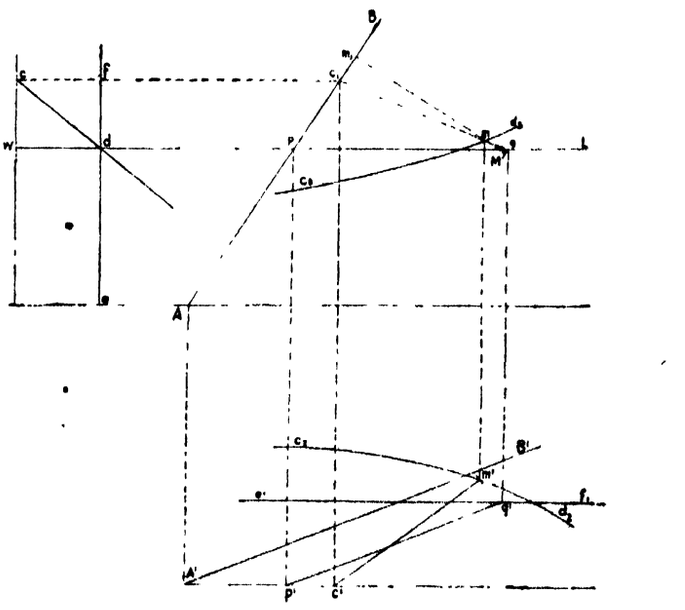


FIG. 105.

fig. 105 AB, A'B' are the traces of the double canted plane; cd, c_3d_3 are the projections of a diagonal line in the body and

sheer and c_2d_2 its rabatment in the half-breadth plan. Draw ef, $e'f'$, the traces of a bow plane and through d where it cuts the diagonal in the body draw the trace of a level plane WL. Find the intersection pL, $p'g'$ of this plane with the double cant plane. Then g', g the intersection of pL, $p'g'$ with the bow plane is a point common to these two planes and to the bow plane. Since this point is common to the level plane WL and to the bow plane ef, $e'f'$, it lies in the diagonal plane cd. Hence gg' is a point in the diagonal and double cant planes. In a similar manner c_1c' is a point in the same two planes. Therefore c_1g is the projection of the intersection of these planes, and m where c_1g cuts c_3d_3 is a point where the double cant plane meets the diagonal line. In rabatment of the double cant about AB, m moves in the line m_1mM perpendicular to AB. If now m be projected on to c_2d_2, then M taken in m_1mM so that m_1M is equal to $c'm'$, will be a point in the moulding edge of the double-canted frame rabatted on to sheer plan. Similar points can be obtained for each diagonal. The plane of the bevelling edge is determined as previously described, and the bevelling edge laid off similarly to the moulding edge, except that provision must be made that it shall come in its right relation to the moulding edge for bevellings to be taken as in the previous case when laying off by level lines.

Swell for propeller shaft.

A method of determining and fairing the swell for the propeller shaft in a twin or multiple screw ship is shown in fig. 106. The projections of the centre line of shaft, which are given in the sheer and half-breadth plans of the sheer drawing, are drawn in these plans on the floor, and the projection in the body plan of the trace of centre line of shaft with the plane of each square station is found as shown by the series of points on the straight line $a\ b$ in the figure. The radius from the centre of shaft required for the shaft tube and fittings at the boss frame, or frame where the shaft passes outside the ship, is found from the machinery specification. This is increased by the thickness of the plank in the case of a wood-sheathed ship and of the plating, and by any allowance necessary for clearance and for the obliquity of the shaft line, and a frame is selected for the boss frame such that a circle drawn with that radius, viz. H in figure, from the trace of the centre line of shaft with the frame plane in question would just touch the frame line on the outside. The length and amount of projection beyond the ordinary frame lines of the shaft swell can be considerably reduced if the frames abaft the boss frame, viz. frame No. 14 in the figure are dished inwards as shown in the figure, thus allowing the required radius between the centre of shaft and the frame line to be obtained further forward than if the frames were not dished. A similar method is used for finding the frame where the distance required round the centre of shaft will not cause any bossing in the frame line. Special attention must be given to the radius required at the stuffing box bulkhead, where considerable space is required for the stuffing box and fittings, and at the after end of the double bottom, where the shaft—although well clear of the frame line—may not be sufficiently clear of the inner bottom line to permit a sufficient depth of double bottom to be maintained without bossing out the frame line as shown by the small diagram in the figure. The frame, No. 2 in the figure, where the swell is to end, having been selected, a normal nl to the frame line is drawn from n, the trace of the centre of shaft line with the plane of the frame, and parallel lines are drawn through the traces of the centre of shaft line with the other frame planes, representing projections of the intersections with the frame planes of a plane through the centre of shaft. This plane is projected on to a diagonal plane having its trace with the body plane parallel to the trace of the plane, and the diagonal plane carrying the projection with it is rabatted by the following process. A convenient line XY is selected perpendicular to the parallel traces in the body plan, and a corresponding line XY is drawn in any convenient position on the floor, having ordinates set up perpendicular to it, the frame-spacing apart. The distances from XY in the body are measured along all such lines as nl to the projections of the centre of shaft and to the unbossed frame lines, and these distances are set up from XY in the plan at the corresponding frame ordinates giving the straight centre of shaft line, and GG the plan of the line of intersection of the plane through the centre of shaft with the frame surface. The radius required to house the shaft tube and fittings is set out from the centre of shaft at the boss frame, as shown by h in plan, and a fair line, as a rule straight except for a short distance at the forward end, is drawn from the point so found to break in fair with the line G G at the frame station where the swell is to end. The distances at the various ordinates, corresponding to that marked r at No. 8, are used as radii for describing the outer part of the section of the shaft swell at the corresponding square stations in the body plan, the trace of the shaft line being the centre at each frame from which the circular arc is described. The outer part of the section of the swell thus formed, *e.g.* cc at the boss frame in figure, is joined up to the general run of the frame line to which it belongs by arcs of circles $c\ d$ struck with the same radius as the outer part. The radii for the hollowed-out frame lines abaft the boss frame are obtained in a similar manner. One or more diagonals cutting the swell may be drawn and rabatted in the half-breadth plan to test the fairness of the altered lines, but no further alteration should be required if the swell has been drawn in the manner described above.

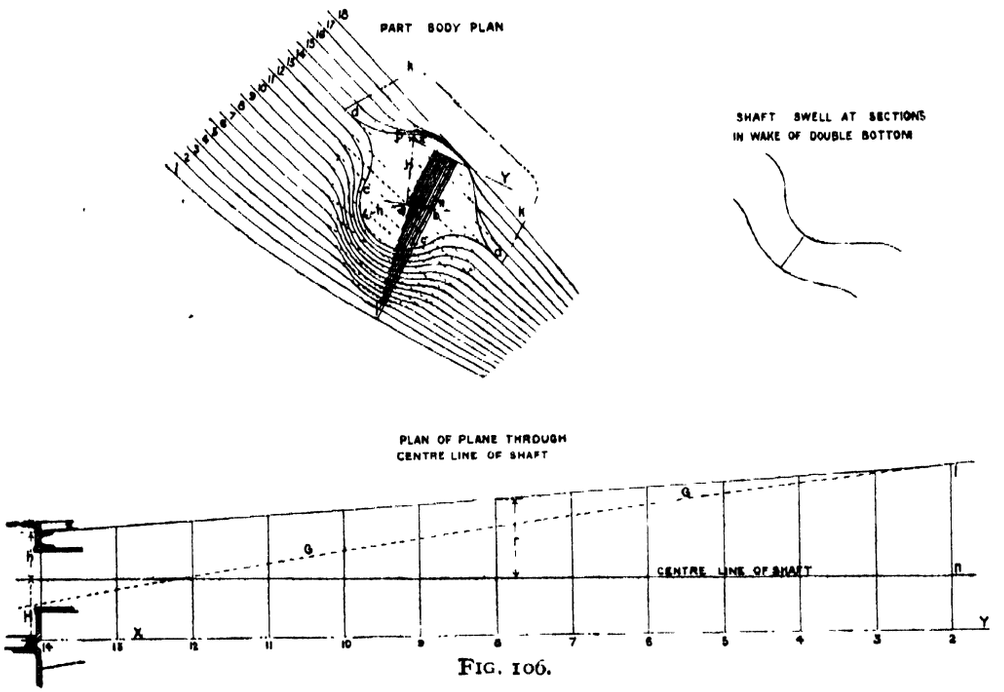


FIG. 106.

The sectional shape of the boss frame casting is shown in the plan in fig. 106, and the outline of the palm which is secured to the floor plate of the boss frame is shown by the line $k.k.$ in the body plan. This part of the casting is fashioned solely with the view of providing sufficient area for a suitable number of fastenings to the floor plate. A drawing is made of the casting, and for further guidance in preparing the pattern a plain batten mould is made to the outline $dccdkk$ on the floor. The line dpd, the position of the centre of shaft and the outline of the circular web for connecting to the shaft tube are marked on the mould. The varying angles made by the webs connecting the casting to the shell plating forward and aft of the boss frame, of which the outlines are $dccd$ and dpd, and of the circular web connecting it to the shaft tube, are obtained by the same method as that used for obtaining the bevelling of the frame angles, which will be described later. These bevellings are marked at the points of the several lines on the mould where they are taken.

Mould for boss frame casting.

The fore and aft position of the shaft struts, or "A" brackets, as they are sometimes called, is shown on the design drawings, and the scantlings of the hollow cylindrical boss which carries the shaft bearing and of the arms which connect the boss to the ship's structure are given in the specification. The detailed drawing appears in these pages, showing these particulars together with the shape of the palms worked on the inner end of the bracket arms to connect them to the ship's structure, and it is only necessary to obtain from the lines of the ship laid off on the floor the exact relation of the positions of the surfaces of the palms to one another and to the centre of the shaft.

Shaft struts.

For this purpose the traces of the line of centre of shaft with transverse planes at the forward and after ends of the boss are marked in the body plan, and a batten mould is made in each of these planes showing the centre of shaft, the direction of the two arms and the position where they are crossed by the frame line of the ship, or, if the lower arm connects to a web or palm on the stern post, as is frequently the case, in a ship with a rising keel line aft, the position of the edge of this palm and the direction of its surface. Each mould has marked on it, or indicated by a straight-edged batten forming part of the mould, a convenient water-line and vertical line drawn on the floor. When the moulds are held in vertical planes separated by the length of the shaft boss the corresponding straight lines on the two moulds are made to lie in the same plane, or are "looked out of winding," giving the relation between the

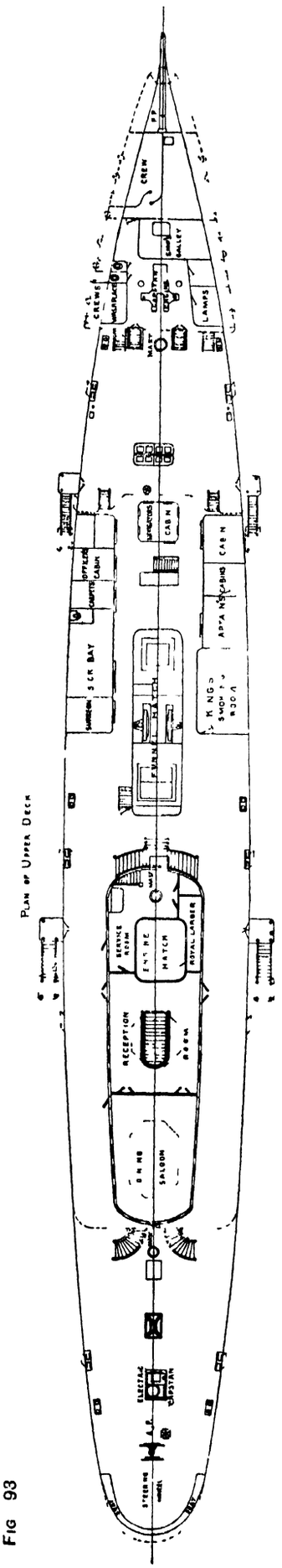


FIG 93

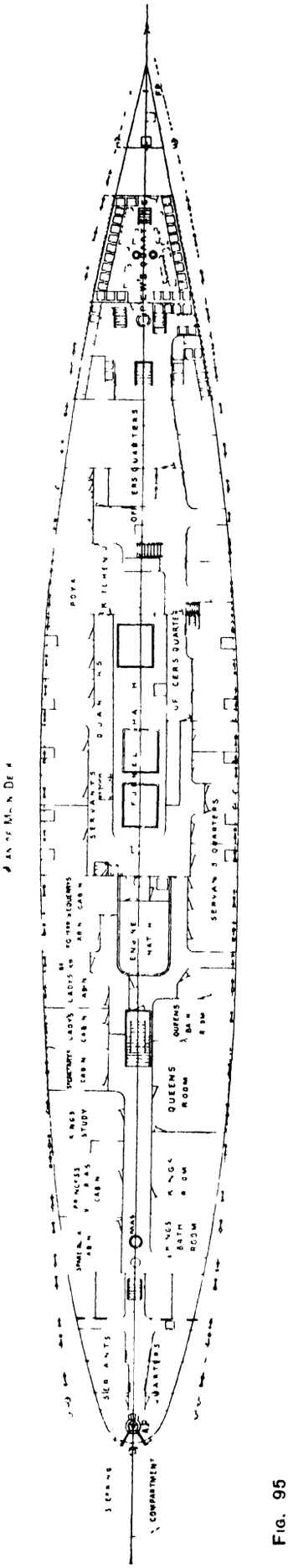


FIG 94

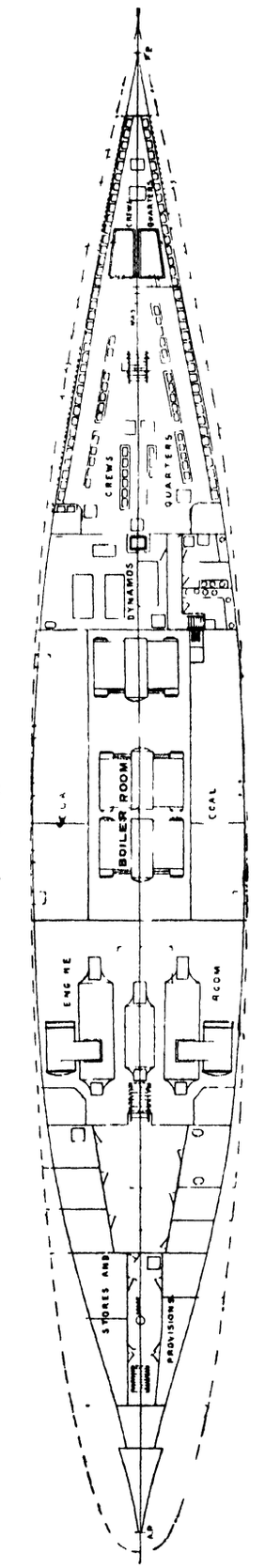


FIG. 95

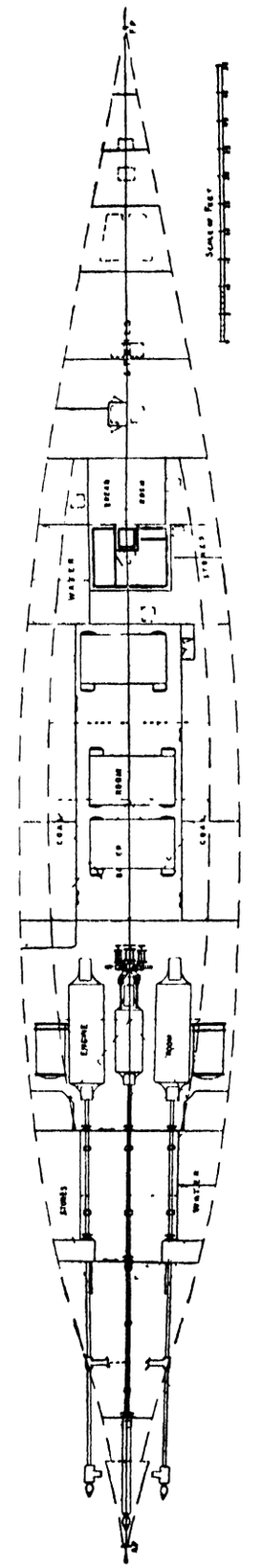


FIG 96.

position of the palms and the direction of centre of shaft. Guided by these moulds and the detailed drawing, the pattern for casting the A brackets is made.

Sight edges in the body plan.

The projections of the plate and longitudinal sight edges are drawn in the body plan on the floor by measuring their distances from the middle line along each frame line in the half-block model, on which they have been already arranged, enlarging the measurements to full size and setting them off round the corresponding square stations in the body. The points so found should lie on fair curves, if the sight edges have been properly arranged on the model, except of course where discontinuities in the curves may occur, as where a plate sight edge crosses a longitudinal sight edge to avoid an acute intersection. The edges of the sunken strakes of plating are drawn parallel to and distant the width of the lap from the sight edges, and as already stated, the breadths of the bottom plates are measured between the lines of plate edges so found and used in ordering the material from the manufacturers.

Inner bottom.

The surface of the inner bottom is defined relatively to the outer bottom by the depth of the vertical keel and longitudinal frames given in the specification. The outline of the vertical keel is also shown in the sheer drawing, and the general shape of the inner bottom by the midship section, which is often supplemented by a section through the engine-room where the double bottom is locally made deeper. The surface of the longitudinal is arranged so that its trace with the plane of each square station is approximately normal to the curve of the square station; taken in conjunction with the method of drawing the sight edges so as to cut the frame lines as nearly as possible at right angles, this is approximately the same thing as generating the surface of the longitudinal by the normal to the ship's surface as it moves along the sight edge. The depths given in the specification are depths measured in the plane of the square stations, and, when the longitudinals are fitted on a raised strake of outer bottom plating, are greater by the thickness of that plating than the distance to be set in from the frame line to find the inside of the frame on the inner bottom. The latter is usually worked with the strakes of plating disposed "clinker" fashion, or is sometimes flush with edge strips fitted on the underside. Points in the sections of the inner bottom frame surface by the planes of the square stations are obtained by setting in the depth of the longitudinals, and the surface of the inner bottom is faired by diagonal and water lines in the same way as the outer frame surface. In the engine-room space where the depth of the double bottom is increased, and where there are usually plane surfaces to take the structure under the engine bed, and a cylindrical recess to provide clearance for the engine cranks, these special features must be faired separately, so also is any bossing of the inner bottom at the after end to allow clearance for the shaft tube and fittings.

The plate edges already arranged on the model of the inner bottom must be transferred to the floor and faired in the same way as those of the outer bottom; and the breadths of the plates measured from the floor must be used in ordering the material from the manufacturers.

Inner surface of frames. Outside double bottom.

Before and abaft the double bottom the transverse frames may consist of zed bars, split at their lower ends for the insertion of a floor plate. The longitudinals are reduced in depth, and are intercostal between the frames until they coalesce with flats or fore and aft bulkheads, or they are continued as deep zed bars slotted over the narrower transverse frames. The inner surface of the frames therefore does not require any process of general fairing; but the upper parts of the floor plates are drawn on the floor, and are faired locally throughout the lengths of the ship where they maintain a uniform character.

Deck lines.

The freeboard forward and aft and amidships is generally given in the specification and can be measured from the sheer drawing. Guided by these dimensions and by the deck lines shown in the sheer drawing, the heights of the intersections of the beam at middle with the square stations are marked on the corresponding square stations of the contracted sheer plan and faired, and the intersections with the square stations are then projected to the middle line of the body plan. The round up or camber of the midship beam of each deck is shown on the midship section drawing. The camber line is a circular arc, the round up being the versed sine of half the arc and the breadth of the ship at the level of the beam the chord. A mould is readily constructed to these data and is applied so that the chord is perpendicular to and its middle point coincident with the middle line of the body plan on the floor. When the centre of the arc coincides with a point projected from the beam at middle line the arc cuts the corresponding square station at a point in the projection of the beam-end line. The points in the beam-end or beam-at-side line so formed should lie on a fair curve, which is tested by projection into the contracted sheer plan, and the line is then rased in in the body plan.

The shape of the lower protective deck in a battleship is shown in the sheer drawing. Throughout that part of the length of the ship covered by the main armour belt, which rests on this deck, the deck edge usually lies in a water plane. The middle part of the deck also lies in a water plane, except where it is raised up over the engines, and the sloping sides form cylindrical surfaces. The straight lines of the sides and middle part of the deck section are joined by arcs of circles of uniform radius, and this part of the deck is necessarily fair from the nature of the method of constructing the sections of its surface. At the ends of the ship the beam-at-middle and beam-at-side lines are copied from the sheer drawing and faired on the floor and the beam surface between these points may be faired by one or more bow and buttock lines.

Framing and plating behind armour.

The surface of the framing behind the main armour belt in a warship, arranged as shown by the midship section depicted, is parallel to the surface of the armour and distant from it the thickness of armour and wood backing plus the thickness of plating behind armour, generally a double thickness of plating flush jointed. This distance, less the thickness of the shell plating already taken off in getting in the frame lines, is set in normal to the surface shown by the lines on the floor in wake of the armoured side by approximate methods similar to those used in taking off the plank and plating, and the projections of the frame lines behind armour in the body plan are thus obtained and drawn in. The frames are usually single zed bars extending vertically from deck to deck and are completely defined by these lines without the necessity of drawing any inside surface lines.

Projections of the intersection of the surface of the frames behind armour with the beam surface of the deck at the top of the frames and with the plate surface of the deck at their heels are drawn in the half-breadth plan, and expansion drawings of the frame surface are prepared in a manner somewhat similar to that which will be described later in dealing with the expansion of the surface of each separate armour plate, except that in the present case the whole length of the surface is expanded in two or three ½-in. scale drawings. The expanded positions of the frame lines, and of any longitudinal girders which may be fitted behind armour are shown on this drawing, also the approximate positions of the armour plate butts and edges and of the armour bolts. The butts and edges of the plating behind armour are arranged on this drawing and the dimensions of the plates measured therefrom in ordering them from the manufacturers.

Thin protective plating beyond the ends of the main armour belt usually projects from the ship's side and is secured without wood backing direct to the shell plating, which is worked in two thicknesses flush jointed in wake of the protective plating. In this case the frame surface of the ship already laid off is the frame surface behind armour, and the disposition of the butts and edges of the plating behind armour and of the armour itself is arranged on the half block model; but only the plating behind the armour is ordered to dimensions taken from the model.

Laying off the armour of a warship.

It is important that the detailed information giving the shapes and dimensions of the armour plates should be in the hands of the manufacturers as early as possible on account of the time required for the manufacture of this material. As, moreover, modern armour plate steel is so hard that it is impossible to cut it with machine tools, the plates must be delivered of the exact size required, and the information sent to the manufacturers must be of a high degree of accuracy. For this reason the shapes and sizes of the armour plates are sometimes obtained by the "mocking up" process, in which the surface of the armour is represented in three dimensions by making moulds or batten frames to the sections of the surface in the body plan on the floor and erecting them in their correct lateral and fore and aft relative positions. The positions of the butts and edges of the plates being marked on the frames so erected, the moulds for each plate, as described below, can be made with great accuracy, and this process is practically necessary if there is any considerable twist in the surface of the ship where covered by the armour.

In general, however, the armoured side is very little twisted and can be treated for practicable purposes as a developable surface, in which case the necessary information can be obtained by a process of laying off as described below, which, though obviously only approximate, is found by experience to be sufficiently accurate for practical purposes.

In fig. 107 the portion of the body plan shows sections of the armour surface by planes of the frames, which are generally 2 ft. apart behind the armour, and the half breadth shows projections of the upper and lower boundaries of the armour surface, and of the joint between the two strakes, which is arranged to lie in a level plane. The armour belt extends from the main deck above to the armour deck below. The upper edge of the armour, therefore, follows the beam-at-side line of the main deck; but is generally allowed to be about ½ in. below it, so as to make sure of getting in the armour, in spite of possible small inaccuracies in building the rest of the structure, which might result in restriction of the space between the two decks. The lower edge follows the armour deck edge, which is usually a level line throughout the length of the belt; but is kept an inch or two above it to avoid making the armour plates with a sharp edge to fit the acute angle between the protective deck and the ship's side; the armour, however, actually rests on the deck as shown by the midship section depicted. The butts of the armour are arranged "brick fashion," that is, the butts of one strake at the middle of a plate in the adjacent

strake, and each butt should be as close as possible to one of the vertical frames behind armour in order to allow the armour bolts to be sufficiently near the butt of the plate. At the same time it is convenient both for manufacturing purposes and for erecting the plates at the ship, to have the butt surfaces as nearly as possible normal to the surface of the plates. The butts are therefore arranged in vertical planes whose traces in the half-breadth plan lie in direction between the normals to the projections of the upper and lower edges of the plate. The lengths of the plates are made as great as possible taking into consideration the capacity of the manufacturer's rolls and of the appliances for handling them during erection at the ship.

To lay off any plate such as that of which the projections of the intersections of the planes of the butts with the surface of the armour are *ab*, *cd* in the body plan and a_1b_1, c_1d_1 in the half breadth, a straight line YY is drawn in the body plan so that its direction lies between the directions of the normals to *ab* and *cd* at the points where they cut YY, and a straight line XX is drawn in the half-breadth plan similarly lying between the normals to a_1 c_1, and b_1 d_1 and approximately at the centre of the plate.

Battens are bent to the curves aYb, cYd, a_1Xc_1, b_1Xd_1 and the points named are marked on the battens so as to give the lengths aY, bY, a_1X, &c., measured round the curves. A pair of rectangular axes OX, OY are then drawn in any convenient position on the floor and the points a_2, b_2, c_2, d_2 found such that the co-ordinates of a_2 are Ya, Xa_1, of b_2, Yb and Xb_1, of c_2, Yc and Xc_1, of d_2, Yd and Xd_1. The figure $a_2b_2c_2d_2$ obtained by joining the points so found by straight lines is regarded as the expanded shape of the surface of the plate. A flexible batten mould is made to this figure and is used by the manufacturer to mark the four corners of the plate and thus to get its superficial size. A pair of moulds such as N are made, one to the top and the other to the bottom of the plate in the half-breadth plan, showing the curvature of the edge and the direction of the butts; and another pair such as M, one at each butt, showing the curvature of the edge of the butt plane and the sectional shape of the top and bottom of the plate. The butt moulds are made to the section of the surface of the plate by the plane of the frame, which is indistinguishable from the section by the very slightly inclined plane of the butt. Each of the butt moulds serves for the two plates which join at the butt, but each edge mould refers only to one plate. Female moulds, the backs of which are straight lines which lie in one plane, or, as it is technically expressed, are "out of winding" when the moulds are in their proper position, are also made to fit on the butt and edge moulds as P, Q in the figure. By means of these moulds the manufacturer makes each separate plate to its correct curvature and twist, while the top and bottom "out-of-winding" moulds for two or more consecutive plates have a common straight line drawn on them as *ll* in the figure, to fix the relative position of the plates when they are temporarily erected at the manufacturer's works to prove the correctness of their shape.

A drawing is also made showing superposed expansions of the back and front surfaces of the armour without any necessity for extreme accuracy, as these surfaces are fully defined by the moulds. The butts and edges of the plates with numbers identifying each plate with its moulds are shown on this drawing.

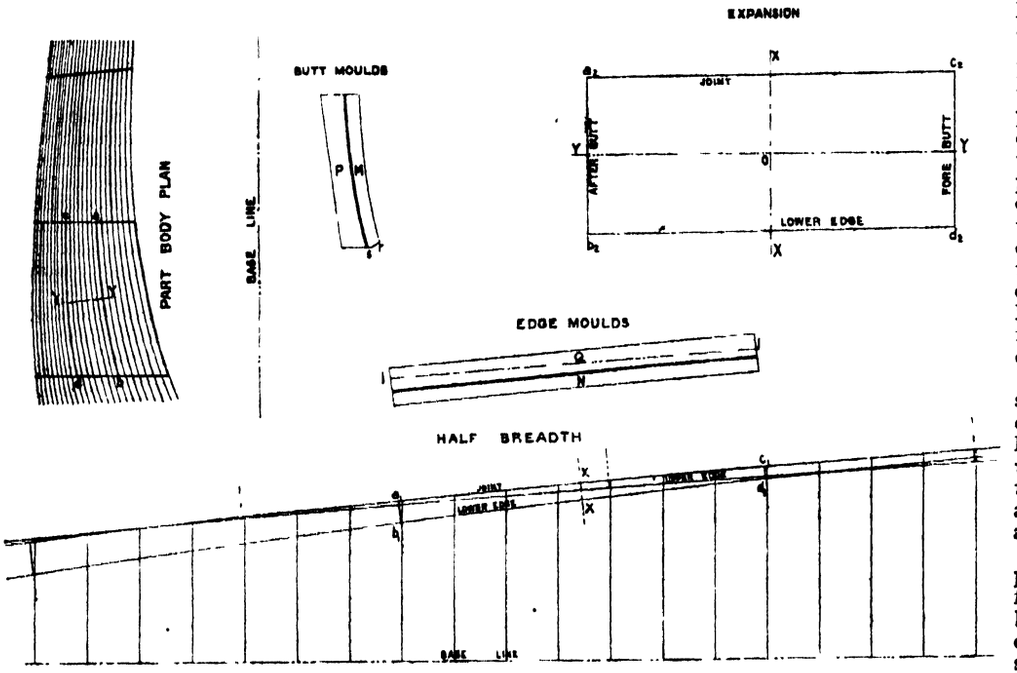


FIG. 107.

The specification gives particulars of the dimensions of the bolt to be used and lays down the general principle of their distribution, *e.g.* one bolt to so many square feet of armour. The bolts are approximately arranged in accordance with this specification on the expansion of the plating behind armour. For the purposes of the present drawing their positions must be definitely fixed sufficiently clear of the frames behind armour to allow space for putting on the nuts. With vertically arranged frames practically the fore and aft position only is of importance from this point of view. The projections of the normals to the plate surface representing the centre lines of the bolts are drawn in the half-breadth plan, and shifted if necessary to give the required clearance of the frames. The positions of the centres on the back of the plates are then measured along the curved sections of this surface in the body and half-breadth plans from the nearest edge and butt, and these distances are indicated in figures on the drawing.

The positions of any holes for the fastenings of top and bottom edge covering plates, or of any fittings to go on the outside surface of the armour are also shown by figured distances from the edges and butts of the plates on this drawing. All holes must be drilled and tapped in the plates by the manufacturer before the final hardening process which renders the material unworkable.

The drawing also shows the plate in each strake selected as the "shutter in" or last plate to be fitted in place. This plate is not finally completed by the manufacturer until all the rest are in place at the ship and moulds have been made to the space which remains to be filled up.

The moulds for screen bulkhead armour are prepared in a similar manner, but the process is usually simpler as the surface of this armour, when not actually plane, is cylindrical with a vertical generating line and therefore accurately developable.

For barbette armour nothing more than a drawing is usually necessary, the barbette being circular in plan, the surface cylindricals and the top in a horizontal plane.

Order of work. The information issued from the Mould Loft for the guidance of the workmen in the shipyard has been generally passed over in the foregoing description, which has been devoted principally to the information prepared for the guidance of manufacturers of material, but it is not intended to imply that all the material is ordered before erection is begun. Much of the information for the erection of the frames and other parts of the structure, including the keel and transverse and longitudinal frames amidships, may be given before the ends of the ship are faired on the floor.

Keel. Keel battens are provided giving the spacing of the transverse frames throughout the length of the ship, the lines defining their positions on the battens being marked with the distinguishing numbers by which the frames are identified on all the drawings, moulds and information subsequently issued.

The drawing showing the size of each plate and the position of each butt of the flat and vertical keel plating and angle bars, prepared in connection with the ordering of the material, is completed to show all details of the keel and its riveting in accordance with the specification, and serves as information for its erection.

Section moulds are made in accordance with the frame lines in the body plan for guidance in shaping the flat keel plates transversely, and on these the edges of the adjacent plates are also marked.

Transverse frames. The practice, at one time quite common, of making batten moulds to each frame line on the Mould Loft floor for the guidance of the workmen employed bending the angle or zed bars, and shaping and assembling the parts of the frame, is now almost entirely superseded by the use of the "scrive-board." Such batten moulds, when issued, showed the outline of the frame, or of the part of the frame between two longitudinals, the shape of the floor plate or bracket plates, the position of the plate edges and other bevelling spots, and generally everything necessary for completing the frame ready to go into its place at the ship.

Scrive-board. The scrive-board is an auxiliary mould loft floor constructed conveniently near the frame-bending slabs, and having copied on it, with certain modifications or additions adapting it to the practical needs of the shipyard work, the whole of the body plan as laid off on the Mould Loft floor. For convenience in copying the lines it is sometimes made so that it can be divided into portable parts and taken to the Mould Loft to have the lines copied on it, and then transported to its proper position and put together again. Otherwise it is a fixture in its proper

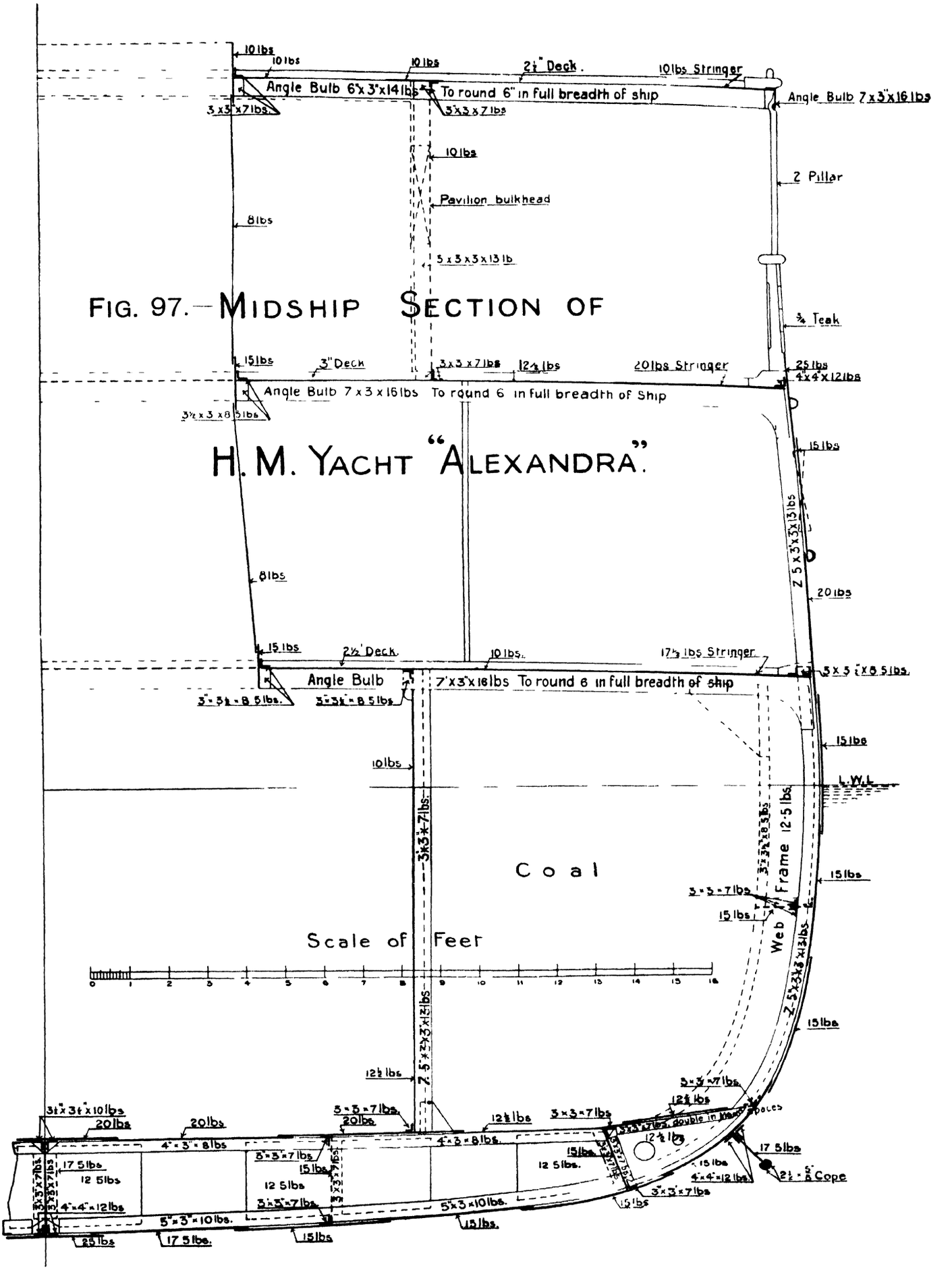


FIG. 97.—MIDSHIP SECTION OF H.M. YACHT "ALEXANDRA."

SHIPBUILDING

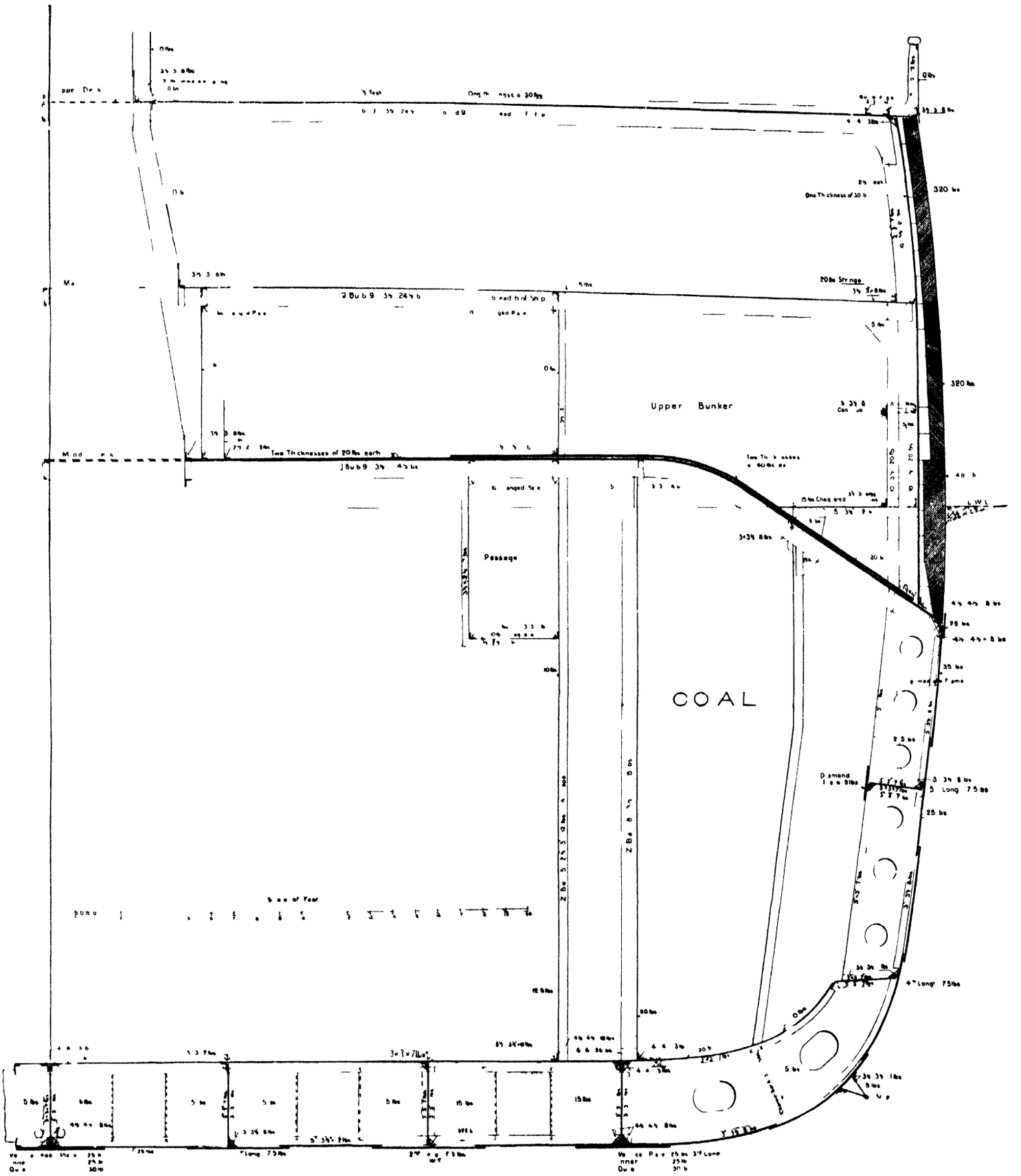
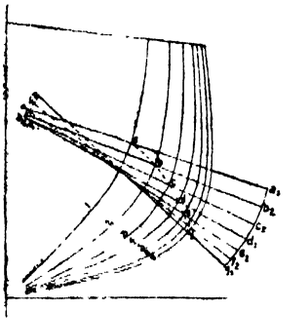


FIG 98—MIDSHIP SECTION OF H M S 'LORD NELSON."

position; but the process of copying the frame lines on it is one of measuring on battens the ordinates of their intersections with water and diagonal lines, and is the same in either case. All of the frame lines are shown on the scrive-board, and the complete section of the frame surface for both sides of the ship is shown at each station. To avoid confusion of lines, either a separate board is used for the fore and after bodies, or they are drawn on the same board with their centre lines parallel and a few feet apart, and one of the two bodies inverted. All the lines already referred to as having been laid off in the body plan on the mould loft floor, including the lines of outer edges of all transverse frames, the inner edges of all in the double bottom, and the upper edges of all floor plates outside the double bottom, the projections of plate edges of inner and outer bottom, and of longitudinal frames and main longitudinal bulkheads, projections of beam at side lines for all decks, and of the intersection of the beam surface of the protective deck by the plane of each frame, are copied on the scrive-board and rased in on its surface. The scrive-board thus gives complete information of the shape and dimensions of every part of each transverse frame. To completely define the frame the "bevelling" is required in addition, that is the angle between the two flanges of the angle bar on the edge of the frame connecting it to the outer or inner bottom plating. The bevelling is usually given at the plate sight edges; but any other convenient bevelling spots may be chosen and their positions marked on the frame lines. To obtain the bevelling at any spot a normal is drawn to the frame line in the body plan at the spot; the distance from the frame line is measured along this normal to its intersection with the next frame line towards the midship section, and this distance is set up as one of the sides containing the right angle in a right-angled triangle of which the frame space is the base. The angle of this triangle opposite the base is the supplement of the bevelling of the frame at the spot considered. When the curvature of the bottom in the plane normal to the square station at the bevelling spot considered is sensible in the length of a frame space, the normal distance measured is that between the two frame lines on either side of that at which the bevelling is to be obtained, and the base of the triangle is made equal to twice the frame space. The bevellings for each frame are marked on a bevelling board, the angles between the straight lines marked on the side of the board and the straight edge of the board representing both the bevelling and its supplement. In the frame bars there is no doubt as to which of these two angles the workmen are to regard as the true bevelling, since the flanges of the frames are all turned towards the midship section, so as to make the true bevelling always greater than a right angle, or "standing" as it is usually expressed, in contradistinction to "under" bevelling, which is less than a right angle.

Special bevelling frames are used in marking the bevelling boards, by which the construction of the triangles is reduced to setting off the normal measurement between the frame lines and drawing the hypotenuse directly on the bevelling board. The flanges of the angle bars on the inside edge of the frame, or the "reverse" frame bars, usually point the same way (that is towards the midship section) as the flanges of the frame bars, throughout the double bottom, in order to facilitate the construction of the bracket frame. Where the breadth of the longitudinals is constant, therefore, the bevelling of these angles on the inner bottom is the supplement of that of the frame angles. But throughout the double bottom neither bevelling differs much from a right angle. When the longitudinals taper in breadth separate bevellings must be taken for the inner angles by a method similar to that already described for the frame angles. Outside the double bottom the reverse angle, or inner part of the split zed bar, is either unconnected to anything but the floor plate, or else connects to a horizontal flat, and does not require bevelling.

The bevellings of the short angle bars which connect the bracket or floor plates of the transverse frames to the longitudinals are also obtained by measuring in the body plan at the middle of the intersection of the longitudinal surface with the plane of a frame station the normal distance to its intersection with the plane of the next frame station, and setting it up as one side of a right-angled triangle of which the frame space is the base.



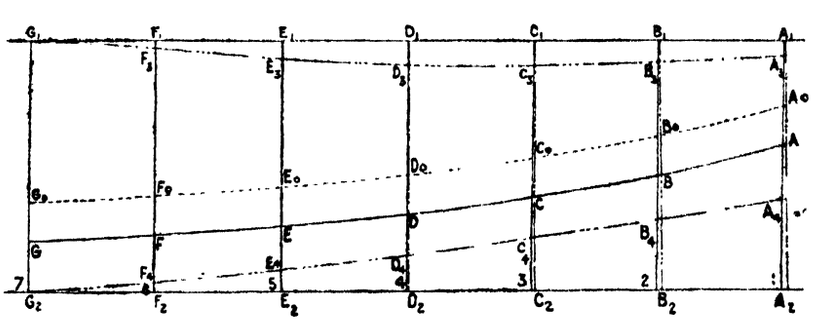


FIG. 108.

To check the spread of the transverse frames during their erection, half-breadth staffs and height of breadth staffs are issued from the mould loft, or their lengths may be taken off the scrive-board. These give the co-ordinates of the intersections of the longitudinal sight edges with the frame lines, referred to the middle line of the body plan and a level line through the underside of the keel at each station. The frames are brought to and held in their correct positions as shown by these staffs by shoring them in the vicinity of the longitudinals.

Shoring ribbands are not universally employed, the longitudinals at some shipyards being relied upon to keep the transverse frames in their correct relative position while framing the ship. When they are used, one is usually placed a few inches below and parallel to each deck edge and longitudinal sight edge. For the ribbands under the deck edges, the beam at side line is projected into an uncontracted half-breadth plan, a flexible batten is bent to the line, and on it are marked the positions and directions of the ordinates representing the traces of the planes of the frames. The ribband batten is then used to mark the positions of the frames on the ribband itself, generally made of pitch pine about 6 in. square in section. The position where the upper edge of the ribband is to come is marked on the scrive-board and the marks transferred to the frame angles when they are bent. When the frames are erected at the ship they are brought into their correct positions as shown by the marks on the ribband, the upper edge of which is kept to the marks on the frames. The frames and ribband are temporarily secured together, until the plating is fitted, and the whole kept in its proper position by shores. The ribbands under the longitudinals lie for practical purposes in diagonal planes, which must be rabatted in order to get the positions and directions of the frames correctly marked on the ribband battens. The ribbands are marked, secured to the frames and shored, similarly to those under the deck edges.

Shoring ribbands.

A beam mould is prepared for each deck, the upper edge of the mould showing the round down or camber of the longest beam in relation to a level line marked on the mould. The mould is applied to the body plan on the mould loft floor or on the scrive-board in its correct position at each frame station and the ends of each beam are marked on it, the ends being short of the frame lines by an amount which varies with the nature of the frame, but sufficient in any case to clear the inside of the flange of the frame bar. Bevelling-boards are supplied showing the angle at each frame station between the upper edge of the beam and the frame line for guidance in forming the beam arm, which is usually two and a half times the depth of the beam, and the form of which is shown by a separate mould. When placing the beams in position at the ship their height is given by the beam end lines shown on the scrive-board and transferred to the frames when bent to the lines on the scrive-board.

Deck beams.

The beam mould for the armour deck shows the length of the sloping part and the shape of the knuckle, with only a short length of the middle horizontal part. On the horizontal arm of the mould vertical lines are drawn at a given distance from the middle line at each frame station.

It is essential that the shape of the longitudinal frames should be obtained with considerable accuracy, especially when half-breadths and heights measured to their sight edges are largely relied upon for keeping the transverse frames to their designed spread during erection.

Longitudinals.

As already stated, the longitudinal surface does not much differ from a surface generated by the normal to the ship's surface as it travels along the curve of the longitudinal sight edge. The surface generated by the normal is developable provided the sight edge is a line of curvature, which is approximately ensured by the method of drawing it, and it is found by experience that no error of practical importance is involved in developing the surface of the longitudinal by the following approximate method.

Fig. 108 shows part of the body plan in which the frame lines are numbered 1 to 7, the projection of the longitudinal sight edge is shown by *a b c d e f g*, and the projections of the traces of the longitudinal surface with the planes of the frames are shown by the straight lines $a_1 aa_2$, $b_1 bb_2$, $c_1 cc_2$, &c.

The curves $a_1 b_1 c_1 d_1 e_1 f_1 g_1$ and $a_2 b_2 c_2 d_2 e_2 f_2 g_2$ both cut all the traces at right angles, so that they are involutes of their envelope. Their positions are chosen at convenient distances beyond the inside and outside of the group of frame lines, which defines the length of longitudinal which is to be developed in one operation.

Parallel straight lines A_1G_1, A_2G_2, the distance between which is equal to the normal distance between the two involutes in the body plan, are drawn in any convenient position on the floor, and perpendicular ordinates, 1, 2, 3, 4, 5, 6, 7, drawn between them distant the frame space apart. The longitudinal is developed in this plan on the assumption that when its surface is unrolled the involutes $a_1\ b_1\ g_1$ and $a_2\ b_2\ g_2$ will coincide with the straight lines A_1G_1 and A_2G_2 respectively. Taking g_1g_2 in the body, represented by G_1G_2 in the plan, as the fixed end of the longitudinal from which the surface is to be unrolled, the lengths g_1f_1, g_1e_1, &c., are measured along the curve of the involute and set off along the lines 6, 5, 4, &c., in the plan giving the points F_3, E_3, &c., which represent with sufficient approximation the true positions of points of the line $a_1\ b_1\ c_1\ d_1\ e_1\ f_1\ g_1$ in space relatively to a straight line through g_1 perpendicular to the body plane. A batten is bent through the points $G_1\ F_3\ E_3\ D_3\ C_3\ B_3\ A_3$ thus obtained, and the positions of the points marked on the batten, which is then allowed to spring straight along the line G_1A_1, the points $F_1\ E_1\ D_1\ C_1\ B_1\ A_1$ being marked from the corresponding marks on the batten. The points $F_2\ E_2\ D_2\ C_2\ B_2\ A_2$ are obtained from the other involute in a similar manner, and the straight lines F_1F_2, E_1E_2, &c., obtained by joining corresponding points are regarded as the expanded positions of the traces of the longitudinal surface with the planes of the frames. The distances G_2G, F_2F, E_2E, &c., are then made equal to g_2g, f_2f, e_2e, &c., in the body, and the curve G F E D C B A through the points so found is the expanded sight edge of the longitudinal. The distances GG_0, FF_0, EE_0, &c., are then made equal to the depth of the longitudinal in the plane of the corresponding frame stations, when $G_0\ F_0\ E_0\ D_0\ C_0\ B_0\ A_0$ will be the expanded shape of the inner edge of the longitudinal.

The method described above is sufficiently accurate to lay off a whole longitudinal in one length, if it is not abnormally twisted. A modification of this method, in which the involutes $a_1\ b_1\ g_1$ and $a_2\ b_2\ g_2$ are replaced by straight lines perpendicular to the trace, from which the longitudinal is to be unrolled, may be used; but, without affording any substantial simplification of the work, its accuracy is so much less than that of the method described above, that it is not safe to lay off more than two or three plates of the longitudinal in one length by it.

When the longitudinal is much twisted, as, for example, when the longitudinal surface at its end is to be made continuous with a deck flat, which is not normal to the surface of the ship, it is generally desirable to use the more laborious but reliable method of "mocking up."

In fig. 109 the curves numbered 1 to 6 are projections of frame lines in the body plan. *a b c d e f* is the projection of the sight edge of the longitudinal breaking into the projection of the edge of a deck flat at a, and $a_1\ b_1\ c_1\ d_1\ e_1\ f_1$ is the projection of the inner edge of the longitudinal. The edges of the longitudinal are faired so that the traces of the longitudinal with the planes of the frames shall turn uniformly from the horizontal position of the deck flat at aa_1 to the position of the main part of the longitudinal normal to the frame lines at 6 and beyond, the depth of the longitudinal in the planes of the frames being kept constant.

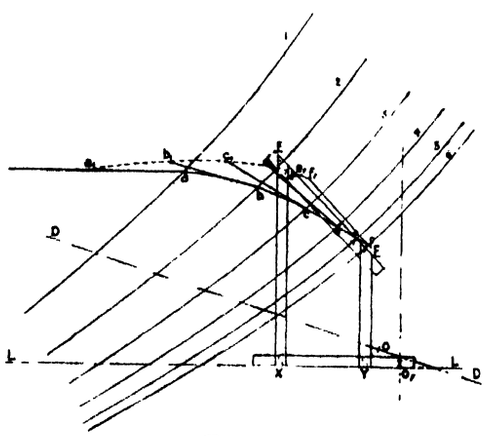


FIG. 109.

LL is the trace of a level plane drawn conveniently near to the sight edge in such a position that it is entirely below all the traces of the longitudinal with the planes of the frames throughout the length which is to be mocked up. Trapezoidal frames made of four straight battens nailed together at the corners, such as X Y E E in the figure, are made to show the relative position of the traces of the longitudinal surface and of the level plane with the plane of each frame. The outer and inner ends of the trace of the longitudinal surface are marked on the upper batten of each frame as at e, e_1, and a point O_1, fixing the lateral position of each batten frame relatively to a convenient straight line perpendicular to the planes of the ship's frames, is marked on the lower batten. A diagonal plane such as DD can be used instead of the level plane LL for convenience in allowing smaller and better-shaped batten frames to be used; and the process is precisely the same.

The batten frames are then erected on their bases XY in planes perpendicular to the floor, parallel to one another and distant the frame space apart, with the points O in all the frames lying in one straight line perpendicular to the batten frames. The upper edges of the upper battens then define the true shape of the longitudinal surface in three dimensions, and a fair curve through the points e, &c., marked on the battens represents the outer edge, and through points e_1, &c., the inner edge of the longitudinal.

Whether the shape of the longitudinal has been obtained by development on the floor or by the mocking-up process, batten moulds are made to the outline of each plate, the butts being arranged to come in the middle of a frame space allotted to them in the drawing, giving the shift of butts of bottom plating and longitudinals. Cross battens are fitted to mark the position of each transverse frame, and diagonal battens in each frame space to stiffen the mould, and to carry marks or figures indicating the shape and dimensions of the lightening hole, which occurs between each pair of frames in non-watertight longitudinals. These moulds are used by the workmen for marking off the shape of the plates and the positions of the rivet holes in them, the size and spacing of the rivets being given by the specification. No moulds giving the twist of the longitudinal are required, as that is so small that the plane plate can be pressed down into shape on the ends of the parts of the transverse frames, which must be already in position when the longitudinal is erected at the ship.

The external sectional shape of the bilge keel in a sheathed ship consists of a single steel plate in the middle of the section covered over by wood trimmed to shape. The plate lies in a diagonal plane and is readily laid off by rabatting the diagonal plane. This gives the true form of the intersection of the bilge keel plate with the surface of the frames, and the outer edge of the plate is obtained by setting out from the inner edge the specified width of the keel plate plus an allowance for the thickness of the shell-plating. ***Bilge keel.***

In an unsheathed ship the bilge keel is of triangular section, as shown in the body plan in fig. 99, and is formed by two steel plates riveted together at their outer edges and connected to the shell-plating by angle bars at their inner edges, the space between the plates being filled with wood. In this case the middle plane of the keel is a diagonal plane, as shown by 2D in the figure. The depth of the bilge keel at each frame plus the allowance for shell-plating is set out from the frame line along the diagonal, giving the vertex of the section of the keel at each frame station. A triangular mould is then made to the section of the bilge keel shown in the midship section drawing and is applied with its vertex coinciding with the points on the floor found as described above and with its centre line coinciding with the diagonal, and the traces of the sides of the keel are drawn by it at each frame station as *ab*, *dc*, in the figure.

The surface of each side of the keel is then developed in the same way as the surface of a longitudinal except that in this case, since all the traces are parallel, the involutes used in the case of the longitudinal become straight lines, and the development is strictly accurate. A mould to each plate of the bilge keel, similar to the mould for a longitudinal plate, is prepared from the expansion on the floor and issued for the guidance of the workmen. A triangular batten mould, made to show the angle between the diagonal plane, in which the centre of the bilge keel lies, and the horizontal, and having marked on it a point to be set at a given distance from the middle line plane of the ship at the height of the under side of the keel, is also issued to enable the position of the centre line of the bilge keel to be sighted-in on the bottom plating of the ship.

The remaining information issued for the erection of the ship is mostly in the form of drawings, which are largely descriptive rather than dimensioned, inasmuch as the frames and beams of the ship being once erected all other principal parts have to conform to them in shape, even where a slight difference may occur between their shape as erected and as laid off on the mould loft floor. ***Drawings.***

All the drawings of the structure and of the fittings must be pushed on and issued to the shipyard in good time. Very much of the success achieved in actual building will depend upon the efficiency of the drawing office, and the rapidity with which the various detailed working plans can be supplied for guidance. These plans must be accurate and complete, and must be ready as soon as required. The drawing-office staff has the oversight of weights actually worked into the ship, a careful record of which should be kept. Each firm has its own system of work in these departments, but experience shows that the more thorough and systematic the work in the drawing office and its adjunct, the mould loft, the better the general result. Another important record is the cost of materials and labour. In all shipyards careful account is kept of workmen's time, whether employed on piece or by the day. Many different systems are in vogue; but whatever the system, the aim is to record the cost of the labour in each trade, and the detailed cost of various parts of the ship.

While the work connected with laying-off and obtaining materials, &c., is going on, the shipwrights, assisted by handy labourers, prepare the ground for the keel blocks, lay the *blocks* at the proper height and inclination, and secure them against being floated away by the tide or being accidentally tripped while the ship is building. The blocks consist ***Laying keel blocks.***

of several pieces of tough rectangular timber, 4 to 6 ft. in length, and laid on each other to the height required. The top block is called the *cap-piece*, and is of oak or other hard wood. The blocks are spaced about 4 ft. apart for ships of medium size, and somewhat less for ships of large size. They are usually placed upon a longitudinal bed of timber, which remains embedded in the ground for successive ships: the ground should be hard, or very well piled, otherwise the blocks may sink when weight becomes concentrated over them during building, and difficulty arises from the keel, or the propelling shafts, drooping from a straight line. The upper surface of the blocks must be at such a height from the ground that men, especially riveters, can do their work with facility under the bottom of the vessel, that the launch can be fitted, and that when launched the vessel may move down into the water without striking the ground. The last-named is a most important consideration; and thus it comes about that the first thing to be settled, before the blocks are laid, is how the vessel is to be launched. The tops of all the blocks are accurately adjusted to a plane surface sloping about $\frac{5}{8}$ in. in a foot from bow to stern. The shipwrights at the same time prepare the uprights for the staging, and erect them around the building berth in suitable position with the first line of staging, which will be required at an early period in the ship's construction. The platers and angle-smiths begin to prepare the keel, framing, bulkheads, &c., as soon as the material is delivered and the laying-off and mould-making are sufficiently advanced for the purpose. The actual building generally dates from the first work of this character.

Keel and frames.

The keels of small vessels usually consist of a stout flat bar placed vertically and attached to the garboard strakes by through rivets. Occasionally the keel consists of a vertical centre through-plate, with side bars at its lower edge. In large merchant ships, and in war vessels, the keel usually consists of a wide horizontal plate running along the centre line of the bottom, the sides being turned up as necessary to follow the shape of the bottom (see figs. 118 and 119, Plate XIII.). The framing varies very considerably with the size and type of the ship, as already described. In small vessels a frame usually consists of an angle bar, called a *frame bar*, extending from gunwale to gunwale, to which is riveted a bar, also continuous from gunwale to gunwale, called a *reverse bar*, in such a way as to form a built-up Z-bar, and between these floor-plates are introduced across the bottom, to give the required strength when resting on the ground or on the blocks. Sometimes the frame consists of a Z-bar, in which case the *reverse bar* is not required in the vicinity of the floor-plate. Sometimes angle bulbs are used for frames, as in the case of oil steamers, where internal ceilings are not required. The process of constructing a complete frame of angle bars and plate is as follows: From the scrive-boards the shape of the section at the frame is transferred to the bending blocks or slabs, the outline being drawn in with chalk; the necessary preparation is made, and the frame bar is drawn from the furnace, and while hot bent to its shape and given the required bevel. The reverse bar is prepared in the same way, except that the inner edge of the frame and floor must be worked to. The floor-plate has to be cut to shape. In large ships the *frame bars*, *reverse bars* and *floor-plates* will be in two, or even in three, pieces; in this case the butts are kept some distance from the middle line, and are *shifted* in alternate frames, so as not all to lie in the same fore-and-aft lines. The butts of both frame and reverse bars, as well as those of the floor-plate, are butt-strapped, to maintain as much as possible the strength of the structure. The frame bar, floor-plate and reverse frame bar all being set, they are placed together in their respective positions over the outline of the frame on the slabs or scrive-boards, the final adjustments made and rivet holes marked and punched, and the work secured together and riveted up.

When the keel is in place, and as far as possible riveted, the frames, bulkheads and beams, which have been made ready by the iron-workers, are brought to the building slip and got into position by the shipwrights. They are held in place and faired by means of shores and *ribbands*. The latter are made from straight-grained timber of considerable length, sawn out in long straight pieces of square transverse section. They hold the frames in position until the outside plating is riveted. Upon them are marked the lines at which they must be crossed by each frame, and they are bent round and attached to the frames in a fore-and-aft direction at certain heights, which are marked on the frames at the scrive-boards. Some four or more ribbands are used each side of the ship. As the work proceeds, the positions of the frames and ribbands are checked continuously, their positions being maintained by shores from the ground, or some structure prepared for the purpose. Except in small vessels, the beams are not attached to the frames before they are erected, but are hoisted into place as soon as possible afterwards.

The bulkheads are put together on some convenient flat surface, sometimes on the scrive-board or a similar platform constructed for the purpose. If of large size, they are transferred piece by piece and erected at their proper positions in the ship; but whenever possible, they are riveted up and hoisted into position complete. The stem and sternpost are obtained from the forge or foundry and erected at an early stage of the work. The part of the stern abaft the transom is sometimes framed separately on the ground before being erected in the ship. The centre keelson is generally worked intercostally between the floors, but it has continuous parts, usually angle bars, above the floors. Each intercostal plate is secured by angle bars or flanged edges to the floors and to the flat keel plate. Sometimes it is continuous, especially in large ships and in warships. The frames are then cut by it, and the floor-plates are attached to it by short angle bars. After the centre keelsons, the side keelsons and side and deck stringers are fitted. The steel pillars are substituted for the shores supporting the deck beams, being riveted at their heads to the beams and at their heels to the keelson, inner bottom or tank top.

While the work is proceeding, the shipwrights make the stages, put up gangways and ladders for carrying on the work, fit extra blocks and shores, or remove and replace them as may be required. They line off all plate edges on the frames, the overlap being usually painted in with white paint, ready for the platers. They also erect the stem, sternpost, rudder and shaft brackets, or struts in twin-screw vessels.

In a ship fitted with an inner bottom the procedure is somewhat more complicated, as the transverse frames cannot be lifted into place as a whole. There are many varieties in the arrangements in such cases; one frequently adopted is shown in fig. 113, in which the inner bottom extends out to the turn of the bilge. This figure also shows the general construction of the vessel, including the framing at a bulkhead and elsewhere, the bulkhead itself with all its stiffening bars and attachments to the sides of the vessel, and the inner bottom. At the centre line, immediately over the flat keel plates, there is a vertical girder, the full depth of the double bottom, connected to the flat keel plate and to the centre plate of the inner bottom by continuous double-angle bars. This centre girder may or may not be water-tight, according to the desired tank arrangements. The transverse frames are in four parts: the two lower extending on either side from the centre girder to the margin plate of the double bottom, which is a continuous girder of special construction; and the two upper, from the margin plates to the top-sides. The lower parts consist of a floor-plate with angle bars at its edges for attaching it to the outer and inner bottoms, the centre girder and the margin plate. At the bulkheads these floor-plates are solid, and the angle bars are united and made water-tight; elsewhere they are lightened by holes, and the angle bars at their upper and lower edges and ends are separate pieces. The two upper parts of the transverse framing consist of a frame and a reverse bar, each having a deep and a shallow flange, and are riveted to one another along their deep flanges, with their shallow flanges standing the reverse way to one another. The shell-plating is attached to the shallow flange of the frame bar. Between the centre girder and the margin plate on each side of the ship there are two intercostal girders, the plates of which are connected by short angle bars to the floors and to the shell and inner bottom plating; and between the margin plates and the lower deck on each side there are three stringers, consisting of intercostal plates attached by short bars to the outer plating, and three continuous angle bars riveted to part of the intercostal plates which extend beyond the reverse bars.

In the course of erection, after the flat keel plate is laid upon the blocks, and the centre girder placed upon it, the two lower parts of the frames, which have been constructed alongside, are put into position, their outer ends being carried by ribbands shored from the ground. The intercostal girders and margin plates are then fitted. The lower edge of the margin plate is brought close to the outer edge of the frames, and is connected by a longitudinal angle bar to the shell-plating, while its upper edge is flanged for the purpose of being attached to the inner bottom plating. The ship at this stage gives the impression that a flat pontoon is being constructed.

When the margin plates are up and faired and, as far as desirable, riveted, the upper parts of the frames on each side are erected and the fairing proceeded with as before. The beams are now got into place, also the side and deck stringers. As will be seen, the margin plate cuts completely through the transverse frames, and special brackets are provided to maintain the transverse strength. The chief advantages derived from cutting the frames by the margin plate are the cheapness with which water-tight work is secured, and the rapidity with which this part of the work can be proceeded with.

Shell or outside plating.

As soon as the keelsons and stringers are riveted, and the ship by their means sufficiently stiffened, the outside or shell plating is commenced. The plating squad is supplied with a drawing showing the disposition of the butts in each line of plates; light wooden moulds or templates are then made, giving the exact shape of the edges and butts, and the positions of all the rivet holes in the frames. From these moulds the edges and butts and the holes are marked off, the holes are punched, and the edges and butts sheared and planed. The plates are then rolled to shape, furnacing being resorted to only when the curvature is too extreme to be obtained with the plate cold. The usual arrangement of the plating is that of inside and outside strakes alternately (see *a*, fig. 79). The inside strakes, which are worked first, are templated off the ship, and lie directly on the flanges of the frame bars. The outside or overlapping

plates are then worked, and are templated from the place they are intended to occupy on the ship. They are kept at the proper distance from the frames by liners or slips of the same thickness as the adjacent inside plates. Towards the ends of the ship the number of strakes of plating must be reduced, as the girth along the frames is much less than over the midship portions. Stealers are introduced for this purpose; they are single plates, which at one end receive the butts of two plates, and at the other the butt of only one. By them two strakes are merged into one.

The number of plates requiring to be furnaced is small in comparison with the whole number, but there are always some at the after end of the ship, especially in the neighbourhood of the boss (for the stern tube) and the counter, and a few at the forward end of most ships. As each plate is got ready, it is taken to the ship, hoisted into position, and temporarily secured by the platers by means of bolts and nuts. As the work of plating proceeds, and the weight of the ship increases, extra shores are put into place, and bilge blocks erected by the shipwrights, to keep the structure to its shape and prevent local and general "unfairness." The shell-plating in way of the intended bilge blocks is completed at as early a period as possible, and painted, so that when once the bilge blocks are in place they need not be disturbed until immediately before launching. While the platers are at work on the shell-plating, other squads of riveters are engaged on the deck-plating and internal work, such as the bunkers, engine and boiler bearers, the shaft tunnel, casings and, in the later stages, the hatches, houses on deck, &c., and as much as possible of the internal work is done before the shell shuts out the daylight. As the work is completed by the platers, it is ready for the riveters and caulkers; and these trades follow on without delay, except in some parts of the casings and decks in way of the machinery, which are left portable, and taken down after the launch, to allow the machinery to be put in place.

The platers usually work in squads, composed generally of three platers, a marker-boy and a number of helpers or labourers, the number of whom depend on the size and weight of the plates, and the nature of the work to be done on them, and also on the facilities of the yard for handling such material. On the work of a large vessel many of these squads would be employed. The riveters also work in squads, a squad consisting of two riveters, one holder-up and one heater-boy, with sometimes a catcher, *i.e.* a boy to pass on the heated rivets when the distance from the rivet-hearth is great. Pneumatic riveting has not made great progress in Great Britain. Hydraulic riveting to a limited extent is adopted, especially in the case of work that can be taken to the machine, such as frames, beams and other parts; but in shipbuilding the large proportion of the riveting is done by hand. In the Royal dockyards platers' work is done by shipwrights, and riveting is not considered a trade, though regarded as skilled labour. Shipwrights also lay the blocks, erect the ribbands, shore and fair the ship, but labourers construct the stages. Drillers' work consists in drilling by hand or by portable electric or pneumatic drills holes which it is not convenient or possible to punch or drill before erection; they also rimer out and countersink punched and drilled holes when this is necessary. Portable electric or pneumatic drills are used when possible in some shipyards, and three-cylinder hydraulic engine drills are employed for some purposes, such as in cutting armour bolt holes in thick plating behind armour. The caulkers follow closely upon the riveters, and generally work singly. A very important part of a caulker's duty is water-testing. In the large oil-tank steamers possibly 8000 tons of water are used for testing one ship alone, and about the same amount for a large war vessel. This water is pumped from the sea or river into the compartment to be tested. In the case of an oil vessel, each compartment is filled right up, and a pressure put on by means of a stand pipe, carried for a considerable height above the highest part of the tank; any leakage found must be made good by the caulker, and the tank retested until it is perfectly water-tight. The double bottoms of merchant ships, and the smaller compartments and double bottoms of war vessels, are filled up and tested by a head of water rising a few feet above the load water-line. It is not usual to fill all the larger compartments, such as boiler and engine rooms in war vessels, or the machinery compartments and cargo holds in merchant ships; but water at a high velocity is played on the bulkheads by hose, to test the water-tightness and the strength. An occasional test, however, is made by filling a typical large compartment with water to a height of some feet above the load water-line. Angle-smiths form beam knees where these are welded, and generally all angle-bar work where heating in a smith's fire is required. It is usual to defer the painting of certain parts of the steel structure of a ship as long as possible, so that ordinary red rust may form and dislodge the black mill scale which is answerable for a great deal of corrosion in steel ships, as

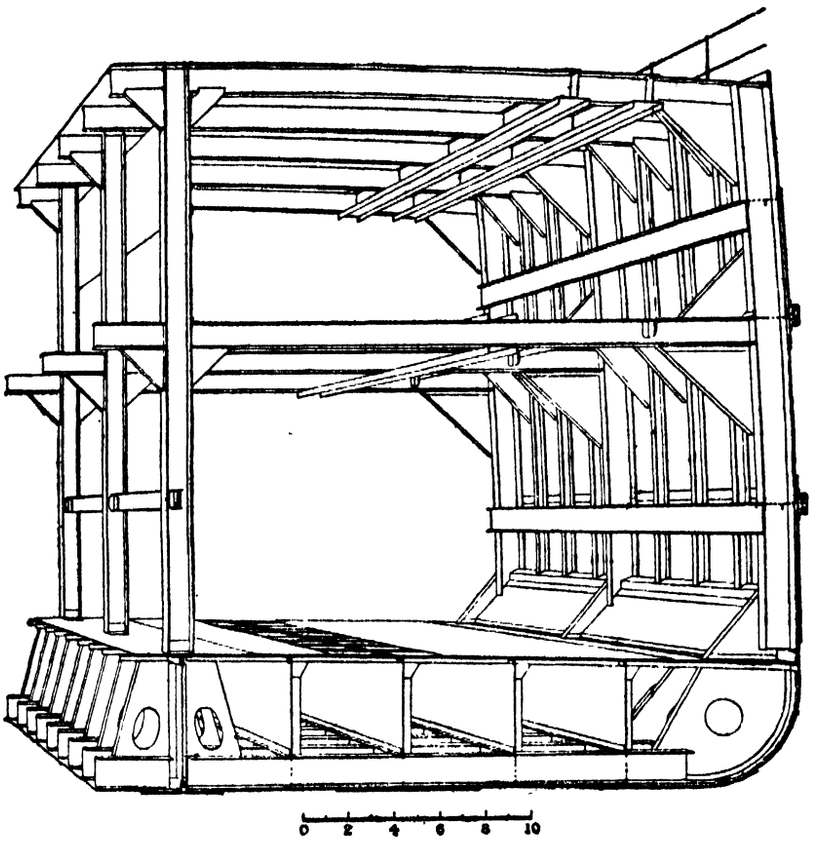


FIG. 110.—Great Lake Cargo Steamer; midship portion, in perspective.

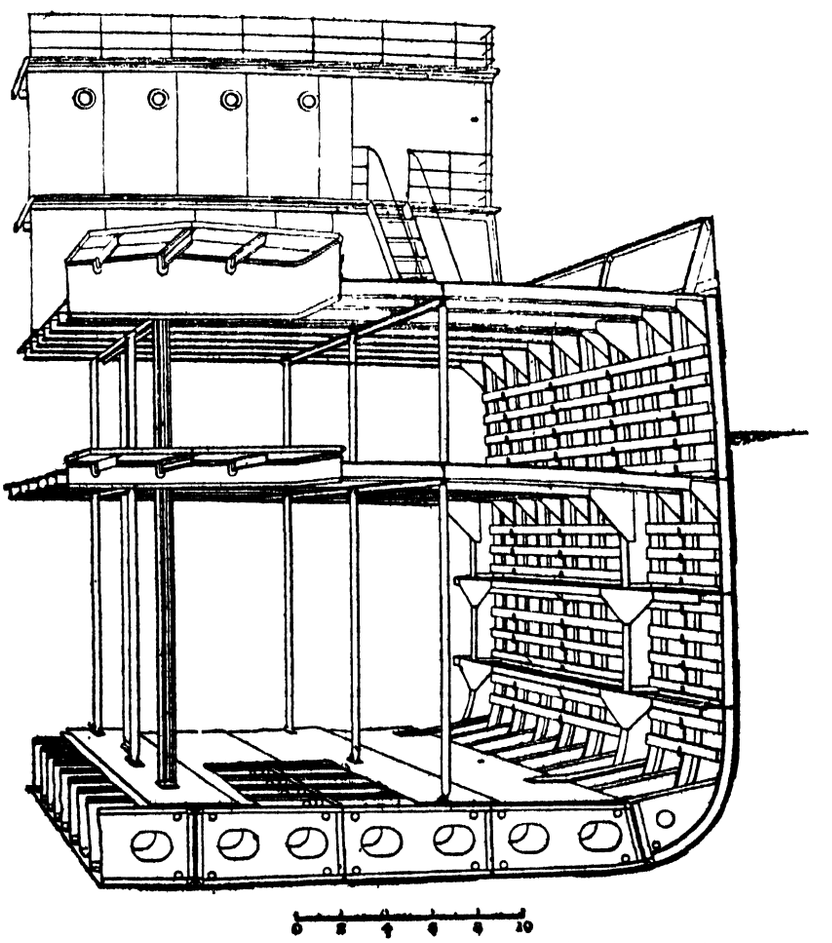


FIG. 111.—British Cargo Steamer; midship portion, in perspective.

in certain circumstances it forms a galvanic couple with the steel plate. For warships the British Admiralty requires the removal of this scale from these parts by immersing the plates in a weak solution of hydrochloric acid. Red and white lead, oxide of iron and oxide of zinc form the bases of most of the paints used on steel ships.

Structural Arrangements.

The following are particulars of ships recently built at New London (Conn., U.S.A.) on the *longitudinal* system: "The great centre girder, which in all vessels prior to these has been in the form of an I girder, is formed of a double II or box; that is, these vessels have two vertical keels instead of one. The girder is of the same depth as the double bottom (6 ft.). On each side of this girder there are several other vertical longitudinal members, having the plating on the top, forming the tank top, and the shell-plating below, forming the bottom of the tank. This tank or double bottom is 6 ft. deep for the greater part of its length, and is increased at the extremities, where it merges into the fore-and-aft peaks at the collision bulkheads. The whole of this space can be filled with water when desired, to sink the ship to a suitable draught when making a voyage without a cargo or with a very light one, at the same time allowing the ship to keep afloat whenever the outer shell or skin has been pierced by rocks or by colliding with other vessels. This bottom girder or double bottom forms the 'backbone' of the ship, from which the great frames spring or extend up to the weather deck, about 60 ft. above the keel. The frames are made of channel steel spaced 30 in. apart, but as they near the extreme ends they are spaced closer, and are composed of angle bars riveted together. At certain parts of the structure, where the heave of the sea will tend to strain the ship, the frames are double and made very strong. The outer surface of these frames is covered with a shell of steel plates averaging about 1 in. in thickness. These enormous plates are arranged to give a maximum of strength, and the riveting of them to the frames and to each other is receiving the utmost care.

"These ships have a continuous longitudinal bulkhead on the centre, extending from the inner bottom to the main deck. The side plating of the shell, with this longitudinal bulkhead, form three vertical members of the entire structure. The upper flanges of the girder are formed by the upper and main decks, which are laid with heavy steel plates. This great girder is designed to support a full cargo when suspended by long sea waves at either end. The side girders are kept in place by three intermediate decks between the tank and the main deck, making in all five complete decks, each covered with heavy steel plate. The beams supporting all these decks are of channel steel, and fitted to every frame by large bracket plates. One of the many notable features in the construction of these vessels is the distribution of the water ballast. Various conditions of trim and safety can be obtained. The double bottom is divided longitudinally into three water-tight divisions and transversely into about twelve, making in all thirty-six separate tanks. In addition to these there are the fore-and-after peak tanks, and side tanks between the main and 'tween decks, about one quarter of the vessel's length from either end. The latter tanks are really fitted for the purpose of controlling the ship's stability and seaworthiness.

"The vessels are divided transversely into thirteen water-tight compartments, while the longitudinal bulkhead is water-tight in the machinery space, which makes in all fifteen water-tight compartments. The engine-rooms are completely independent of each other; so are the boiler-rooms; but access is had from one to the other by water-tight doors. The coal can gravitate direct to the stokehold floor. The method of pillaring is somewhat novel. . . . Strong girders run under the transverse beams and are supported at wide intervals by built stanchions. By this means the least possible trouble is experienced in stowing the cargo."

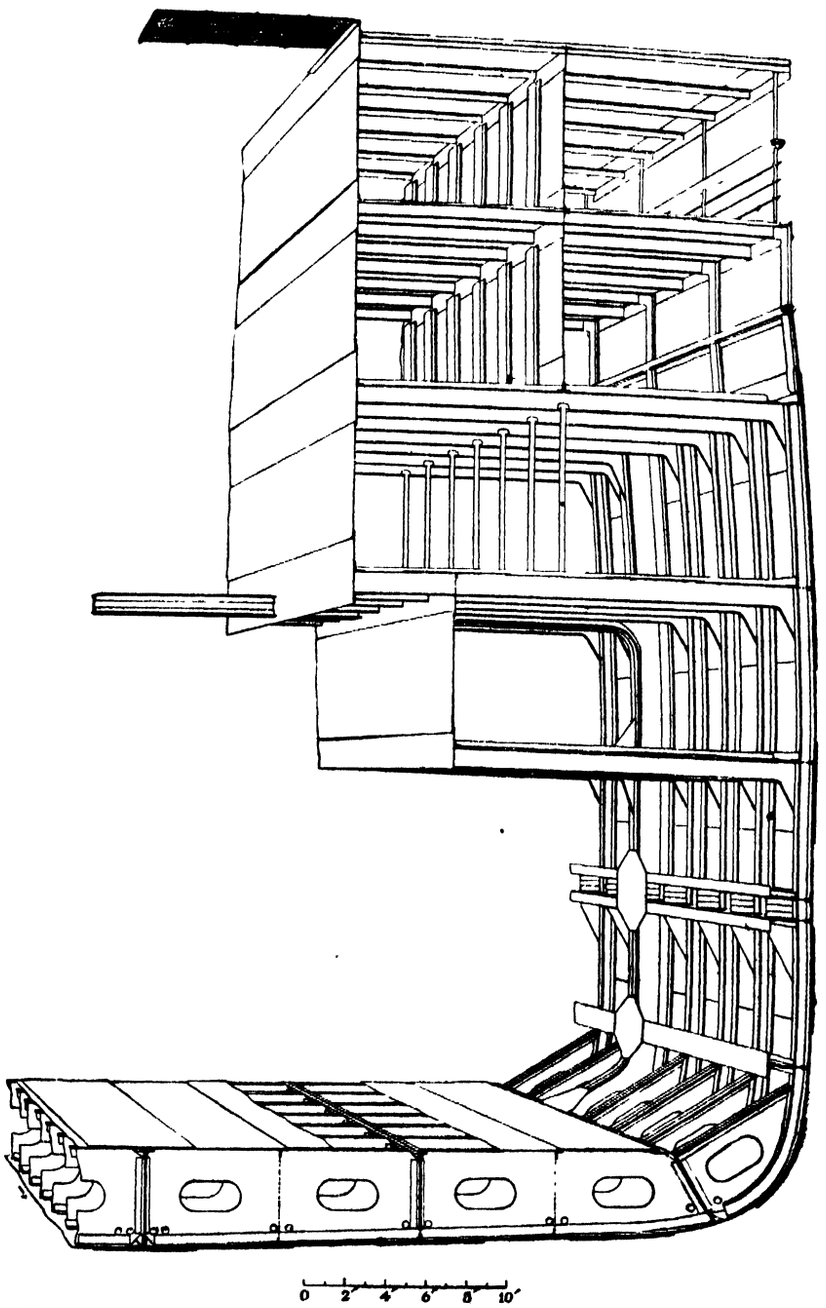


FIG. 112.—Cunard Liner "Campania"; midship portion, in perspective.

Fig. 110 shows the construction of a typical American Lake steamer, a diagram of which is given in the article SHIP, fig. 16. She is 450 ft. over all, 50 ft. beam and 28 ft. 6 in. moulded depth; and when loaded to a draught of 18 ft. 3 in. can carry about 6000 tons weight of cargo on a total displacement of about 9000 tons. For half the length or more the ship is of the same transverse section, the frames being made identical in form. The outside plating is about $\frac{5}{8}$ in. thick generally, but it is thicker at the garboards, flat keel and sheer strake, and becomes thinner generally towards the ends of the vessel. The frames are 24 in. apart, and consist of four separate pieces—two across the bottom and one up each side. These across the bottom consist of a 15-in. channel bar, with deep flanged brackets of 17½ lb plating connecting their inner ends to the centre keelson and their outer ends to the bilge and tank top. Extending up each side the frames consist of 6-in. channel bars of 17 lb per foot, worked 24 in. apart in the case of ordinary frames; and 15-in. channel bars of 33 lb per foot, worked 8 ft. apart, and called belt or special frames. The frames are all connected to the tank top and to the upper deck-plating by flanged bracket plates 17½ lb per square foot; and the belt frames are stiffened by hold beams of I section, 12 in. deep and 35 lb per foot, attached to each by deep flanged brackets of 17½ lb plating as indicated, and supported in the middle by stanchions or pillars of similar section. The stanchions are attached to the tank top by double clips of 6-in. angle bar, and to the upper deck beams by direct riveting and by flanged brackets of 15 lb plating. Each belt frame is thus complete in itself, and very readily erected after the tank top is completed. The tank top is of 20 lb plating amidships and under the loading hatches and 17½ lb elsewhere. The margin plate is a continuation of the tank top, is made of 17½ lb plating, and flanged against the shell. The centre keelson is of about 22½ lb plating and about 5½ ft. deep; the side keelsons are of 17½ lb and slightly less depth, so that with a small rise of floor on the outside, say 3 in. in the half-breadth of the ship, there is a small fall of the tank top towards the bilges, say 6 in. in the half-breadth, so as to drain the hold to the water-courses over the margin plates. The centre keelson extends from the inner to the outer bottom, being attached to the tank top and the flat keel by heavy double angle bars, and well stiffened by the flanged floor brackets, which are connected to it by heavy double angle bars. The side keelsons are connected to the tank top and the floors by fore-and-aft angle bars 3 in. by 3 in. of 7½ lb per foot, and stiffened by vertical 6-in. angle bars at every frame. At the lower edge the keelson plates are connected to fore-and-aft intercostal channel bars

American Great Lake steamer.

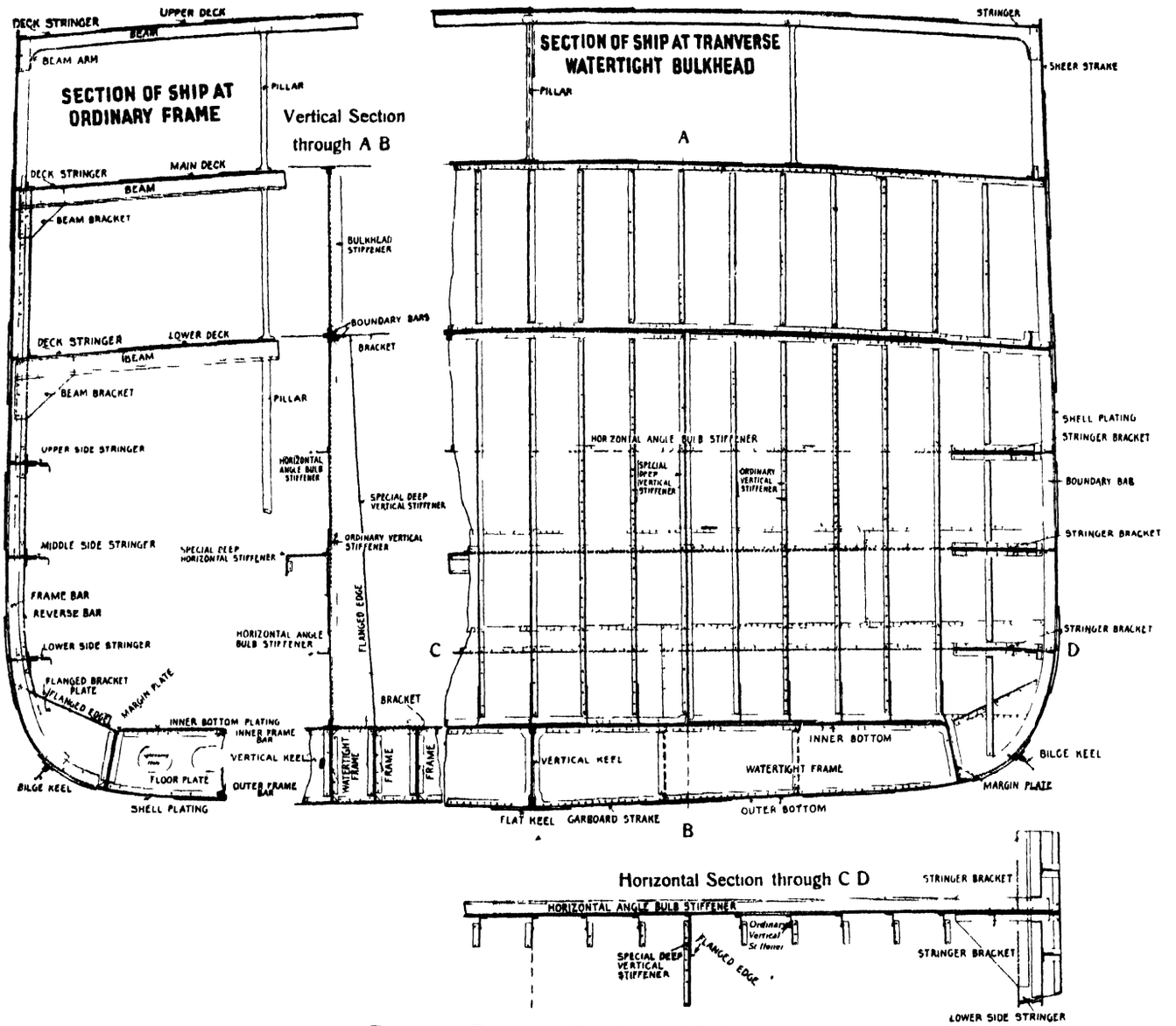


FIG. 113.—Details of Framing and Bulkheads.

15 in. deep of 33 lb per foot, riveted to the shell-plating, which, with the channel floors, give very great local support to the bottom. This system of framing extends practically throughout the length of the vessel; thus the bottom is very strong, and very large ballast tanks are formed, having a capacity of nearly 3000 tons. The upper deck is plated, and the stringers are made specially heavy, to compensate for the strength lost by cutting wide hatchways.

British cargo steamer.

Fig. 111 represents a modern British cargo steamer of ordinary construction, of about the same breadth and depth as the American Lake steamer just described, and it will be interesting to note the differences between the two vessels. These differences, so far as the outside form is concerned, are chiefly that the British cargo steamer has deck erections, topsides and a main deck, whereas the Lake steamer has scarcely any deck erections and no topsides, while her hold extends from the top of the inner bottom to the upper deck; they are due to the fact that the latter ship is only required to traverse inland waters, where heavy weather is not met with, whereas the former is an ocean-going vessel, and must be prepared to meet all conditions of wind and sea. As to the differences in the details of construction, they are chiefly that in the American Lake steamer the bottom framing, which is of great depth, consists of deep channel-frame bars, above which the longitudinals are continuous, instead of the usual transverse framing in the British ship, extending between the outer bottom and tank top; and that the margin plate continues the surface of the tank top out to the side, instead of being nearly vertical, as in the British ship. The system adopted in the American steamer conduces to security in case of grounding in the shallow waters through which she has to pass.

Atlantic liner.

The general construction of a large passenger vessel is shown by fig. 112, which gives a perspective sectional view of the framing, &c. of the Cunard liner "Campania." The transverse frames and the girders or longitudinals extend in depth from the outer bottom plating to the inner bottom plating. The centre keelson, the second longitudinal from the middle line, and the margin plate on each side, are continuous, the transverse frames being fitted between them and attached to them by angle bars. The first and third longitudinals from the middle line are intercostal, being fitted in short pieces between the frames and attached to the floor-plates by short angle bars. The floor-plates have large holes cut in them to lighten them, and to give access to the different spaces for inspection, painting, &c., and smaller holes for watercourses. From the margin plate the transverse frames consist of stout channel

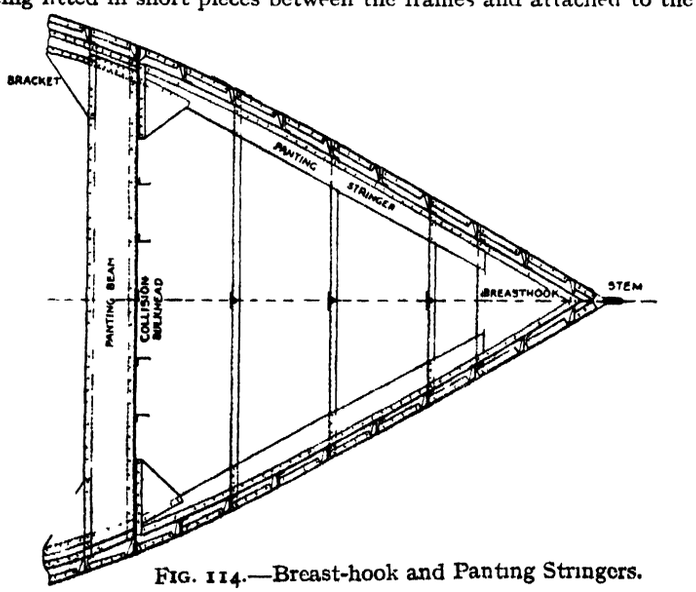


FIG. 114.—Breast-hook and Panting Stringers.

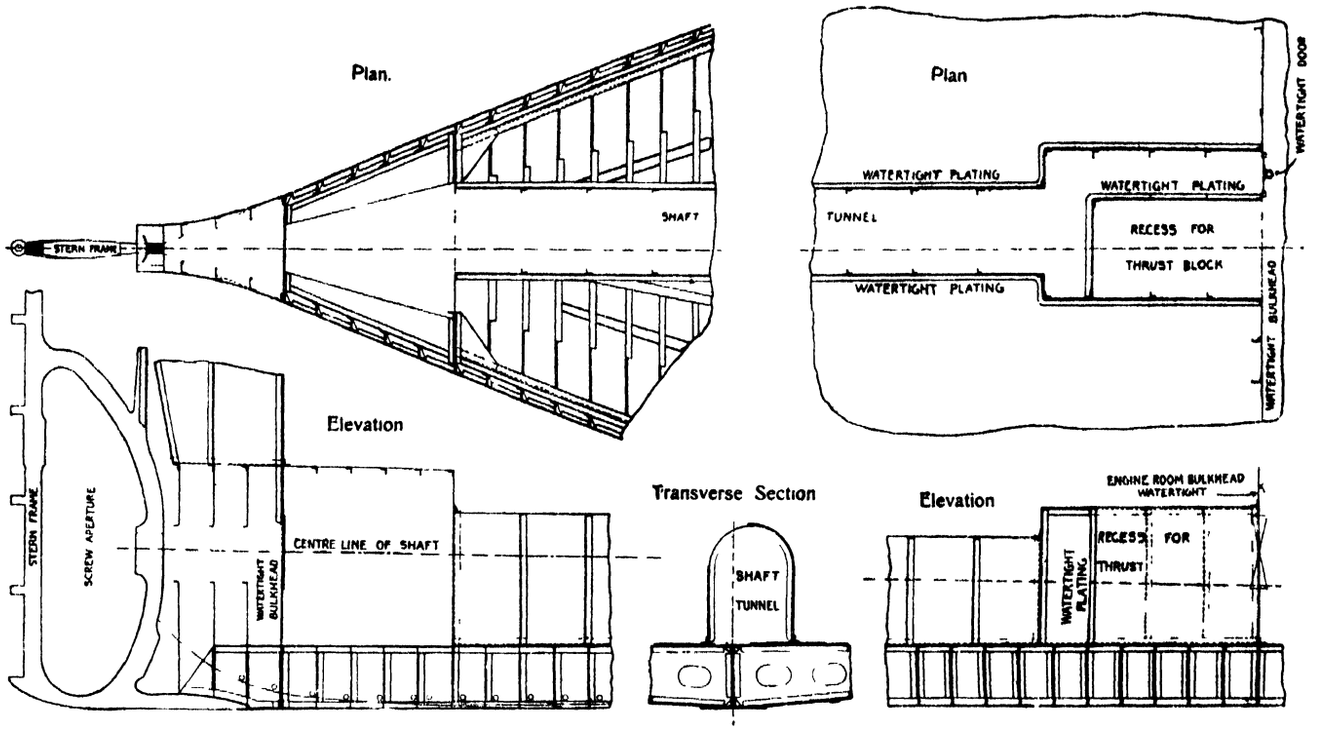


FIG. 115.— Stern Framing, Shaft Tunnel, &c., of Single-Screw Ship.

bars extending to the upper deck; each tier of beams is securely riveted to them, and their lower ends are connected to the margin plate by strong brackets. At intervals the channel-bar frames are replaced by deep built-up frames, the frequency of which depends on local requirements. Heavy side stringers of the same depth as the deep frames run fore and aft, to stiffen the side between the bilges and the first plated deck. Where the deep frames are cut by these

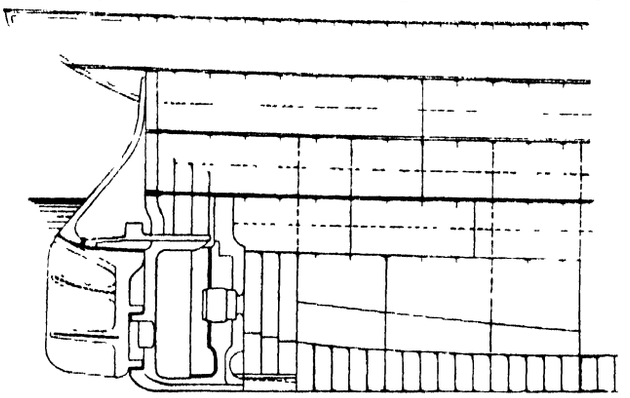


FIG. 116.—Stern Framing of the "Campania."

stringers, the strength of the frames is continued by *gusset* plates, as shown.

Some further structural arrangements usually adopted in British ships are shown in figs. 113 to 115. Fig. 113, to which reference has already been made, shows in detail the construction of a bulkhead, with the framing in wake of it, and the same details at an ordinary frame; also the stringers, beams, pillars, &c. The bulkhead itself stops at the tank top, being secured to it by double angle bars, and the floor immediately beneath it is made water-tight. It would involve very costly work to make the bulkhead water-tight if the side and bilge stringers were made continuous; these have therefore been cut, and the continuity of the longitudinal strength is maintained, as far as possible, by the large brackets shown in the plan. Besides bulb stiffeners, the bulkhead is provided with built-up vertical stiffeners at AB and a built-up horizontal stiffener at CD. Fig. 114 shows the arrangement for special strengthening at the extreme fore end of a vessel, between the collision bulkhead and the stem, and below the main deck, these consisting chiefly of panting stringers, panting beams and breast hook. Fig. 115 shows the general arrangement of stern framing of a single-screw ship, including the shaft tunnel. A water-tight door, which can be closed when necessary from above the level of the outside water, shuts off communication between the engine-room and tunnel; the form of the stern post and aperture frame casting is shown, with its attachment to the centre keelson and other details.

Figs. 116 and 117 show the arrangements of the stern and bow framing of the "Campania," which may be taken as those usually adopted in large passenger steamers of this class.[1] In both the transverse framing becomes deeper and stronger as the extremities are approached, while the decks and side stringers are all continued to the extremities, finishing in strong breast-hooks, and additional stringers, breast-hooks and panting beams are introduced. It is worthy of note that the rudder and steering gear are in this vessel entirely under water, so that she may be used for war purposes without running the risk of disablement by the rudder or steering gear being struck by projectiles. Above the water the stern is finished off so as to have the appearance of being fitted with an ordinary rudder. This important departure from the usual practice was first introduced by Professor Biles in the "City of Paris," and the "Campania" and her sister the "Lucania" were in 1902 the only British ships so fitted.

Fig. 122 gives in perspective the general structural arrangements of the Japanese cruiser "Idzumo," and figs. 118-121 (Plate XIV.) are from photographs of the vessel in course of construction. It will be seen that the departures from the structural arrangements of a merchant ship are very considerable. As already pointed out, lighter scantlings are used in warships than in ordinary merchant ships. This is effected by more carefully devised and more costly arrangements of framing and plating, and by making the structural features necessary in a warship for protection, &c., serve also for local and general strength.

Differences between war and merchant ships.

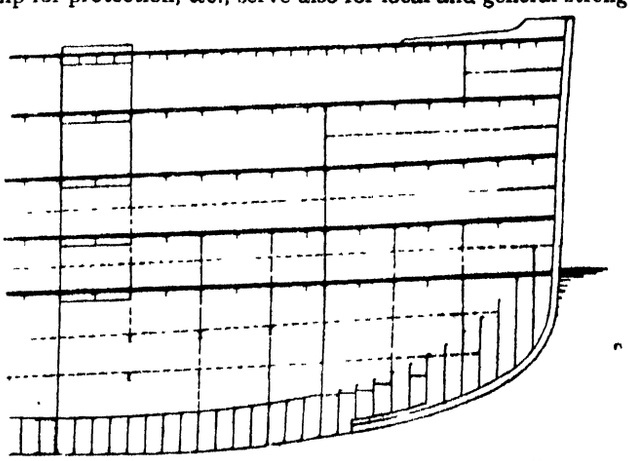


FIG. 117.—Bow Framing of the "Campania."

In warships, frames are placed at greater distances apart, 4 ft. amidships and 3 ft. at the extremities being the usual spacing, as compared with some 2 ft. in a merchant ship. On the other hand, there are more continuous longitudinals in the framing of a warship, which extend in depth from the inner bottom to the shell-plating, and give

[1] We are indebted to the late Dr Elgar, F.R.S., for these and other plans of the "Campania."

local support to the bottom as well as general strength to the vessel. There are in a warship so many structural features, such as water-tight bulkheads and flats or platforms, required for the necessary subdivision, armour decks, plating and framing behind armour, &c., which are made to contribute to the strength of the structure as a whole, that the strength of the shell-plating and the transverse framing can be proportionately reduced.

In a merchant ship there are many considerations which require the structure to be stronger and heavier than would be necessary

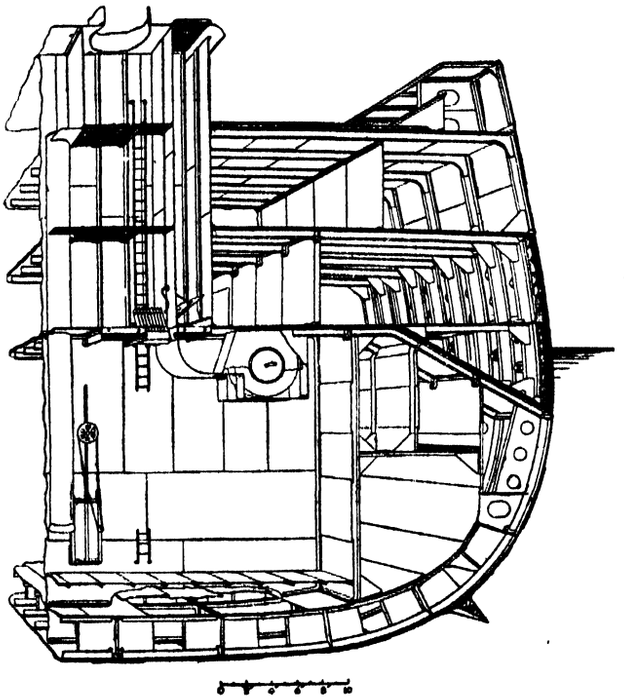


FIG. 122.—Japanese Cruiser "Idzumo"; midship portion, in perspective.

to withstand the wind and waves which she may encounter. The continual change of cargo and of disposition of cargo necessitates special local strength throughout. The custom, often pursued, of grounding vessels to discharge cargo, and their liability to touch the ground in the ports they frequent, make the provision of great strength in the floors and the shell-plating essential. Other considerations affect the decks, and call for local strength in them with corresponding increase of weight.

Most warships, except gunboat, torpedo and other small craft, have double bottoms, chiefly for protection against damage in action, but also against accidental grounding. The space between the bottoms is divided into a large number of compartments by making some of the frames and longitudinals water-tight. The inner bottom extends on each side to the turn of the bilge, and from that point is carried up vertically as a wing bulkhead, as shown in fig. 122, the wing spaces thus formed being occasionally utilized for coal-bunkers. The framing, consisting of frame bars, reverse frame bars and frame plates or brackets, is usually carried up in a fair curve to the armour shelf, supposing the vessel to be an armour-clad, as in fig. 122. From the edge of the armour, which is generally about 5 ft. below the load water-line, a change in structure is made, and the framing behind the armour is set back from the outside of the ship sufficiently to admit of an internal skin of steel plating (often worked in two thicknesses), teak backing, upon which the armour is embedded, and the armour itself, to be carried with the surface of the armour flush with the shell-plating. The vertical frames behind armour are spaced 2 ft. apart, and the longitudinals are made intercostal, the whole having exceptional strength, to support the armour. Above the armour another change is made, the frames being brought again to the outside of the ship, and the topside plating directly attached to them becoming flush with the outside of the armour. There is generally a strong deck, called the protective deck, extending from stem to stern in the form of a turtle back, the lower edges being at the armour shelf on each side of the ship, and the top of the arch forming the first deck above water, as indicated in fig. 120. With a view to maintaining its defensive power where it has to be perforated for funnels and air shafts, armour gratings, or armour bars as they are called, are fitted in the openings. As much water-tight subdivision as possible is introduced throughout the ship, but for communication between the various compartments openings are provided in the bulkheads, having water-tight doors which can be closed either from a position close to the door or from a deck above water, or from both. Below the protective deck are the engine and boiler spaces, magazines, shell-rooms, submerged torpedo rooms, and steering-gear. A passage is provided on each side of the ship just below the protective deck, for the supply of ammunition to the secondary armament.

Fig. 118 shows the "Idzumo" partially in frame, looking forward from the after extremity: the frames below the armour deck over a considerable length of the ship are complete, and a number of the beams which carry the armour deck are in place. Fig. 119 shows the ram stem, which has just been placed in position. The collision bulkhead and the framing below the armour deck are for the most part in place. Fig. 120 gives the top of the armour deck, which is nearly completed, as seen from the fore end, with the forward citadel

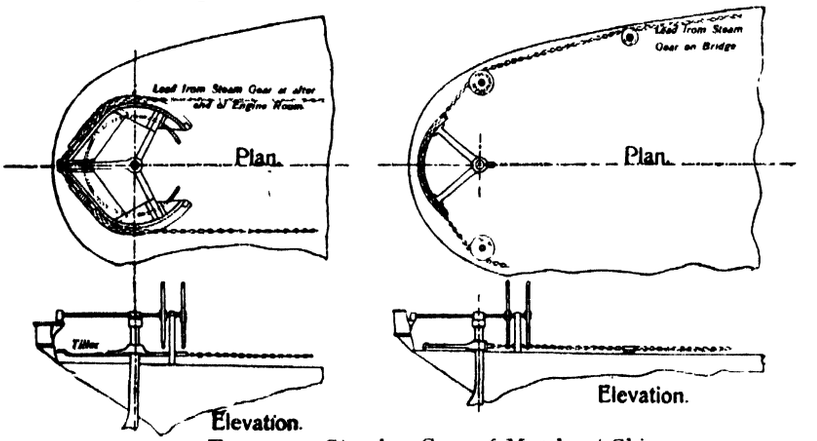


FIG. 123.—Steering Gear of Merchant Ship.

bulkhead in course of construction. Fig. 121 shows the after part of the vessel, which is not so far advanced as the forward portion shown in fig. 120. In fig. 121 the framing has been carried to a bulkhead near the after extremity, the rudder post is in place, and the bearing for the rudder head can be seen in the foreground. The construction of the armour deck is proceeding, and the after citadel bulkhead is also well advanced, though no backing is yet upon it, as in the case of the forward bulkhead, but the base of the redoubt which carries the after turret is erected.

The fittings in a ship cannot be fully described in the present article, but we shall conclude with some account of the auxiliary machinery. Two ordinary arrangements of steering-gear fitted in merchant steamers are shown in fig. 123. In the first example a three-quarter circular grooved rim, keyed to the rudder head, carries the steering-chains, which are led forward one on each side of the hatches to the steam engine, placed in this case in the engine-room casing, and controlled by shafting from the bridge. The usual steering-wheel is fitted on the bridge, and actuates the controlling valve of the steam engine by means of the shafting. The second example is very similar to the first: a quadrant is keyed

Auxiliary machinery.

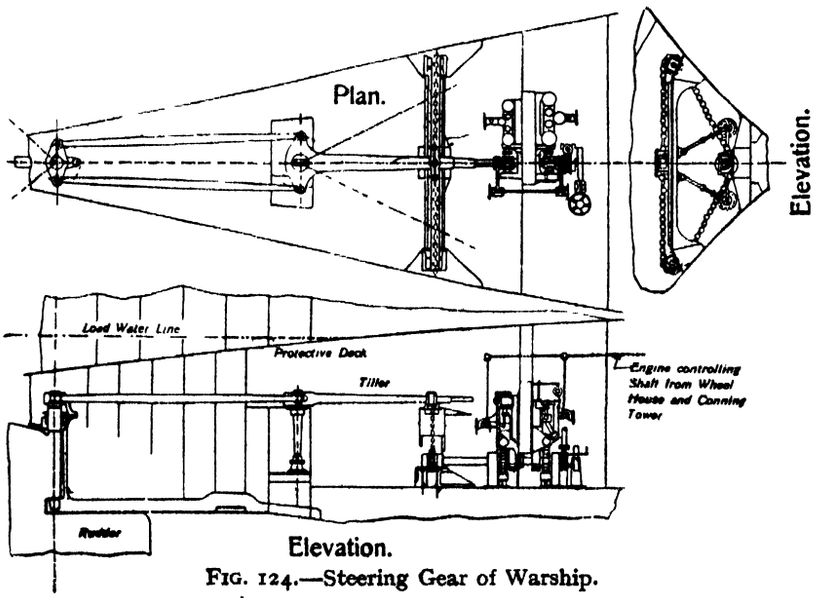


FIG. 124.—Steering Gear of Warship.

on the rudder head, and worked by chains led over pulleys one on each side of the ship to the steam gear, which in this case is placed on the bridge, close to the wheel. In all such cases gear is also provided by which in an emergency the ship can be steered by hand, by steering-wheels placed close to the rudder head, as indicated in the figures.

In a warship the arrangement is different, as it is necessary to keep the steering gear below the water-line for protection. The breadth available at the rudder head is as a rule not sufficient for a tiller or quadrant to be fitted. Fig. 124 illustrates an arrangement frequently adopted. A crosshead of sufficient size is keyed on to the rudder head, and is worked by connecting rods from a similar crosshead placed a little farther forward, where the breadth of the ship is sufficient to allow a tiller to be worked. The tiller is worked by a block or carriage, which is drawn across the ship on a guide, at the same time sliding upon the tiller, which is machined for the purpose. The block-and-guide arrangement is known as Rapson's slide. The block is hauled to and fro across the ship by a chain which passes round a sprocket wheel upon a shaft, which is driven in either direction, as required, by the steering-engine. In fig. 125 the arrangement is shown which has been for a considerable period adopted in large merchant ships and has in recent years been adopted in ships of the British navy. It is known as *screw steering gear*. On the same central shaft there are right- and left-handed screws as indicated on the plan, by which blocks A and B are made to travel always in the opposite direction when the shaft is

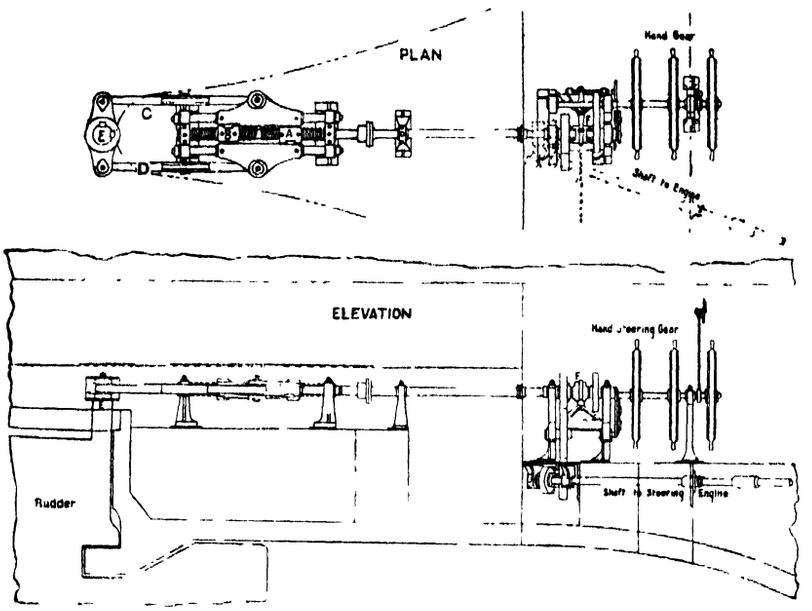


FIG. 125.—Screw Steering Gear.

rotated. These actuate the crosshead on the rudder E by means of the rods C and D, one of which will communicate a thrust and the other a pull, and vice versa according to which way the shaft is made to rotate. The shaft may be actuated either by hand-gear or by steam by means of the clutch F. In many cases the steam steering-engine is placed in the engine-room, to avoid heating the after-compartments by the steam pipes, and for the sake of easier control by the engineers.

Amongst the auxiliary machinery usually fitted in passenger and other well-found vessels may be mentioned the windlass for working the cables and weighing the anchors; a warping capstan forward in connexion with the windlass, and another aft with its own engine; steam winches for handling the cargo and baggage, and for hoisting coals on board; and occasionally steam cranes, fitted either in addition to or in place of the winches. Then there are the electric light, pumping, ventilating and refrigerating installations. Hydraulic power is employed in many cases, especially for cranes, but here the source of the power is necessarily a steam engine, which is usually placed in the main engine-room. Electric power sometimes replaces steam for operating some of the machines enumerated above; for instance, ventilating fans are now generally driven by electric motors in passenger and war ships. A large number of comparatively small fans are used, each supplying air to a particular part of the ship.

In warships the amount of auxiliary machinery has been very greatly increased in recent years. On each side of the deck amidships there is generally a steam winch for raising and lowering the boats, one of the principal functions of the mast in the modern warship being to carry the derrick used for this purpose. Electric motors are fitted for working the after-capstans, ash hoists, sometimes the winches, and the workshop machinery; also to traverse, elevate and work the guns, and bring the powder and projectiles up from the magazines to the guns. But for the heavier guns, the steering-gear, and certain other purposes, hydraulic power or steam is still preferred.

The writer is indebted to Mr H. G. Williams, Mr Lloyd Woollard and Mr A. W. A. Cluett for valuable assistance in preparing this article. (P. WA.)

SHIPKA PASS, in Bulgaria, a pass in the Balkans, celebrated as the scene of fierce fighting in the Russo-Turkish War of 1877–78. The main road from Rumelia to Bulgaria, leading from Sistova by Tirnova and Eski Zagra to Adrianople, crosses the Balkans near the village of Shipka, and this passage was of necessity an important point in the Russian plan of operations. The road does not pass between high peaks, but crosses the main ridge at the highest point; it is therefore not a pass in the ordinary sense of the word. Near the summit, running parallel, and close to the road is a series of three ridges, some 200 ft. high, and about 2 m. from north to south, which formed the position for a force holding the pass. It was originally held by a Turkish force of about 4000 men with 12 guns, prepared to resist the Russian advance. On the 17th of July they repelled a feeble attack from the north, and the following day faced round and drove back an attack by Gurko from the south. These attacks were to have been simultaneous, but Gurko, having met with unexpected resistance, was a day late. Though so far successful, the Turks evacuated their strong position, and it was occupied by the Russians on the 19th of July.

They were first attacked by Suleiman Pasha towards the end of August. Having concentrated with Reouf Pasha and driven Gurko across the Balkans at the end of July, he moved to the Shipka on the morning of the 21st of August, and attacked. The Russian force there, including five battalions of Bulgarians, then numbered 5000, but that day a regiment from Selvi brought their numbers to 7500, and this force held the position against 30,000 Turks for three days, when heavy reinforcements arrived. The fighting continued till the morning of the 26th, when Suleiman, his troops being exhausted, and having lost 10,000 men, entrenched himself in the position he then occupied in a semi-circle round the southern end of the Russian position. Having called up more battalions from Yeni Zagra, after a four days' artillery bombardment, he attacked on the 17th of September, and was repelled with a loss of 3000 men.

There was no more fighting on the Shipka till the general advance of the Russians after the fall of Plevna. Radetzky's command of about 60,000 men advanced from Gabrova on the 5th of January, in three columns. Radetzky, with the central column, moved by the main road and attacked the Turks, who still faced the position on the summit, while Skobelev and Mirski, crossing by trails some 3 m. to the west and east of the Turkish position, attacked their reserves on the far side, about Shipka and Shenova, where Vessil Pasha (who had succeeded Suleiman in command) had formed an entrenched camp. These flank columns made their way over the mountains, deep in snow. Mirski attacked alone on the 8th of January, as Skobelev's advance had been delayed, but the following day both columns attacked, and after fierce fighting the Turks surrendered. The force on the summit had that day repulsed, with heavy loss, a frontal attack by Radetzky, but they were included in the surrender. Their numbers were 36,000, including 6000 sick and wounded, and 93 guns. The Russian losses were 5500.

Not only were the Turkish attacks on the Shipka unsuccessful, but they were made without object. At the end of July, when Suleiman forced Gurko back over the Balkans, the moral equilibrium and the plan of operations of the Russians had been upset by the second battle of Plevna, and the Shipka ceased to have any strategical importance for the time being. Had Suleiman at that time followed up Gurko and joined Mehemet Ali, or moving round acted with Osman against the Russian flank, the evacuation of the Shipka would have been compulsory. Suleiman, knowing nothing of strategy, preferred to act independently, and his action was supported by the still more ignorant ministers at Constantinople. The Shipka was merely a geographical point until the Russians were prepared to advance, but, fortunately for them, the Turks chose to waste an army in fighting for it throughout the critical period of the operations. As with Osman at Plevna, it was Constantinople that forbade Vessil

Pasha to withdraw his forces at the beginning of January, compelling him to wait to be swallowed up. The Turkish tactics were equally unsound. Suleiman divided his forces and used up his troops in costly frontal attacks on Mt. St Nicholas, the southern and strongest point of the position, whereas a well-supported flank attack would probably have met with success. The manner in which he sacrificed his men earned for him the name of the "Shipka butcher." (J. H. V. C.)

SHIPLEY, JONATHAN (1714–1788), bishop of St Asaph, was educated at Reading and Oxford. He was ordained about 1738, and acted as tutor in the household of the 3rd earl of Peterborough. In 1743 he became rector of Silchester and Sherborne St John, Hampshire, and prebendary of Winchester. He was appointed to a canonry of Christ Church, Oxford, in 1748, and in 1760 to the deanery of Winchester and the living of Chilbolton, Hampshire, which he held in addition to his earlier preferments. In 1769 he was consecrated successively bishop of Llandaff and of St Asaph. He was much concerned with politics, and joined the Whig party in strong opposition to the policy of George III. towards the American colonies. In 1779 he was the only bishop to advocate the abolition of all laws against Protestant dissenters. He died on the 6th of December 1788. His brother, William Shipley (1714–1803), originated the Society of Arts; and his son, William Davies Shipley (1745–1826), became dean of St Asaph.

SHIPLEY, an urban district in the Shipley parliamentary division of the West Riding of Yorkshire, England, on the south bank of the Aire, 3 m. N. by W. of Bradford, on branches of the Great Northern, Midland, and North Eastern railways. Pop. (1901) 25,573. The manufacture of worsted is the principal industry, and there are large stone quarries in the neighbourhood. The parish includes Saltaire, so named after Sir Titus Salt, who established large alpaca manufactories, opened in 1853.

SHIP-MONEY, a tax, the levy of which by Charles I. of England without the consent of parliament was one of the causes of the Great Rebellion. The Plantagenet kings of England had exercised the right of requiring the maritime towns and counties to furnish ships in time of war; and the liability was sometimes commuted for a money payment. Notwithstanding that several statutes of Edward I. and Edward III. had made it illegal for the crown to exact any taxes without the consent of parliament, the prerogative of levying ship-money in time of war had never fallen wholly into abeyance, and in 1619 James I. aroused no popular opposition by levying £40,000 of ship-money on London and £8550 on other seaport towns. The fleet of Charles I. during the first three years of his reign was, says S. R. Gardiner, "largely composed of vessels demanded from the port towns and maritime counties. The idea of universal ship-money to be levied in every county in England seemed to him to be merely a further extension of the old principle." Accordingly, on the 11th of February 1628, Charles issued writs requiring £173,000 to be returned to the exchequer by the 1st of March for the provision of a fleet to secure the country against French invasion and for the protection of commerce, and every county in England was assessed for payment. This was the first occasion when the demand for ship-money aroused serious opposition. Lord Northampton, lord-lieutenant of Warwickshire, and the earl of Banbury in Berkshire, refused to assist in collecting the money; and Charles withdrew the writs.

It will be seen, then, that the statement of Hallam—that in 1634 William Noy, the attorney-general, unearthed in the Tower of London musty records of ship-money as a tax disused and forgotten for centuries—has no real foundation. It was, it is true, the suggestion of Noy that a further resort should be had to this expedient for raising money when, in 1634, Charles made a secret treaty with Philip IV. of Spain to assist him against the Dutch; and Noy set himself to investigate such ancient legal learning as was in existence in support of the demand. The king having obtained an opinion in favour of the legality of the writ from Lord Keeper Coventry and the earl of Manchester, the writ was issued in October 1634 and directed to the justices of London and other sea ports, requiring them to provide a certain number of ships of war of a prescribed tonnage and equipment, or their equivalent in money, and empowering them to assess the inhabitants for payment of the tax according to their substance. The distinctive feature of the writ of 1634 was that it was issued, contrary to all precedent, in time of peace. Charles desired to conceal the true aim of his policy, which he knew would be detested by the country, and he accordingly alleged as a pretext for the impost the danger to commerce from pirates, and the general condition of unrest in Europe. The citizens of London immediately claimed exemption under their charter, while other towns demurred to the amount of their assessment; but no resistance on constitutional grounds appears to have been offered to the validity of the writ, and a sum of £104,000 was collected. On the 4th of August 1635 a second writ of ship-money was issued, directed on this occasion, as in the revoked writ of 1628, to the sheriffs and justices of inland as well as of maritime counties and towns, demanding the sum of £208,000, which was to be obtained by assessment on personal as well as real property, payment to be enforced by distress. This demand excited growing popular discontent, which now began to see in it a determination on the part of the king to dispense altogether with parliamentary government. Charles, therefore, obtained a written opinion, signed by ten out of twelve judges consulted, to the effect that in time of national danger, of which the crown was the sole judge, ship-money might legally be levied on all parts of the country by writ under the great seal. The issue of a third writ of ship-money on the 9th of October 1636 made it evident that the ancient restrictions, which limited the levying of the impost to the maritime parts of the kingdom and to times of war or imminent national danger, had been finally swept away, and that the king intended to convert it into a permanent and general form of taxation without parliamentary sanction. The judges again, at Charles's request, gave an opinion favourable to the prerogative, which was read by Coventry in the Star Chamber and by the judges on assize. Payment was, however, refused by Lord Saye and by John Hampden (*q.v.*), a wealthy Buckinghamshire landowner. The case against the latter (*Rex* v. *Hampden*, 3 *State Trials*, 825) was heard before all the judges in the Exchequer Chamber, Hampden being defended by Oliver St John (*q.v.*) and Robert Holborne, and lasted for six months. Seven of the twelve judges, headed by Finch, chief justice of the common pleas, gave judgment for the crown, and five for Hampden; though two of the latter—namely, Bramston, chief justice of the king's bench, and Davenport, chief baron of the exchequer—based their judgment on technical grounds which did not touch the constitutional question at issue. The judgment of the court practically abrogated the right of parliament to control supply; and the necessity for curbing the royal prerogative in regard to taxation, thus rendered arbitrary by legal decision, became one of the chief motives in the popular resistance to Charles I., which after the Hampden trial grew increasingly formidable. In 1639 Charles ventured again to issue a writ of ship-money, but for the comparatively small sum of £70,000. In 1641, by an Act of the Long Parliament (17 Car. I. c. 2), introduced by Selden, the illegality of ship-money was expressly declared, and the Hampden judgment annulled.

See John Rushworth, *Historical Collections*, vols. i., ii., iii. (7 vols., 1659–1701); Strafford's *Letters and Despatches*, edited by W. Knowler (2 vols., London, 1739); S. R. Gardiner, *History of England from the Accession of James I. to the Outbreak of the Civil War*, vols. iii., vi., vii., viii. (10 vols., London, 1883–1884); Henry Hallam, *Constitutional History of England* (3 vols., London, 1832, &c.); Oliver St John, *Speech to the Lords, Jan. 7, 1640, concerning Ship-money* (London, 1640). (R. J. M.)

SHIPPARD, SIR SIDNEY GODOLPHIN ALEXANDER (1838–1902), British colonial administrator, was the eldest son of Captain William Shippard, 29th Regiment. He was educated at King's College school and Oxford. Taking his degree in 1863, he was called to the bar as a member of the Inner Temple in 1867. He then entered upon a long career in South Africa. He was attorney-general of Griqualand West from 1873 until 1877, when he was made acting recorder of the High Court of Griqualand. From 1880 to 1885 he sat as a judge of the Supreme Court of Cape Colony; and he was British commissioner on the Anglo-

German commission in 1884–1885 for settling the claims of British subjects at Angra Pequena and other parts of the south-west coast. Shippard, while at Oxford in 1878, had discussed with Cecil Rhodes the plan of the projected British advance in south central Africa. He saw in the German annexation of Damaraland and Namaqualand the first step in a design to secure for Germany territory stretching from ocean to ocean—a design which if executed would have been fatal to the British position in South Africa. Consequently when after the Warren expedition of 1885 he was chosen to organize the newly acquired British possessions in Bechuanaland he saw in his appointment an opportunity for forestalling the Germans, and also the Boer adventurers who likewise sought to be beforehand with Britain in the countries north of the Limpopo. From his first establishment in Bechuanaland he kept up a friendly correspondence with the Matabele king Lobengula with the object of attaching him to the British cause. At the end of 1887 he went to Graham's Town with the hope of inducing the high commissioner (Sir Hercules Robinson —afterwards Lord Rosmead) to sanction the conclusion of a treaty with Lobengula binding that ruler not to cede any part of his territory to any other power than England. "I used all my power of persuasion," Sir Sidney writes, "but failed to induce Lord Rosmead either to act on his own responsibility in the matter or to approach Her Majesty's government on the subject. As a last resource I telegraphed to Mr Rhodes, who was then busily engaged at Kimberley, to come down at once to Graham's Town and try the effect of his eloquence. He came, and by taking upon himself all pecuniary responsibility succeeded in obtaining the requisite sanction" (see article "Bechuanaland," by Sir S. Shippard, in *British Africa*, London, 1899). The treaty was signed and British interests secured. Shippard was thenceforth freer to devote himself to the special interests of Bechuanaland, which he governed with conspicuous success. He held the chief official position there from 1885 to 1895, being administrator, chief magistrate and president of the Land Commission for British Bechuanaland, and resident commissioner for the Bechuanaland Protectorate and the Kalahari. He was created K.C.M.G. in 1887. In 1896 he played an unofficial part in the negotiations between Sir Hercules Robinson and the Johannesburg reformers after the Jameson Raid. He then returned to England, where he died on the 29th of March 1902.

SHIPPING. To the floating log and paddle of the primeval fisherman must doubtless be attributed the first beginning of the great industry of merchant shipping. The hollowing of a log and the addition of a skin sail would before long serve to convert the embryo craft into a vessel navigable in the smooth and narrow waters which lapped the shores of the Mediterranean and the far distant East. The coastal villages had need of worked stone knives, of beads and of skins for winter coverings, to be obtained by barter for their fish and salt. Passing from settlement to settlement dotted on the shore, the traders found in the local skiffs a convenient alternative to the rough and tedious tracks along the winding or indented coast. In course of time they established themselves at the coastal settlements and built or purchased craft for their own use. As populations and their needs increased, the traders, gaining confidence by experience, built larger vessels and extended the area of their barter, sailing in companies, for mutual safety and defence. Of the early days of this traffic, as developed in the East, we have but little information, but in the Eastern seas, apparently, the Chinese usually came no farther than the coast of Malabar. The Malays seem in all ages to have traded with India and probably with the coast of Africa. In the Indian Ocean the Arabians were the principal carriers. Greatest of all the ancient navigators nearer to the West were the Phoenicians, the hardy sons of Tyre and Sidon. To the remarkable maritime ascendancy of Tyre Ezekiel xxvii. bears eloquent testimony. King Solomon's undertaking for the building of the temple was largely founded on the support of Phoenician Hiram. Much later, but still some 2000 years ago, ships had become a common means of transport and were of no small size, since the centurion charged with the conveyance of St Paul to Rome (Acts xxvii.) found at Myra an Alexandrian ship about to sail with wheat for Italy, which was able to take on board, besides the cargo, the whole of the company, making a total of 276 souls in all. Then, as now, ships were but links in a mighty chain of commerce on the land, a commerce for which the ports are the centres of collection and distribution. The products of India and Europe were conveyed from east and west in stages by inland or coastal routes with which in their entirety India and Europe alike were unacquainted (Vincent). And, generally, in the ancient days ocean commerce ceased with the summer season, and sea-borne goods from the distant east to the remote west found their way from entrepôt to entrepôt. These entrepôts were great trading centres, the advantageous situation of London, for example, having before the days of the Roman conquest marked it out as a convenient emporium for the northern trade.

Early history.

The Phoenicians, especially, for centuries pushed their commerce farther and farther afield, establishing factories and trading ports which in time grew into independent settlements. Cadiz, the ancient Gadir, was one of such, and from Gadir or more northern settlements the Phoenicians visited Britain, bartering merchandise for tin at Cornwall or the Scilly Isles. Amongst the various nations of the south, between whom the great shipping heritage of the Phoenicians was in course of time divided, the Rhodians rose to great importance. By these notable traders was drawn up a code of maritime laws, many of which were embodied in the Roman law, and eventually, at or about the time of Richard I., became a foundation for the Law of Oleron, which is in some part adopted at this day. Emerging from the constant struggles in the Mediterranean and Adriatic, the Venetians, Genoese and Pisans attained to great prosperity and renown, the reputation of the Genoese as shipbuilders creating from time to time a demand for their ships on the part of the nations struggling for maritime supremacy in the channel and the North Sea. The once familiar English word "argosy" dates from the appreciation of the vessels built at Arguze or Ragusa, a Dalmatian city on the Adriatic. The proximity of Italy to the Holy Land tended greatly to the prosperity of the Italian shipping.

In very early days the commerce of northern Europe was principally carried on by inland routes. With the increase and civilization of the populations, the cities on the navigable rivers and on the sea found the advantage of ocean commerce, and strove for supremacy in trade. In Britain many an ancient seaboard town, from Bristol to far north Inverness, largely owing to the enterprise of the Flemish and the German merchants, became important as a trading centre. The English merchants were not without ships, but the foreign traders were enterprising and wealthy, and in their emulation for the renowned English wool and for English hides were prepared to venture much.

In those days and for several centuries later the history of shipping was a history of arbitrary restraints, of claims for exclusive rights of trading and navigation, and of pretexts of various kinds, resulting in captures and burnings, in embargoes and confiscations in port and in fierce reprisals. The merchantman was a more or less armed vessel prepared alike for aggression or defence, a condition of affairs to which has probably to be attributed the occasional construction of vessels of a tonnage then remarkable. The ships of Spain and Portugal, of England and the Netherlands—of French shipping for a considerable period there was comparatively little—homeward bound from Indian ports and factories and from the New World's trading settlements from time to time were preyed on by one another. The Algerian and Barbary corsairs, with nothing to lose and everything to gain in merchandise and captives, were the dread of all who sailed the seas from Lisbon to Gibraltar—and indeed still farther north—and within the straits. The insurance of the voyagers against capture and the payment of head-money for their ransom was a well-established system of the times.

In England, the Cinque ports, in consideration of valuable privileges, were specially engaged to hold vessels at the service of the state, but on need arising the ports at large were called upon for ships and men. These demands at times became oppressive. Thus we read that in 1371 it was complained in parliament

that owing to the demands of the king the merchants were being ruined and their mariners driven into other trades. The size or measurement of ships was assessed on the basis of their capacity to carry tuns of wine, the first step in the present system of tonnage measurement. Ships sailed in fleets, one or more of their masters being appointed admirals, to be obeyed by all the company. In times of special maritime disturbance an armed fleet convoyed the merchantmen, much, no doubt, to the added cost of transport. The great source of England's wealth was her wool, of which the abundance and fineness gave rise to a wide demand. Staples or licensed entrepôts or marts were set up for this and other produce at certain towns in England and overseas, English merchants associating themselves at such foreign staples. In like manner foreign trading societies located themselves under certain privileges and obligations at English marts, to the great increase of shipping, more especially of foreign bottoms. About the middle of the 15th century a considerable use sprang up for shipping in the carriage of African slaves to Portugal, their captors being the Moors. In later years this melancholy trade found large employment for the ships of Liverpool, Bristol and London, trading with the distant west. Pilgrimages, too, were bringing profit to the ships, a constant stream of the devout with their offerings journeying on the one hand to the shrine of St James of Compostela and on the other to that of St Thomas of Canterbury.

English progress.

From times remote the fishing industry produced a hardy race of shipmen, the maritime nations being all more or less engaged in an enterprise rendered doubly lucrative by the want of flesh meat and the regulations of Holy Church. Thus in very early days the northern seas were thronged with rival fishing fleets, which, from about the middle of the 15th century, began to find their way to the banks of Newfoundland. At the close of the 16th century the whale was being pursued by rival fishermen on the Greenland coasts. Queen Elizabeth, for the maintenance of shipping and the increase of fishermen and mariners, forbade the eating of flesh on Wednesdays and Saturdays, an order from time to time subsequently revived. Sir Walter Raleigh, in his statement to King James, lamenting English commercial supineness as compared with the enterprise of the Dutch, declared that 20,000 vessels of all nations were engaged in fishing off the British coasts, of which vessels the Dutch owned 3000; and no doubt they formed a valuable mercantile and naval school.

The great discoveries of the renowned Spanish and Portuguese navigators in the reign of Henry VII. awoke in the maritime states a new spirit of commercial enterprise and emulation, in which Henry and his successors took an active part. A royal grant of navigation and discovery was given to the Cabots, then settled at Bristol, and "divers tall ships" of London, Southampton and Bristol traded direct with the Mediterranean ports, though the English merchants generally employed foreign vessels for this trade. A "tall" ship was apparently a vessel carrying topmast with yards and square sails, an important development of the simpler pole-mast rig of earlier times. Henry VIII. and Ferdinand of Spain entered into a league, primarily aimed at France, under which it was agreed to police the seas in protection of their shipping, the English fleet to watch the sea to Gibraltar, and Spain to guard the Mediterranean. The Corporation of the Trinity House was now established, in great part for the deepening of the Thames and to supply shipping with the ballast gained in the process, though the vessels actually London-owned were apparently few in number. Most English ships of burthen were then obtained by purchase at the South Baltic ports, where the great Hanse town, Lübeck, was the centre of an enormous trade. The Hanse towns, indeed, practically carried on the trade of England. In the time of Elizabeth, England began to achieve commercial independence. Great building of ships took place, for which bounties were granted by the queen, and Elizabeth set herself against the Hanseatic league. At the close of her reign the Steelyard was shut up, and the Dutch were competing successfully with the Hanse towns, of which "most of their teeth were out and the rest but loose." In the early days of commerce the risks were too considerable to be borne by individuals, who accordingly associated themselves as companies of merchant adventurers for the purposes of their particular trade, exclusive rights and privileges being granted to them by their own sovereign, and corresponding facilities on the part of the foreign states or cities traded with. In England certain of these societies, notably the company of Russian merchants, the Turkey merchants and, for long, the East India Company, occupied positions of influence and importance, the last-named company especially becoming possessed of much shipping, including large vessels, well armed, for prize-making or defence. The needs of trade and shipping were for long but little understood and often arbitrarily obstructed, but as a broad general principle it was recognized by the crown that the national trading interests required for their protection special privileges and concessions. Thus the patent granted by Elizabeth to the African adventurers in 1588 was expressed to be on the ground that "the adventuring of a new trade cannot be a matter of small charge and hazard to the adventurers in the beginning."

At the middle of the 16th century Antwerp was at the zenith of its great prosperity. It was described as the general storehouse of the world, and it was stated that so many as 2500 vessels might be seen lying in the Scheldt at one time. These, however, were mainly foreign, Antwerp being a mart or emporium to which other nations traded. Towards the close of the century this great city's peaceful population was, in the name of Holy Church, crushed under the iron heel of Christian Spain. Its traders fled from cruelty and torture largely to Amsterdam, about this time the northern entrepôt for Portugal's East India trade. The Hollanders, profiting by the decline of the Hanse towns, were now greatly devoting themselves to shipbuilding and to foreign trade. They, like the English, hampered in their navigation by hostile and unfriendly occupation of the ports of refuge and supply at the two great southern capes, were bent on discovering a north-east or north-west passage to the East. This enterprise and the desire for gems and precious metals, as to the existence and abundance of which there were many false beliefs, added greatly to the knowledge of the distant seas and shores, on which many settlements were being established. To such settlements the attention of the French was now directed, with much encouragement to their shipping by the powerful Richelieu. The East Indian settlements and shipping of the Portuguese were being persistently harassed by the advancing Dutch, while the rich treasure ships of Spain were laid wait for and captured by English shipping, greatly to the Spanish loss. But the Dutch especially were prospering. Amsterdam, a vast trade centre supplied by Dutch shipping, had between 1571 and 1650 trebled itself in size. So far back as 1603 Sir Walter Raleigh, in his statement to King James, had complained that the vessels of the Dutch, by reason of their greater capacity and smaller crews and consequently lower freights, were cutting out the English ships or driving them into the Newcastle coal trade. By such enterprise the Hollanders gradually became the carriers for the English merchants. English bottoms were neglected and English seamen took service with the Dutch. Affairs for English shipping had about 1650 reached a crisis. There existed, moreover, great animosity between the English and the Hollanders.

In the defence of the national shipping the great Navigation Act was in 1651 placed upon the British statute-book. Under this far-reaching act the trade between England and her colonies and the British coasting trade was strictly confined to English bottoms, English owned and manned substantially by English seamen. The act contained further provisions in support of British shipping, the effect of which was greatly to prejudice foreign shipping in its competition for the British carrying trade. It is not impossibe that some of the regulations of the act may have proceeded from the animosity already mentioned (Adam Smith). From the point of view of the Dutch, indeed, it was a "vile act and order," to be resisted at all costs. From the prolonged hostilities which ensued England finally emerged supreme at sea. For some time the French, under the powerful encouragement of Richelieu and

Navigation Act 1651.

subsequently of Colbert, had been devoting themselves to colonial enterprises both across the Atlantic and in distant India, to the eventual important increase of French shipping, whilst on the other hand Spanish shipping was declining. As the result of the Navigation Act and its successful maintenance a great increase had taken place in English tonnage, which in 1688 was said to be nearly double that of 1666. In the war with France this increase was greatly in favour of her privateers, which in two years are stated to have captured 3000 British ships as against but 67 which were taken from France, a result in part attributable to her employment of Dutch vessels. About this time Inverness, long devoted to shipbuilding, had obtained a high reputation for its ships.

In 1701 England's private shipping numbered 3281 vessels, of a total burthen of 261,222 tons and carrying 5660 guns, London leading with 560 ships of 84,882 tons, Bristol coming next with 165 of 17,338 tons, Liverpool being seventh on the list with 102 ships. Thirty years later London's ships had increased to 1417, ranging from 15 tons to a great ship of 750 tons owned by the South Sea Company, but the majority measured less than 200 tons. In 1765 we read that the Dutch, Danish and Swedish ships were generally larger than the English vessels and that they had succeeded in ousting England as the carrier of Lisbon's Mediterranean trade. In 1714 an act was passed, and at subsequent dates revived, offering public rewards for improved methods of ascertaining longitude at sea, and John Harrison (" that heaven taught artist ") received in all £20,000 for the invention of a chronometer which was successful to a degree of accuracy beyond that for which the act provided. Towards the second half of the 18th century the foundations were laid of the present great shipping industry on the Great Lakes. Oak timber of large size was now becoming scarce in England, and in the interests of the navy restrictions were placed upon the East India Company as regards its use. British merchant shipping, too, had apparently outgrown the supply of seamen, for towards the close of the century it was permitted to British vessels to carry foreign seamen to the extent of three-fourths of the crew. The traffic in African negroes gave much employment to British shipping. The war with America led to the harrying of British commerce by American privateers cruising off the English coasts. War premiums were very high and the insurance obtainable was insufficient. Partly on this account and partly owing to the fact that about 1000 British vessels had been taken up for transport and other public services, whilst many more were sailed as privateers, the Thames was now full of foreign vessels loading British cargoes. During the absence from the West Indies of the British fleet under Admiral Byron, engaged in conveying homewards the West Indian merchantmen, two valuable British islands were captured by the French. The hostilities of the rival states were being fought out at sea, with peaceful commerce as their objective. The seas swarmed with privateers, armed and equipped as sordid speculative enterprises, occasional rich prizes stimulating the greed of many citizens, not a few of them, no doubt, the owners of ships and merchandise which had in like manner fallen to the enemy. The French privateer " Bordelais," captured by the English in 1799, is reported to have taken in four years 164 prizes, of the net value of £1,000,000 sterling (Mahan). Between May 1756 and July 1757 a total of 772 French vessels was captured by the British, whilst 637 British ships were taken by the French. It was declared in the House of Lords in February 1778 that the value of the British captures of American vessels had amounted to £1,808,000, against which that of British shipping captured by America had been £1,800,000. Towards the close of the prolonged hostilities which concluded in 1815 Liverpool and Glasgow were holding public meetings and urging upon the admiralty and the throne that they were being ruined by the want of protection to their shipping. In 1786 an act was passed (26 Geo. III. c. 86) for the encouragement of shipping, in which the personal liability of shipowners, till then unlimited, was in certain cases of their loss of cargo now limited to the value of the vessel and her freight, the first of progressive acts of the like nature. Smuggling was for long the cause of serious loss to the national revenue, and an act was passed declaring forfeited any British sloops or cutters found within four leagues of the coast if provided with a bowsprit exceeding two-thirds of the vessel in length (27 Geo. III. c. 32).

18th century.

In 1797 the English and Scottish private vessels numbered together 12,995 of 1,385,252 tons burthen. With respect to tonnage, in the days of wooden vessels the weight of cargo which a ship was capable of carrying was about equivalent to her own displacement or breaking-up weight. Nowadays, owing to steel construction and the adoption of a fuller cross-section in ship designing, the carrying capacity of a cargo steamer is reported to be about double, or even more than double, the ship's own weight; but types of steamers of course vary. The Board of Trade ton is 100 cub. ft., purely a measure of permanently covered-in space, and not to be confounded with the ship's capacity to carry dead-weight, of which capacity the registered tonnage is consequently not to be regarded as an index. For the purpose of a rough and ready calculation, however, the dead-weight carrying capacity of an average cargo steamer may be taken to be about twice that of her net registered tonnage or a little more. The chief object of fixing and registering the gross and net tonnage is the establishment of a basis of assessment for tonnage dues and for liability for payment of damages caused by wrongful navigation or otherwise. The present diversity in the designs of steamships is in no small degree due to a desire on the part of shipowners to possess vessels which with a minimum of registered tonnage shall provide a maximum of cargo space.

The close of the 18th century was marked, especially in America, by attention to the possibilities of steam navigation. A new era in shipping had dawned, and year by year and step by step, from river craft to short-voyage vessels, the new motive power gained ground. In 1833 the Canadian vessel " Royal William " steamed throughout from Quebec to London, making the voyage in seventeen days, and in 1838 the " Great Western " and the " Sirius " arrived on the same day at New York, having crossed the Atlantic in eighteen days and fifteen days respectively (Pollock). In 1840 was founded the celebrated Cunard Steamship Company, the nucleus of its fleet being four wooden paddle steamers, also equipped as sailing vessels. Each was about 206 ft. in length and of about 1145 tons burthen. At the beginning of the 19th century American shipowners had laid themselves out to obtain command of the Atlantic trade, from which the British Navigation Act did not debar them. With this aim, ships of great sailing power and carrying capacity were constructed, being provided in addition with ingenious labour-saving devices which materially enhanced their economy in working. Successful in their attempts on the Atlantic trade, the Americans now set themselves to gain predominance in the trade with China, for which they provided vessels of unexampled speed. But British owners, put upon their mettle, eventually succeeded in designing a class of sailing ship superior to any yet constructed, while the advantages of steam navigation were now proving fatal to American sailing vessels in the Atlantic (Cornewall-Jones). The use of steam was becoming general, to the gradual displacement of sailing vessels, though the Australian trade for some considerable time continued to be carried on by sailing ships of wide renown. The opening of the Suez Canal and the provision of coaling stations on the long sea routes eventually, however, placed the bulk of the Australasian carrying trade in the hands of the steamship owners, the principal employment for large sailing vessels now being in the Pacific trade. Probably in great part on account of the cost and difficulty of fuel supplies, the Californian wheat trade, and the guano and the nitrate trades of the South Pacific, are thus still competed for by sailing vessels, some of them of remarkable capacity. For some years the possibilities of iron in shipbuilding had been slowly gaining recognition, to the eventual displacement in Great Britain, though not in the United States, of wooden hulls. Partly as the result of the war between the northern and southern states and partly

19th century.

owing to the superior advantages of iron hulls, not yet constructed in America, the United States now further lost place as ocean carriers. In 1908 the chief employment of her ocean shipping was on the Atlantic coast and in the Gulf of Mexico.

The steady increase in steam-propelled vessels resulted in the establishment of many coaling stations in distant parts, with much employment of shipping to supply them. Towards the middle of the 19th century British shipowners were greatly alarmed at proposals to repeal the navigation acts, and in spite of their petitions and remonstrances, and of demands that the bill, eventually introduced, should at least require reciprocity, in 1849 the proposed measure became an act, the coastal trade being in 1854 similarly thrown open, this latter measure being induced by the need for British ships and seamen for the purposes of the Crimean War (Lindsay). Probably in no small degree owing to the discovery of gold in California and Australia about this time, and to the further employment provided for shipping by the Crimean War and by the necessities of the Indian Mutiny, the direful forebodings of British owners as to the consequences of the repeal of the Navigation Act were not verified. In 1856 the Treaty of Paris and its appended Declaration pronounced, amongst other notable clauses affecting maritime warfare, the abolition of privateering. To this great treaty most of the maritime states in course of time gave their adhesion, the United States and Spain, however, not yet being signatories. The altered conditions as between warships and merchant vessels, and the disabilities imposed by neutrality laws have, however, in themselves done very much to render privateering as formerly conducted no longer possible. But the Declaration, notwithstanding, the employment of duly commissioned merchant vessels may still be resorted to by the state for the destruction of commerce and for other belligerent purposes.

In 1858, after great difficulty and outlay, Brunel's huge ship the "Great Eastern" was floated on the Thames. The vessel, having a length of 679 ft. and a burden of 18,337 tons gross and 13,344 tons net (Lloyd's Register) and being provided with six sail-carrying masts, was furnished both with a screw propeller and with paddles. Highly successful as an engineering enterprise, commercially she was from the first a ruinous failure. Under the remarkable development of the Atlantic passenger traffic, however, the size of steamships steadily and continually increased.

In 1873, as the outcome of a prolonged public agitation conducted by Mr Samuel Plimsoll, member for Derby, a royal commission was appointed to inquire into his allegations that many lives were lost owing to the unseaworthiness of ships. In 1876, under pressure of public sympathy with the views of Mr Plimsoll, an amended Merchant Shipping Act was passed (39 & 40 Vic. c. 80), making it a penal offence to knowingly send a ship to sea unseaworthy, and requiring a loadline to be fixed on British vessels, the line to be indicated on ocean going vessels by what is now universally known as the Plimsoll mark.

The opening in 1869 of the Suez Canal created a revolution in the eastern shipping trade. Year by year steamships increased greatly in number and in burden. With improved conditions of steam navigation the supplementary use of sails was generally abandoned, masts being retained only for signalling purposes and as attachments for cargo hoists. New conditions in ship construction, the commercial demand for expedition and the manufacture of new articles of commerce together resulted in an increased risk of fire on ships both at sea and in port, with great loss primarily to underwriters, more especially by the flooding of holds full of valuable cargo. To overcome this danger steamships are being increasingly equipped with an apparatus which on the outbreak of fire enables the holds to be filled with a fire-extinguishing gas. The invention and adoption of refrigerating machinery and insulated holds resulted in the development of a vast trade in frozen meat and perishable produce.

The triumph of Germany in the Franco-Prussian War awoke in the Fatherland a spirit of industrial enterprise which greatly increased the population of her manufacturing areas. The supplies required by the prosperous industrial populations and the national demand for raw materials for the manufactories, together with the great export trade for which these were now laying themselves out, filled the German and other North Sea ports with shipping. Germany, able to consume whole shipload of various foreign products, now imported these direct instead of in parcels through London and other ports. Unwilling that the profit of carrying her great and increasing trade should be reaped by foreign bottoms, Germany turned herself to shipowning and shipbuilding, and with remarkable success. So great, indeed was this success that important lines of German steamships rapidly grew up as competitors with British and other lines in foreign trades. Both in bringing home raw materials and in enabling German manufacturers to send their products to foreign consumers at low rates of freight, the German shipping was now greatly increasing the national prosperity. In return the state neglected nothing which would promote the success of its industrial centres in their competition for foreign markets or which would assist the development of the national shipping. Rates of carriage from inland centres to the shipping ports were in the case of goods intended for shipment by German vessels considerably reduced by the state railways; and whereas in Great Britain shipping subsidies or subventions are granted essentially if not solely for services to be rendered, in Germany the granting of subsidies has also in view the development of the national shipping. The notable growth in Germany's trade and shipping is in fact believed to be in no small degree attributable to a system of subsidies to shipping in conjunction with preferential railway rates on German goods despatched for shipment under "through" bills of lading under the national flag.

In the Far East also, a new and important maritime competitor has sprung up, the industrial and commercial awakening of Japan having been attended by the creation of a Japanese merchant fleet and by much enterprise in the national shipbuilding. To the name of every Japanese merchant vessel is added the word "Maru," in ancient times a masculine "humility title," but in its present use having the approximate signification of "dearest" or "esteemed."

The following figures, supplied by Lloyd's Register, recording the number and tonnage of German and Japanese steamers and sailing vessels of 100 tons and upwards, illustrate severally the recent maritime progress of the two countries:—

Year.	Germany.		Japan.	
	No.	Sailing Vessels Net, Steamers Gross.	No.	Sailing Vessels Net, Steamers Gross.
		Tons.		Tons.
1890	1875	1,569,311	289	171,554
1900	1710	2,650,033	1066	574,557
1908	2178	4,232,145	..	..
1908 steamers only	1806	3,839,378	865	1,140,177

In consequence of an act passed by the French government to grant bounties on sailing vessels constructed and owned in France the owners of such vessels found it to their profit, the bounty being assessed on distances sailed, to engage in long voyages with the earning of freight as a secondary consideration. This procedure being found to operate prejudicially on the freight earnings of sailing vessels generally, and more especially in the Pacific trade, an international meeting of the owners of sailing vessels was held at Paris in 1903, with the result of the formation of the Sailing Ship Owners' International Union to maintain rates of freight, French owners identifying themselves with the measures decided on by the union in the common interest. Influenced, no doubt, by German example, certain French steamship companies about this time decided to grant preferential combined tariffs on goods sent from inland centres of production in France for shipment by their vessels, to the great dissatisfaction of the owners of foreign steamers loading for similar destinations at French ports.

Early in 1902 a shipping pool or "combine" was effected in the case of certain important British steam lines engaged in the North Atlantic trade. The combine, involving vast capital

values, was engineered by a well-known New York business house largely interested in American railways. In England it was variously attributed to a resolve on the part of American traders to share in the transport of the national trade; to a desire on the part of the lines concerned to effect economies by a consolidation of management, and to a scheme intended to benefit certain great American railways. The transaction gave rise to much comment in Great Britain, being by not a few regarded as contemplating the eventual transfer of the lines to American ownership. And indeed, though the steamers continued to be under the British flag, the extent to which they remain substantially under British ownership cannot be affirmed. It was stated in 1908 that on completion of its building programme the combined fleet would consist of 132 vessels of together 1,159,704 tons.

The general adoption of steamships in place of sailing vessels was gradually followed by their separation into two classes, one devoted to a fixed service on regular lines of employment, the other to promiscuous trade. The former class are now known somewhat vaguely as "liners," ranging, however, from the first-class mail and passenger steamer on the one hand, to the regular cargo steamer on the other. To the second class belong the "seekers" or "tramps" which come and go wherever profitable employment offers, and which more especially lay themselves out to be chartered to carry full cargoes of coal, timber, wheat, nitrate, jute and such like. These vessels, some of which are of great capacity, are frequently in competition with the liners. This competition sometimes results in "cut rates" of freight, to the serious loss of the great shipowning firms and companies. With the establishment of regular lines, moreover, there grew up competition between rival lines, with similar results. A solution was found by the creation of working agreements between rival lines at agreed rates of freight, but the lines thus associated were still exposed to the attacks of "tramps" upon what the liner owners regarded as their privileged trade. Fierce conflicts from time to time ensued, with great disturbance of the freight market and with consequent loss or inconvenience to the merchants themselves. As the result, shipping "rings" or "conferences" were created in many trades, the owners of the liners undertaking to provide the traders with a regular service accompanied by advantageous conditions, whilst the traders undertook to ship only by the conference steamers. In order to ensure this support, the shipowners instituted the system of deferred rebates, under which each merchant, at the end of a year or other fixed period, should be entitled to a discount or rebate on the amount of freight paid by him during such period, provided that he should have shipped no goods at all by steamers outside the conference, the discount only to be paid after a further fixed period of six or nine months, during which time also he should rigidly support the conference lines. In the event of failure to comply with the conditions, a merchant is exposed to forfeiture of the rebate, and in addition to measures in the nature of a boycott on the part of the conference lines. Notwithstanding, attempts are from time to time made by steamers outside the ring to gain admittance, with the consequence of occasional freight wars, and with the incidental result that goods are sometimes carried, for example, from America to a British colony at lower rates of freight than similar goods manufactured in England. Mainly on account of complaints made against the working of the South African ring, a British royal commission was in 1906 appointed to take evidence and report upon the subject generally.

With the growth of populations and the development of means of transport, both by land and sea, a great increase arose both in production and consumption, and competition became very keen for markets, both home and foreign. In this competition the cost of carriage is always an element of great importance, even though the freight payment may bear but an insignificant relation to the value of the goods carried. For in modern trade rivalries every penny saved in charges counts with the importer, and if goods of a similar kind can, by reason of lower transport charges, be obtained a fraction cheaper from one industrial centre than from another, the tendency is to give the preference to the centre or country which can deliver most cheaply to the consumer. Trade follows cheapness, and, with the world's industrial development, the striving for cheapness took at the outset the form of economies in production. The day of small trade with large profits was passed, and producers of all kinds now aimed at a large output at diminished cost, and contented themselves with a smaller ratio of profits on a larger business. The utmost economy was studied with a view to successful competition, especially in overseas markets; and in this struggle for the cheapening of supplies the cost of transport became an important element. The fact was recognized that the ship is but a link in the chain of connexion between producer and consumer, and the system of "through" bills of lading was introduced, under which a particular steamer line or railway service contracted for the through-carriage of goods in conjunction with other lines, with the object and effect of cheapening the transport as a whole. Individual shipowners, in order to obtain cargoes for their ships, were in turn driven to devise economies in transport, with the result that rates of freight were continually reduced. In modern ocean carriage size means cheapness, the transport of a given weight of cargo being cheaper in a single vessel than in two vessels each of half the size. For not only does this concentration of carrying power effect economy in officers and crew, with their wages, provisions and accommodation space, but in shipbuilding also size makes for cheapness. Thus, if, for example, two steamers each carrying 2000 tons will cost together say £40,000, a single vessel of equal carrying capacity can be supplied for £35,000. Or, put another way, if for £40,000 two steamers can be built to carry between them 4000 tons, for the same sum a single vessel can, it is stated, be provided to carry 4700 tons. Consequently, the size of vessels is continually on the increase, and no sooner is a navigable channel at much cost made deep enough for the great vessels knocking at the door of the port, than still larger are constructed, and shipowners complain anew that the harbour depth provided is insufficient. The constant demand for greater depths resulted in the production of mammoth dredgers of which, also, the size and power are continually increasing. At the present time it is the navigable depth of ports and canals, and the need of adequate dry docks, rather than the obtaining of cargoes, which are the controlling factors in the size of great ocean vessels. But the heavy interest on the capital cost of these vessels and their working expenses call for the utmost despatch in their loading and discharge, and with the simultaneous arrival of several vessels of large tonnage, the question of prompt discharge is one of great and increasing difficulty. For many modern steamers will carry 10,000 tons of cargo, and some a great deal more; so that, with old-type railway trucks carrying ordinarily only about 8 tons, it not infrequently happens that the discharge of the ship, equipped though she be with remarkable facilities for landing her cargo and assisted by discharge into barges, is impeded owing to deficiency of shore clearance. If 8 tons be taken as the capacity of an ordinary railway truck and 30 trucks be allowed to a train, it will be obvious that a single modern cargo ship will require a vast procession of rolling stock to clear her cargo. A single cargo of 10,000 tons, for example, will require some 1250 railway trucks for its removal; or, allowing 6 yards' length to the truck, 7500 yards of rolling stock, without engines and vans. And, in fact, congestion of shipping owing to delays is frequently the cause of bitter complaint in the case of certain ports. Trucks of much increased capacity are now being introduced, but for various reasons their adoption is very slow. In port polemics the argument is sometimes heard that the backwardness of this or that port will result in the trade being driven elsewhere: the ships, it is said, will remove it. But the ship is but the blind instrument of trade, to come and go where and as trade calls it. The ship will, however, sooner or later require a higher rate of freight for ports of slow despatch, and this increased expense in transport will undoubtedly operate in favour of rival ports. For the ports themselves are but stepping-stones to or from a market or industrial centre, and the market will always select the cheapest route for its trade.

With the increase of populations in the Old World and the development of new countries, the transport of emigrants and of travellers for business and for pleasure became a highly important and lucrative source of employment for steam shipping. It is now indeed becoming a common practice on the part of ocean steamship companies to employ a surplus or superseded vessel of their fleet solely in carrying holiday tourists to a succession of foreign ports. In regular traffic the demand for increased speed and greater security and comfort on the part of ocean travellers resulted in the competitive evolution of passenger steamers of dimensions and draught which create an increasing strain on port and dock authorities.

These remarks must not be concluded without mention of the important part played in the evolution of modern shipping by the system of marine insurance and by the rules of classification. For the cost of insurance is a heavy tax on the profits of the shipowners, and only by providing vessels of the best construction and maintaining their reputation can owners gain the advantage of low insurance rates. And not only so, but by the merchants also, to whom insurance premiums are a no less serious consideration; vessels of the highest class and reputation are insisted on with a view to cheap cargo insurance, inferior ships being consequently placed at a serious disadvantage. On the other hand, the rules of construction and classification of the Society of Lloyd's Register (a body altogether distinct from the Corporation of Lloyd's) are most exacting, and any failure to comply with the rules of the Register or "Book," which, moreover, are in a constant state of scientific evolution, may involve withdrawal of the vessel's class, a result which would be fatal to her cheap insurance as well as to her employment in successful competition for freights. With its skilled surveyors at foreign, colonial and home ports, the great society offers every facility for the classing of the whole world's shipping, and foreign as well as British owners are fully alive to the importance of a strict compliance with the Book's requirements. Consequently, amongst the various factors making for improved construction and the greater safety of shipping, the beneficent influence of Lloyd's Register occupies a foremost place.

But the various factors or forces which make for the evolution of shipping may all be summed up under the word "competition," which is the mainspring of the machinery both of insurance and classification. These factors operate, however, in different ways. Thus, while insurance and classification make most for ships' increased safety, the desire for profitable freights tends continually to their greater size. But making also for increased size, and in addition for the many improvements and inventions which result in luxury and comfort at sea, the vast influence of the ocean passenger is conspicuous. For, no longer regarded as an encumbrance to be made room for on a cargo ship, the modern age of travel has rendered him a vast source of profit. The old position is reversed, and now fast-steaming hotels are built for ocean travellers, in which cargo occupies a secondary place, which only merchandise able to pay highly for the costly advantage of a speedy voyage can afford to occupy. The growth of the passenger traffic and the demand of travellers for routes the most direct is, in turn, creating or developing ports which have small regard to cargo considerations, and involving the ports, both old and new, of the various maritime states in a keen and costly competition for the great passenger steamers. This competition is further enhanced by railway lines at rivalry for the conveyance of the ocean passenger and for the more valuable merchandise able to pay high rates for speed between ocean port and inland city, and therefore shipped by the fastest vessels. Competition for freights and competition for passengers, these are the great and beneficent forces which are silently but irresistibly developing the ship, while insurance and classification are the potent handmaids of this competition.

Number and Tonnage of Steamers and Sailing Vessels (of 100 tons and upwards) belonging to various countries as recorded in the 1908 Edition of Lloyd's Register or Book.

Country.	Vessels.	Tonnage. (Net for Sailing Vessels and Gross for Steamers.)
United Kingdom	9,542	17,318,351
United Kingdom and Colonies (A)	11,563	18,709,537
United States (B)	3,480	4,810,268
Germany	2,178	4,232,145
Norway	2,148	1,982,878
France	1,517	1,883,894
Italy	1,098	1,285,225
Japan (Steamers only)	865	1,140,177
Russia (C)	1,381	974,517
Sweden	1,542	904,155
Spain	551	701,278
Holland	565	876,620
Denmark	870	733,790

N.B.—The figures of the official or Board of Trade returns, owing to their inclusion of vessels below 100 tons, differ more or less widely from the totals as appearing in Lloyd's Register.

(A) Wooden colonial vessels trading on the Great Lakes of North America are not included. (B) These figures only include seagoing vessels and iron and steel vessels trading on the Great Lakes. (C) These figures do not include sailing vessels registered in southern Russia.

The following table illustrates the growth and progress of British home shipping:—

Number and Tonnage of Steamers and Sailing Vessels registered in the United Kingdom, Isle of Man and Channel Islands on 31st of December of various Years. (Official Returns of the Board of Trade.)

Year.	Steamers.			Sailing Vessels.			Total.		
	No.	Tonnage.		No.	Tonnage.		No.	Tonnage.	
		Net.	Gross.		Net.	Gross.		Net.	Gross.
1830	298	30,339	..	18,876	2,171,253	..	19,174	2,201,592	..
1840	771	87,928	..	21,883	2,680,334	..	22,654	2,768,262	..
1850	1,187	168,474	.	24,797	3,396,659	..	25,984	3,565,133	..
1860	2,000	454,327	..	25,663	4,204,360	..	27,663	4,658,687	..
1870	3,178	1,112,934	..	23,189	4,577,855	..	26,367	5,690,789	..
1880	5,247	2,723,468	..	19,938	3,851,045	..	25,185	6,574,513	..
1890	7,410	5,042,517	8,095,370	14,181	2,936,021	3,055,136	21,591	7,978,538	11,150,506
1900	9,209	7,207,610	11,816,924	10,773	2,096,498	2,247,228	19,982	9,304,108	14,064,152
1907	11,394	10,023,700	16,513,800	9,648	1,461,490	1,575,900	21,042	11,485,190	18,089,700

(D. O.)

SHIPTON, MOTHER, a witch and prophetess who is supposed to have lived in early Tudor times. There is no really trustworthy evidence as to her ever having existed, but tradition has it that her maiden-name was Ursula Southill, Sowthiel or Southiel, and her parents were peasants, living near the Dropping Well, Knaresborough, Yorkshire. The date of her birth is uncertain, but it is placed about 1486–1488. Her mother, Agatha Southill, was a reputed witch, and Ursula from her infancy was regarded by the neighbours as "the Devil's child." The girl's appearance seems to have been such as to encourage superstitions. Richard Head in his *Life and Death of Mother Shipton* (1684) says, "the body was of indifferent height, her head was long, with sharp fiery eyes, her nose of an incredible and unproportionate length, having many crooks and turnings, adorned with many strange pimples of divers colours, as red, blue and dirt, which like vapours of brimstone gave such a lustre to her affrighted spectators in the dead time of the night, that one of them confessed several times in my hearing that her nurse needed no other light to assist her in her duties." Allowing for the absurdity of this account, it certainly seems (if any reliance is to be placed on the so-called authorities) that the child was phenomenally plain and deformed. While still at school she became known as a prophetess. When about twenty-four she married a builder of York, Tobias Shipton.

Her most sensational prophecies had to do with Cardinal Wolsey, the duke of Suffolk, Lord Percy and other men prominent at the court of Henry VIII. There is a tradition that on one occasion the abbot of Beverley, anxious to investigate the case for himself, visited Mother Shipton's cottage disguised, and that no sooner had he knocked than the old woman called out "Come in, Mr Abbot, for you are not so much disguised but the fox may be seen through the sheep's skin." She is said to have died at Clifton, Yorkshire, in 1561, and was buried there or at Shipton. Her whole history rests on the flimsiest authority, but her alleged prophecies have had from the 17th century until quite recently an extraordinary hold on the popular imagination. In Stuart times all ranks of society believed in her, and referring to her supposed foretelling of the Great Fire, Pepys relates that when Prince Rupert heard, while sailing up the Thames on the 20th of October 1666, of the outbreak of the fire "all he said was, 'now Shipton's prophecy was out.'" One of her prophecies was supposed to have menaced Yeovil, Somerset, with an earthquake and flood in 1879, and so convinced were the peasantry of the truth of her prognostications that hundreds moved from their cottages on the eve of the expected disaster, while spectators swarmed in from all quarters of the county to see the town's destruction. The suggestion that Mother Shipton had foretold the end of the world in 1881 was the cause of the most poignant alarm throughout rural England in that year, the people deserting their houses, and spending the night in prayer in the fields, churches and chapels. This latter alleged prophecy was one of a series of forgeries to which Charles Hindley, who reprinted in 1862 a garbled version of Richard Head's *Life*, confessed in 1873.

See Richard Head, *Life and Death of Mother Shipton* (London, 1684); *Life, Death and the whole of the Wonderful Prophecies of Mother Shipton, the Northern Prophetess* (Leeds, 1869); W. H. Harrison, *Mother Shipton investigated* (London, 1881); *Journ. of Brit. Archaeo. Assoc.* xix. 308. *Mother Shipton's and Nixon's Prophecies*, with an introduction by S. Baker (London, 1797).

SHIRAZ, the capital of the province of Fars in Persia, situated in a fertile plain, in 29° 36′ N., 52° 32′ E., at an elevation of 5100 ft., 156 m. by road N.E. by E. from Bushire (112 m. direct). According to Eastern authorities Shiraz was founded in A.D. 693 by Mahommed b. Yusuf Thakefi, a brother of the famous Hajjaj. It is approached on the south from the Persian Gulf through lofty and difficult mountain passes (highest 7400 ft.) and on the north through chains of hills which separate the plain of Shiraz from that of Mervdasht, where the ruins of Persepolis are. It is surrounded by a low mud wall flanked by towers, and a dry ditch, and measures about 4 m. in circumference. There are six gates. The town is divided into eleven quarters (*mahalleh*), one of which is exclusively inhabited by Jews and called Mahalleh Yahudi. The population of Shiraz is estimated at 60,000, but in 1884 it was 53,607, of which 1970 were Jews. The houses of Shiraz are, in general, small, and the streets narrow. A great bazaar, built by Kerim Khan Zend, forms an exception to this; it is about 500 yds. in length and has a vaulted roof 22 ft. high, and contains many spacious shops well supplied with goods and merchandise. There are many mosques, the most notable being the old Jama, a foundation of the Saffarid ruler Amr b. Leith in 894, now in a state of ruin; the new Jama, generally called Masjed i Nau; the New Mosque, built by Atabeg S'ad b. Zengi, *c.* 1200; and the Jama i Vakil, built by Kerim Khan Zend in 1766. Shiraz still possesses the title "Dar ul ilm," the "Seat of Knowledge," and has many colleges (*madresseh*), the oldest being the Mansurieh built in 1478 by Seyed Sadr ed din Mahommed Dashteki; the Hashimiyeh and Nizamieh date from the middle of the 17th century, the college called M. i Agha Baba was begun by Kerim Khan Zend, *c.* 1760, but finished in 1823 by Agha Baba Khan Mazanderani. Of the twenty caravanserais, or more, which Shiraz has, the oldest is that called Car Chiragh Ali, built in 1678. There are several shrines of Imam-zadehs, the most venerated and rich being that of Seyed Amir Ahmed, commonly known as Shah Chiragh, a son of Mūsā Kāzim, the seventh imam of the Shiites. It was built *c.* 1240 by Atabeg Abu Bekr. Two of Shah Chiragh's brothers and a nephew also have their graves at Shiraz. Within the town and in close proximity to it are many pleasant gardens (*bagh*), among them the B. Jehan Nema (Kerim Khan 1766), where C. J. Rich, British resident at Bagdad and explorer of Babylon and Kurdistan, died on the 5th of October 1821, and the adjoining B. i Nau (1810); B. i Takht i Kajar (built 1087 by Atabeg Karajeh under the Seljuk Malik Shah; restored 1794 by order of Agha Mahommed Khan, the first Kajar ruler); B. i. Dilgusha (restored 1785), &c. Close to the last-mentioned garden is the Sadiyeh, an enclosure with the tomb of the celebrated poet S'adi, and in a cemetery near the northern side of the town stands the Hafiziyeh, with the tomb of the likewise celebrated poet Hafiz, a sarcophagus made of yellow Yezd marble with two of the poet's odes beautifully chiselled in relief in a number of elegant panels upon its lid. A fine view of the town and environs is obtained from the narrow pass (*tang*), which leads into the Shiraz plain a mile or two north of the city, and "so overwhelmed with astonishment at the beauty of the panorama is the wayfarer expected to be, that even the pass takes its name of Tang i Allahu Akbar, the Pass of God is Most Great, from the expression that is supposed to leap to his lips as he gazes upon the entrancing spectacle" (Curzon).

The most noted product of Shiraz is its wine made from the famous grapes of the Khullar vineyards, 30 m. N.W. of Shiraz, but only a very small quantity of it is exported, and religious scruples still prevent its manufacture on a large scale. The climate of Shiraz is agreeable and healthy in the winter, but unhealthy in the spring and summer. July is the hottest month with a mean temperature of 85°, February the coldest with 47°. The lowest temperature observed during a number of years was 21°, the highest 113°, showing a difference of 92° between extremes. The mean annual temperature is 65°. Earthquakes are of frequent occurrence; those in modern times which caused great loss of life and destruction of property happened in 1824 and 1853. Shiraz is the residence of a British consul (since 1903) and has post and telegraph offices. On a hill adjoining the Dilgusha garden stand the ruins of an old castle known as Kal'ah i Bender (a corruption of Fahn-dar), with two wells hewn in the rock to a depth of several hundred feet. (A. H.-S.)

SHIRÉ, a river of East Central Africa, the only tributary of the Zambezi navigable from the sea. The Shiré (length about 370 m.) issues from the southernmost point of Lake Nyasa and almost immediately enters a shallow sheet of water called Malombe (or Pa-Malombe), 18 m. broad and 12 or 13 m. long. A shifting bar of sand obstructs the end of Malombe nearest Nyasa, but does not prevent navigation. Below Malombe the bed of the Shiré deepens. The river flows through a mountainous country, and in its descent to the Zambezi valley forms rapids and cataracts, rendering its middle course for a distance of 60 m. unnavigable. The most southern and the finest of these cataracts is called the Murchison Cataract or Falls, after Sir Roderick Murchison, the geologist, who identified himself during the mid-Victorian epoch with geographical exploration in Africa. In passing the cataracts the Shiré falls 1200 ft. From the station called Katunga, a short distance below the cataracts, shallow-draught steamers can navigate the river when in flood (January–March) to its junction with the Zambezi, and thence proceed to the Chinde mouth of the main stream. About 130 m. above its confluence with the Zambezi the Shiré is joined from the east by a smaller stream, the Ruo river, whose headwaters rise in Mount Mlanje. At the junction of the Ruo and Shiré is the town of Chiromo, and here is an extensive swampy region and game reserve known as the Elephant Marsh. The scenery of the lower Shiré is very picturesque, the spurs of the plateau forming bold, rocky crags overhanging the water. The river is studded with small islands usually covered by thick grass. A little before the Zambezi is reached the country becomes flat. The Shiré joins the main river in about 35° 25′ E., 17° 50′ S., at a point where the Zambezi is of great width and presents in the dry season many narrow winding channels, not more than 3 ft. deep, with intervening sandbanks.

The lower part of the Shiré is in Portuguese territory; the upper part is in the British Nyasaland Protectorate, to which it

is the natural highway. At the lowest point in British territory, on the west bank of the river, is Port Herald, whence a railway runs past Chiromo to Blantyre. Below Port Herald the Shiré is navigable all the year round.

See Zambezi and British Central Africa.

SHIRE, one of the larger administrative divisions, in Great Britain, now generally synonymous with "county" (*q.v.*), but the word is still used of smaller districts, such as Richmondshire and Hallamshire in Yorkshire, Norhamshire and Hexhamshire in Northumberland. The Anglo-Saxon shire (O. Eng. *scir*) was an administrative division next above the hundred and was presided over by the ealdorman and the sheriff (the shire-reeve). The word *scir*, according to Skeat (*Etym. Dict.*, 1910), meant originally office, charge, administration; thus in a vocabulary of the 8th century (Wright-Wülcker, *Anglo-Saxon and Old English Vocabularies*, 1884, 40-32) is found *procuratio, sciir*. Skeat compares O. Eng. *scirian*, to distribute, appoint, Ger. *Schirrmeister*, steward. The usual derivation of the word connects it with "shear" and "share," and makes the original meaning to have been a part cut off.

SHIRLEY (or Sherley), **SIR ANTHONY** (1565–*c.* 1635), English traveller, was the second son of Sir Thomas Shirley (1542–1612), of Wiston, Sussex, who was a member of parliament during the reigns of Elizabeth and James I. and who was heavily in debt when he died in October 1612. Shirley's imprisonment in 1603 was an important event as in consequence thereof the House of Commons successfully asserted one of its privileges—freedom of its members from arrest. Educated at Oxford Anthony Shirley gained some military experience with the English troops in the Netherlands and also during an expedition to Normandy in 1591 under Robert Devereux, earl of Essex, who was related to his wife, Frances Vernon; about this time he was knighted by Henry of Navarre (Henry IV. of France), a proceeding which brought upon him the displeasure of his own sovereign and a short imprisonment. In 1596 he conducted a predatory expedition along the western coast of Africa and then across to Central America, but owing to a mutiny he returned to London with a single ship in 1597. In 1598 he led a few English volunteers to Italy to take part in a dispute over the possession of Ferrara; this, however, had been accommodated when he reached Venice, and he decided to journey to Persia with the twofold object of promoting trade between England and Persia and of stirring up the Persians against the Turks. He obtained money at Constantinople and at Aleppo, and was very well received by the shah, Abbas the Great, who made him a *mirza*, or prince, and granted certain trading and other rights to all Christian merchants. Then, as the shah's representative, he returned to Europe and visited Moscow, Prague, Rome and other cities, but the English government would not allow him to return to his own country. For some time he was in prison in Venice, and in 1605 he went to Prague and was sent by the emperor Rudolph II. on a mission to Morocco; afterwards he went to Lisbon and to Madrid, where he was welcomed very warmly. The king of Spain appointed him the admiral of a fleet which was to serve in the Levant, but the only result of his extensive preparations was an unsuccessful expedition against the island of Mitylene. After this he was deprived of his command. Shirley, who was a count of the Holy Roman Empire, died at Madrid some time after 1635.

Sir Anthony's elder brother, Sir Thomas Shirley (1564–*c.* 1620), was knighted while serving in Ireland under Sir William Fitzwilliam in 1589. In 1601 he was chosen a member of parliament, but his time was mainly passed in seeking to restore the shattered fortunes of his family by piratical expeditions. In January 1603 he was captured by the Turks and he was only released from his captivity at Constantinople in December 1605. One of his sons was Henry Shirley (d. 1627) the dramatist, who was murdered in London on the 31st of October 1627, and one of his grandsons was Thomas Shirley (1638–1678), the physician and writer.

Sir Anthony's younger brother, Sir Robert Shirley (*c.* 1581–1628), went with his brother to Persia in 1598, remaining in that country when the latter returned to Europe in 1599. Having married a Circassian lady he stayed in Persia until 1608 when the shah sent him on a diplomatic errand to James I. and to other European princes; after visiting Cracow, Prague, Florence, Rome and Madrid, he reached England in 1611 and had an interview with the king. In 1613 he went again to Persia, but in 1615 he returned to Europe and resided for some years in Madrid. His third journey to Persia was undertaken in 1627, but soon after reaching that country he died at Kazvin on the 13th of July 1628.

Sir Anthony Shirley wrote: *Sir Anthony Sherley: his Relation of his Travels into Persia* (1613), the original manuscript of which is in the Bodleian Library at Oxford. There are in existence five or more accounts of Shirley's adventures in Persia, and the account of his expedition in 1596 is published in R. Hakluyt's *Voyages and Discoveries* (1809–1812). See also *The Three Brothers; Travels and Adventures of Sir Anthony, Sir Robert and Sir Thomas Sherley in Persia, Russia, Turkey and Spain* (London, 1825); E. P. Shirley, *The Sherley Brothers* (1848), and the same writer's *Stemmata Shirleiana* (1841, again 1873).

SHIRLEY (or Sherley), **JAMES** (1596–1666), English dramatist, was born in London in September 1596. He belonged to the great period of English dramatic literature, but, in Lamb's words, he "claims a place among the worthies of this period, not so much for any transcendent genius in himself, as that he was the last of a great race, all of whom spoke nearly the same language and had a set of moral feelings and notions in common." His career of playwriting extended from 1625 to the suppression of stage plays by parliament in 1642. He was educated at Merchant Taylors' school, St John's College, Oxford, and Catherine Hall, Cambridge, where he took his B.A. degree in or before 1618. His first poem, *Echo, or the Unfortunate Lovers* (of which no copy is known, but which is probably the same as *Narcissus* of 1646), was published in 1618. After proceeding to M.A. he was, Wood says, "a minister of God's word in or near St Albans." In consequence apparently of his conversion to the Roman Catholic faith he left his living, and was master of St Albans grammar school from 1623–1625. His first play, *Love Tricks*, seems to have been written while he was teaching at St Albans. He removed in 1625 to London, where he lived in Gray's Inn, and for eighteen years from that time he was a prolific writer for the stage, producing more than thirty regular plays, tragedies and comedies, and showing no sign of exhaustion when a stop was put to his occupation by the Puritan edict of 1642. Shirley's sympathies were with the king in his disputes with parliament and he received marks of special favour from the queen. He made a bitter attack on Prynne, who had attacked the stage in *Histriomastix*; and, when in 1634 a special masque was presented at Whitehall by the gentlemen of the Inns of Court as a practical reply to Prynne, Shirley supplied the text—*The Triumph of Peace*. Between 1636 and 1640 Shirley went to Ireland, under the patronage apparently of the earl of Kildare. Three or four of his plays were produced by his friend John Ogilby in Dublin in the theatre in Werburgh Street, the first ever built in Ireland and at the time of Shirley's visit only one year old. On the outbreak of war he seems to have served with the earl of Newcastle, but when the king's fortunes began to decline he returned to London. He owed something to the kindness of Thomas Stanley, but supported himself chiefly by teaching, publishing some educational works under the Commonwealth. Besides these he published during the period of dramatic eclipse four small volumes of poems and plays, in 1646, 1653, 1655 and 1659. He "was a drudge" for Ogilby in his translations of the *Iliad* and the *Odyssey*, and survived into the reign of Charles II., but, though some of his comedies were revived, he did not again attempt to write for the stage. Wood says that he and his second wife died of fright and exposure after the great fire, and were buried at St Giles's-in-the-Fields on the 29th of October 1666.

Shirley was born to great dramatic wealth, and he handled it freely. He constructed his own plots out of the abundance of materials that had been accumulated during thirty years of unexampled dramatic activity. He did not strain after novelty of situation or character, but worked with confident ease and buoyant copiousness on the familiar lines, contriving situations

and exhibiting characters after types whose effectiveness on the stage had been proved by ample experience. He spoke the same language with the great dramatists, it is true, but this grand style is sometimes employed for the artificial elevation of commonplace thought. "Clear as day" becomes in this manner "day is not more conspicuous than this cunning"; while the proverb "Still waters run deep" is ennobled into—

> "The shallow rivers glide away with noise—
> The deep are silent."

The violence and exaggeration of many of his contemporaries left him untouched. His scenes are ingeniously conceived, his characters boldly and clearly drawn; and he never falls beneath a high level of stage effect.

Shirley's tragedies are: *The Maides Revenge* (acted, 1626; printed, 1639); *The Traytor* (licensed, 1631; printed, 1635), which Dyce reckoned as Shirley's best tragedy; *Love's Crueltie* (1631; printed, 1640); *The Duke's Mistris* (acted, 1636; printed, 1638); *The Politician* (acted, 1639; printed, 1655); *The Cardinal* (acted, 1641; printed, 1652), a good example of Shirley's later style, and characterized by Edmund Gosse as perhaps the last great play produced by the giants of the Elizabethan age. His comedies are: *Love Tricks, or the School of Complement* (licensed, 1625; printed under the latter title, 1631); *The Wedding* (licensed, 1626; printed, 1629); *The Brothers* (acted, 1626; printed, 1652); *The Wittie Faire One* (acted, 1628; printed, 1633); *The Gratefull Servant* (licensed in 1629 as *The Faithful Servant*; printed, 1630); *Changes: Or Love in a Maze* (acted and printed, 1632); *Hide Parke* (acted, 1632; printed, 1637); *The Ball* (acted, 1632; printed, 1639); *The Bird in a Cage* (acted and printed, 1633), ironically dedicated to William Prynne; *The Young Admirall* (licensed, 1633; printed, 1637); *The Gamester* (played at court, 1634; printed, 1637), executed at the command of Charles I. who is said to have invented or proposed the plot; *The Example* (acted, 1634; printed, 1637); *The Opportunity* (licensed, 1634; printed, 1640); *The Coronation* (licensed, 1635, as his, but printed, 1640, as by Fletcher); *The Lady of Pleasure* (licensed, 1635; printed, 1637); *The Constant Maid, or Love will find out the Way*, printed in 1640 under the former title with *St Patrick for Ireland*; *The Royall Master* (acted and printed, 1638), an excellent comedy of intrigue, with an epilogue addressed to Strafford; *The Doubtfull Heir* (printed, 1652), licensed as *Rosania, or Love's Victory* in 1640; *The Gentleman of Venice* (licensed, 1639; printed, 1655); *The Imposture* (acted, 1640; printed, 1652); *The Sisters* (licensed, 1642; printed, 1653); *The Humorous Courtier* (perhaps identical with *The Duke*, licensed, 1631), printed, 1640; *The Court Secret* (printed, 1653). *Poems* (1646), by James Shirley, contained "Narcissus," and a masque dealing with the Judgment of Paris, entitled *The Triumph of Beautie. A Contention for Honour and Riches* (1633) appeared in an altered and enlarged form in 1659 as *Honoria and Mammon*. In 1653 a selection of his pieces was published as *Six New Playes*. He wrote the magnificent entertainment presented by the members of the Inns of Court to the king and queen in 1633, entitled *The Triumph of Peace*, the scenery being devised by Inigo Jones and the music by W. Lawes and Simon Ives. In this kind of composition he had no rival but Ben Jonson. His *Contention of Ajax and Ulysses* (printed, 1659) closes with the well-known lyric, "The Glories of our Blood and State."

The standard edition of Shirley's works is *The Dramatic Works and Poems of James Shirley, with Notes by William Gifford, and Additional Notes, and some Account of Shirley and his Writings*, by Alexander Dyce (6 vols., 1833). A selection of his plays was edited (1888) for the "Mermaid" series, with an introduction by Edmund Gosse.

SHIRLEY, WILLIAM (1694–1771), colonial governor of Massachusetts, was born at Preston in Sussex, England, on the 2nd of December 1694. He studied law, entered the Middle Temple, emigrated to Massachusetts in 1731, was appointed "the King's only advocate-general in America" (*i.e.* of all New England except Connecticut) in 1734, and in 1741, while representing Massachusetts in a boundary dispute with Rhode Island, was appointed governor. His efforts to secure a permanent fixed salary for himself (of £1000) were unsuccessful; and his attempt to prevent the further issue of paper money also involved him in a controversy with the General Court; but their relations were not unfriendly after 1743. The most important event of his administration was the conquest of Louisburg in 1745. The expedition was undertaken on his suggestion and its success was largely due to his energy and enthusiasm; in September 1749 £183,650 (English) in coin was brought to Boston to cover the outlay of Massachusetts, and largely through Shirley's influence this was used for the redemption of outstanding paper money, thus re-establishing the finances of the province, a subject to which Shirley had given much attention. Both in the colonies and in England, whither he returned in 1749 on leave of absence, Shirley kept up an active agitation for the expulsion of the French from the whole of Canada. He went back to Massachusetts as governor in 1753; led an unsuccessful expedition against Fort Niagara in 1755, and after the death of General Edward Braddock (1755) until June 1756 was commander-in-chief of all the British forces in America. In September 1756 he was recalled to England and was succeeded as governor by Spencer Phips. He was governor of the Bahamas until 1770, then again returned to Massachusetts and died at Roxbury on the 24th of March 1771. He published a *Journal of the Siege of Louisbourg* (1745), and *The Conduct of General William Shirley Briefly Stated* (1758).

SHIRREFF, EMILY ANNE ELIZA (1814–1897), English pioneer in the higher education for women, was born on the 3rd of November 1814, the daughter of a rear-admiral. Both she and her sister Maria (Mrs William Grey) took a keen interest in bettering women's equipment for educational work, and, in 1858, she published *Intellectual Education and its Influence on the Character and Happiness of Women*. Before that the sisters had written in collaboration a novel, *Passion and Principle* (1841), marked with that serious sense of the deficiencies in women's education, to remedy which they did so much, and *Thoughts on Self-Culture addressed to Women* (1850). In 1869 Emily Shirreff was for a short time honorary mistress of Girton College, and she served for many years on the council of that institution and of the Girls' Public Day School Company. She took a leading part in establishing and developing the Maria Grey Training College for teachers and in the work of the Froebel Society, of which she was the president. She was a firm believer in Froebel's system and wrote a short memoir of him, and several books on kindergarten methods. She died in London on the 20th of March 1897.

SHIRT, an undergarment of linen, silk, cotton and flannel for the upper part of the body, usually only applied to such a garment when worn by men, though the term is becoming common as used of a plain form of blouse worn by women, the American "shirt-waist." The word is apparently Scandinavian in origin and is an adaptation of the Icel. *skyrte*, Dan. *skiorte*, properly a short garment, and is derived from the root *skar*—to cut off; it is cognate with Ger. *Schurz*, apron, and the same root is seen in "short," "shear" and "skirt"; the last word is now used of that part of a woman's garment which reaches from the waist to the feet, but properly means the lower part of the shirt, hence, edge, border of anything.

SHIRVAN, a small district of the great province of Khorasan in Persia, N.W. of Meshed and W. of Kuchan. It is under the jurisdiction of Kuchan and comprises the town of the same name and twelve villages with a population of 12,000. It produces cotton, wheat and a little silk. SHIRVAN, the capital, is situated on the river Atrek, in 37° 24′ N., 57° 56′ E. at an elevation of 3500 ft. Its inhabitants are of the Turkish Garaili tribe and number about 7000. There are post and telegraph offices.

SHOA, the southern of the three principal provinces of the Abyssinian empire. Shoa from about the middle of the 10th century till nearly the close of the 13th century was the residence of the Abyssinian sovereigns, who had been driven out of Axum, their former capital. About 1528 Shoa was conquered by Mahommedan invaders and was for over a century afterwards a prey to Galla raiders. In 1682 it was reconquered by an Abyssinian chief, but remained independent of northern Abyssinia until 1855 when the emperor Theodore reduced it to submission. In 1889 Menelek II., king of Shoa, on the death of the emperor John, made himself master of the whole of Abyssinia. The capital, Adis Ababa (*q.v.*), is the seat of government for the whole empire (see ABYSSINIA).

SHOCK, or COLLAPSE, in surgery, the enfeebled condition of body which comes on after a severe physical injury, such as a blow upon the head or a kick in the abdomen, or as the result of grievous mental disturbance, as on seeing a ghastly sight or

hearing sad news. It is the condition which the prize-fighter desires to inflict upon his adversary by giving what is called the "knock-out blow" upon the point of the jaw, over the heart or in the lower part of the chest.

In severe shock the individual falls "all of a heap," as the saying is, which is exactly expressed by the word "collapse" (*collapsus, collabor*, fall in ruins). The explanation of the condition is that the heart is suddenly deprived of its power to pump blood up to the brain which, like the face itself, is left anaemic and has no power to send out control to the muscles. The blood at once sinks into, and remains stagnant in, the large veins of the abdomen. And inasmuch as the condition of collapse is due to anaemia of the brain, it is met with in those cases in which a sudden and serious loss of blood has been sustained, as in the "flooding" of child-bed, the giving way of an aneurism, or the opening of some large blood-vessel. It may also supervene on the rupture of a gastric ulcer, and is then the result of the injury to which the network of nerves in the interior of the abdomen has been subjected by the sudden escape on to them of the contents of the stomach.

In severe shock the patient is pale, and bathed in clammy perspiration; his sensibility is blunted; his pulse is small and weak, sometimes, indeed, it is imperceptible, and even on laying the hand over the heart no cardiac impulse may be felt. The person is unable to make any exertion, but lies indifferent to external circumstances, and can be roused only with difficulty or not at all. He complains of a feeling of cold, and he may have a distinct shivering. These symptoms may continue for some hours. The first evidence of improvement is that he shifts his position, becomes restless and complains of the injury. Perhaps he vomits. The pulse becomes stronger, and he then passes from the state of shock into that of reaction. If the improvement continues, recovery takes place; but if it is only transient, he sinks back again into a drowsy condition, which may end in death, for it must be clearly understood that shock may end fatally. Sometimes there is no rallying, death following the injury immediately. In cases where there is no reaction, the patient gradually becomes weaker, and his pulse feebler, till death ensues. Shock is due to an impression conveyed to the medulla oblongata, by which the nerve-centres are so affected that a partial paralysis of the voluntary and involuntary muscular fibres in the body takes place, the patient being, perhaps, unable to lift his arm or move his leg. The respiratory functions are performed wearily, and the muscle of the heart contracts feebly. The walls of the blood-vessels lose their tonicity and the vessels dilate, the blood collecting in the large venous trunks, more especially of the abdomen. The vessels of the skin being emptied of blood, marked pallor ensues. The heart beats feebly because its nervous energy is lowered, and because it has not a sufficient quantity of blood upon which to act. An understanding of these facts gives the general indications for treatment, which comprise external stimulation over the heart by mustard poultices or turpentine stupes; elevation of the limbs—to cause the blood to gravitate towards the heart, and so to the brain; manual pressure on the abdominal cavity from below upwards—to encourage the flow of blood from the overloaded abdominal veins into the heart. In urgent cases an injection may be given into the veins of warm water in which table salt (60 grains to a pint) is dissolved. These different measures may be supplemented by the administration of stimulants by the mouth, or, if the patient cannot swallow, by subcutaneous injection of brandy, ether or a solution of strychnine. In all probability many men have been left for dead upon the field of battle who were only in a state of extreme collapse; in the future many such cases will be saved by the prompt injection of ether over the region of the heart.

In syncope from mental emotion the weakened heart cannot drive a sufficient quantity of blood to the brain; the patient feels dizzy and faint, and falls down insensible. The condition is transitory and the recumbent posture, assisted if need be by elevation of the limbs, causes the blood to gravitate to the heart, which is thereby stimulated to contract. A sufficient quantity of blood is then driven to the brain, and the insensibility passes off. If the patient is in the sitting posture when he feels faint, the head should be depressed between the knees, which will cause the blood to flow to the brain, and the faintness will pass off. Otherwise he should be laid flat on his back, his head being kept low. When a collapsed person is put to bed, no pillow should be allowed, and the foot of the bed should be raised above the level of the head. (E. O.*)

SHODDY, in origin probably a factory term and first applied to the waste thrown off or "shed" during the process of wool manufacture. It is now the name given to a special type of fabric made from remanufactured materials, *i.e.* materials which have already been spun into yarn and woven into cloth but have been torn up or "ground up"—as this operation is termed technically—into a fibrous mass, and respun and rewoven. The term "shoddy" is sometimes applied to all fabrics made of such remanufactured materials, of which there are many types, such as "mungos," "extracts," "flocks," &c., but strictly it should be confined to a cloth produced from fabrics originally made from English and the longer cross-bred wools. Mungo is produced from fabrics originally made from Botany and short fine wools; extract is the wool fibre obtained from goods originally composed of wool and cotton from which the cotton has been "extracted" by sulphuric acid or some other agent; and flocks mostly come from milling, raising and cropping machines. There are some few other particular types of minor importance.

The operations of converting rags, tailors' clippings, &c., into these remanufactured materials are as follows: dusting, to render the subsequent operations as healthy and agreeable as possible; seaming, *i.e.* taking out every little bit of sewing thread (unless the rags are for extracting) in order that a good "spin" may result; sorting into the various qualities and colours; oiling, to cause the fibres to glide upon one another, and thus separate so far as possible without breakage; and finally grinding, *i.e.* tearing up into a fibrous mass which may be readily spun into threads. The last-named operation is usually spoken of as "grinding," but really it is anything but grinding, being more of a teasing-out operation, the object being to preserve the length of the fibre so far as possible. The remanufactured materials are necessarily very short in fibre, so that it is usually necessary to mix, *i.e.* "blend," some better material with them to carry the bulk through the machines into the yarn. With this object in view, sometimes good wool or noils (the short from combing), but more often cotton, is employed. The yarns thus spun are in the majority of cases woven into pieces as weft yarns, the warps usually being cotton; but there are some exceptions, a really good mungo blend being readily woven as warp.

Upon the whole the "cheap and nasty" idea usually associated with the term "shoddy," in reference to these remanufactured materials, is quite a mistake. Some most excellent cloths are produced, and when price is taken into consideration it must be conceded that the development of this industry has benefited the working classes of Great Britain and other countries to a remarkable extent. Many are now well clothed, who, without the advent of the remanufactured materials, would have been clothed in rags.

SHOE (a word appearing in the Teutonic languages in various forms, as Ger. *Schuh*, Swed. and Dan. *sko*, sometimes supposed to come from an unknown root *ska* or *sku*, cover), a covering for the foot. The simplest foot-protector is the sandal, which consists of a sole attached to the foot, usually by leather thongs. The use of this can be traced back to a very early period; and the sandal of plaited grass, palm fronds, leather or other material still continues to be the most common foot-covering among oriental races. Where climate demanded greater protection for the foot, the primitive races shaped a rude shoe out of a single piece of untanned hide; this was laced with a thong, and so made a complete covering. Out of these two elements—sole without upper and upper without sole—arose the perfected shoe and boot, consisting of a combination of both. The boot

proper differs from the shoe in reaching up to the knee, as exemplified by such forms as jack-boots, top-boots, Hessian boots and Wellington boots, but the term is in England now commonly applied to "half-boots" or "ankle-boots" which reach only above the ankle. A collection illustrating the numerous forms and varieties of foot-covering, formed by Jules Jacquemart, is in the Cluny Museum in Paris.

Wooden Shoes.—The simplest foot-covering, largely used throughout Europe, is the wooden shoe (*sabot*) made from a single piece of wood roughly cut into shoe form. Analogous to this is the clog of the midland counties of England. Clogs, known also as pattens, are wooden soles to which shoe or boot uppers are attached. Sole and heel are made of one piece from a block of maple or ash 2 in. thick, and a little longer and broader than the desired size of shoe. The outer side of the sole and heel is fashioned with a long chisel-edged implement, called the clogger's knife or stock; a second implement, called the groover, makes a groove about one-eighth of an inch deep and wide round the side of the sole; and by means of a hollower the contour of the inner face of the sole is adapted to the shape of the foot. The uppers of heavy leather, machine sewed or riveted, are fitted closely to the groove around the sole, and a thin piece of leather-binding is nailed on all round the edges, the nails being placed very close, so as to give a firm durable fastening. These clogs are of great advantage to all who work in damp sloppy places, keeping the feet dry and comfortable in a manner impossible with either leather or india-rubber. They are consequently largely used on the continent of Europe by agricultural and forest labourers, and in England and the United States by dyers, bleachers, tanners, workers in sugar-factories, chemical works, provision packing warehouses, &c. There is also a considerable demand for expensive clogs, with finely trimmed soles and fancy uppers, for use by clog-dancers on the stage.

Manufacture of Leather Shoes.—There are two main divisions of work comprised in ordinary shoemaking. The minor division—the making of "turn shoes"—embraces all work in which there is only one thin flexible sole, which is sewed to the upper while outside in and turned over when completed. Slippers and ladies' thin house boots are examples of this class of work. In the other division the upper is united to an insole and at least one outsole, with a raised heel. In this are comprised all classes, shapes and qualities of goods, from shoes up to long-top or riding boots which reach to the knee, with all their variations of lacing, buttoning, elastic-web side gussets, &c. The accompanying cuts (figs. 1 and 2) show the parts and trade names of a boot.

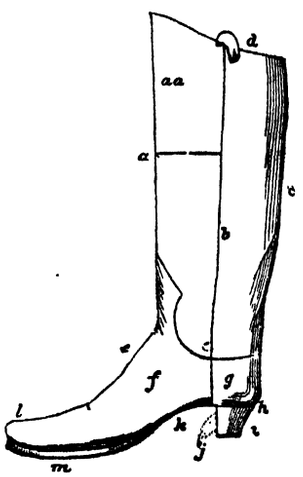


FIG. 1.—Parts of a Boot.

aa, The extension.
a, The front.
b, The side seam.
c, The back.
d, The strap.
e, The instep.
f, The vamp or front.
g, The quarter or counter.
h, The rand.
i, The heel—the front is the breast, the bottom the face.
j, The lifts of the heel.
k, The shank or waist.
l, The welt.
m, The sole.

Shoemaking was formerly a pure handicraft; but now machinery effects almost every operation in the art. On the factory system all human feet are treated alike; in the handicraft, the shoemaker deals with the individual foot, and he should produce a boot which for fit, comfort, flexibility and strength cannot be approached by the product of machinery.

The shoemaker after measuring the feet, cuts out upper leather according to the size and pattern. These parts are fitted and stitched together by the "boot-closers," but little of this closing is now done by hand. The sole "stuff" is next cut out and assembled, consisting of a pair of inner soles of soft leather, a pair of outer soles of firmer texture, a pair of welts or bands about 1 in. broad, of flexible leather, and lifts and top-pieces for the heels. These the "maker" mellows by steeping in water. He attaches the insoles to the bottom of a pair of wooden lasts, which are blocks the form and size of the boots to be made, fastens the leather down with lasting tacks, and, when it is dried, draws it out with pincers till it takes the exact form of the last bottom. Then he "rounds the soles," by paring down the edges close to the last, and forms round these edges a small channel or feather cut about one-eighth of an inch in the leather. Next he pierces the insoles all round with a bent awl, which bites into, but not through, the leather, and comes out at the channel or feather. The boots are then "lasted," by placing the uppers on the lasts, drawing their edges tightly round the edge of the insoles, and fastening them in position with lasting tacks. Lasting is a crucial operation, for, unless the upper is drawn smoothly and equally over the last, leaving neither crease nor wrinkle, the form of the boot will be bad. The welt, having one edge pared or chamfered, is put in position round the sides, up to the heel or "seat," and the maker proceeds to "inseam," by passing his awl through the holes already made in the insole, catching with it the edge of the upper and the thin edge of the welt, and sewing all three together in one flat seam, with a waxed thread. He then pares off inequalities and "levels the bottoms," by filling up the depressed part in the centre with a piece of tarred felt; and, that done, the boots are ready for the outsoles. After the leather for them has been thoroughly compressed by hammering on the "lap-stone," they are fastened through the insole with steel tacks, their sides are pared, and a narrow channel is cut round their edges; and through this channel they are stitched to the welt, about twelve stitches of strong waxed thread being made to the inch. The soles are now hammered into shape; the heel lifts are put on and attached with wooden pegs, then sewed through the stitches of the insole; and the top-pieces, similar to the outsoles, are put on and nailed down to the lifts. The finishing operations embrace pinning up the edge of the heel, paring, rasping, scraping, smoothing, blacking and burnishing the edges of soles and heels, scraping, sandpapering and burnishing the soles, withdrawing the lasts, and cleaning out any pegs which may have pierced through the inner sole. Of course, there are numerous minor operations connected with forwarding and finishing in various materials, such as punching lace-holes, inserting eyelets, applying heel and toe irons, hob-nailing, &c. To make a pair of common stout lacing boots occupies an expert workman from fourteen to eighteen hours.

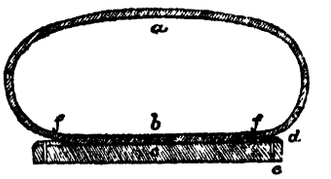


FIG. 2.—Section of Boot.

a, The upper.
b, The insole.
c, The outsole.
d, The welt.
e, The stitching of the sole to the welt.
f, The stitching of the upper to the welt.

The principal difficulties to be overcome in applying machinery to shoemaking were encountered in the operation of fastening together the soles and uppers. The first success in this important operation was effected when means other than sewing were devised. In 1809 David Meade Randolph obtained a patent for fastening the soles and heels to the inner soles by means of little nails, brads, sprigs or tacks. The lasts he used were covered at the bottom with plates of metal, and the nails, when driven through the inner soles, were turned and clinched by coming against the metal plates. To fix the soles to the lasts during the operation the metal plates were each perforated with three holes, in which wooden plugs were inserted, and to these the insoles were nailed. This invention may be said to have laid the foundation of machine boot-making. In 1810 M. I. Brunel patented a range of machinery for fastening soles to uppers by means of metallic pins or nails, and the use of screws and staples was patented by Richard Woodman in the same year.

Apart from sewing by machine or hand, three principal methods of attaching soles to uppers have been used. The first is "pegging" with small wooden pins or pegs driven through outsole and insole, catching between them the edges of the upper. The points of the pegs which project through the insole are cut away and smoothed level with the leather either by hand or by a machine pegging rasp. The second is the system of "riveting or clinching" with iron or brass nails, the points of the nails being turned or clinched by coming in contact with the iron last used. The third method, screwing, has come into extensive use since the standard screwing machine was introduced in America by the McKay Sewing-Machine Association, of Boston, Massachusetts, and in Europe by the Blake and Goodyear Company, of London. The standard screw machine, which is an American invention, though the idea was anticipated by a Frenchman named Blanchon in 1856, is provided with a reel of stout screw-threaded brass wire, which by the revolution of the reel is inserted into and screwed through outsole, upper edge and insole. Within the upper a head presses against the insole directly opposite the point of the screw, and the instant screw and head touch the wire is cut level with the outsole. The screw, making its own hole, fits tightly in the leather, and the two soles, being both compressed and screwed firmly together, make a perfectly water-tight and solid shoe. The surface of the insole is quite level and even, and as the work is really screwed, the screws are steady in their position, and they add materially to the durability of the soles. The principal disadvantage in the use of standard screwed soles is the great difficulty met with in removing and levelling down the remains of an old sole when repairs are necessary.

The various forms of sewing-machine by which uppers are closed, and their important modifications for uniting soles and uppers, are also principally of American origin. But the first suggestion of machine sewing was an English idea. The patent secured by Thomas Saint in the English Patent Office in 1790, while it foreshadowed the most important features of the modern sewing-machine, indicated more particularly the devices now adopted in the sewing of leather. After the introduction of the sewing-machine for cloth work its adaptation to stitching leather both with plain,

thread and with heated waxed thread was a comparatively simple task. The first important step in the more difficult problem of sewing together soles and uppers by a machine was taken in the United States by Lyman R. Blake in 1858. Blake's machine was ultimately perfected as the McKay sole-sewing machine—one of the most successful and lucrative inventions of modern times. Blake secured his first English patent in 1859, his invention being thus described: "This machine is a chain-stitch sewing-machine. The hooked needle works through a rest or supporting surface of the upper part of a long curved arm which projects upwards from the table of the machine. This arm should have such a form as to be capable of entering a shoe so as to carry the rest into the toe part as well as any other part of the interior of it; it carries at its front end and directly under the rest a looper, which is supported within the end of the arm so as to be capable of rotating or partially rotating round the needle, while the said needle may extend into and through the eye of the looper, such eye being placed in the path of the needle. The thread is led from a bobbin by suitable guides along in the curved arm, thence through a tension spring applied to the arm, and thence upwards through the notch of the looper. The needle carrier extends upwards with a cylindrical block which can be turned round concentrically with it by means of a handle. The feed wheel by which the shoe is moved along the curved arm during the process of sewing is supported by a slider extending downwards from the block, and applied thereto so as to be capable of sliding up and down therein. The shoe is placed on the arm with the sole upwards The feed wheel is made to rest on the sole." Blake's original machine was very imperfect and was incapable of sewing round the toe of a shoe; but a principal interest in it coming into the hands of Gordon McKay (1821–1903), he in conjunction with Blake effected most important improvements in the mechanism, and they jointly in 1860 procured United States patents which secured to them the monopoly of wholly machine-made boots and shoes for twenty-one years. On the outbreak of the Civil War in America a great demand arose for boots, and, there being simultaneously much labour withdrawn from the market, a profitable field was opened for the use of the machine, which was now capable of sewing a sole right round. Machines were leased out to manufacturers by the McKay Company at a royalty of from ½ to 3 cents on every pair of soles sewed, the machines themselves registering the work done. The income of the association from royalties in the United States alone increased from $38,746 in 1863 to $589,973 in 1873, and continued to rise till the main patents expired in 1881, when there were in use in the United States about 1800 Blake-McKay machines sewing 50,000,000 pairs of boots and shoes yearly. The monopoly secured by the McKay Company barred for the time the progress of invention, but still many other sole-sewing machines were patented. Among the most important of these is the Goodyear welt machine—the first mechanism adapted for sewing soles on lasted boots and shoes. This machine originated in a patent obtained in 1862 in the United States by August Destory for a curved-needle machine for sewing outsoles to welts, but was not successful till taken in hand by Charles Goodyear, son of the well-known inventor in indiarubber fabrics. This device was first applied in a machine for sewing turn shoes. Later it was used in a machine which sewed with a chain-stitch from the channel of the insole through the welt and upper, and a little later still it was followed by the "rapid outsole lock-stitch machine," which united the outsole to the welt with lock-stitching. Improvements have been continually effected in the Goodyear system and numerous accessory mechanisms have been brought out, until there is now not a single operation necessary in shoemaking, however insignificant, for which machinery has not been devised. In consequence the range of machines employed in a modern shoe factory is very extensive, the various operations being highly specialized, and there being minute subdivision of labour. Though the fundamental principles were not in all cases of American origin, American inventors were foremost in developing such machinery, and America took the lead in employing it to the supersession of handwork in shoemaking. When English makers, in about the seventh or eighth decade of the 19th century, were forced by the pressure of economic necessity to do the same, they found that the suitable machinery was controlled by American makers, from whom therefore they had to hire it on the payment of royalties and under stringent conditions which rendered it difficult for them to use machines of any other maker, even if available, on pain of the whole plant being stripped from their factories. The British United Shoe Machinery Company, the English branch of the United Shoe Machinery Company, of Boston, Mass., thus maintained a practical monopoly of the supply of shoemaking machinery in Great Britain. However, by the beginning of the 20th century English makers began to assert themselves and to show that they could produce machines able to compete effectively with those from America. The loosening of the American monopoly thus begun was aided by the Patent Act of 1907, section 27 of which provided that a patent may be revoked if the article is not manufactured "to an adequate extent" in Great Britain (most of the shoe machinery in question having been manufactured in America), while section 38 prohibits the insertion in a lease of conditions excluding the lessee from using articles or processes not supplied or owned by the lessor.

Rubber Shoes.—The manufacture of indiarubber galoshes,[1] shoes, fishing boots, &c., forms an important branch of the indiarubber industry, especially in America, where rubber overshoes, colloquially known as "rubbers," are extensively worn, and where fully 1000 different shapes and sizes are said to be produced. So far back as 1833 the Roxbury India Rubber Company was constituted to work the discovery that indiarubber dissolved in turpentine and mixed with lampblack formed a varnish which gave a hard waterproof surface when applied to leather, but the process failed because the varnish melted with heat and cracked with cold. This defect was remedied by Charles Goodyear (1800–1860), who found that when sulphur was combined with the rubber by the aid of heat the product ("vulcanized rubber") was not only stronger but retained its elasticity through a wide range of temperature. His patent, taken out in 1844, was the foundation of various American rubber industries, including that of rubber boots and shoes. Guttapercha has also been used instead of leather for the outer soles of boots.

SHOE-BILL, a huge African bird from the White Nile, the *Balaeniceps rex* of ornithology, now regarded as a giant heron. It was first brought to Europe by M. Parkyns and described by J. Gould in the Zoological *Proceedings* (1851, pp. 1, 2, pl. xxxv.)



After J. Wolf in *Trans. Zool. Soc.*

Shoe-Bill or Whale-headed Heron.

as an abnormal pelican. This view was disputed by Reinhardt (*op. cit.* 1860, p. 377), and wholly dispelled by W. K. Parker in the Zoological *Transactions* (iv. pp. 269-351), though these two authors disagreed as to its affinities, the first placing it with the storks, the last assigning it to the herons. In singularity of aspect few birds surpass *Balaeniceps*, with its gaunt grey figure, some 5 ft. in height, its large head surmounted by a little curled tuft, the scowling expression of its eyes and its huge bill in form

[1] The galosh or golosh was originally a wooden shoe or clog, but later came to mean an overshoe (cf. R. Holme, *Armoury*, 1688: "Galloshios are false shooes, or covers for shooes"). The word is adapted from the French *galoche*, from Low Lat. *galopedium*, a wooden shoe, Gr. καλοπόδιον, shoemaker's last, from κᾶλον, wood, and πούς, foot.

not unlike a whale's head—this last suggesting its generic name—but tipped with a formidable hook. The shape of the bill has also prompted the Arabs to call it, according to their idiom, the "father of a shoe." It forms large flocks and frequents dense swamps. The flight is heron-like, and the birds settle on trees. The food consists of any small animals or carrion. The nest is a hole in dry ground, roughly limed with herbage, and from two to twelve chalky white eggs are laid. (A. N.)

SHOEBURYNESS, a promontory on the coast of Essex, England, the point at which the coast-line trends north-eastward from the estuary of the Thames. It gives name to a school of gunnery, where officers are instructed and experiments carried out. The railway station (39 m. E. from London, the terminus of the London, Tilbury and Southend railway) bears the same name, but the parish is South Shoebury; North Shoebury is a parish situated nearer to Southend-on-Sea. The church of St Andrew retains some ornate Norman work, but is mainly a Perpendicular reconstruction. On the seaward side of the Ness there is a large ancient earthwork which is attributed to the Norsemen through a reference in the Saxon Chronicle (894) under the name Sceobrig. The parish is in the S.E. parliamentary division of the county. Pop. (1901) 4081.

SHOFAR, SCHOFAR or SHOFER, the ancient ram's horn trumpet of the Hebrews, sometimes also translated cornet in the English Bible. The shofar consisted of a natural horn turned up at the bell end, and, having a short conical bore of very large calibre, it would be capable of producing at most the fundamental octave and twelfth. The shofar has continued in use in the Jewish synagogue until the present day, being blown with great solemnity once every year at the impressive service held on the Day of Atonement. The shofar was more generally used by the Israelites than the other horn *Keren*, and although figuring largely as a signal instrument in battle, and used for rousing the people against the foe, it can hardly be regarded as a military instrument, but rather as the token of God's presence in their midst, to give them the victory as in the case of Joshua and Gideon. It was the shofar that was used to call the people together on a solemn feast day (Ps. lxxxi. 3). (K. S.)

SHOGUN (Japanese for "generalissimo"), in Japan, originally merely the style of a general in command in the field, a title which only gradually came into existence at the beginning of the 8th century, the mikado himself having previously been regarded as the only authority. The rise of a military class and of shoguns (generals) was a development coincident with the division of supremacy between the Minamoto and Taira clans (see JAPAN: *History*). In 1192 the emperor Takahira made the Minamoto leader, Yoritomo, a Sei-i-tai-shogun ("barbarian-subjugating generalissimo") or general-in-chief, and this office became stereotyped in the hands of successive great military leaders, till in 1603 Lyéyasu Tokugawa became shogun and established the Tokugawa dynasty in power. The shogunate from that time till 1867 exercised the *de facto* sovereignty in Japan, though in theory subordinate to the mikado. The revolution of 1867 swept away and abolished the shogunate and restored the mikado's supreme authority.

The term "Tycoon," which was commonly used by foreigners in the 19th century, is merely a synonym for shogun, being the English rendering of the Japanese *taiko* or *taikun*, "great lord."

SHOLAPUR, a city and district of British India, in the Central division of Bombay. The city is 164 m. S.E. from Poona by rail. Municipal area, about 8 sq. m.; pop. (1901) 75,288. Since 1877 it has ceased to be a military cantonment. Its great fort, of Mahommedan construction, dates from the 14th to 17th centuries. The large bazaar is divided into seven sections, one of which is used on each day of the week. There are two municipal gardens, with fine tanks and temples. It is an important centre of trade, with three cotton mills.

The DISTRICT OF SHOLAPUR has an area of 4541 sq. m. Except in Karmala and Barsi subdivisions, in the north and east, where there is a good deal of hilly ground, the district is generally flat or undulating; but it is bare of vegetation, and presents everywhere a bleak treeless appearance. The chief rivers are the Bhima and its tributaries—the Man, the Nira and the Sina—all flowing towards the south-east. Lying in a tract of uncertain rainfall, Sholapur is peculiarly liable to seasons of scarcity; much, however, has been done by the opening of canals and tanks, such as the Ekruk and Ashti tanks, to secure a better water-supply, the Ekruk tank near Sholapur city is the second largest irrigation work in the Deccan. In 1901 the population was 720,977, showing a decrease of 4% in the decade. The principal crops are millet, pulse, oil seeds and cotton. There are manufactures of silk and cotton cloth, and blankets. The chief trading mart is Barsi. Pandharpur is a popular place of pilgrimage. The Great Indian Peninsula railway runs through the district, with a junction for the Southern Mahratta railway, and another junction for the Barsi light railway, recently extended to Pandharpur.

Sholapur passed from the Bahmani to the Bijapur kings and from them to the Mahrattas. In 1818, on the fall of the peshwa, it was ceded to the British, when it formed part of the Poona collectorate, but in 1838 it was made a separate district.

SHOOTING, as a British field sport, may be said to have existed for at least two hundred years, though it is only within the last half century that it has attained its present importance. In many parts of Great Britain the importance of the sporting rights of an estate now more than counterbalance its agricultural value, while enormous sums are annually devoted to the artificial production of game. Taking all contingent expenses into consideration, the average cost of every head of game killed may be taken as not less than three shillings. A hand-reared pheasant can scarcely be brought to the gun for less than seven to eight shillings; and these birds in particular—and partridges and wild duck to a lesser, but steadily increasing, extent—are reared in tens of thousands every year. So far, the grouse alone among recognized British game-birds has defied all attempts at artificial production, but it is probable that in course of time this will also yield to the modern taste for big bags.

The enormous head of game now preserved, and the correspondent development of the art of gunmaking, has to a great extent revolutionized the sport of shooting, the modern tendency being all in favour of "driving," *i.e.* bringing the game to the sportsman, instead of the sportsman to the game. While this has undoubtedly raised the standard of marksmanship, it has equally deteriorated the exercise of such minor woodcraft as is required for small game shooting under present conditions.

In this article it is only possible to touch on the various forms of the sport of shooting most in vogue. First must be placed grouse-shooting, admittedly the finest form of sport with the gun obtainable in the British Islands. It is customary to speak of this as though it were merely confined to Scotland, but grouse are found in every English county north of the Trent, as well as in Shropshire, Wales and Ireland, while in a good season as many are probably killed in Yorkshire alone as in any two Scotch counties put together. Practically all English grouse are killed by driving, the practice of which is fast extending to Scotland. On the undulating English and Lowland moors this has undoubtedly resulted in largely increasing the stock of grouse, but it is questionable whether it has been equally successful on the more rugged hills of the Highlands. Save in a few specially favoured localities, such as the Moy Hall moors in Inverness-shire, grouse-driving in Scotland has by no means produced the marvellous results achieved on the English moors, while far too many lessees of Scottish shootings resort to the suicidal policy of only driving their birds when the latter have become too wild to lie to dogs.

Grouse-shooting.

In laying out a moor for driving care should be taken to avoid placing a row of butts against a sky line: where possible these should be placed in a depression of the ground, which not only serves to conceal them from the birds, but also ensures higher and more difficult shots. For these reasons, on very flat stretches of ground the butts are sometimes excavated after the manner of a rifle pit with a low parapet, but in the writer's experience these are not to be specially recommended. It is in all cases advisable to refrain from placing a line of butts on very stony or

rocky ground, owing to the possibility of an accident from glancing or deflected shot-pellets. Much of the success of a day's grouse-driving depends on the manner in which the drivers are handled, and especially on the "flankers," whose business it is to turn in such birds as show a tendency to break away from the butts.

A few simple rules for the guidance of the shooter may be mentioned in connexion with grouse-driving. He should remain motionless in his butt, without attempting to conceal himself by crouching, until the moment arrives for him to throw up his gun, when he should refrain from dwelling on his bird, or reserving his fire until it is close upon him—the latter a very common error among beginners. An excellent method of determining the range at which to open fire is to mark some conspicuous object, a tuft of heather or a stone, about 40 yds. in front of one's butt, before the commencement of a drive. Above all the shooter should concentrate his attention only on birds coming at him, and not concern himself with those that have passed his butt: in nine cases out of ten by the time he has turned to fire they will be 60 or 70 yds. away, and the only result of his shot will be to wound, but not kill; apart from the cruelty of such a proceeding, it should be remembered that these "pricked" birds are a fruitful source of grouse disease. A good retriever is essential to enjoyment in grouse-driving, where only a limited time is available for picking up dead birds. The modern fashion is in favour of spaniels for this work, but a large wavy-coated retriever is usually preferable, as being less likely to tire or "potter." It is customary on some moors to burn the heather round the butts with a view to facilitating the recovery of dead birds, but this has also the disadvantage of rendering the butts more conspicuous to the grouse, which soon come to know the dangerous zone. In August grouse can be driven without much difficulty, but later in the season, and especially in a high wind, pack after pack will go straight back over the beaters' heads sooner than face the guns. Enormous bags of driven grouse are occasionally made on the Yorkshire and Durham moors; over 1300 brace have been killed in a single day at Broomhead near Sheffield, and there are several other well-known moors where, in a good season, 1000 brace are obtainable in a day's shooting. Grouse driving is believed to have been first practised in a very modified form on the English moors as early as 1805, but its usage did not become general until fifty or sixty years later.

Grouse-shooting over dogs, though lacking the excitement of grouse-driving, and not requiring the same high standard of skill in shooting, is none the less incomparably the higher form of sport. Owing to the almost universal wildness of all modern game-birds, its general practice is now almost entirely confined to the Highlands, where, especially on the western seaboard, grouse will lie to dogs practically throughout the season. Except on very ill-watered moors, where they suffer more than other breeds of dogs from thirst, large big-boned setters are preferable to pointers for grouse-shooting, as the latter are more easily affected by cold and damp, and in the writer's experience are more easily fatigued. Care should of course be taken always to work one's dogs up wind when possible, and in hot, still weather to beat the higher ground thoroughly, with a view to killing down the old cocks and barren hens which resort there. In stormy weather grouse naturally seek the lower slopes of the moors.

Partridge-shooting over dogs is a most delightful form of sport, popularly supposed to be extinct nowadays, but there are happily many parts of England where it is still practised in suitable localities. None the less, modern agricultural conditions do not lend themselves to the use of dogs in partridge-shooting, and the most general custom is to drive the birds off the pastures and stubbles into the root crops where they can be walked up in line, a rather uninteresting method of shooting. Care should of course be taken always to walk across the drills; and where birds are wild, and time does not press, it will occasionally be found advantageous to work a field in a series of gradually diminishing circles. Much valuable time is often wasted in partridge-shooting in the search for dead and wounded birds; this can be obviated to a large extent by observing the golden rule that as soon as a bird is down the line should halt, and the dogs, whose business it is to retrieve the game, be allowed to do so, unassisted—or more correctly unhampered. If the bird cannot be found within reasonable time, the line should proceed, leaving a keeper and a steady dog behind to search for it. Where game is plentiful it is always advisable to employ one man with a couple of retrievers for the sole purpose of remaining behind the line to retrieve lost or running birds. As with all game, the modern tendency is to drive partridges: a form of shooting that of all others exacts the highest test of skill, not only on the part of the shooter, but also of the keeper who organizes the proceedings. To these requirements must be added a suitable tract of country for the purpose, and a large head of game; given all these essentials, partridge-driving is a delightful amusement; without them it is usually a fruitless and wearisome undertaking.

Partridge-shooting.

In driving, the birds should be gradually and quietly collected into one large root-field, and sent from this over the guns, who should, when possible, always be placed in a grass-field where dead or wounded birds are more easily retrieved. Another field of roots should be at a convenient distance behind the guns for the purpose of gathering the birds, which, unless the wind be specially unfavourable, can then be brought back over them in a return drive. Long drives are not advisable; the more partridges can be kept on the wing, and the coveys broken up, the better. Where partridge-driving is carried on on a large scale, it is a good plan to supplement such hedge-rows as are convenient for the purpose by narrow belts of coniferous trees. These, if wired in to prevent disturbance by foxes, dogs, &c., not only provide admirable nesting-ground for winged-game, but afford better concealment for the guns, and cause the partridges to offer higher and more attractive shots. In shooting driven partridges, the sportsman should stand as far as practicable away from the fence, and concentrate his attention on the bird which first tops it. A driven grouse or rocketing pheasant will fly straight towards the shooter without swerving when he raises his gun, but not so the partridge, which can twist in the air almost like a snipe; it is this peculiarity, coupled with their startling scream, that proves so disconcerting to the young sportsman. Especial care should always be taken that the guns stand in a perfectly straight line within sight of one another: neglect of this precaution has often led to serious accidents.

Frequent change of blood is beneficial on estates where a large head of partridges is preserved, and it is advisable to kill off superflous cock-birds before the commencement of the breeding-season, though when partridges are reared artificially a better plan is to catch them alive, and use them as foster-mothers, a duty they perform admirably.

The *pheasant*, once one of the rarest British game-birds, has now, thanks to artificial production, become almost the commonest, and to shoot it over dogs among the hedge-rows in October, as was formerly the practice, would be a manifest absurdity. Under modern conditions it can only be dealt with satisfactorily as a "rocketer," *i.e.* a bird flying high and fast towards the shooter. As such, the pheasant has no superior, provided only it fly high and fast enough, but otherwise it is a rather uninteresting sporting-bird which invariably elects to seek safety by running rather than flight. Like the modern pheasant itself, the rocketer is a more or less artificial creation, and considerable organization is necessary to produce it in perfection. It is only of late years that keepers have recognized that sportsmen place little value on the mere magnitude of a day's bag, as compared to the difficult or "pretty" shots they may obtain. Much, therefore, depends on the management of covert-shooting, the handling of the beaters, the disposition of the "stops," and the pains taken to ensure high-flying pheasants, or the reverse. When the configuration of the coverts permits of it, pheasants should always be driven down-hill to the guns; on flat ground the latter should stand at such a distance from the covert-side as to permit

Pheasant-shooting.

the birds to rise high, and get well on the wing. This is sometimes attained by cutting away the undergrowth at the end of the covert where it is purposed to flush the birds, but this is also liable to make them break back over the beaters. Where pheasants exist in large quantities, "false coverts" of spruce or fir loppings should always be placed at the flushing-point; the birds should be collected as quietly as possible in these, and then sent forward over the guns in small quantities at a time.

Of other recognized British game-birds—as distinct from wildfowl—it is only necessary to dwell on the most beautiful of them all, blackgame. These, though far more widely diffused than the red grouse, are not nearly so numerous. This is possibly due to altered agricultural conditions, the laying to pasture of much of the arable land which formerly fringed the Lowland moors, and the consequent surface-drainage which is responsible for the destruction of many young birds; but the chief cause lies in the wholly inefficient close-time afforded, which should be extended by at least a month. Black-game- and grouse-shooting differ in no way in their methods, though the former are far more difficult birds to handle by driving, while really fascinating sport can be obtained by stalking the old cocks with a miniature rifle.

Black-game.

Ptarmigan are practically confined to the summits of the higher Scottish hills, which are usually reserved for deer-forests, and, therefore, offer no opportunity for sport with the shot-gun. In mild still weather they give but poor sport, running persistently in front of the dogs, or sitting until they can almost be knocked down with a stick, but on stormy days they rise wild, and afford splendid sport, especially in conjunction with the wild and romantic scenery in which they are found. They are of course invariably shot over dogs.

Ptarmi-gan.

Capercally, once extinct in Great Britain, were reintroduced into Scotland about 1835, and now exist in tolerable numbers, chiefly in Perthshire. Being a forest-haunting bird, they are usually driven to the guns like pheasants, but apart from their rarity and size, they are not held in great favour as sporting birds, while owing to the great damage they do to young coniferous trees, they are not encouraged to multiply on estates where there is a large acreage of growing plantations. Capercally are very courageous birds, and the writer has seen a winged cock attack and hold at bay a dog sent to retrieve it.

Caper-cally.

Snipe and *woodcock*, though properly wild-fowl, are usually regarded as belonging to the category of game-birds. Though both the full-snipe and the woodcock breed to a limited extent in the British Isles, they may more correctly be described as autumn and winter migrants to them. The varieties then to be shot are the full-snipe, the jack-snipe and the great or solitary snipe; but the latter is exceedingly rarely met with, and the jack-snipe is becoming scarcer every year. Neither of these latter varieties breeds in the United Kingdom. Snipe are exceedingly erratic in their movements, which are largely influenced by the weather; like the woodcock they are here to-day and gone to-morrow. They haunt moist, or marshy localities, and the finest snipe shooting in the British islands is to be found on the Irish bogs. In hard frosts they should be sought near running water. As a general rule a dog is not used to find snipe, but where this may be considered necessary, a well broken Irish water-spaniel is to be recommended. These are the most intelligent of dogs, can be trained to point and retrieve as well, and are capable of standing wet and cold with impunity. It is a generally accepted axiom that snipe should be walked up, down wind, since they offer an easier mark when rising against it, but in the writer's experience this is more than counterbalanced by the fact that snipe, which are particularly susceptible to noise, lie far better when approached up wind. To kill snipe well is the most difficult knack in shooting, and one to which few men, however good shots they may be at other forms of game, rarely attain.

Snipe.

Woodcock are rarer birds than snipe, and even more erratic in their movements. Large quantities of them usually arrive in England with the first November combination of an easterly gale and a full moon, but they cannot be depended on to stay more than a few hours in the locality where they alight. In Ireland, however, they are far more constant in their habits, and it is here that the largest bags of woodcock are made in the United Kingdom. Though woodcock are properly forest, or covert-haunting birds, in many parts of Ireland and the Western Highlands of Scotland they frequent the open bogs and moors, where they are shot over pointers or setters. Otherwise no particular rules can be laid down for their pursuit, beyond the fact that they are very conservative in their choice of a haunt, and that year after year cock may be found in the same spot. Woodcock are usually esteemed difficult birds to shoot, but more are missed from over-eagerness on the part of the shooter than from the difficulty of the shot they present. Still in thick covert they undoubtedly require a quick hand and eye acting in unison, to kill them neatly.

Woodcock.

Of quadrupeds or ground-game, only three varieties, the roe-deer, the hare and the rabbit, are preserved for sport with the shot-gun in the United Kingdom. The first-named, though found in a few widely distant districts in England and Ireland, is chiefly associated with Scotland so far as shooting is concerned. It is essentially a forest-loving animal, and is usually killed by driving it up to a line of guns, when, if close enough, it will drop to an ordinary charge of No. 5 shot; but a heavy load of B.B. or No. 1 is a far preferable, and more merciful, gauge to use. Roe-deer are not easy animals to move in a direction in which they suspect danger, and the more quietly a drive is conducted, the greater the chance of success. A few men walking carelessly through a wood, *i.e.* as if beating were not their object, will drive roe, and especially the cunning old bucks, with far greater certainty than an array of shouting, stick-rapping beaters.

Roe-deer.

Far finer sport, however, in every sense of the expression, can be obtained by stalking roe-bucks during the summer months with a small-bore rifle, carrying a hollow-nosed, and not a solid bullet. The most suitable opportunity for this is at sunrise or sunset, when the roe will be found feeding in the more open spaces in the woods. The same animals will nearly always be found in the same locality, but they are exceedingly wary creatures, and the old bucks are quite as difficult to stalk as a red-deer stag.

The *hare* no longer exists in the same quantities as formerly; indeed in many parts of Great Britain it is practically extinct, the result of the Ground Game Act of 1881. No special methods are employed for shooting hares, nor is any great skill requisite for doing so, but sportsmen should always bear in mind that unless hit in the head or heart hares are not easily killed dead, and should, therefore, refrain from firing long shots at them, especially when they do not offer a broadside shot.

Hares.

It is to be presumed that the Ground Game Act was specially directed—and with reason—against rabbits more than hares, but the former show little or no evidence of being affected by it. Yet from every point of view, except perhaps that of shooting, they are far less valuable, and more noxious, animals, which ravage alike the young plantations of the landlord and the crops of the tenant farmer. Where they are preserved in large numbers, the most usual method of shooting them is to ferret them out of the burrows as short a time as possible before the day fixed for shooting, and then fill in the mouths of the holes with well beaten soil, which should also be drenched with paraffin or tar to deter the rabbits from digging their way in again. If this be carefully done, and plenty of covert—coarse grass, bracken or gorse—be available, in fine dry weather the rabbits will lie out for two or three nights, but in the event of heavy rain or especially snow, nothing will prevent them going to ground again. Where natural covert is scarce, it can be supplemented by strewing brushwood and fir-loppings under which rabbits will readily shelter. In beating for rabbits, the beaters should not merely tap with their sticks, but should thrust them into the clumps of grass and underwood; otherwise many rabbits will be passed over. When rabbits are driven up

Rabbits.

to a line of guns in covert, the latter—if no winged game is expected—should stand just inside the edge of the wood, with their backs to the beaters, and take the rabbits after they have passed. This not only induces the rabbits to face the open, but precludes the possibility of an accident to the beaters. Capital sport can be enjoyed in the summer evenings by stalking rabbits with a pea-rifle in a suitable locality, *i.e.* where no danger to human beings or live-stock can be caused by a stray or deflected bullet. A disused quarry or sand pit is an ideal place for such sport.

Wild-fowl.

One branch of shooting remains to be touched on, namely, wild-fowling, which again must be classed under two totally distinct headings, shore or flight shooting, and shooting afloat with a swivel punt gun. In flight shooting, the sportsman stations himself at a point over which the birds will probably pass at sundown or daybreak in their passage from or to the sea, when going to or leaving their inland feeding places. Success in flight-shooting must, therefore, depend very largely on chance or luck, but given a fair proportion of the latter, it is a fine, wild sport. One essential requirement is a well-trained and thoroughly intelligent dog, and here again no better can be selected than an Irish water-spaniel. No special rules of guidance can be laid down for shore-shooting; the districts are unhappily few and far between where even a moderate bag of edible wild-fowl can be made nowadays, and experience alone can give that knowledge of their habits which is essential to success. Wild stormy weather which drives the birds off the sea is the best for shore-shooting.

Punt-gunning or wild-fowling afloat is a sport confined to an exceedingly small number of people, professional or amateur, and is as distinct from ordinary inland shooting as deer-stalking from pigeon-shooting. It may be briefly described as the art of shooting wild-fowl on the sea, or in estuaries of rivers, from a flat-bottomed punt carrying a heavy, fixed gun, weighing anything from 70–170 lb, the muzzle of which rests in a revolving crutch in the bow of the boat, and firing a charge of 1–2 lb of shot. A punt may be either single- or double-handed, *i.e.* to contain one or two people, and it is perhaps unnecessary to add the fowl are shot sitting, or just as they rise from the water. It is a sport that contains a considerable element of danger, and requires great powers of endurance and a strong constitution no less than good nerves, and it has been rightly termed a science in itself, only to be learnt by a patient apprenticeship under an experienced teacher.

The art of shooting.

The art of shooting cannot be learnt theoretically, and can only be acquired by experience and practice. The beginner should, however, from the first seek to avoid an ugly or cramped style, which, once developed, is very difficult to get rid of, and should bear in mind that, in firing at a moving object, his purpose should be not to place his charge of shot where such object is at the moment he pulls the trigger, but where it will be by the time the shot reaches it; in other words the game should run or fly into the circle of pellets. Nor should he seek to effect this by dwelling on his game with his gun at his shoulder—a practice not only clumsy but exceedingly dangerous—but by firing at an imaginary point in front of it. Practice alone can teach the knack of doing this properly; to some men it seems a natural gift, while others do not acquire it in a life-time. A sound digestion is the surest aid to successful shooting, for unless the nervous system be in perfect tune, brain, eye and hand cannot act in that spontaneous sympathy necessary to quick and pretty marksmanship.

None the less a good deal depends on the gun, as well as the man who uses it, and in choosing a fowling-piece it will be found an advantage, no less than an ultimate economy, for the young shooter to place himself in the hands of a London gunmaker of repute, and pay a good price for a good article. A 12-bore is the generally accepted gauge for modern shot guns, and this should weigh from 6½–6¾ lb. Of late years it is gradually becoming customary to reduce the length of the barrels from 30 to 28 in., a most decided improvement, as without diminishing the killing-power of the gun it improves its balance, and so lessens the probability of shooting under game, a very common fault among sportsmen. Excessive choking is to be deprecated; a pattern of 140 for the right and of 160 for the left barrel will be found amply sufficient, and a load of 40–42 grains of nitro-powder with 1 or 1⅛ oz. No. 5½ unchilled shot will meet all ordinary requirements of the shooting field. A thoroughly good hammerless ejector gun can be obtained from a first-class London gunmaker for 35–45 guineas, and a pair for £75 to £100, but these prices are capable of considerable modification or the reverse. Single-trigger guns are the latest fashion, but no special advantage can be claimed for them.

The bibliography of shooting is very extensive, but the following works may be cited as standard ones on the subject: The "Badminton Library" *Shooting—Hints to Young Shooters*, by Sir Ralph Payne-Gallwey; "The Fur and Feather" series of publications; *The Gun and its Developments*, by Greener; and for wild-fowling, Colonel Hawker's evergreen *Instructions to Young Sportsmen*; *The Art of Wildfowling*, by Abel Chapman; *The Fowler in Ireland*, by Sir Ralph Payne-Gallwey; and *The Wildfowler*, by Folkard.

Big Game.

The pursuit of large game, whether for food or sport, has ever exercised the greatest fascination for mankind, and with the rapid opening up of vast continents hitherto unexplored, and the introduction of breech-loading rifles, it has assumed an importance within the last few decades that bids fair to render it a thing of the past before the end of the current century. The present generation has seen the bison, which formerly roamed the American prairies in countless millions, wiped off the face of creation; the veldt of Southern Africa, which teemed in equal proportions with big game of every description, has become a pastoral country, where a few of the commoner varieties of antelope are suffered to exist under much the same conditions as the semi-wild deer of the Scottish Highlands; and even the jungles of Hindustan, save where jealously preserved by native potentates, show signs of exhaustion as regards the larger fauna. True, wherever the white man holds sway, the danger of extinction has been recognized; close-times have been instituted; reserves set apart wherein the animals may breed unmolested, and the number of each species that may be killed, restricted; but it is doubtful whether these laws, wholesome and well-intentioned as they are, can do more than retard the ultimate destruction of big game outside such reserves as the Yellowstone Park in North America. Within the pale of this no rifle is ever fired, and the game has prospered correspondingly, but once let a single head of it wander outside the restricted area, and its doom is sealed. Moreover, there are still vast tracts in Africa, and to a limited extent in other parts of the globe, where big game forms the staple meat supply of the aboriginal inhabitants, who, in addition, are no longer dependent on their primitive weapons of the chase, but are equipped with more or less efficient firearms. Great regions are however still to be found, of which sportsmen have as yet barely touched the fringe. The dense forests of Western Africa are practically unexplored, much less shot out, and Central and Eastern Asia, the Dutch East Indies, and Borneo and Sumatra, offer an almost virgin field for sport with big game. Save for the Barren Grounds of the Arctic regions and some parts of the extreme north-west—though Alaska now enjoys particularly stringent game laws—the North American continent is fast becoming denuded of big game; but in Europe, within a week's journey of London, the mountains of the Caucasus and the forests at their feet are only known to a handful of intrepid explorers. It will thus be seen that although good trophies, whether of hide or horn, are yearly becoming scarcer, fair sport is yet obtainable in those parts of the world where big game is indigenous, though the days are long past when a sportsman could shoot at his own discretion over the whole of Africa or North America, or when the globe-trotter visiting India could count on big game shooting as forming part of his programme.

Indeed, in view of the increased, and increasing, facilities for world travel, and the prevalent fashion for sport, it is probable that in course of time big game shooting will be universally

conducted on modern European lines; *i.e.* wild animals will be carefully preserved by the state and private owners, and where the latter do not care to exercise the sporting rights they will be let to the highest bidder, and big game shooting will, as with Scottish deer-stalking, become exclusively a pastime of the wealthy or luxurious classes. Already large tracts in the wilder parts of the Eastern States of America have been acquired by rich men, over which they jealously preserve the sporting; and with the opening up of railway communication in the south of Africa to the Zambezi, and in the north to Khartum, the dawn of another century may not improbably see shooting-boxes advertised "to let for the winter months," dotting the very countries where Oswell, or Baker, found a virgin field for their rifles within the last few decades. Distasteful as such a state of things may seem to the present generation of sportsmen, something more or less approaching it will inevitably come to pass; and where climatic conditions or inaccessibility forbid its adoption, big game will become extinct at the hands of native races or white "professional" hunters. *Carpe diem* must undoubtedly be the motto of the big game shooter of the present day, who requires genuine wild sport under the highest possible conditions. Even at present it is essential that he should obtain the fullest information as to the existing game laws in the part of the world in which he proposes to hunt, the whole of North America and practically three-fourths of Africa being governed by stringent regulations respecting the preservation of big game. Every state in the North American Union, and in some cases every county in a state, has its own close-times and game laws, and the same is true of Canada. Moreover, heavy fees for licences to kill big game are now exacted in all parts of the world where game laws exist. In the United States the cost of this varies very much, the present highest charge being $50 for a "non-resident" sportsman, while in addition in some states he is not permitted to hunt unless accompanied with a qualified guide. Full information on these points can be obtained gratis on application to the Board of Agriculture at Washington, where every assistance is given with the greatest courtesy, and which further issues admirably compiled pamphlets dealing with the whole question of game-preservation. Infringement of the United States Game Laws entails exceedingly heavy penalties, amounting in the most extreme case to two years' imprisonment plus a fine of $5000.

In Canada the highest charge is $100 in Manitoba, while in Africa it varies from £50 in the Sudan and British and German East Africa to £100 in Bechuanaland. Moreover, it must be borne in mind that these fees only permit the killing of a limited number of specified animals. Still, excellent as these laws undoubtedly are, their value must remain enormously discounted as long as the sale of game and skins by aboriginal or professional hunters is permitted; it is they, and not the heavily taxed foreign sportsman, who are responsible for the threatened extinction of big game.

So far as Asiatic sport is concerned, British India, save to those furnished with credentials to native potentates or high government officials, offers scant opportunity as regards big game to the itinerant sportsman, who must now wander farther afield into Central or North-Eastern Asia, Borneo, Java and the wilder parts of Assam or Burma; but the greater portion of the first-named locality is only open to persons duly authorized by the Russian government.

Although South America and Australia offer little attraction for sport with the rifle, big game of varying species is thus indigenous in every part of the world.[1] It is obviously impossible within our limits to deal at any length with either its habits or the various methods of hunting it. Brief allusion will be made, however, to the chief varieties of it found in the various continents, and the necessary equipment for their pursuit.

Europe contains big game in greater variety and quantity than is generally supposed. The last survivors of the aurochs or European bison still roam the forests of Lithuania and the Caucasus: elk are found in Scandinavia, Russia and Eastern Prussia, and red-deer are common to the whole of the continent. Of the more Alpine kinds of big game, reindeer exist in Norway; chamois in the mountainous districts of Central and Southern Europe; wild sheep in Corsica and Sardinia; while a few of the European ibex still linger in the royal preserves of the Italian Alps. A variety of ibex is fairly plentiful in Spain, and wild goats are found in South-Eastern Europe. Of the carnivora, bears, wolves and lynxes, though not often met with, still exist in fair numbers in most of the mountainous countries of Europe, though the first-named animal is practically the only one affording opportunity for sport with the rifle. Gluttons or wolverines are found in Scandinavia and Russia, and so-called wild-boar are plentiful in the carefully preserved forests of Central Europe. The reason for this continued supply of big game is that the whole of the European continent has been for centuries under private, communal or state preservation. The Caucasus, which though geographically in Europe, can hardly with fairness be held to be so as regards sport, further contain such purely Asiatic varieties of big game as tigers, leopards and tahr, and but for the savage character of the country and its inhabitants, and the obstacles thrown in the way of foreign travellers, would probably be far more visited by English sportsmen than is at present the case. In civilized Europe, Scandinavia, Spain and the Mediterranean islands probably offer the best field for the big game hunter of moderate means, though the last named localities still enjoy an unenviable reputation for brigandage. ***Europe.***

Among useful works of reference dealing with big game shooting in Europe the following may be cited: *Wild Spain*, by Chapman, and *Wild Norway* by the same author; *Flood, Fell and Forest*, by Sir Henry Pottinger; *Savage Svanetia* and *Sport in the Crimea and Caucasus*, by Phillips Woolley; *Tyrol and the Tyrolese*, by Baillie-Grohmann; the volumes of the "Badminton Library" dealing with the subject, and especially *Short Stalks*, by E. N. Buxton.

The physical geography of so vast a continent as Asia, no less than its varying climatic conditions, naturally produce many different species of big game, ranging from the Alpine to the purely tropical. When it is remembered that the continent includes the frozen tundras of the Arctic Circle, the steaming plains of Hindustan, the treeless wastes of the Pamirs and the dense jungles of Burma, together with the highest mountains in the world, it will be readily seen how varied must be its fauna. Among the carnivora, the tiger and the leopard or panther are found practically throughout Asia, save in the extreme north and north-west; while lions, though exceedingly rare, still exist in Guzerat and parts of Persia and Mesopotamia. The usual methods of tiger-shooting in British Asia are, when the game has been located, either to drive it to the sportsmen by means of natives acting as beaters, or else to force it into the open with a long line of elephants, which also serve to carry the shooters; the choice of methods must, of course, depend on local conditions. The second practice is not a form of sport within the reach of men of moderate means, who, indeed, except as the guests of some native potentate, are not likely to have the opportunity of indulging in tiger-shooting at all. In localities where neither of these methods is feasible, it is usual to tie up a live animal as a bait, and sit up over it during the night in a *machān* or platform lashed to the nearest tree; but this is usually an unsatisfactory and disappointing proceeding. In parts of Asia other than British possessions, tigers are found as far apart as the shores of the Caspian Sea and the island of Saghalien. Europeans recover with difficulty from the bite of a tiger, since blood-poisoning is the almost inevitable result owing to the septic condition of the animal's teeth and claws, and a supply of antiseptic lint and solution should always form part of the tiger-shooter's equipment. Panthers, though more plentiful than tigers, are less frequently bagged, as they are exceedingly difficult animals to beat out of covert; they are usually killed by sitting up over a bait, or by smoking them out of the caves they frequently make their homes. A wounded panther has the reputation of being a more dangerous animal than a tiger. Other varieties of the felines are the cheetah, the clouded panther, ***Asia.***

[1] Except in New Zealand, where red-deer have, however, been introduced and afford magnificent sport.

the lynx, and most beautiful and rarest of all, the ounce or snow leopard, only found above the snow line.

Of other Asiatic carnivora the bears are the most important from the sportsman's point of view. A great variety of them exists, ranging from the great Kamchatkan bear to the small blue bear of Thibet, but the methods of their pursuit call for no special mention.

The Indian elephant is rather smaller than the African variety, and has other well-marked differences, the chief as regards shooting being the fact that the cavity at the top of the trunk is not protected by the roots of the tusks as in the African elephant, thus enabling a frontal shot to reach the brain. This point, one at the side of the temple, and another at the back of the ear, are most usually selected for their aim by Indian sportsmen, who do not favour the shoulder shot so commonly employed in Africa. A charging elephant can often be turned by a well-planted, though not necessarily fatal, bullet, but a really determined animal, especially a female with a calf, will not cease its attack until either it or the hunter be killed. Though elephants will usually fly from the report of a rifle, the sound of a human voice will often make them charge.

Four varieties of rhinoceros, of which two are one-horned, and two double-horned, are found in Asia, ranging eastwards from Assam through Burma and Siam as far as Sumatra. The rhinoceros is almost invariably found in heavy grass swamps, and can consequently only be hunted by means of elephants. It is usually beaten out by means of a long line, but is occasionally tracked to its lair on a single elephant. In common with many animals of the deer and antelope tribes, the rhinoceros always deposits its droppings in the same place, a peculiarity which enables native shikaris to locate it with tolerable ease. Although a rhinoceros, even when wounded, will rarely charge home, it has a peculiarly terrifying effect on tame elephants, and specially trustworthy ones are necessary for this sport. The Indian rhinoceros differs in many important details from the African variety.

Of bovines, Asia produces the buffalo, three species of the gaur —miscalled the Indian bison—and the yak, the latter a rather uninteresting beast of the chase only found on the open ground of the Tibetan plateau. Very different is the pursuit of the gaur in the dense forests of India and Burma, where it is usually stalked on foot; and to track a wounded bull through thick jungle affords one of the most exciting experiences of big game shooting. Such an animal will almost invariably turn at right angles to its trail, and watch for its pursuer, whom it will charge from a distance of perhaps a few yards, even feet. The wild buffalo, too, is an exceedingly plucky animal, and will on occasion even attack a European—whose smell appears distasteful to it—unmolested, a peculiarity it shares with the tame variety.

The numerous species of deer and antelope scattered over the continent of Asia are usually obtained by stalking, but the former being essentially forest-haunting animals, while the latter are usually found on open ground, the methods of approaching them naturally vary with local conditions. Of deer the best known are the sambar, the chital and the swamp deer, but the Hangul or Cashmere stag, the Altai wapiti and the Maral or Asiatic red-deer afford the finest trophies. Of Asiatic antelope the handsomest and commonest variety is probably the black-buck, found practically all over India as far east as Assam.

To many sportsmen the most fascinating form of Asiatic big game shooting is the pursuit of the many varieties of wild goats and sheep, common to the various mountain ranges and high-lying plateaus of the continent. While such sport lacks the risk of attack from the animal hunted, it exacts remarkable powers of endurance and perseverance on the part of the hunter, coupled in most cases with the dangers inseparable from Alpine climbing. There is scarcely a mountainous or elevated part of Asia which does not contain some variety of wild goat or sheep, of which the best known are the ibex and markhor of the Himalayas and Hindu Kush among the former, and the *Ovis Poli* and *O. Ammon* of Tibet among the latter. As a general rule all wild goats can only be obtained under conditions which exact the highest mountaineering qualities on the part of the stalker, but with regard to the sheep of the vast tablelands of High Asia—"the roof of the world"—a good deal of work has to be done on pony back, as the rarefied atmosphere of these great altitudes precludes much physical exertion. Exception, however, in this respect must be made of the burhel—*Ovis Nahura*—which haunts the same inaccessible crags as the ibex or markhor. The sportsman who essays to bag an *Ovis Poli*, or *O. Ammon*, will probably have had ample opportunity of testing his climbing powers on the march from India to his shooting-ground.

Ibex-shooting begins with the melting of the snows on the lower slopes, and ends in June, when the flies and the flocks of native herdsmen, driven to the Alpine pastures, force the wild animals to seek ground absolutely inaccessible to man. "First come first served" is a recognized rule in Himalayan shooting, and once a sportsman has claimed a *nullah*, or mountain valley, by priority of possession, it is his alone as long as he chooses to retain it; consequently the "race for the nullahs" in early spring is not the least exciting part of Himalayan big game shooting. In addition to ibex, markhor and such animals, the season's bag should also include two varieties of bear, and, with extreme good fortune, an ounce or snow leopard.

Like the fox in Great Britain, the wild boar is never shot in any part of British Asia where it can be hunted on horseback.

Equipment.

Thanks to the improvements in modern firearms, and particularly to the adaptation of cordite ammunition to sporting rifles, the battery necessary for Asiatic big game shooting has been considerably reduced, both in weight and number of weapons required. It is not long since 8-, or even 4-bore rifles, weighing respectively 18 and 24 lb, or at least a ·577 Express, were considered indispensable for the pursuit of the pachyderms and larger bovines, yet nowadays a ·450 rifle of 11 lb weight, in conjunction with cordite powder, is held amply sufficient for the heaviest or most dangerous game, the penetration or expansion of the bullet being regulated by the extent of its covering of cupro-nickel or steel. For soft-skinned animals, deer and mountain game, a ·256 or ·303 magazine rifle is the most useful weapon, and it may be confidently said that the introduction of these and similar small-bore rifles has extended the killing zone in stalking by at least 100 yds. For forest or jungle shooting a 10- or 12-bore Paradox gun is an admirable weapon, capable of use as a rifle against large and dangerous animals, or as an ordinary shot gun for small game. A double-barrelled rifle is essential for dangerous game, the saving of time, short as it is, in merely shifting the finger from one trigger to another, being an enormous advantage as compared with the action of ejecting and re-loading from a magazine. Finally it may be said that a sportsman would be completely equipped for big game shooting in Asia, or indeed any part of the world, with a battery consisting of a ·450 cordite rifle, a 10- or 12-bore Paradox gun and a ·256 or ·303 magazine rifle.

As regards the rest of his outfit, if he propose to shoot in any part of British Asia, he can procure this on the spot, as well, and far cheaper, than in England.

Useful works dealing with big game shooting in Asia are: Baldwin, *Large and Small Game of Bengal*; Forsyth, *Highlands of Central India*; Sanderson, *Thirteen Years among the Wild Beasts of India*; Kinloch, *Large Game Shooting in Thibet, &c.*; MacIntyre, *Hindu Koh*; Steindale, *Natural History*; Demidoff, *Sport in Central Asia*; Ronaldshay, *Sport and Travel 'neath an Eastern Sky*; *A Shooting Trip to Kamchatka*; and Fife-Cookson, *Tiger-Shooting in the Doon and Ulwar.*

Africa.

The main feature of African big game is the antelopes, which exist in great variety; such widely different animals as the noble sable antelope and the tiny dik-dik being classed among them. African gazelles and antelopes may be roughly divided into two classes, those found on plains or open ground, and those frequenting forest or bush, and the methods of hunting them naturally vary with the locality. Still, as a general rule, the antelopes of the plains are not only the finer animals, but afford more enjoyable sport in the stalk, combined with the advantage of a climate free from malaria. There is practically no part of Africa where antelopes do not exist in one variety or

another, but probably British East Africa or Somaliland offer the best field for sportsmen. On open ground a good deal of hunting can be done on horseback—except in those districts where the tsetse fly exists—and antelopes are occasionally ridden down, but a very stout-hearted horse is required to overtake such animals as sable antelopes, eland or gemsbok. Caution should always be exercised in approaching the larger varieties of antelope when at bay, whether wounded or not, as some of them, notably the roan and sable, and the oryx, are inclined to be very savage, and will charge desperately home. It is said that even a lion is chary of attacking the oryx, owing to its long rapier-like horns.

The African carnivora include the lion, leopard, cheetah, hyena and other smaller varieties, but it is only necessary to deal with the first named, which, where not exterminated or driven away by civilization, may be said to be common to the whole continent. As with all game, big or small, the conditions of lion-shooting vary with the locality; thus, on the open plains of Somaliland, lions can be spied from a distance and stalked on foot, or even ridden to bay on horseback, while in densely bushed districts, unless chanced on in open ground, the most usual method is to sit up at night over a bait or kill, inside a *zareba* of thorn bushes. This method, however, makes aiming with any degree of accuracy a matter of difficulty, but a German, Herr Schillings, has demonstrated the use of a flashlight in such circumstances. Lions frequently lie up or shelter in detached patches of scrub, whence they may be driven by a "bobbery" pack of dogs, or as a last resource the bush may be set on fire, the sportsman having previously concealed himself down wind. Lions when emboldened by hunger will fearlessly attack human beings, especially at night, and, like tigers that have once developed a taste for human flesh, become positive scourges of their neighbourhood. Mr F. C. Selous, than whom there are few better authorities, considers the lion the most dangerous of all African big game, a distinction that other writers award to the buffalo.

Of the pachyderms the commonest is the rhinoceros (*R. bicornis*), usually termed the black rhinoceros to distinguish it from the so-called "white" variety now almost extinct. Though the first-named is by no means so widely distributed as formerly, it is still plentiful in Equatorial Africa, and to a lesser extent in Somaliland. It bears rather a mixed character for ferocity, but most hunters agree that while it will charge with little or no provocation, it does so blindly, and rarely turns to renew the attack. This is probably due to its exceedingly poor sense of sight, but its sense of smell is correspondingly extraordinarily acute, while an additional cause that renders it a difficult beast to stalk is the presence of the "rhinoceros birds" which are its almost invariable companions, and which warn it of danger. Though so huge an animal, the rhinoceros is easily killed by a bullet in front of the base of the ear, or midway along the neck: the shoulder shot is only employed when the hunter has stepped aside to avoid a charge. The hippopotamus is still plentiful throughout most parts of uncivilized Africa. In narrow rivers where they can be shot from the bank, they are easily killed by a brain-shot, the best spot to aim at being the base of the ear. If the bullet be properly placed the animal will sink to the bottom of the stream and rise to the surface within a few hours. Hippopotami are nocturnal feeders, and can be occasionally shot at night when at a considerable distance from water; but owing to the difficulty of placing the bullet accurately, they are apt to escape wounded. Hippopotamus shooting does not rank high as a sport, but the meat, when young, is excellent, and the huge size of the animal enables a hunter to provide a large number of followers with food; this can be the only excuse for killing these comparatively harmless animals in any number.

Elephants still exist in considerable numbers in parts of Africa, but, unless more stringent methods of protection are afforded, their ultimate extermination at the hands of professional ivory-hunters, white or coloured, is inevitable. What can be done in the direction of preservation is shown in Cape Colony, where elephants, which have been rigidly protected for many years, now exist in considerable, and increasing, quantity. Elephants have an extraordinarily keen sense of smell, which, coupled with their habit of roaming over vast expanses of country, forms their chief safeguard against the relentless persecution to which they are subject. They may be hunted either on foot or horseback; where feasible, the latter is the preferable method, as it not only enables the hunter to follow up his quarry with greater ease—and when startled, or wounded, elephants will travel enormous distances—but in open country gives him a better chance of escape from a charge. The heart, or broadside, shot is usually employed. Incredible as it may seem, these enormous creatures can be killed by a single pellet of hardened nickel, discharged from a ·303 rifle. A weapon of heavier calibre is, however, to be recommended, and a ·450 rifle, or 10 or 8-bore Paradox gun, are most suitable; the closer the hunter can safely get to the animal the better. A charging elephant can usually, but not invariably, be turned by a shot in the chest; to fire at the head is useless.

The buffalo (*Bos caffer*), formerly one of the commonest of African wild animals, has been practically exterminated in many parts by the plague of rinderpest, but is still plentiful in the malarious swamps between the mouths of the Limpopo and the Zambezi, and even more so in the Beira district of Portuguese East Africa. Like most wild animals, the buffalo is naturally disinclined to take the offensive, but when roused to action, it will pursue a hunter with relentless ferocity, and is held by many authorities to be the most dangerous of African big game. The greatest care should therefore be exercised in following up a wounded animal, or in approaching one that is apparently dead, for as long as a spark of life lingers in it, it will endeavour to destroy its destroyer. A wounded buffalo will nearly always make for the nearest thicket, where it will await its pursuer, and in such circumstances, it should be left alone for an hour or two, when it will probably lie down, and be less active in attack owing to its wound having stiffened. A charging buffalo always carries its head at such an angle that a frontal shot is useless, unless the bullet penetrates through the nose into the throat or chest. A ·500 or ·450 rifle with a solid bullet, or an 8-bore Paradox gun is the best weapon for buffalo-shooting. Other varieties of the African bovines are the smaller, Abyssinian, the Senegalian, and the dwarf, or Congo buffaloes.

The only other species of African big game calling for special mention is the giraffe, which is usually ridden down and killed by a raking shot at the root of the tail; but except when required for food or specimens, the destruction of this inoffensive animal, which offers no trophy of the chase, is to be deprecated. Great numbers are annually destroyed by professional skin hunters, and their carcases left to rot. Bears, though little known, exist in North-West Africa, and the ubiquitous wild goat, or ibex, is also found in the north of the continent. A ·450 cordite rifle, a ·303 small bore, and a 10 or 8-bore Paradox gun, is an ample battery for African big game shooting.

Useful books of reference for African shooting are: Selous, *A Hunter's Wanderings in Africa*; *Travel and Adventure in S.E. Africa*, by the same author; Baker, *Wild Beasts and their Ways*; Swayne, *Seventeen Trips through Somaliland*; Powell Cotton, *Travel and Adventure in the Congo Free State*, *A Sporting Trip to Abyssinia*; Melliss, *Lion Hunting in Somaliland*; Willoughby, *East Africa and its Big Game*; Neumann, *Elephant Hunting in East Equatorial Africa*; Hay, *Western Barbary*; Bryden, *Kloof and Karoo*; Millais, *A Breath from the Veldt*; Thomson, *Through Masai-Land*; and Theodore Roosevelt, *African Game Trails* (N.Y., 1910).

North America.

Big game in North America has been rapidly disappearing for several decades before the advance of civilization armed with breech-loading rifles. Among the carnivora, bears and pumas are the only species that need be taken into account as far as shooting is concerned. Of the former three[1] varieties exist, the grizzly, rarely found east of the Rocky Mountains, the brown bear, and the black bear, common to

[1] The Polar bear may be claimed as a fourth species, as it is found on the mainland of the ice-bound north, but it can hardly be included as far as big game shooting is concerned. American naturalists recognize many sub-varieties of both the grizzly and brown bear.

practically the whole of the continent, though now rarely killed in the Eastern states. The best country for bears is Alaska, where the grizzly grows to an enormous size, and the Kadiak Island bear is probably the largest variety of its genus in the world, except perhaps the Yezo bear of Japan. In Alaska, bears are frequently shot along the river-banks, to which they resort in autumn to feed on the salmon which then crowd the rivers. Otherwise no fixed rule can be laid down for American bear-shooting; the quarry may be hunted with dogs, which "tree" the black bear, or bring the grizzly, which is unable to climb, to bay; it may be killed over a bait; it may be spied and stalked, or, most common of all, it may be accidentally "jumped" and shot by the hunter. The neck or heart is the most vulnerable spot to aim for, but bears are very tenacious of life, and astonishingly active, despite their clumsy appearance. Their eyesight is bad, but their sense of smell and hearing very acute. The biggest of grizzlies will rarely charge unprovoked, unless it be a female with cubs, but when molested or wounded it will push its attack home with the greatest temerity, and caution should always be exercised in approaching a wounded animal, even when apparently dead.

Of North American *Cervidae* the finest is the wapiti, invariably miscalled elk, once as plentiful as the bison, but now extinct east of the Rockies, where, though still fairly abundant, it is found in sadly diminished numbers. It is especially common in Vancouver, but as is almost invariably the case with insular deer, the heads are small compared to those of the mainland. Wapiti-hunting is probably the finest sport in America, not only from the magnificent trophy these splendid deer afford, but also on account of the beautiful country they frequent in the United States; open rolling ranges of hills interspersed with patches of timber. Wapiti are almost invariably killed by stalking during the rutting-season, when the big bulls betray themselves by their defiant challenge. The largest deer in the world is the North American moose, which, except for a difference in size, is precisely the same animal as the elk of Northern and Eastern Europe. It is essentially a forest-haunting animal, which in the Eastern States and Canada is frequently killed by "calling," *i.e.* imitating the call of the cow, and so attracting the rutting bull to within shot of the hunter. This is usually effected by means of a species of trumpet made of birch-bark, and in this art of "calling" both white men and Indians become exceedingly skilful. In Alaska, where the finest moose are found, they are usually stalked or "still-hunted" on foot, and to "still-hunt" these animals in dense timber successfully is a most delicate piece of wood craft. Unless struck in a vital part a wounded moose will travel enormous distances, but a single shot in the heart, or better still, the neck, is usually fatal. A wounded moose can be dangerous and should be approached with caution.

The North American caribou, which is practically the same animal as the European and Asiatic reindeer, may be divided into two varieties: the Barren Ground caribou found in the north, and the Woodland caribou, found all over the forests of Canada, and in a few localities in the United States. The former is probably the only wild animal existing on the American continent in practically the same numbers as formerly, while the latter, thanks to careful preservation, is still abundant. The Barren Ground caribou of the northern regions of North America are frequently hunted by white men. They form the staple food of the natives of Arctic North America, and huge quantities of them are killed during the spring and autumn migration, especially when swimming lakes or rivers. The woodland caribou is easily stalked in fairly open ground, and a bullet in the heart or neck will kill the largest bull. Caribou and reindeer are the only animals of the *Cervidae* in which the females have horns as well as the males. The two most widely separated districts of Canada, Newfoundland and British Columbia, probably afford the best ground for woodland caribou. Other American deer are the mule, or black-tailed, and the Virginian, or white-tailed, both widely distributed throughout the continent, but the latter, which is essentially a denizen of thick forest, is much the most difficult beast to stalk. It is occasionally "hounded" or hunted with dogs, which drive it to runways where the hunter has previously concealed himself. A smaller variety of the black-tail is found on the Pacific coast.

The prongbuck, invariably, but incorrectly, styled an antelope, is a sporting little animal only found on open plains. It was formerly exceedingly plentiful, but is now sadly diminished in numbers. It can only be obtained by fair stalking, and the shot has almost invariably to be taken at long range. It affords excellent sport when coursed with greyhounds. It is the only hollow-horned ruminant which annually sheds its horns.

Now that the bison is extinct as far as shooting is concerned, the only bovine of North America is the musk ox of the Arctic Circle, but few sportsmen care to undergo the discomforts attendant on the pursuit of this animal, which moreover is an exceedingly uninteresting beast of sport and offers but a poor trophy. The same may be said of the Rocky Mountain goat, a curious animal, which zoologically is an antelope, and which, though its pursuit exacts great powers of endurance and mountaineering ability, is so stupid, or self-confident a creature, that practically no science is required to stalk it. Very different is the chase of the magnificent big horn or wild sheep, now scarce in the United States, but fairly plentiful in the Kootenay district of British Columbia, and which, when killed by fair stalking, affords a trophy that may be considered the Blue Ribbon of American big game shooting. It is occasionally hunted with dogs, which hold it at bay until the hunter can get within range, or it may be killed by watching the so-called "licks," or beds of limestone clay, to which these animals are fond of resorting, and which they lick or gnaw, presumably as a form of corrective. Big horn, varying according to locality, are found as far north as the shores of the Bering Sea, and south to Northern Mexico. The only other wild animal of North America that needs mention is the puma or panther. This is invariably hunted with dogs, which "tree" it or hold it at bay until the arrival of the hunter, while a good pack of staunch hounds will kill it themselves. To seek it without the aid of dogs is useless, and it is therefore an uninteresting beast of sport. Certain American writers have claimed a rather spurious courage for the puma, but the general consensus of opinion is that it is a skulking, cowardly beast.

No special battery need be taken to America; a ·303 rifle is sufficient for all the big game of the continent, but a ·400 or ·450 cordite rifle is probably preferable for dealing with the big Alaskan grizzlies.

Useful works of reference for American shooting are: Roosevelt, *Hunting Trips of a Ranchman*; Van Dyke, *The Still-Hunter*; Pike, *The Barren Grounds of Northern Canada*; Grohmann, *Camps in the Rockies*; Caton, *The Antelope and Deer of America*; *American Big Game Hunting* (edited by Roosevelt); Davis, *Caribou Shooting in Newfoundland*; Buxton, *Short Stalks*; Whitehead, *Camp Fires of the Everglades*; and the volumes of the "Badminton Library" dealing with the subject.

South America. Although two or three sorts of unimportant deer are found in South America, as well as the puma or jaguar, it does not call for special mention in respect of big game shooting, an extraordinary fact in view of the enormous size of the continent. The best work of reference is Kennedy, *Sporting Sketches in South America.*

Other areas. Arctic big game shooting appeals to such a small class of sportsmen, and is so limited in its variety of game, that it need not be touched on here. Full information on the subject can be found in the works of Lamont, Nansen, and other Arctic explorers.

Some of the finest deer stalking in the world can be obtained in New Zealand, by those able to spare the time for so long a journey.

General considerations. Big game shooting is not only an exceedingly expensive amusement, but one of which the cost has been continually increasing, and no expedition of any length outside Europe could be enjoyed under an expenditure of from £300–£500; but in view of the enormous difference in local conditions, no less than individual requirements, no hard and fast scale can be laid down. East Africa and Somaliland are probably the most expensive localities in which

to hunt, on account of the numbers of porters, and followers, with which a sportsman is obliged to encumber himself, while British India is relatively the cheapest. South of the Zambezi in Africa, it is usual to transport stores and equipment in an ox-wagon, and though the initial cost is heavy, great part of this can be recouped by selling the equipment at the end of the trip. No matter in what part of Africa it is purposed to hunt, it is advisable to bring everything, camp-equipment—Weissman tent, mosquito curtains, camp bedstead, table and chair—and all stores from England. These latter should be packed in strong boxes, each branded with the nature of its contents, to weigh when full 65 lb, the weight an African porter can conveniently carry. Beads and presents for natives should not be overlooked. In India, on the other hand, nearly everything can be procured cheaper and better there than in England, while as regards North America, as indeed everywhere, the expense of a shooting trip varies largely with locality; the outfit of wagons, horses and attendants requisite for Wyoming or Montana, being useless in British Columbia, or Alaska, where everything has to be "packed" on Indian porters. Of Central or Northern Asia it is difficult to speak with any degree of accuracy as regards expense; but on this important point, no matter in what part of the globe an expedition may be planned, information should be sought from only the latest and most reliable authorities.

The hunter's personal equipment, rifle, clothing, saddlery, &c., should be the best procurable. Where a camp bed is not practicable, a sleeping-bag of three partitions and waterproof back should be taken. Clothing must of course be adapted to the climate, but flannel must always be worn next the skin, and a cholera belt is a necessity. It should be remembered that clothing should err on the side of warmth; a chill can be contracted in the tropics just as easily as in a temperate clime, and is far more dangerous in its effects. A small medicine-chest should form part of the equipment, and most medicines can now be obtained in easily portable tabloids. Warburg's fever tincture, and quinine, are essential in tropical or malarious districts. Cheap rubber-soled shoes, to be thrown away when worn out, are excellent for rock work, otherwise no footgear can equal a well-made English shooting boot. Good field-glasses are preferable to telescopes, on account of their handiness. Now that big game shooting has become the "fashion," and facilities for world travel are increasing every year, people are prone to enter on the sport with but vague ideas as to its dangers, hardships and responsibilities. Presumably no one not of sound constitution would undertake an expedition to, say, Central Africa, or Asia; but even granted this necessary qualification, he may be naturally unfitted by temperament to deal with the discomforts and drawbacks inseparable from big game shooting, even under the most favourable conditions. He may be able to plant shot after shot on the bull's-eye of a stationary iron target, yet this is a very different matter from finding the shoulder of an animal moving through surroundings which closely assimilate with its own colouring, or from placing his bullet in exactly the right spot to stop the charge of an infuriated wild-beast. In such a situation, if eye, hand, or nerve fail him, the odds are that the creature will kill him instead of his killing it, for, as has been truly said, dangerous wild animals when wounded, or provoked beyond endurance, will hunt a human being as a terrier does a rabbit. In dealing with coloured retainers, whether Asiatic or African, the hunter should above all remember that he is a white man, and exact implicit obedience and respect, by combining firmness with scrupulously fair treatment. Again, to instance a minor, but none the less important, essential, how many would-be big-game hunters are there who can trust themselves to find their direction by a compass, or steer a course at night by the aid of the best-known constellations? Yet this is merely one of a hundred other requirements necessary to travel in a wild country.

(P. St.)

SHOP, a term originally for a booth or stall where goods were sold, and in most cases also made, now used chiefly in the sense of a room or set of rooms in a building where goods are displayed for sale and sold by retail, also the building containing the rooms. Another application of the word is to the building or rooms in which the making or repairing of articles is carried on, a carpenter's shop, a repairing-shop, at engineering works and the like. In America, in the smaller towns and rural districts the "shop" is usually styled a "store" (O.F. *estor*, Late Lat. *staurum, instaurare*, to build, construct, in later use, to provide necessaries). While in America in the larger cities the word "shop" is becoming applied to the retail places of sale, in English usage "store" has in recent years become the recognized form for the large retail places for universal supply.

SHORE, JANE (d. 1527), mistress of the English king Edward IV., is said to have been the daughter of Thomas Wainstead, a prosperous London mercer. She was well brought up, and married young to William Shore, a goldsmith. She attracted the notice of Edward IV., and soon after 1470, leaving her husband, she became the king's mistress. Edward called her the merriest of his concubines, and she exercised great influence; but, says More, "never abused it to any man's hurt, but to many a man's comfort and relief." After Edward's death she was mistress to Thomas Grey, marquess of Dorset, son of Elizabeth Woodville by her first husband. She also had relations with William Hastings, and may perhaps have been the intermediary between him and the Woodvilles. At all events she had political importance enough to incur the hostility of Richard of Gloucester, afterwards King Richard III., who accused her of having practised sorcery against him in collusion with the queen and Hastings. Richard had her put to public penance, but the people pitied her for her loveliness and womanly patience; her husband was dead, and now in poverty and disgrace she became a prisoner in London. There Thomas Lynom, the king's solicitor, was smitten with her, and wished to make her his wife, but was apparently dissuaded. Jane Shore survived till 1527; in her last days she had to "beg a living of many that had begged if she had not been." More, who knew her in old age when she was "lean, withered and dried up," says that in youth she was "proper and fair, nothing in her body that you would have changed, but if you would have wished her somewhat higher." Her greatest charm was, however, her pleasant behaviour; for she was "merry in company, ready and quick of answer." She figured much in 16th-century literature, notably in the *Mirrour for Magistrates*, and in Thomas Heywood's *Edward IV.* The legend which connected Jane Shore with Shoreditch is quite baseless; the place-name is very much older.

Bibliography.—Most of our information as to Jane Shore comes from Sir Thomas More's *Life of Richard III.*, edited by J. R. Lumby (Cambridge, 1883), supplemented a little by Edward Hall (*Chronicle*, pp. 363-364). See also H. B. Wheatley's edition of Percy's *Reliques*, ii. 264 (1876–1877), and J. Gairdner's *Life and Reign of Richard III.* (Cambridge, 1898).

(C. L. K.)

SHORE, a word meaning (1) the margin or edge of land when bordering on a large piece of water, whether of an ocean or sea or lake, "bank" taking its place when applied to the borders on either side of a river; for the legal aspect of the "shore," *i.e.*, the space bordering on tidal waters between high and low water mark, see Foreshore; (2) a prop of timber, used as a support, temporary or permanent, for a building when threatening to fall or during reconstruction (see Shoring), and more particularly a timber support placed against a ship's side when building on the stocks, or when ready for launching on the slips; the props which are the final supports knocked away at the moment of launching are called the "dog-shores," one of the very numerous uses of "dog" for mechanical devices of many kinds (see Shipbuilding). Both words are to be derived ultimately from the same source, viz., the root seen in "shear," to cut off; in sense (1) the word means a part cut or "shorn" off, an edge, and appears in M.Eng. as *schore*, from O.Eng. *sceran*, to cut, shear; in sense (2) it is of Scandinavian origin and is an adaptation of the Nor. *skora*, a piece of timber cut off to serve as a prop or support.

SHOREDITCH, an eastern metropolitan borough of London, England, bounded N.W. by Islington, N.E. by Hackney, E. by Bethnal Green and Stepney, S. by the City of London, and W. by Finsbury. Pop. (1901), 118,637. It is a poor and crowded district extending east and west of Kingsland Road, and has a large artisan population. Chain-making, cabinet work, and other industries are carried on. An old form of the name is *Soersditch*, and the origin is lost, though early tradition connects it with Jane Shore, mistress of Edward IV. The parliamentary borough of Shoreditch includes the Hoxton and Haggerston divisions, each returning one member. In Hoxton is the Shoreditch technical institute. The borough council consists of a mayor, 7 aldermen and 42 councillors. Area, 657·6 acres.

SHOREHAM, a seaport in the Lewes parliamentary division of Sussex, England, near the mouth of the river Adur, 6 m. W. of Brighton on the London, Brighton & South Coast railway. Pop. of urban district of New Shoreham (1901), 3837. The town is sometimes known as New Shoreham, in distinction from the village of Old Shoreham, a mile up the river, which was the former port. The church of St Mary the Virgin lacks almost the entire nave, but the remainder shows fine work ranging from Norman to Early English. Of no less interest is the church of St Nicholas, Old Shoreham, a cruciform Norman structure retaining some remarkable early woodwork. There are public gardens containing a museum and theatre. The trade of the small port is chiefly in coal, corn and timber. Shipbuilding is also carried on. The important public boys' school of St Nicholas, Lancing, near Shoreham, is part of a wide scheme which within Sussex includes the middle-class school at Hurstpierpoint, that for sons of tradesmen, &c., at St Saviour's, Ardingly, and the girls' school of St Michael's, Bognor. The scheme was originated by the Rev. N. Woodward in 1849.

It seems probable that soon after the Conquest the increasing prosperity of New Shoreham (Soresham, Sorham, Schorham) resulted in the decay of Old Shoreham, and that the borough grew up within the former. Shoreham owed its early importance to the natural harbour formed by the river Adur. In the time of the Confessor it was held by Azor of the king, but in 1066 was among the lands granted to William de Braose. From here Charles II. escaped to Fécamp after the battle of Worcester, 1651. It became a port of great consequence in the 13th and 14th centuries, but in the 15th and following centuries was much reduced, doubtless owing to the encroachment of the sea. The port revived during the reign of George III., when acts were passed for securing and improving the harbour. Shoreham was called a borough in 1236. In 1308 there was a mayor, and the "mayor and bailiffs of Shoreham" are mentioned in a Close Roll of 1346, but no charter of incorporation is known. The town adopted the Local Government Act of 1858 in 1866. It returned two members to parliament from 1295 until it was disfranchised in 1885. In the reign of Edward I., William de Braose held at Shoreham by prescriptive right weekly markets on Wednesdays and Saturdays, and a two-days' fair at the Exaltation of the Holy Cross. In 1792 the market-day was Saturday and a fair was held on the 25th of July, but these are not now held. Shipbuilding has always been the chief industry, and was largely carried on in the 13th and 14th centuries.

SHORING (from "shore," a prop), an operation connected with building. It is often necessary before actual building is begun to support adjoining premises while the work of excavating for underground apartments is being carried out. The art of shoring comprises the temporary support of buildings, and may become necessary because of the failure or settlement of some portion of the structure or for the purpose of upholding the upper portion while alterations are being made in the lower. There are several different forms of shoring, each adapted to suit peculiar circumstances. Much of the shoring for ordinary cases is done with heavy, roughly sawn timbers strongly braced together, but for especially heavy work steel members may be introduced and prove of great value. There is the trouble in connexion with their use, however, that connexions between steel members are not made with the same facility as between pieces of timber.

The form of shore in most general use is that known as the raking shore. It consists of one or more timbers sloping from the face of the structure to be supported and bedded upon the ground. As the ground is usually of a more or less yielding nature, a stout timber plate termed a sole-piece, of sufficient area to withstand being driven into the soil, is placed to receive the base of the raking timber or timbers. A wall-plate, with the object of increasing the area of support, is fixed to the face of the wall by means of hooks driven into the wall. Where space is available an angle of 60° is the best to adopt for the main shore, the auxiliary members ranging in their slope from 45° to 75°. In many cases, especially in towns, the angle of slope is governed by outside influences such as the width of the footway. Raking shores are erected in "systems" of two or more members placed in the same vertical plane at right angles to the face of the wall. The different members rise fanwise from the sole-plate to support the wall at different points. The distance horizontally between the systems depends on the condition of the building being propped up, and also upon the spacing of its window and other openings. The usual spacing is 10 ft. or 15 ft. apart, but this distance has often to be varied according to the positions of the openings in the wall. The application of the shores should be carefully made and support given only where there is a corresponding thrust inside, such as from a floor or roof, as without this the shore is liable to act more as a destructive agent than a supporting one, and cause the wall to cave in at that point, or placed against a parapet wall it might have the effect of pushing it over. The members, therefore, should be so placed as to meet the wall at a point somewhat below the floor or roof, so that if their length were continued they would meet and support the end of the floor or roof inside. Perhaps the best idea of the positions and functions of the various component parts of a system of raking shores can be obtained from a description of the various members, coupled with some little study of the illustrations (fig. 1). The names of the different timbers are therefore set out here, and against each part is given a short description of its use and position.

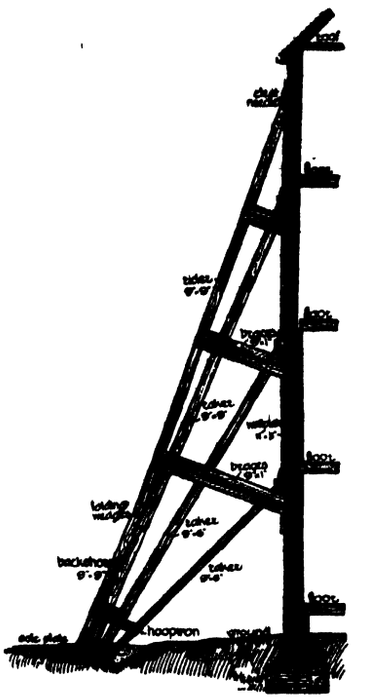


FIG. 1.

Raking Shore, or Raker.—This is a piece of timber sloping up from the sole-plate to the wall-piece. For a detail drawing of the connexion between the raker and wall-plate see fig. 2. The top and longest shore is often formed in two pieces, in which form it can be more conveniently handled. The upper piece is termed the *riding shore* or *rider*, and the lower member which supports it is known as the *back shore*. At the junction of the rider and back shore a pair of folding wedges is introduced and driven in to give the head of the rider a firm bearing against the needle and wall-plate above. The *sole-piece* has already been mentioned as the timber base upon which the shores take their bed or bearing. It usually consists of a piece of 11 by 3 plank, but when the ground is soft or the load supported very great it should be bedded on a platform of timber to spread the weight over a larger area. The sole should be placed sloping down towards the building at something less than a right angle (say 80°) with the inside of the shore to enable the latter to be gradually levered to a firm bearing with the aid of a crowbar. Wedging should not be resorted to or the already shaky building may sustain further injury through the vibration. When in position the foot of the shore is fixed by dog-irons to the sole-piece, and for additional security a cleat is spiked on the sole tight up to the shore to prevent any slipping.

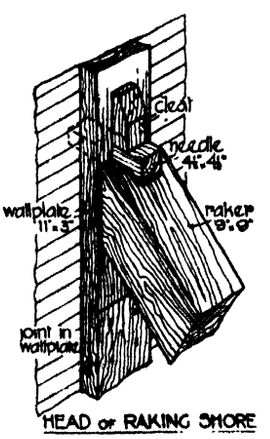


FIG. 2 (½-in. to foot).

Braces.—When more than one shore takes a bearing upon the sole-piece the feet of the several members are stiffened and braced either by having rough boarding nailed right across them or by being bound together with a number of rounds of hoop-iron. For further strength also braces of 1-in. boards, 6 to 9 in. wide, are taken across from the wall-plate to the topmost shore and spiked to each intervening member, binding the whole together. These braces should be fixed a little below the junctions of the heads of the shores with the wall-plate. The *wall-plate* has already been referred to. It is usually a deal 9 in. wide by 3 in. thick, secured tightly against the face of the wall with wrought-iron wall hooks, forming a good abutment for the shores and serving to spread the support

afforded by them. Holes are cut through this plate to receive the *needles* (or joggles as they are sometimes termed to distinguish them from the needles used in dead shoring, which are large horizontal

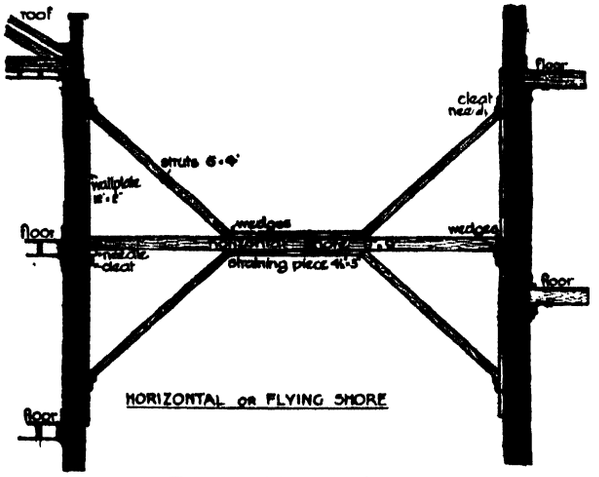


FIG. 3.—($\frac{1}{12}$ in. to foot.)

members usually of balk timber), which are pieces of wood about 1 ft. long and 4 in. square in section, cut with a shoulder to butt against the wall-plate. A portion of a brick or stone is removed from the wall and the end of the needle is passed through the rectangular hole in the wall-plate and fitted into the recess in the wall.

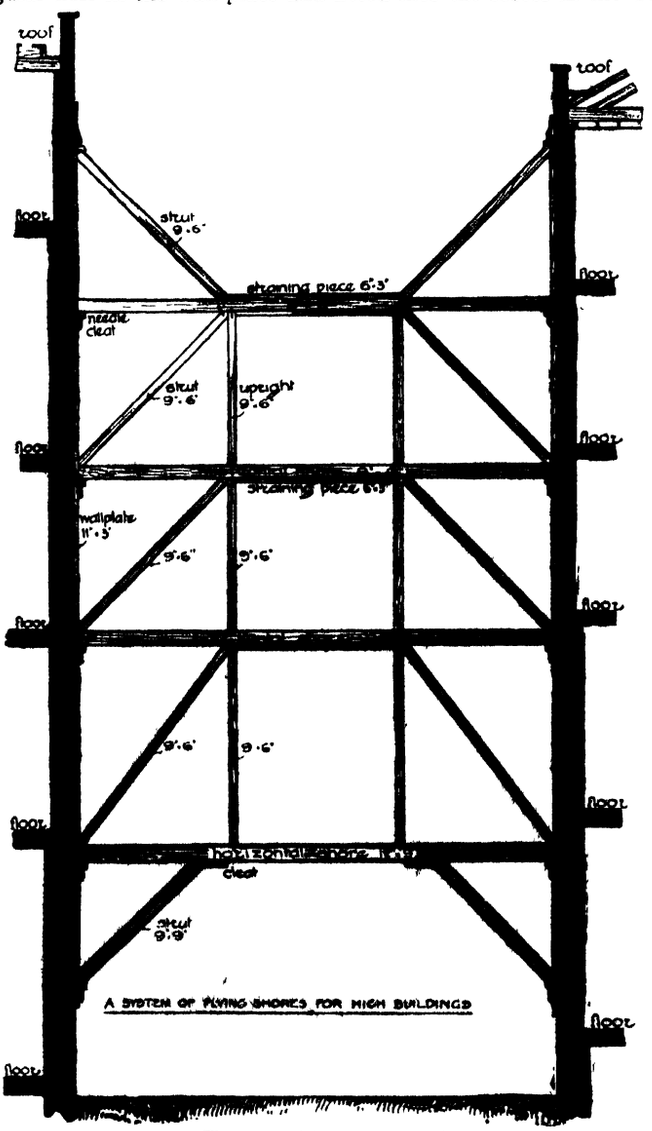


FIG. 4.—($\frac{1}{12}$ in. to foot.)

The head of the needle projects about 4½ in. beyond the face of the wall-plate and forms an abutment for the head of the shore. The head of the shore is notched to fit the underside of the needle to prevent any movement sideways. If this is not done the shore is liable to be acted upon by the wind and be blown down. A small block of wood, cut somewhat after the fashion of a wedge and termed a *cleat*, is fixed above the needle to keep the latter quite firm. Cleats are used also in other positions to keep timbers in position. *Wedges* are used to obtain a tight bearing for the rider shores and are used at their base. As little force as possible must be employed in driving them as vibration is liable to injure the already weakened wall.

Horizontal shores, or *flying shores* as they are more often termed by the workman, may be employed for spans up to about 35 ft. They are used to support the party walls of the houses adjoining the premises being rebuilt. They are erected during the pulling down operations and removed as the new building is raised and there is no further need for them. A system of flying shores consists of one or more horizontal timbers, sometimes known as dog shores, cut in tightly between the wall-plates fixed with hooks to the faces of the walls of the adjoining buildings (fig. 3). These horizontal members are supported at each end by cleats and needles fixed in the wall-plate as described for raking shoring. The shores are supported in their length by inclined braces springing from needles fixed near the lower ends of the wall-plates and serving to strut the shore at a point about a third of its length from the wall. Corresponding braces are carried from the upper surface of the shore and abut against needles at the upper ends of the plates. Straining pieces are secured to the upper and lower faces of the shore to serve as abutments for the ends of the braces. The best angle for these braces is one of 45°, but a smaller inclination than this is frequently adopted. Wedges are inserted, usually at the end of the *flyer* so as to tighten this up between the wall-plates, and sometimes between the braces and the straining piece, and carefully driven to tighten up the whole and cause each timber to find a close bearing. If the adjoining premises are of considerable height and especially if it is proposed to undertake extensive excavations, the systems of flying shores may need to be somewhat complicated, each consisting of several horizontal members spaced from 10 to 13 ft. apart and well strutted one to another and to the wall-plate (fig. 4). In the application of this form of shoring, as in raking shores, the same rules apply as regards placing the shores on the face of the wall in a proper position to obtain a solid abutment on a floor or roof on the other side. The members should be securely dogged and spiked together to form a homogeneous framework capable of resisting the attacks of a strong wind, which in an exposed position will sometimes destroy a poorly constructed framework.

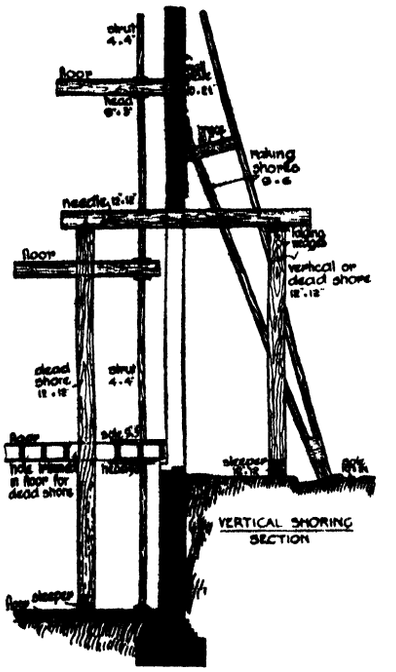


FIG. 5.—($\frac{1}{12}$ in. to foot.)

Horizontal shores should be adopted wherever possible in preference to raking shores. Besides being more economical, they are more convenient and more effectual than rakers springing from the ground, especially if the height of the building is considerable and the span at the most not much over 30 ft. Apart from the economy effected, they present a direct resistance to the thrust and are well out of the way of any building operations that may be carried on below them, so that there is no risk of their being accidentally disturbed, whereas the feet of raking shores are generally in the way of the workmen, and if not disturbed by accidental blows from materials or carts will very likely be loosened and rendered useless by the digging and pumping which is going on around them.

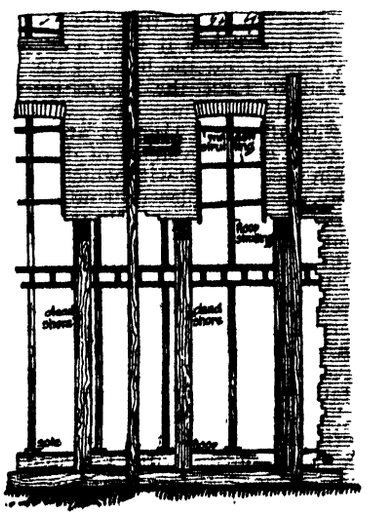
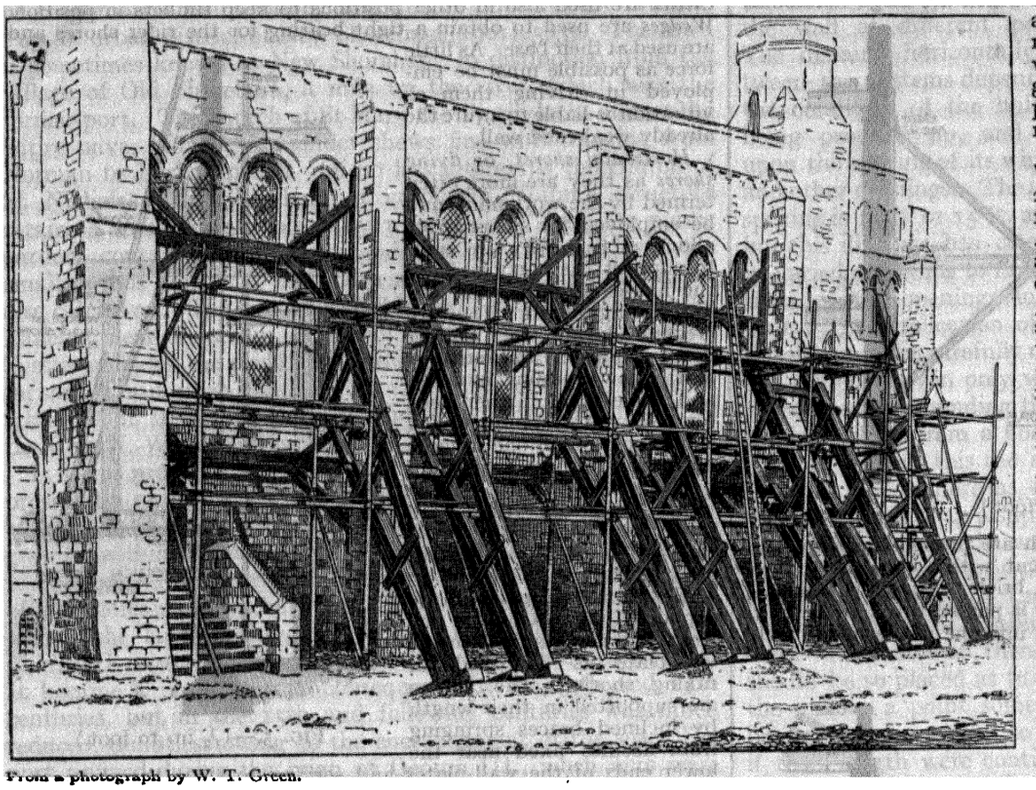


FIG. 6.—($\frac{1}{12}$ in. to foot.)

Needle shoring is the next method of temporary support to come under consideration. It is known also as *vertical shoring* and *dead shoring*, and is the means usually adopted to support temporarily

the upper portion of the walls of a building when it is found necessary to reconstruct the foundations or to make large openings in the lower parts of the wall, as, for example, when putting a shop front in an existing building. This form of shoring consists of horizontal members of balk timber termed *needles* (very different from the needles used in raking and flying shoring), which are passed through holes in the wall to be supported, at a sufficient height to allow of the insertion of any arch or lintels that may be necessary above the opening it is proposed to cut (figs. 5 and 6). The needles are supported at each end by an upright timber or *dead shore*, one on each side of the wall to each needle. These should not be allowed to rest upon any floor or vault but be carried down to a solid foundation and set upon and securely dogged to a timber sleeper running parallel to the wall. If it is not practicable to take the inner dead shore through intervening floors down to the solid ground in one piece, and it is necessary for its base to be set upon the floor or upon sleepers placed on the floor, the strutting must be continued in a direct line below it until a firm foundation is obtained. Between the needle and the head of the dead shores folding wedges are inserted to force the horizontal supporting balk firmly up to the underside of the masonry. Connexions between the dead shores and the needles and sleepers are made with wrought iron dogs. The spacing of the systems of dead shoring depends to a large extent upon the material with which the wall is constructed; for brickwork they should be placed at intervals not greater than 6 ft. With this form of shoring especially it is often found necessary to adopt other methods auxiliary to the main shoring. These take the form of raking or flying shores from the face of the building. All the openings in the wall above should be well strutted between their reveals to prevent any alteration of shape taking place. Inside the building vertical shores or strutting must be carried up independently in a direct line between the floors with head and sole plates at floor level and ceiling. This strutting must start from a firm foundation at the bottom of the building and be tightly wedged up so as to relieve the wall of any weight from the floors and roof. To obviate settlement as much as possible, work done in underpinning should be built slowly with Portland cement mortar mixed in strong proportions. Before the shoring is removed at least a week should elapse to allow the work to set hard and firm. Then the needles should be carefully loosened and removed and the holes from which they were withdrawn made good. The remainder of the props can then be "struck," leaving the raking or flying shores until the last. If possible this work should be spread over several days, an interval of a day or two being left between the removal of each portion of timbering to allow the work gradually to set on its new bearings.

Shoring should be the subject of careful calculations to ascertain the most suitable sizes of timbers and to determine the most appropriate points of support. This is not always done, however, and much work of this character is carried out by rule of thumb methods. The usual result is that the timber used is of a much greater size than is really necessary, although as the material is not much injured and is available on removal for re-use this fact is not of great consequence. Such methods perhaps work very well for ordinary buildings, but in special cases they may very well lead to shoring being constructed in too fragile a manner, with serious results. Some rules which experience has shown to work satisfactorily for ordinary work are given below, together with the approximate scantlings of the timber required.



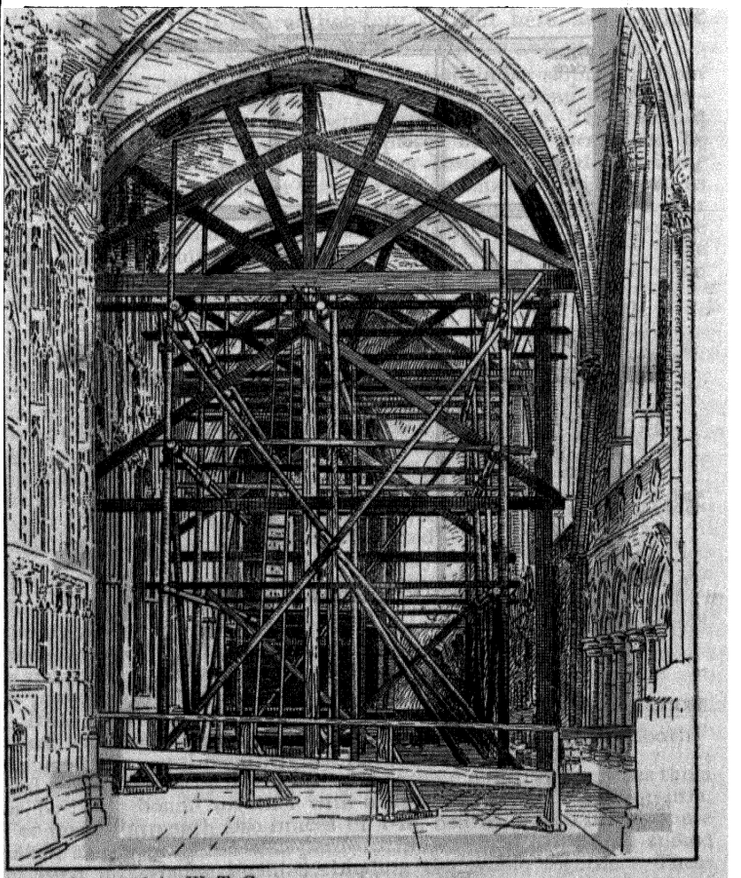
From a photograph by W. T. Green.

FIG. 7.—Shoring of the Presbytery, Exterior, Winchester Cathedral Restoration.

Rules and Sizes for Raking Shores.—Walls 15 ft. to 30 ft. high should have 2 shores to each system; if 30 ft. to 40 ft. in height, 3 shores each system; if 40 ft. or more in height, 4 shores, with an additional shore for each 10 ft. increase. Shoring is rarely seen more than 5 shores high. The angle of the main shores is usually about 60°, and none of the timbers should exceed an angle of 75°. Some of the lower shores will slope much less than this, at angles between 40° and 60°. The systems should not be placed at a greater distance apart than 15 ft. It is often found convenient to place them at the piers between window openings. As regards the sizes of the timbers used for walls 15 ft. to 20 ft. high, the shores may be 4 in. or 5 in. square in section; for walls 20 ft. to 30 ft. high, 6 in. by 6 in., or 9 in. by 4½ in.; for walls 30 ft. to 35 ft. high, 12 in. by 6 in., or 8 in. by 8 in.; for walls 40 ft. to 50 ft. high, 9 in. by 9 in.; for walls above this height 12 in. by 9 in.

For Horizontal or Flying Shores.—For spans not exceeding 15 ft. the principal strut may be 6 in. by 4 in., with raking struts 4 in. by 4 in.; for spans exceeding 15 ft. but not exceeding 35 ft. the size of the principal strut should be from 6 in. to 9 in. square, and the raking struts from 6 in. by 4 in. to 9 in. by 6 in.

Interesting examples of shoring on a large scale may frequently be seen applied to large buildings in the course of repair or restoration. The rebuilding of the foundations of the retro-choir and lady chapel of Winchester cathedral which was carried out in the autumn



From a photograph by W. T. Green.

FIG. 8.—Shoring of the Presbytery, Interior, Winchester Cathedral Restoration.

of 1906 necessitated the erection of a very elaborate and complicated arrangement of shoring to uphold the masonry while the work of underpinning the walls was being carried on. The foundations of the eastern portion of the cathedral were found to be dangerously insecure, being in fact laid upon a bed of soft marl only 10 ft. below the surface of the ground, in spite of the fact that at a depth of 16 ft. a hard solid stratum of gravel, at least 6 ft. thick, is arrived at. The medieval builders without doubt entertained suspicions as to the sustaining power of their proposed foundation, and so to ensure stability, as they thought, strengthened it by placing below the masonry horizontal layers of beech trees, filling up the interstices with hard chalk and flints. These contrivances were not sufficient to prevent the gradual sinking, through succeeding centuries, of the heavy mass of masonry. This not only affected the footings of the building, but caused fissures of an alarming nature in the vaulting and walls. Under the direction of Mr T. G. Jackson a carefully designed arrangement of shoring was applied, consisting of raking shores, flying shores and needling, for the purpose of the underpinning, with specially designed timbering to support the arches and vaulting while they were undergoing repair. The foundations were found to be much undermined by water, which filled the excavations made for the underpinning in such quantities that it was necessary to employ a diver to deposit cement concrete in bagfuls upon the gravel bed to which the new foundations are taken down. The illustration (fig. 7) will readily explain the external shoring above described, while fig. 8 shows the interior shoring of the presbytery.

AUTHORITIES.—The principal works of reference on this subject are: C. H. Stock, *Shoring and Underpinning*; T. Tredgold, *Elementary Principles of Carpentry*; J. Blagrove, *Shoring and its Application*. (J. BT.)

SHORNCLIFFE, a military station in Kent, England, on high ground immediately north of Sandgate and 3 m. W. of Folkestone. It was first established in 1803, when Sir John Moore here trained the troops which afterwards formed the Light Division in the Peninsular War. Its position was chosen as a strategic position on the flank of the French invader who was expected at the time to descend upon the English coast.

SHORT, FRANCIS JOB (1857–), English engraver, was born at Stourbridge, Worcestershire, on the 19th of June 1857. He was educated to be a civil engineer, and was engaged on various works in the Midlands until 1881, when he came to London as assistant to Mr Baldwin Latham in connexion with the Parliamentary Inquiry into the pollution of the river Thames. He was elected an associate member of the Institute of Civil Engineers in 1883. Having worked at the Stourbridge School of Art in his early years he joined the National Art Training School, South Kensington, in 1883. He also worked at the life class under Professor Fred Brown at the Westminster School of Art, and for a short time at the Schools of the Royal Institute of Painters in Water-colours. His real life-work now became that of an original and translator engraver. He was a keen student of the works of J. M. W. Turner; and his etchings and mezzotints from Turner's *Liber Studiorum* (1885 seq.), wonderful examples of painstaking devotion and unrivalled skill, were among his earliest successes, showing the deepest sympathetic study of the originals combined with a full knowledge of the resources of engraving and unwearied patience. Short received the highest praise and constant advice and encouragement from Ruskin, and the co-operation of students of Turner such as Mr W. G. Rawlinson and the Rev. Stopford Brooke. After completing the series from the existing plates of Turner's *Liber* Short turned to the subjects which Turner and his assistants had left incomplete. Several fine plates resulted from this study, bearing the simple lettering "F. Short, Sculp., after J. M. W. Turner, R.A.," which told very little of the work expended on their production even before the copper was touched. Short also reproduced in fine mezzotints several of the pictures of G. F. Watts, "Orpheus and Eurydice," "Diana and Endymion," "Love and Death," "Hope," and the portrait of Lord Tennyson, all remarkable as faithful and imaginative renderings. His own fine quality as a water-colour painter made him also a sympathetic engraver of the landscapes of David Cox and Peter de Wint. His subtle drawing of the receding lines of the low banks and shallows of river estuaries and flat shores is seen to perfection in many of his original etchings, mezzotints, and aquatints, notably "Low Tide and the Evening Star" and "The Solway at Mid-day." Other plates that may be mentioned are:—"Gathering the Flock on Maxwell Bank," a soft-ground etching; "The Ferry over the Blyth," "Walberswick Pier," soft-ground; "Dutch Greengrocery," "Noon on the Zuider Zee," "Deventer," "Strolling Players at Lydd," "An April Day in Kent," and "Staithes," all etchings; "A Wintry Blast on the Stourbridge Canal," "Peveril's Castle," and "Niagara Falls," dry points; "The Curfew," "A Span of old Battersea Bridge," and "Sunrise on Whitby Scaur," aquatints; "Ebbtide, Putney Bridge," "The Weary Moon was in the Wane," "Solway Fishers," "The Lifting Cloud," and "A Slant of Light in Polperro Harbour," mezzotints. Short was elected A.R.A. in 1906 when the rank of associate-engraver was revived. As head of the Engraving School at the Royal College of Art, South Kensington, he had great influence on younger engravers. Short was elected to the Royal Society of Painter-Etchers and Engravers in 1885, and took a prominent part in conducting its affairs. In 1910 he succeeded Sir Seymour Haden as president. He received, amongst other distinctions, the gold medal for engraving at the Paris International Exhibition, 1889, and another gold medal (*Rappel*) 1900.

The Etched and Engraved Work of Frank Short, by Edward F. Strange (1908), describes 285 plates by the artist. (C. H.*)

SHORTHAND, a term applied to all systems of brief handwriting which are intended to enable a person to write legibly at the rate of speech. Synonyms in common use are stenography (from στενός, narrow or close), and tachygraphy (from ταχύς, swift), or occasionally brachygraphy (from βραχύς, short).

Greek and Roman Tachygraphy.—The question of the existence among the ancient Greeks of a system of true tachygraphy, that is, of a shorthand capable of keeping pace with human speech, has not yet been solved. From surviving records we know that there were, both in the 4th century B.C. and in the early centuries of the Christian era, as well as in the middle ages, systems in practice whereby words could be expressed in shortened form by signs or groups of signs occupying less space than the ordinary method of longhand writing. But such systems appear to have been systems of brachygraphy or stenography, that is, of shortened writing, which were not necessarily also systems of tachygraphy properly so called. If, however, as there is some reason to believe, the Roman system of tachygraphy, as exhibited in the Tironian notes (see below) was derived from a Greek system, it may fairly be inferred that the latter system was also a developed system of tachygraphy. But, be that as it may, no very early specimens of Greek shorthand have hitherto come to light; and the key to the decipherment of the stenographic inscriptions in the waxen book of the 3rd century in the British Museum (see below) still remains to be discovered. We are therefore in the dark whether we have in this MS. an example of true tachygraphic writing. Here it may be noticed that certain words of Diogenes Laertius have been taken to imply that Xenophon wrote shorthand notes (ὑποσημειωσάμενος) of the lectures of Socrates; yet a similar expression in another passage, which will not bear this meaning, renders it hardly possible that tachygraphy is referred to.

The surviving records of Greek shorthand are not very numerous, although they are scattered through a long period of time, beginning with the 4th century B.C. and extending to the 14th century. They have been arranged in three groups. At the head of the first group, which embraces all that has been found dating down to the 3rd century, is a remarkable inscription, unfortunately fragmentary, on a marble slab discovered on the Acropolis of Athens in 1884, which is attributed to the 4th century B.C.; and it is on this discovery that the actual claim of tachygraphy to have been practised among the ancient Greeks chiefly rests. The inscription describes a system, or rather part of a system, whereby certain vowels and consonants can be expressed by strokes placed in various positions. But here, too, it has been urged that we have the explanation of a system of brachygraphy only, and not one of tachygraphy. To the first group also belong a few specimens of shorthand writing on papyri of the 2nd and 3rd centuries, and, above all, the most important MS. of Greek stenographic symbols hitherto discovered. This is the waxen book already referred to (Brit. Mus., Add. MS. 33,270), consisting of seven wooden tablets coated with wax on both sides, and two covers thus coated on the inner sides, which seems to have been the exercise-book of a shorthand scholar who has covered its pages with symbols, which in places are repeated again and again as if for practice.

In these symbols we may have an actual system of tachygraphic shorthand, and not a mere syllabary; but unfortunately they have not yet been interpreted.

The second group of examples of Greek shorthand is confined to a few fragmentary papyri and waxen tablets ranging from the 4th to the 8th century, chiefly among the Rainer collection at Vienna, to which Professor Wessely has devoted much labour.

After this there is a long period unrepresented by any remains, until we come to the period of the third group, which stands quite apart from the preceding groups, being representative of the medieval Greek tachygraphy of the 10th century. First stands the Paris MS. of Hermogenes, with some tachygraphic writing of that period, of which Bernard de Montfaucon (*Pal. Gr.*, p. 351) gives some account, and accompanies his description with a table of forms which, as he tells us, he deciphered with incredible labour. Next, the Add. MS. 18231 in the British Museum contains some marginal notes in shorthand, of A.D. 972 (Wattenb., *Script. Graec. specim.*, tab. 19). But the largest amount of material is found in the Vatican MS. 1809, a volume in which as many as forty-seven pages are covered with tachygraphic writing of the 11th century. Cardinal Angelo Mai first published a specimen of it in his *Scriptorum veterum nova collectio*, vol. vi. (1832); and in his *Novae patrum bibliothecae tom. secundus* (1844) he gave a second, which, in the form of a marginal note, contained a fragment of the book of Enoch. But he did not quote the number of the MS., and it has only been identified in recent years. The tachygraphic portion of it has been made the subject of special study by Dr Gitlbauer for the Vienna Academy. It contains fragments of the works of St Maximus the Confessor, the confession of St Cyprian of Antioch, and works of the pseudo-Dionysius Areopagita. There are also certain MSS. written at Grottaferrata belonging to the group.

But here again this medieval shorthand is not a tachygraphic system in the true sense of the word, but a syllabic system having very little advantage over the ordinary system of contracted longhand in respect to rapidity of writing, excepting that the scribe could pack more of the text into a given space. The medieval system therefore cannot be regarded as a development of any ancient system of Greek tachygraphy, but rather as a stunted descendant or petrified fragment, as it has been called, of an earlier and better system. Other medieval varieties or phases of Greek shorthand have also been traced in the 14th and even in the 15th century.

Evidence of the employment of tachygraphy among the Romans is to be found in the writings of authors under the empire. It appears to have been taught in schools, and, among others, the emperor Titus is said to have been skilled in this manner of writing. According to Suetonius the first introduction of shorthand signs or *notae* was due to Ennius; but more generally Cicero's freedman M. Tullius Tiro is regarded as the author of these symbols, which commonly bear the title of *Notae Tironianae*. The Tironian notes belonged to a system which was actually tachygraphic; that is, each word was represented by a character, alphabetic in origin, but having an ideographic value. The notes, as we have them, have come down to us in a medieval dress, and are probably amplified from their shapes of early times with various diacritical additions which attached to them after the practice of the system had died out, and when the study of them had become an antiquarian pursuit, demanding a more exact formation of the symbols and their variants than was possible or necessary to a shorthand writer familiar with the system and writing at full speed. Such a system of shorthand, expressing words by comprehensive symbols or word-outlines, could be the only system possible for rapid reporting of human speech. But it seems that in instances where a symbol was not forthcoming to express an unusual word, such as a proper name, it was customary, at least in the written notes which have survived, to express it by a group of syllabic signs. A reporter, taking down a speech, could not have waited to express the unusual word or proper name by such a slow process; and no doubt in actual practice he would, in such an emergency, have invented on the spur of the moment some conventional sign which he would remember how to expand afterwards. But in the medieval inscriptions written in Tironian notes a syllabic system was made use of in such cases; and hence arose variations in different countries in the syllabic method of expressing words; an Italian system, a French system and a Spanish system having already been identified. Such a syllabic system is comparable with the "African" and "Italian" varieties of the medieval Greek shorthand system noticed above.

There are no ancient documents written in Tironian notes. But the tradition of their employment survived, especially in the chanceries of the Merovingian and Carolingian dynasties of the Frankish empire; and a limited use of them was made by the officials who controlled the royal diplomas. In Merovingian documents they generally accompany the subscription of the referendary, the earliest instance being in a diploma of Chlothar II. A.D. 625. From the reign of Thierry III. they become fairly frequent. They give brief indications referring to the composition of the deed, the name of the person moving for it, that of the official revising it, &c. Such uses may be regarded as safeguards against forgery. A more extensive employment of the notes prevailed under the Carolingian monarchs. Official MSS. were written in these characters as, for example, the formulary of the chancery of Louis the Pious. They appear in subscriptions, often attached to the *ruches* (see DIPLOMATIC). Sometimes they accompany the monogrammatic invocation at the beginning of a deed; sometimes they themselves contain the invocation or a pious formula. Such notes continued to appear in royal deeds down to the end of the 9th century; and so inveterate had their employment become in certain positions in the charters, that the scribes, after having forgotten their meaning, went on adding mere imitative signs. In the 10th century they appear in ecclesiastical and even private deeds, but in the latter class of documents their use was probably only suggested by vanity and pretension to learning on the part of the scribes. Even in the 11th century a few notes lingered on, their meaning fast dying out.

In general literature Tironian notes were adopted in the 9th and 10th centuries by the revisers and annotators of texts. Of this period also are several MSS. of the Psalter written in these characters, which it has been suggested were drawn up for practice at a time when a fresh impulse had been given to the employment of shorthand in the service of literature. The existence also of volumes containing lexicons or collections of Tironian notes, of the same period, points to a temporary revival of interest in these symbols of Roman tachygraphy. But such revival was short-lived; early in the 11th century it had expired.

AUTHORITIES.—J. Gomperz, *Über ein bisher unbekanntes griech. Schriftsystem* (Vienna Academy, 1884) and *Neue Bemerkungen* (1895); M. Gitlbauer, *Die drei Systeme der griech. Tachygraphie* (Vienna Academy, 1896); K. Wessely, *Ein System altgriech. Tachygraphie* (Vienna Academy, 1896); T. W. Allen, "Fourteenth Century Tachygraphy," *Journ. Hellen. Studies*, xii. (1890); F. W. G. Foat, "On Old Greek Tachygraphy," *J.H.S.*, xx., giving a full bibliography (1901); *Archiv für Stenographie* (new series, 1901); F. Ruess, *Über griech. Tachygraphie* (1882); J. W. Zeibig, *Geschichte und Literatur der Geschwindschreibekunst* (1878); V. Gardthausen, *Griech. Paläographie* (1879); P. Carpentier, *Alphabetum Tironianum* (1747); U. F. Kopp, *Palaeographia critica* (1827); J. Tardif, *Mém. sur les notes tironiennes* (1854); O. Lehmann, *Quaestiones de notis Tironis*, &c. (1869); A. P. Kühnelt, *Über die Geschwindschrift der Alten* (1872); F. Ruess, *Über die Tachygraphie der Römer* (1879); W. Schmitz, *Comment. notarum Tironiarum* (1893) and many other works; *Mélanges J. Havet* (1895); J. Havet, *Œuvres* (1896); E. Chatelain, *Introduction à la lecture des notes tironiennes* (containing a full bibliography, 1900). (E. M. T.)

In the 10th century all practical acquaintance with the shorthand systems of Greece and Rome faded completely away, and not till the beginning of the 17th can the art be said to have revived. But even during that interval systems of writing seem to have been practised which for speed approximated to modern shorthand.[1]

Shorthand in English-speaking Countries.—England was the birthplace of modern shorthand. The first impulse to its cultivation may possibly be traced to the Reformation. When the principles of that movement were being promulgated from the pulpit, a desire to preserve the discourses of the preacher naturally suggested the idea of accelerated writing. It is certainly striking that in the early systems so many brief arbitrary signs are provided to denote phrases common in the New Testament and Protestant theology. In the early systems of Dr Timothy Bright[2] and Peter Bales[3] almost every word is provided with an arbitrary sign. Dr Bright (*c.* 1551–1615) was a doctor of medicine who afterwards entered the church. His *Characterie. An Arte of*

[1] For instances, see Zeibig's *Geschichte u. Lit. der Geschwindschreibekunst* (Dresden, 1878), pp. 67-79. For John of Tilbury's system (*c.* 1175), see especially *Shorthand*, No. 5, and *Hermes*, viii. p. 303.

[2] The Bodleian Library contains the only known copy of Bright's book. For a description of the system, see *Phonetic Journal* (1884), p. 86; *Circulars of Information of the Bureau of Education* (Washington, 1884), No. 2, p. 8; and *Notes and Queries*, 2nd ser., vol. ii. p. 394. *A* is represented by a straight line, the other letters of the alphabet by a straight line with a hook, circle, or tick added at the beginning. Each alphabetic sign placed in various positions, and having some additional mark at the end, was used to indicate arbitrarily chosen words beginning with *a*, *b*, *c*, *d*, &c. There were four slopes given to each letter and twelve ways of varying the base, so that forty-eight words could be written under each letter of the alphabet if necessary. Thus the sign for *b* with different terminal marks and written in four different directions signified a number of words commencing with *b*; 537 such signs had to be learned by heart. By adding certain external marks these signs were applied to other words: thus by writing a dot in one of two positions with respect to a sign the latter was made to represent either a synonym or a word of opposite meaning. Under *air* are given as synonyms *breath*, *exhalation*, *mist*, *reek*, *steam*, *vapour*.

[3] Bales's method was to group the words in dozens, each dozen headed by a Roman letter, with certain commas, periods, and other marks to be placed about each letter in their appropriate situations, so as to distinguish the words from each other.

Shorte, Swifte and Secrete Writing by Character (1588), which set forth a system of writing by character or shorthand, was dedicated to Queen Elizabeth, who rewarded the author with a Yorkshire living, and granted to him the sole right for fifteen years of teaching and printing books "in or by Character not before this tyme commonlye knowne and vsed by anye other oure subjects" (Patent Roll, 30, Eliz. part 12). Peter Bales (1547?–1610) promised his pupils that "you may also learn to write as fast as a man speaketh, by the arte of Brachigraphie by him devised, writing but one letter for a word"; his "Arte of Brachigraphie" is contained in his *Writing Schoolemaster* (1590). Only with a gigantic memory and by unremitting labour could one acquire a practical knowledge of such methods.

The first shorthand system worthy of the name which, so far as is known, appeared in England is that of John Willis (d. *c.* 1627), whose *Art of Stenographie* (London, 14 editions[1] from 1602 to 1647) is substantially based on the common alphabet; but the clumsiness of his alphabetic signs, and the confused laborious contrivances by which he denotes prefixes and terminations, involving the continual lifting of the pen, would seem to render his method almost as slow as longhand. Of the numerous systems which intervened between J. Willis's and Isaac Pitman's phonography (1837) nearly all were based, like Willis's, on the alphabet, and may be called a, b, c systems. But seven were, like phonography, strictly phonetic, viz. those by Tiffin (1750), Lyle (1762), Holdsworth and Aldridge (1766), Roe (1802), Phineas Bailey (1819), Towndrow (1831) and De Stains (1839).

John Willis.

A few general remarks apply largely to all the a, b, c systems. Each letter is designated by a straight line or curve (vertical, horizontal, or sloping), sometimes with the addition of a hook or loop. *C* and *q* are rejected, *k* being substituted for hard *c* and *q*, *s* for soft *c*. Signs are provided for *ch*, *sh*, *th*. *G* and *j* are classed under one sign, because in some words *g* is pronounced as *j*, as in *giant*, *gem*. Similarly each of the pairs *f*, *v* and *s*, *z* has only one sign. A few authors make the signs for *j*, *v*, *z* heavier than those for *g*, *f*, *s*. Some class *p* and *b*, *t* and *d*, each under one sign. The stenographic alphabet is therefore—*a*, *b*, *d*, *e*, *f* (*v*), *g* (*j*), *h*, *i*, *k*, *l*, *m*, *n*, *o*, *p*, *r*, *s* (*z*), *t*, *u*, *w*, *x*, *y*, *ch*, *sh*, *th*. Letters which are not sounded may be omitted. *Gh*, *ph* may be counted as *f* in such words as *cough*, *Philip*; but the *th* in *thing* is never distinguished from the *th* in *them*. Thus the a, b, c systems are largely phonetic with respect to consonant-sounds; it is rather with regard to the vowels that they disregard the phonetic principle. No attempt is made to provide adequately for the many vowel-sounds of the language. Thus the signs for *like* and *lick*, for *rate* and *rat*, &c., are the same. In the case of vowel-sounds denoted by two letters, that vowel is to be written which best represents the sound. Thus in *meat* the *e* is selected, but in *great* the *a*. In some a, b, c systems, including the best of them (Taylor's), a dot placed anywhere does duty for all the vowels. This practice is, of course, a fruitful source of error, for *pauper* and *paper*, *gas* and *goose*, and hundreds of other pairs of words would according to this plan be written alike. In the early systems of Willis and his imitators the vowels are mostly written either by joined characters or by lifting the pen and writing the next consonant in a certain position with respect to the preceding one. Both these plans are bad; for lifting the pen involves expenditure of time, and vowels expressed by joined signs and not by marks external to the word cannot be omitted, as is often necessary in swift writing, without changing the general appearance of the word and forcing the eye and the hand to accustom themselves to two sets of outlines, vocalized and unvocalized. In the better a, b, c systems the alphabetic signs, besides combining to denote words, may also stand alone to designate certain short common words, prefixes and suffixes. Thus in Harding's edition of Taylor's system the sign for *d*, when written alone, denotes *do*, *did*, the prefixes *de-*, *des-*, and the terminations *-dom*, *-end*, *-ened*, *-ed*. This is a good practice if the words are well chosen and precautions taken to avoid ambiguities. Numbers of symbolical signs and rough word-pictures, and even wholly arbitrary marks, are employed to denote words and entire phrases. Symbolical or pictorial signs, if sufficiently suggestive and not very numerous, may be effective; but the use of "arbitraries" is objectionable because they are so difficult to remember. In many shorthand books the student is recommended to form additional ones for himself, and so of course make his writing illegible to others. The *raison d'être* of such signs is not far to seek. The proper shorthand signs for many common words were so clumsy or ambiguous that this method was resorted to in order to provide them with clearer and easier outlines. For the purpose of verbatim reporting the student is recommended to omit as a rule all vowels, and decipher his writing with the aid of the context. But, when vowels are omitted, hundreds of pairs of words having the same consonant skeleton (such as *minister* and *monastery*, *frontier* and *furniture*, *libel* and *label*) are written exactly alike. This is one of the gravest defects of the a, b, c systems.

A, b, c systems.

John Willis's system was largely imitated but hardly improved by Edmond Willis (1618), T. Shelton (1620), Witt (1630), Dix (1633), Mawd (1635), and Theophilus Metcalfe (1635). T. Shelton's system, republished a great many times down to 1687, was the one which Samuel Pepys used in writing his diary.[2] It was adapted to German, Dutch and Latin.[3] An advertisement of Shelton's work in the *Mercurius Politicus* of 3rd October 1650 is one of the earliest business advertisements known. The book of Psalms in metre (206 pages, $2\frac{3}{8} \times 1\frac{1}{2}$ in.) was engraved according to Shelton's system by Thomas Cross. Metcalfe's *Radio-Stenography*, or *Short-Writing*, was republished again and again for about a hundred years. The 35th "edition" is dated 1693, and a 55th is known to exist. The inefficiency of the early systems seems to have brought the art into some contempt. Thus Thomas Heywood, a contemporary of Shakespeare, says in a prologue[4] that his play of *Queen Elizabeth*

> "Did throng the seats, the boxes, and the stage
> So much that some by stenography drew
> A plot, put it in print, scarce one word true."

Shakespeare critics would in this manner explain the badness of the text in the earliest editions of *Hamlet*, *Romeo and Juliet*, *Taming of the Shrew*, *Merry Wives of Windsor*, and *Henry V*. Perhaps a study of J. Willis's system and of E. Willis's (which, though not published till after Shakespeare's death, was practised long before) may shed light on corrupt readings of the text of these plays.[5] Rich's system (1646, 20th edition 1792) was reproduced with slight alterations by many other persons, including W. Addy, Stringer, and Dr Philip Doddridge (1799 and three times since). The New Testament and Psalms were engraved in Rich's characters (1659, 596 pages, $2\frac{1}{2} \times 1\frac{1}{2}$ in., 2 vols.), and Addy brought out the whole Bible engraved in shorthand[6] (London, 1687, 396 pp.). Locke, in his *Treatise on Education*, recommends Rich's system; but it is encumbered with more than 300 symbolical and arbitrary signs. In 1847 it was still used by Mr Plowman, a most accomplished Oxford reporter.

Rich.

In 1672 William Mason, the best shorthand author of the 17th century, published his *Pen pluck'd from an Eagle's Wing*. The alphabet was largely taken from Rich's. But in his *Art's Advancement* (1682) only six of Rich's letters are retained, and in his *Plume Volante* (1707) further

Mason.

[1] The first edition, published anonymously, is entitled *The Art of Stenographie, teaching by plaine and certaine rules, to the capacitie of the meanest, and for the use of all professions, the way to Compendious writing. Wherevnto is annexed a very easie Direction for Steganographie, or Secret Writing*, printed at London in 1602 for Cuthbert Burbie. The only known copies are in the Bodleian and British Museum libraries.

[2] See a paper by J. E. Bailey, "On the Cipher of Pepys' Diary," in *Papers of the Manchester Literary Club*, vol. ii. (1876). Shelton (1601–1650) is not to be confounded with the translator of *Don Quixote*.

[3] See Zeibig's *Gesch. u. Lit. d. Geschwindschreibekunst*, p. 195.

[4] *Pleasant Dialogues and Drammas* (London, 1637), p. 249.

[5] See M. Levy's *Shakspere and Shorthand* (London), and *Phonetic Journal* (1885), p. 34.

[6] This curiosity is described in the *Phonetic Journal* (1885), pp. 158, 196. The Bodleian Library has a copy.

changes are made. Initial vowels are written by their alphabetic signs, final vowels by dots in certain positions (*a*, *e* at the beginning; *i*, *y* at the middle; *o*, *u* at the end), and medial vowels by lifting the pen and writing the next consonant in those same three positions with respect to the preceding one. Mason employed 423 symbols and arbitraries. He was the first to discover the value of a small circle for *s* in addition to its proper alphabetic sign. Mason's system was republished by Thomas Gurney in 1740, a circumstance which has perpetuated its use to the present day, for in 1737 Gurney was appointed shorthand writer to the Old Bailey, and early in the 19th century W. B. Gurney was appointed shorthand-writer to both Houses of Parliament. Gurney reduced Mason's arbitraries to about a hundred, inventing a few specially suitable for parliamentary reporting. The Gurneys were excellent writers of a cumbrous system. Thomas Gurney's *Brachygraphy* passed through at least eighteen editions.

In 1767 was published at Manchester a work by John Byrom, sometime fellow of Trinity College, Cambridge, entitled *The Universal English Shorthand*, distinguished for its precision, elegance, and systematic construction. Byrom had died in 1763. Having lost his fellowship by failing to take orders, he made a living by teaching shorthand in London and Manchester, and among his pupils were Horace Walpole, Lord Conway, Charles Wesley, Lord Chesterfield, the duke of Devonshire and Lord Camden. Shorthand, it is said, procured him admission to the Royal Society. He founded a stenographic club, to the proceedings of which his journal,[1] written in shorthand, is largely devoted. In the strangers' gallery of the House of Commons in 1728 Byrom dared to write shorthand from Sir R. Walpole and others. In 1731, when called upon to give evidence before a parliamentary committee, he took shorthand notes, and, complaints being made, he said that if those attacks on the liberties of shorthand men went on he "must have a petition from all counties where our disciples dwell, and Manchester must lead the way." Thomas Molyneux popularized the system by publishing seven cheap editions between 1793 and 1825. Modifications of Byrom's system were issued by Palmer (1774), Nightingale (1811), Adams (1814), Longmans (1816), Gawtress (1819), Kelly (1820), Jones (1832) and Roffe (1833). Byrom's method received the distinction of a special act of parliament for its protection (15 Geo. II. c. 23, for twenty-one years from 24th June 1742). To secure lineality in the writing and facility in consonantal joinings he provided two forms for *b*, *h*, *j*, *w*, *x*, *sh*, *th*, and three for *l*. *A*, *e*, *i*, *o*, *u*, he represented by a dot in five positions with respect to a consonant. Practically it is impossible to observe more than three (beginning, middle and end). With all its merits, the system lacks rapidity, the continual recurrence of the loop seriously retarding the pen.

Byrom.

In 1786 was published *An Essay intended to establish a Standard for a Universal System of Stenography, by* Samuel Taylor (London).[2] This system did more than any of its predecessors to establish the art in England and abroad. Equal to Byrom's in brevity, it is simpler in construction. No letter has more than one sign, except *w*, which has two. Considering that five vowel places about a consonant were too many, Taylor went to the other extreme and expressed all the vowels alike by a dot placed in any position. He directs that vowels are not to be expressed except when they sound strong at the beginning and end of a word. Arbitraries he discarded altogether; but Harding, who re-edited his system in 1823, introduced a few. Each letter when standing alone represents two or three common short words, prefixes and suffixes. But the list was badly chosen: thus *m* represents *my* and *many*, both of them adjectives, and therefore liable to be confounded in many sentences. To denote *in* and *on* by the same sign is evidently absurd. Taylor's system was republished again and again. In Harding's edition (1823) the vowels are written on an improved plan, the dot in three positions representing *a*, *e*, *i*, and a tick in two positions *o*, *u*. Several other persons brought out Taylor's system, in particular G. Odell, whose book was re-edited or reprinted not less than sixty-four times, the later republications appearing at New York. The excellence of Taylor's method was recognized on the Continent: the system came into use in France, Italy, Holland, Sweden, Germany, Portugal, Rumania, Hungary, &c.

Taylor.

The *Universal Stenography* of William Mavor (1780) is a very neat system, and differs from Taylor's in the alphabet and in a more definite method of marking the vowels. *A*, *e*, *i*, are indicated by commas, *o*, *u*, *y*, by dots, in three places with respect to a letter, namely beginning, middle and end. Other systems were introduced by J. H. Lewis (1812) and Moat (1833).

Mavor.

The vast mass of a, b, c systems are strikingly devoid of originality, and are mostly imitations of the few that have been mentioned. Nearly all may be briefly described as consisting of an alphabet, a list of common words, prefixes and suffixes, expressed by single letters, a list of arbitrary and symbolical signs, a table showing the best way of joining any two letters, a few general rules for writing and a specimen plate.[3]

Pitman's phonography, on account of its enormous diffusion in Great Britain and the colonies, and in America, its highly organized and original construction, and its many inherent advantages, merits a more extended notice than has been given to the systems already mentioned. In 1837 Mr (afterwards Sir) Isaac Pitman (*q.v.*) composed a short stenographic treatise of his own, which Samuel Bagster published under the title of *Stenographic Sound-Hand*. The price was fixed at fourpence, for the author had determined to place shorthand within the reach of everybody. In 1840 a second edition appeared in the form of a penny plate bearing the title *Phonography*, the principal feature of the system being that it was constructed on a purely phonetic basis. In December 1841 the first number of what is now known as *Pitman's Journal* appeared at Manchester in a lithographed form. It was then called the *Phonographic Journal*, and subsequently in turn the *Phonotypic Journal*, the *Phonetic News* and the *Phonetic Journal*. Pitman's system was warmly taken up in America, where it was republished in more or less altered forms, especially by the author's brother Benn Pitman, and by Messrs A. J. Graham, J. E. Munson, E. Longley, and Eliza B. Burns. A large number of periodicals lithographed in phonography are published in England and America. The *Shorthand Magazine*, monthly, was started in 1864. Of standard English books printed or lithographed in phonography may be mentioned, besides the Bible, New Testament, and Prayer Book, *The Pilgrim's Progress*, *The Vicar of Wakefield*, *Pickwick Papers*, *Tom Brown's School-Days*, Macaulay's *Essays* and *Biographies*, *Gulliver's Travels*, Blackie's *Self-culture*, Bacon's *Essays*, and a long list of tales and selections. Numerous societies have been formed in all English-speaking countries for the dissemination of phonography, the largest being the Phonetic Society. Phonography has been adapted to several foreign languages, but not so successfully as Gabelsberger's German system. T. A. Reed's *French Phonography* (1882) was intended only for English phonographers who wish to report French speeches. Other adaptations to French were by A. J. Lawson and J. R. Bruce. A society for the adaptation of phonography to Italian was organized at Rome in 1883 by G. Francini, who published his results (Rome, 1883, 1886). Phonography was adapted to Spanish by Parody (Buenos Aires, 1864), to Welsh by R. H. Morgan (Wrexham, 1876), and to German by C. L. Driesslein (Chicago, 1884).

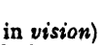
Pitman's phonography.

The main features of Pitman's system must now be described. The alphabet of consonant-sounds is—*p*, *b*; *t*, *d*; *ch* (as in *chip*), *j*; *k*, *g* (as in *gay*); *f*, *v*; *th* (as in *thing*), *th* (as in *them*); *s*, *z*; *sh*,

[1] Byrom's private journal and literary remains have been published by the Chetham Society of Manchester. See, too, a paper by J. E. Bailey in the *Phonetic Journal* (1875), pp. 109, 121.

[2] Taylor, it was only lately discovered, died in 1811; see M. Levy in *The Times* (April 10, 1902), and *Notes and Queries* (May 24, 1902).

[3] For early English systems, see especially some careful papers by Mr A. Paterson in *Phonetic Journal* (1886).

sh (as in *vision*); *m*, *n*, *ng* (as in *thing*); *l*, *r*; *w*, *y*, *h*. The sounds *p*, *t*, *ch*, *k* are represented respectively by the four straight strokes ; and the corresponding voiced sounds *b*, *d*, *j*, *g* by exactly the same signs respectively written heavy. *F*, *th* (as in *thing*), *s*, *sh* are indicated by  respectively; the same signs written heavy and tapering to the ends are used for *v*, *dh*, *z*, *zh* respectively. *M*, *n*, *l*, *r* are denoted by  respectively. *R* is also represented by  written upwards and in a more slanting direction than the sign for *ch*. The signs for *sh* and *l* may be written up or down when in combination, but standing alone *sh* is written downwards and *l* upwards. The signs for *w*, *y*, *h* are  , all written upwards. *H* has also  down. *Ng*, *mp* (or *mb*), *rch* (or *rj*), *lr*, are represented by the signs for *n*, *m*, *r*, *l* respectively written heavy. Signs are provided for the Scotch guttural *ch* (as in *loch*), the Welsh *ll*, and the French nasal *n*. *S* is generally written by a small circle. The long-vowel sounds are thus classified —*ā* (as in *balm*), *ē* (as in *bait*), *ee* (as in *feet*), *aw* (as in *law*), *ō* (as in *coal*), *ōō* (as in *boot*). The vowels *ā*, *ē*, *ee* are marked by a heavy dot placed respectively at the beginning, middle, and end of a consonant-sign; *aw*, *ō*, *ōō* by a heavy dash in the same three positions, and generally struck at right angles to the direction of the consonant. The short vowels are *ă* (as in *pat*), *ĕ* (as in *pet*), *ĭ* (as in *pit*), *ŏ* (as in *pot*), *ŭ* (as in *but*), and *ŏŏ* (as in *put*). The signs for these are the same as for the corresponding long vowels just enumerated, except that they are written light. Signs similarly placed are provided for the diphthongs *oi* (as in *boil*), *ŏă* or *ŏĕ*, *ŏĭ* (as in *Boanerges*, *poet*, *coincide*), for the series *yā*, *yē*, *yee*, &c., and for the series *wā*, *wē*, *wee*, &c. The signs for *ei* (as in *bite*) and *ou* (as in *cow*) are  , and may be placed in any position with respect to a consonant. A straight line may receive four hooks, one at each side of the beginning and end, but a curve only two, one at each end in the direction of the curve. Hooks applied to a straight line indicate the addition of *r*, *l*, *n*, and *f* or *v* respectively, thus  *pr*,  *pl*,  *pf* or *pv*, and  *pn*; *kr*, *kl*, *kf*, *kn*;  *rf* or *rv*, *rn*. Hooks applied to a curve denote the addition of *r*, *n* respectively, thus  *fr*, *fn*; *mr*, *mn*. Vowel-signs placed after (or, in the case of horizontal strokes, under) a consonant having the *n* or *f*, *v* hook are read between the consonant and the *n* or *f*; thus  *cough*, *fun*, but *crow*, *pray*. A large hook at the commencement of a curve signifies the addition of *l*, as  *fl*. The hooks combine easily with the circle *s*, thus  *sp* *spr* (where the hook *r* is implied or included in the circle), *spl*, *pns* (the hook *n* being included), *pfs*, &c. The halving principle is one of the happiest devices in the whole history of shorthand. The halving of a light stroke—that is, writing it half length—implies the addition of *t*; the halving of a heavy stroke that of *d*, the vowel placed after (or under) the halved stroke being read between the consonant and the added *t* or *d*, thus  *thaw*, *thought*, *Dee*, *deed*, *pit*, *cat*, *fat*, *note*, &c. By this means very brief signs are provided for hosts of syllables ending in *t* and *d*, and for a number of verbal forms ending in *ed*, thus  *ended*. The halving of a heavy stroke may, if necessary, add *t*, and that of a light stroke *d*, thus *beautified*. By combining the hook, the circle, and the halving principle, two or three together, exceedingly brief signs are obtained for a number of consonantal series consisting of the combination of a consonant with one or more of the sounds *s*, *r*, *l*, *n*, *f*, *t*, thus *sp*, *spr*, *sprt*, *sprts*; *pl*, *spl*, *splt*, *splnt*, *splnts*; *fn*, *fns*, *fnt*, *fnts*; *frn*, *frnd*, &c. As a vowel-mark cannot conveniently be placed to a hook or circle, we are easily led to a way of distinguishing in outline between such words as *cough* and *coffee*, *pen* and *penny*, *race* and *racy*, &c. This distinction limits the number of possible readings of an unvocalized outline. A large hook at the end of a stroke indicates the addition of *-shon* (as in *fashion*, *action*, &c.). This hook easily combines with the circle *s*, as in *actions*, *positions*. The circle *s* made large indicates *ss* or *sz*, as in *pieces*, *losses*. The vowel between *s* and *s* (*z*) may be marked inside the circle, as in *exercise*, *subsistence*. The circle *s* lengthened to a loop signifies *st*, as in *step*, *post*, while a longer loop indicates *str*, as in *muster*, *minster*. The loop may be continued through the consonantal stroke and terminate in a circle to denote *sts* and *strs*, as in *boasts*, *minsters*. The loop written on the left or lower side of a straight stroke implies the *n* hook and so signifies *nst*, as in *against*, *danced*. A curve (or a straight stroke with a final hook) written double length implies the addition of *tr*, *dr*, or *thr*, as in *father*, *letter*, *kinder*, *fender*, *render*. This practice is quite safe in the case of curves, but a straight stroke should not be lengthened in this way when there is danger of reading it as a double letter. The lineal consonant-signs may stand alone to represent certain short and common words as in many of the old, a, b, c systems, with this difference, that in the old systems each letter represents several words, but in phonography, in almost every case, only one. By writing the horizontal strokes in two positions with respect to the line (above and on) and the others in three positions (entirely above, resting on and passing through the line) the number is nearly trebled, and very brief signs are obtained for some seventy or eighty common short words (e.g. *be*, *by*, *in*, *if*, *at*, *it*, *my*, *me*, &c.). A few very common monosyllables are represented by their vowel-marks, as *the*, remnant of ; *of*, remnant of ; *on*, remnant of . A certain number of longer words which occur frequently are contracted, generally by omitting the latter part, sometimes a middle part of the word, as in (*ksp*) *expect*, (*djr*) *danger*, (*krk sk*) *characteristic*, (*nd f t*) *indefatigable*. The connective phrase *of the* is intimated by writing the words between which it occurs near to each other. *The* is often expressed by a short slanting stroke or tick joined to the preceding word and generally struck downwards, thus *in the*, *for the*.

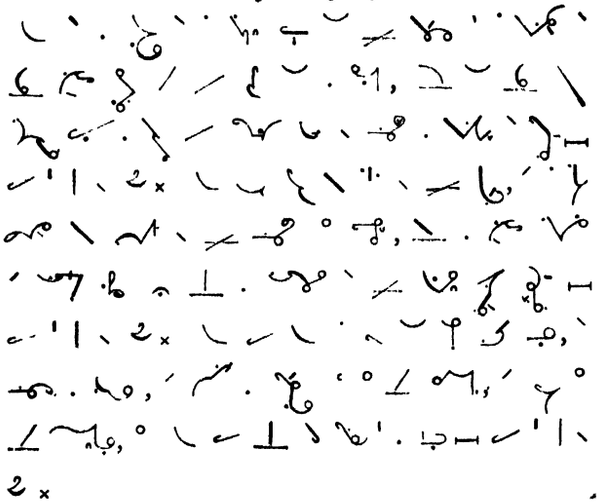
Three principles which remain to be noticed are of such importance and advantage that any one of them would go far to place phonography at the head of all other systems. These are the principles of positional writing, similar outlines and phraseography. (1) The first slanting stroke of a word can generally be written so as either to lie entirely above the line, or rest on the line, or run through the line, thus . In the case of words composed wholly of horizontal strokes the last two positions (on and through the line) coincide, as . These three positions are called first, second and third respectively. The first is specially connected with first-place vowels (*ā*, *ă*; *aw*, *ŏ*; *ĭ*; *oi*), the second with second-place vowels (*ĕ*, *ĕ*; *ō*, *ŭ*), and the third with third-place vowels (*ee*, *ī*; *ōō*, *ŏŏ*; *ou*). In a fully vocalized style position is not employed, but in the reporting style it is of the greatest use. Thus the outline (*tm*) written above the line must be read either *time* or *Tom*; when written resting on the line *tome* or *tame*; when struck through the line *teem*, *team* or *tomb*. By this method the number of possible readings of an unvocalized outline is greatly reduced. That word in each positional group which occurs the most frequently need not be vocalized, but the others should. In the case of dissyllables it is the accented vowel which decides the position; thus *methoúght* should be written first position , *méthod* second position . (2) Another way of distinguishing between words having the same consonants but different vowels to vary the outline. The possibility of variety of outline arises from the fact that many consonant-sounds have duplicate or even triplicate signs, as we have seen. For instance, *r* has two lineal signs and a hook sign, and so each of the words *carter*, *curator*, *creature* and *creator* obtains a distinct outline. A few simple rules direct the student to a proper choice of outline, but some difference of practice obtains among phonographers in this respect. Lists of outlines for words having the same consonants are given in the instruction books; the *Reporter's Assistant* contains the outline of every word written with not more than three strokes, and the *Phonographic Dictionary* gives the vocalized outline of every word in the language. Aided by a true phonetic representation of sounds, by occasional vocalization, variety of outline, and the context, the phonographic verbatim reporter should never misread a word.[1] (3) Lastly, phraseography. It has been found that in numberless cases two or more words may be written without lifting the pen. A judicious use of this practice

[1] Phonography is so legible that the experiment of handing the shorthand notes to phonographic compositors has often been tried with complete success. A speech of Richard Cobden, on the Corn Laws, delivered at Bath on 17th September 1845, and occupying an hour and a quarter, was reported almost verbatim, and the notes, with a few vowels filled in, handed to the compositors of the *Bath Journal*, who set them up with the usual accuracy. A notice of the occurrence appeared the next day in the *Bath Journal*, and was immediately transferred to the columns of *The Times* and other newspapers. Mr Reed tried the same experiment with equal success, the notes being handed to the compositors in their original state (*Phonetic Journal*, 1884, p. 337).

promotes legibility, and the saving of time is very considerable. Words written thus should be closely connected in sense and awkward joinings avoided. Such phrases are *I am*, *I have*, *you are*, *you may*, *it would*, *it would not*, *we are*, *we have*, *we have not*, *we have never been*, *my dear friends*, *as far as possible*, *for the most part*, and many thousands of others. For the sake of obtaining a good phraseogram for a common phrase, it is often advisable to omit some part of the consonant outline. Thus the phrase *you must recollect that* may very well be written (*you must recollect that*). Lists of recommended phraseograms are given in the *Phonographic Phrase Book*, the *Legal Phrase Book* and the *Railway Phrase Book*.

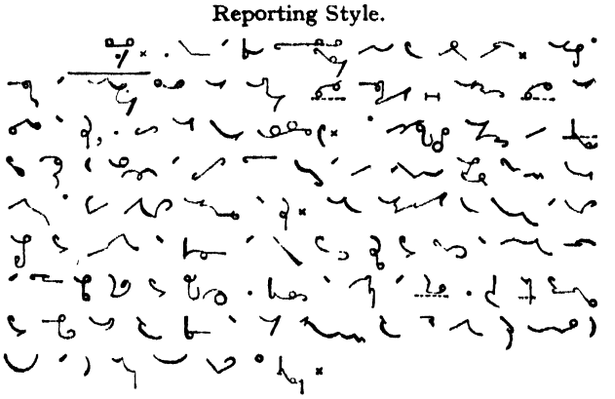
Specimens of Phonography.

Corresponding Style.



KEY.—If all the feelings of a patriot glow in our bosoms on a perusal of those eloquent speeches which are delivered in the senate, or in those public assemblies where the people are frequently convened to exercise the birthright of Britons—we owe it to shorthand. If new fervour be added to our devotion, and an additional stimulus be imparted to our exertions as Christians, by the eloquent appeals and encouraging statements made at the anniversaries of our various religious societies—we owe it to shorthand. If we have an opportunity in interesting judicial cases, of examining the evidence, and learning the proceedings with as much certainty, and nearly as much minuteness, as if we had been present on the occasion—we owe it to shorthand.

Reporting Style.



KEY (the phraseograms being indicated by hyphens).—CHARACTERISTICS OF THE AGE.—The peculiar and distinguishing characteristics of the present-age are-in every respect remarkable. Unquestionably an extraordinary and universal-change has commenced in-the internal as-well-as-the external-world—in-the-mind-of-man as-well-as-in-the habits of society, the one indeed being-the necessary-consequence of the other. A rational consideration of the circumstances in-which-mankind are at-present placed must-show-us that influences of the most-important and wonderful character have-been and are operating in-such-a-manner-as-to bring-about if-not-a reformation, a thorough revolution in-the-organization of society. Never in-the-history-of-the-world have benevolent and philanthropic institutions for-the relief of domestic and public affliction; societies for-the promotion of manufacturing, commercial and agricultural interests; associations for-the instruction of the masses, the advancement of literature and science, the development of-true political-principles, for-the extension in-short of-every description of knowledge and-the-bringing-about of-every kind-of reform,—been-so numerous, so efficient and so indefatigable in-their operation as at-the-present-day.

An enumeration made in 1894 showed that 95 % of British newspaper reporters used Pitman's system; but there are still numerous varieties preferred by individuals. Of the systems published since the invention of phonography the principal are A. M. Bell's *Stenophonography* (Edinburgh, 1852), Professor J. D. Everett's (London, 1877), Pocknell's *Legible Shorthand* (London, 1881), and J. M. Sloan's adaptation (the Sloan-Duployan) of the French system of Duployé (1882). More recent essays in English shorthand are almost entirely in the direction of script characters with connected vowels, as contrasted with the geometric forms and disjoined vowels of Pitman's phonography. The majority are founded on the French system of the brothers Duployé, but *Cursive Shorthand* (Cambridge, 1889), by Prof. H. L. Callendar, and *Current Shorthand* (Oxford, 1892), by Dr Henry Sweet, may be noted as original methods, the first having a phonetic, and the second both an orthographic and a phonetic, basis. ***Recent history.***

The distinctive features in recent shorthand history have been the widely-extended employment of the art, the increased attention paid to instruction and the growth of stenographic societies. Throughout the civilized world the systems employed are those of the leading authors of the 19th century; earlier systems have now a numerically small number of practitioners. Shorthand has become an almost indispensable qualification for the amanuensis, and practical stenographic ability is a necessary equipment of the typewriter operator. In professional and commercial offices, and more recently in the services, dictation to shorthand writers has become general. Shorthand has been included among examination subjects for the army, navy, civil service and medicine in the United Kingdom, and to a certain extent in other countries. Its inclusion in the Technical Instruction Act of 1889 was the first recognition of shorthand by the British parliament, and it was subsequently comprised in the codes of elementary day and evening continuation schools. It first became an examination subject for secondary schools in the Oxford Local Examination in 1888, but the Society of Arts has examined students of polytechnics, &c., in shorthand since 1876. Examinations in connexion with the phonographic system of Isaac Pitman date from 1845.

In 1887 the tercentenary of the origination of modern shorthand by Timothy Bright and the jubilee of Isaac Pitman's phonography were celebrated by the holding of the first International Shorthand Congress in London. Subsequent congresses were held at Paris (1889), Munich (1890), when a statue of Gabelsberger was unveiled; Berlin (1891), Chicago (1893), Stockholm (1897), Paris (1900), &c. These gatherings have promoted the improved organization of stenographic practitioners in the respective countries. After the first congress, three national organizations were established in Great Britain by Pitman writers, which take the place of the Phonetic Society (established in 1843 and dissolved in 1895). In America the formation of national associations for reporters and teachers followed the fifth congress.

As regards speed in shorthand writing, it may be mentioned that at the exhibition at Olympia (London) in 1908, the "World's Shorthand Championship" was awarded for 220 words a minute for five minutes. But it has been claimed that a rate of 250 words a minute has been accomplished. It may be pointed out, however, that such a rate cannot be wanted for any practical purpose, since the fastest public speaker never speaks anything like 250 words a minute, even though for a demonstration such a thing could be done. The average rate of public speaking is from 120 to 150 words a minute.

Foreign Shorthand Systems.

To complete the history of the subject, the following notes on systems introduced in various European countries may be useful.

German.—C. A. Ramsay's *Tacheographia* (Frankfort, 1679, and several times afterwards until 1743) was an adaptation of T. Shelton's English system. Mosengeil (1797) first practically introduced short-

hand writing into Germany in an adaptation of the Taylor-Bertin method. Reischl's (1808) is a modification of Mosengeil's. On Horstig's (1797) are based those of an anonymous writer (Nuremberg, 1798), Heim (1820), Thon (1825), an anonymous author (Tübingen, 1830), Nowack (1830), Ineichen (1831), an anonymous author (Munich, 1831) and Binder (1855). Mosengeil published a second system (1819) in which Horstig's alphabet is used. On the Mosengeil-Horstig system are based Berthold's (1819) and Stärk's (1822). On Danzer's (1800), a close imitation of Taylor's, is based that of Ellison *v.* Nidlef (1820). Other systems are those of Leichtlen (1819); J. Brede (1827); Nowack (1834), a system in which the ellipse is employed as well as the circle; Billharz (1838); Cämmerer (1848), a modification of Selwyn's phonography (1847); Schmitt (1850); Fischbäck (1857), a reproduction of Taylor's; and that of an anonymous author (1872), based on Horstig, Mosengeil and Heim. Nowack, in his later method of 1834, makes a new departure in avoiding right or obtuse angles, and in endeavouring to approximate to ordinary writing. This system Gabelsberger considered to be the best which had appeared down to that date. F. X. Gabelsberger's (1789–1849) *Anleitung zur deutsche Redezeichenkunst* (Munich, 1834) is the most important of the German systems. The author, an official attached to the Bavarian ministry, commenced his system for private purposes, but was induced to perfect it on account of the summoning of a parliament for Bavaria in 1819. Submitted to public examination in 1829, it was pronounced satisfactory, the report stating that pupils taught on this system executed their trial specimens with the required speed, and read what they had written, and even what others had written, with ease and certainty. The method is based on modifications of geometrical forms, designed to suit the position of the hand in ordinary writing. The author considered that a system composed of simple geometrical strokes forming determinate angles with each other was unadapted to rapid writing. He does not recognize all the varieties of sound, and makes some distinctions which are merely orthographical. Soft sounds have small, light and round signs, while the hard sounds have large, heavy and straight signs. The signs too are derived from the current alphabet, so that one can find the former contained in the latter. Vowels standing between consonants are not literally inserted, but symbolically indicated by either position or shape of the surrounding consonants, without, however, leaving the straight writing line. On Gabelsberger's system is based that of W. Stolze (1840). Faulmann (Vienna, 1875) attempted in his *Phonographie* to combine the two methods. While Gabelsberger's system remained unchanged in principle, Stolze's split into two divisions, the old and the new. These contain many smaller factions, *e.g.* Velten's (1876) and Adler's (1877). Arends's (1860) is copied from the French system of Fayet. Roller's (1874) and Lehmann's (1875) are offshoots of Leopold Arends's (1817–1882). Many other methods have appeared and as rapidly been forgotten. The schools of Gabelsberger and Stolze can boast of a very extensive shorthand literature. Gabelsberger's system was adapted to English by A. Geiger (Dresden, 1860 and 1873), who adhered too closely to the German original, and more successfully by H. Richter (London, 1886), and Stolze's by G. Michaelis (Berlin, 1863).

French.—The earliest French system worthy of notice is that of Coulon de Thévenot (1777), in which the vowels are disjoined from the consonants. Later may be divided into two classes, those derived from Taylor's English system, translated in 1791 by T. P. Bertin, and those invented in France. The latter are (*a*) Coulon de Thévenot's; (*b*) systems founded on the principle of the inclination of the usual writing—the best known being those of Fayet (1832) and Sénocq (1842); and (*c*) systems derived from the method of Conen de Prépéan (5 editions from 1813 to 1833). Prévost, who till 1870 directed the stenographic service of the senate, produced the best modification of Taylor. Many authors have copied and spoilt this system of Prévost. The best known are Plantier (1844) and Tondeur (1849). On Conen's are based those of Aimé-Paris (1822), Cadrès-Marmet (1828), Potel (1842), the Duployé brothers (1868), Guénin, &c. Among amateur writers the Duployan method is best known.

Spanish.—The father of Spanish stenography was Don Francisco de Paula Marti, whose system was first published in 1803. The alphabet is a combination of Taylor's and Coulon's. By decree of November 21, 1802, a public professorship of shorthand was founded in Madrid, Marti being the first professor. Founded on Marti's system are those of Serra y Ginesta (1816) and Xamarillo (1811). Many Spanish systems are merely imitations or reproductions of Marti's, and adaptations of Gabelsberger's, Stolze's and Pitman's systems. That of Garriga y Maril (1863) has attained some popularity in Spain.

Italian.—Italian translations and adaptations of Taylor's system succeeded one another in considerable numbers from Amanti (1809) to Bianchini (1871). Delpino's (1819) is the best. The Gabelsberger-Noe system (1863) has gained many followers.

Dutch.—J. Reijner's Dutch method (1673) was an adaptation of Shelton's, and Bussuijt's (1814) of Conen's system. Sommerhausen and Bossaert (1829) received prizes from the government for their productions. Cornelis Steger (1867) translated Taylor's work. Gabelsberger's system was transferred to Dutch by Rietstap (1869), and Stolze's by Reinbold (1881).

Adaptations of Gabelsberger's method have also come into use in other countries.

Indian.—Mirza Habib Hosain, at the Mahommedan Educational Conference of 1905 in India, introduced a system of Urdu and Hindi shorthand, called "Habib's Samia," for which he was awarded a gold medal. The Pitman system has also been adapted for some Indian languages.

AUTHORITIES.—J. W. Zeibig's *Geschichte u. Literatur der Geschwindschreibekunst* (Dresden, 1878) contains a historical sketch of the use of shorthand in ancient and modern times (especially in Germany), a full bibliography of shorthand literature in all languages, a number of lithographed specimens, and a useful index. *Circulars of Information of the Bureau of Education*, No. 2, 1884 (Washington, 1885), by J. E. Rockwell, contains a very complete and accurate bibliography of English and American shorthand publications, a chronological list of 483 English and American shorthand authors, notices on shorthand in the United States, on the employment of stenographers in the American courts, on American shorthand societies and magazines, and a beautifully engraved sheet of 112 shorthand alphabets. Isaac Pitman's *History of Shorthand* (reprinted in the *Phonetic Journal* of 1884) reviews the principal English systems previous to phonography, and a few foreign ones. The author draws largely on J. H. Lewis's *Historical Account of the Rise and Progress of Stenography* (London, 1816). Other histories of shorthand are by F. X. Gabelsberger (prefixed to his *Anleitung zur deutschen Redezeichenkunst*, Munich, 1834), A. Fossé (prefixed to his *Cours théorique et pratique de sténographie*, Paris, 1849), Scott de Martinville (Paris, 1849), M. Levy (London, 1862) and T. Anderson (London, 1882). Here too should be mentioned J. Heger's *Bemerkenswerthes über die Stenographie* (Vienna, 1841), mainly historical; J. Anders's *Entwurf einer allgemeinen Gesch. u. Lit. d. Stenographie* (Coeslin, 1855); R. Fischer's *Die Stenographie nach Geschichte, Wesen, u. Bedeutung* (Leipzig, 1860); Krieg's *Katechismus der Stenographie* (Leipzig, 1876); Dr Westby-Gibson's *Early Shorthand Systems* (London, 1882); T. Anderson's *Shorthand Systems*, with a number of specimens (London, 1884); T. A. Reed's *Reporter's Guide* (London, 1885), and *Leaves from the Notebook of T. A. Reed* (London, 1885). Mr C. Walford's *Statistical Review of the Literature of Shorthand* (London, 1885) contains valuable information on the circulation of shorthand books and on shorthand libraries. Among later publications dealing fully with the history and practice of shorthand are the *Transactions* of the London Congress in 1887, and similar publications in connexion with later congresses; *Bibliography of Shorthand*, by J. Westby-Gibson, LL.D. (London, 1887), treating of English, colonial and American authors; *Shorthand Instruction and Practice*, by J. E. Rockwell, of the United States Bureau of Education (Washington, 1893), dealing with shorthand work throughout the world; and *Examen critique des sténographies françaises et étrangères*, by Dr Thierry-Mieg (Versailles, 1900).

SHORTHOUSE, JOSEPH HENRY (1834–1903), English novelist, was born in Great Charles Street, Birmingham, on the 9th of September 1834. He was the eldest son of Joseph Shorthouse, chemical manufacturer, and Mary Ann, daughter of John Hawker, of the same town. He was educated at Grove House, Tottenham, where he proved a promising and industrious pupil, and upon leaving school entered his father's business, in which he was all his life actively engaged. He married, in 1857, Sarah, daughter of John Scott, of Birmingham. His literary interest was fostered by a local essay club, to which he contributed many papers. It was not until he was nearly fifty years old that Shorthouse made his public appearance as an author, and even then his remarkable story, *John Inglesant*, had undergone vicissitudes. It was kept for over three years in MS., and the author eventually printed one hundred copies for private circulation. One of these found its way into the hands of Mrs Humphry Ward, who recommended it to Messrs Macmillan. Its first appearance was a quiet one; but Gladstone was at once struck by its quality, and made its reputation by his praise. It became the most discussed book of the day, and its author was suddenly famous. Besides *John Inglesant* (1881), Shorthouse published *The Little Schoolmaster Mark* (1883), *Sir Percival* (1886), *The Countess Eve* and *A Teacher of the Violin* (1888), and *Blanche, Lady Falaise* (1891); but none of these has been so popular as his first novel. He will always remain known to fame as "the author of *John Inglesant*." Shorthouse was originally a Quaker, but the appeal of the Anglican Church was insistent with him, and he was baptized into its body before the appearance of his story. Something of his own stress of religious transition appears in the character of his hero, who is pictured as living in the time of the Civil War, a pupil of the Jesuits, a philosopher and a Platonist, who is yet true to the National Church. The story,

which is deeply mystical and imaginative, has for its central idea the dangers of bigotry and superstition, and the necessity of intuitive religion to progress and culture. It is a work full of opulent colour and crowded life, no less than of philosophy and spiritual beauty. Shorthouse's work was always marked by high earnestness of purpose, a luxuriant style and a genuinely spiritual quality. He lacked dramatic faculty and the workmanlike conduct of narrative, but he had almost every other quality of the born novelist. He died at Edgbaston on the 4th of March 1903.

See *The Life, Letters and Literary Remains of J. Henry Shorthouse*, edited by his wife (2 vols., 1905).

SHOSHONG, a town in the British protectorate of Bechuanaland, formerly the chief settlement of the eastern Bamangwato. It is about 200 m. N.N.E. of Mafeking and 30 m. N. of Shoshong Road Station on the Cape Town-Bulawayo railway. The town is situated 3000 ft. above the sea in the valley of the Shoshong, an intermittent tributary of the Limpopo. The site was originally chosen as the headquarters of the Bamangwato as being easily defensible against the Matabele. At the time of the declaration of a British protectorate in 1885 Shoshong had 20,000 to 30,000 inhabitants, including about twenty Europeans. Being the meeting place of trade routes from south and north it was of considerable importance to early explorers and traders in South-Central Africa, and a mission station of the London Missionary Society (preceded for many years by a station of the Hermannsburg Lutheran Missionary Society) was founded here in 1862. Owing, however, to the scarcity of water at Shoshong, Khama, the chief of the Bamangwato, and most of his followers removed about 1890 to Palapye—50 m. N.E. of Shoshong—and later to Serowe to the north-west of Palapye. Like Shoshong, these places are built in valleys of tributaries of the Limpopo. Shoshong was not entirely deserted and has a population of about 800 (see BECHUANALAND).

SHOTTS, a mining and manufacturing parish of Lanarkshire, Scotland. It comprises eight villages, parts of two others, and the town of Cleland (including Omoa) and is served by the North British and Caledonian railways. Pop. (1891) 11,957; (1901) 15,562. The parish contains large ironworks, tile, fire-clay and brick-works, and quarries, and includes the Lanark district asylum and a fever hospital. The curious name of Omoa is supposed to have been given to his property by some soldier or sailor who had settled here after the wars in Honduras, of which Omoa is a seaport. Matthew Baillie (1761–1823), famous for his researches in morbid anatomy, and Janet Hamilton (1795–1873), the poetess, were born in the parish of Shotts.

SHOULDER (in O.E. *sculder*, cognate with Ger. *Schulter*, Dutch *schouder*, Swed. *skuldra*, &c.; the root is unknown), the name of that part of the body of man and animals where the upper arm or fore-leg articulates with the collar bone and shoulder-blade (see JOINTS).

SHOVEL, SIR CLOUDESLEY [or CLOWDISLEY SHOVELL as he seems to have spelt the name himself] (*c.* 1650–1707), English admiral, was baptised at Cockthorpe in Norfolk on the 25th of November 1650, and went to sea under the care of his kinsman Sir Christopher Mynns. He set himself to study navigation, and, owing to his able seamanship and brave and open-hearted disposition, became a general favourite and obtained quick promotion. In 1674 he served as lieutenant under Sir John Narborough in the Mediterranean, where he burned four men-of-war under the castles and walls of Tripoli, belonging to the pirates of that place. He was present as captain of the "Edgar" (70) at the first fight at Bantry Bay, and shortly afterwards was knighted. In 1690 he convoyed William III. across St George's Channel to Ireland; the same year he was made rear-admiral of the blue, and was present at the battle of Beachy Head on 10th July. In 1692 he was appointed rear-admiral of the red, and joined Admiral Russell, under whom he greatly distinguished himself at La Hogue, by being the first to break through the enemy's line. Not long after, when Admiral Russell was superseded, Shovel was put in joint command of the fleet with Admiral Killigrew and Sir Ralph Delaval. In 1702 he brought home the spoils of the French and Spanish fleets from Vigo, after their capture by Sir George Rooke, and in 1704 he served under Sir George Rooke in the Mediterranean and co-operated in the taking of Gibraltar. In January 1704 he was named rear-admiral of England, and shortly afterwards commander-in-chief of the British fleets. He co-operated with the earl of Peterborough in the capture of Barcelona in 1705, and commanded the naval part of the unsuccessful attempt on Toulon in October 1707. When returning with the fleet to England his ship, the "Association," at eight o'clock at night on the 22nd of October, struck on the rocks near Scilly, and was seen by those on board the "St George" to go down in three or four minutes' time, not a soul being saved of 800 men that were on board. The body of Sir Cloudesley Shovel was cast ashore next day, and was buried in Westminster Abbey. It is said that he was alive when he reached the shore at Porthellick Cove, but was murdered by a woman for the sake of his rings.

See *Life and Glorious Actions of Sir Cloudesley Shovel* (1707); Burnet's *Own Times*; various discussions in *Notes and Queries*, 5th series, vols. x. and xi.; and T. H. Cooke, *Shipwreck of Sir Cloudesley Shovel* (1883).

SHOVEL (O.E. *scofl*, from root of *scufan*, to shove, push, cf. Ger. *Schaufel*, also *Schuppe*, scoop), an implement or tool, consisting of a broad flat blade with edges or sides turned up fixed to a wooden handle terminating in a bow like a spade. It is used for lifting or removing such loose substances as coal, gravel and the like.

SHOVELER, formerly spelt SHOVELAR, and more anciently SHOVELARD, a word by which used to be meant the bird now almost invariably called Spoonbill (*q.v.*), but in the latter half of the 16th century transferred to one hitherto generally, and in these days locally, known as the Spoon-billed Duck—the *Anas clypeata* of Linnaeus and *Rhynchaspis* or *Spatula clypeata* of modern writers. All these names refer to the shape of the bird's bill, which, combined with the remarkably long *lamellae* that beset both maxilla and mandible, has been thought sufficient to remove the species from the Linnaean genus *Anas*. Except for the extraordinary formation of this feature, which carries with it a clumsy look, the male Shoveler would pass for one of the most beautiful of this generally beautiful group of birds. As it is, for bright and variegated colouring, there are few of his kindred to whom he is inferior. His golden eye, his dark green head, surmounting a breast of pure white and succeeded by underparts and flanks of rich bay, are conspicuous; while his deep brown back, white scapulas, lesser wing-coverts (often miscalled shoulders) of a glaucous blue, and glossy green speculum bordered with white present a wonderful contrast of the richest tints, heightened again by his bright orange feet. On the other hand, the female, excepting the blue wing-coverts she has in common with her mate, is habited very like the ordinary Wild-Duck, *A. boscas*. The Shoveler is not an abundant species, and in Great Britain its distribution is local; but its numbers have remarkably increased since the passing of the Wild-Fowl Protection Act in 1876, so that in certain districts it has regained its old position as an indigenous member of the Fauna. It has not ordinarily a very high northern range, but inhabits the greater part of Europe, Asia and America, passing southwards, like most of the *Anatidae* towards winter, constantly reaching India, Ceylon, Abyssinia, the Antilles and Central America, while it is known to have occurred at that season in Colombia, and, according to Gould, in Australia. Generally resembling in its habits the other freshwater ducks, the Shoveler has one peculiarity that has been rarely, if ever, mentioned, and one that is perhaps correlated with the structure of its bill. It seems to be especially given to feeding on the surface of the water immediately above the spot where diving ducks (*Fuligulinae*) are employing themselves beneath. On such occasions a pair of Shovelers may be watched, almost for the hour together, swimming in a circle, about a yard in diameter, their heads turned inwards towards its centre, their bills immersed vertically in the water, and engaged in sifting, by means of the long *lamellae* before mentioned, the floating matters that are disturbed by

their submerged allies and rise to the top. These gyrations are executed with the greatest ease, each Shoveler of the pair merely using the outer leg to impel it on its circular course.

Four other species of the genus *Spatula*, all possessing the characteristic light blue "shoulders," have been described: one, *S. platalea*, from the southern parts of South America, having the head, neck and upper back of a pale reddish brown, freckled or closely spotted with dark brown, and a dull bay breast with interrupted bars; a second, *S. capensis*, from South Africa, much lighter in colour than the female of *S. clypeata*; a third and a fourth, *S. rhynchotis* and *S. variegata*, from Australia and New Zealand respectively—these last much darker in general coloration, and the males possessing a white crescentic mark between the bill and the eye, very like that which is found in the South-American Blue-winged Teal (*Querquedula cyanoptera*), but so much resembling each other that their specific distinctness has been disputed by good authority. (A. N.)

SHREVEPORT, a city and the capital of Caddo Parish, Louisiana, U.S.A., on the Red river, in the N.W. part of the state, near the Texas border. Pop. (1890) 11,979; (1900) 16,013, of whom 8532 were negroes; (1910, census) 28,015. It is the second city of the state in population. It is served by the Vicksburg, Shreveport & Pacific, the Houston & Shreveport, the Kansas City Southern, the St Louis & South-Western, the Louisiana Railway & Navigation Company, the Texas & Pacific (main line and two branches), the Louisiana & Arkansas, the Kansas City Southern, and the Missouri, Kansas & Texas railways and by boats on the Red river. In the city are the State Charity Hospital (1872), the T. E. Schumpert Memorial Hospital (1910), the Genevieve Orphanage (1899) and the Shreveport Training School (1908). Owing to its situation and excellent transportation facilities the city has a large trade. The surrounding country is a rich agricultural region, mainly devoted to the production of cotton, for which Shreveport is the principal shipping point. Live-stock and cattle products are trade items of importance. The situation of the city (about 170 m. east of Dallas, and somewhat farther from Little Rock, Houston, and New Orleans) makes it a natural centre of wholesale trade of varied character, and the development since 1906 of the important Caddo oil and gas fields north of the city has added greatly to its industrial prominence. The city contains planing mills, cotton gins, compresses and cotton-seed oil mills, machine and railway shops, and ice and molasses factories. In 1905 its factory product was valued at $2,921,923 (87·8% more than in 1900). Shreveport was settled about 1835, incorporated as a town in 1839, and chartered as a city in 1871. It was named in honour of Henry Miller Shreve (1785–1854), a native of New Jersey, who in 1815 ascended the Mississippi and the Ohio rivers to Louisville in the "Enterprise," the first steam vessel to make this trip, introduced improvements in the steamboat, and in 1826–1841 had charge of the improvement of western rivers, removing during this period the great Red river raft. After the capture of Baton Rouge, the state capital, and New Orleans by the Unionists in 1862, Shreveport was occupied by the Confederate officials of the state. In the spring of 1863 and again in that of 1864 it was the objective of combined naval and land expeditions made by the Union forces up the Red river under command of Admiral David D. Porter and General N. P. Banks, the Confederate commander in Louisiana being General Richard Taylor, with General E. Kirby Smith in charge of the entire trans-Mississippi department. In 1863 Shreveport was not seriously threatened. In 1864 when the Federals were within two marches of the city they were worsted by Taylor at Mansfield (on the 8th of April); on the next day the Confederates in their turn met with a demoralizing repulse at Pleasant Hill.

SHREW,[1] a term applied to the species of the family *Soricidae* of the mammalian order insectivora (*q.v.*), but in the British Isles to the common and lesser shrews (*Sorex araneus* and *S. minimus*).

The common shrew, or, properly, shrew-mouse, which in England is by far the commoner of the two, is a small animal about the size of a mouse, which it somewhat resembles in the shape of its body, tail and feet. But here the resemblance ends, for, unlike the mouse, it possesses a long and slender muzzle, with prominent nostrils, which project far beyond the lower lip; the small eyes are almost concealed by the fur; the ears are wide, short and provided internally with a pair of deep folds, capable when laid forwards of closing the entrance; the tail, which is slightly shorter than the body, is quadrangular in section and clothed more or less densely with moderately long hairs, terminating in a short tuft, but in old individuals almost naked; the feet are five-toed, the toes terminating in slender, pointed claws. The dentition is very peculiar and characteristic: there are in all thirty-two teeth, tipped with deep crimson; of which twelve belong to the lower jaw; of the remaining twenty ten occupy each side of the upper jaw, and of these the first three are incisors. The first incisor is large, with a long anterior canine-like cusp and a small posterior one; then follow two small single-cusped teeth; which are succeeded by three similar progressively smaller teeth, the first being a canine and the other two premolars; the next, a premolar, is large and multicuspid, and this is followed by three molars, of which the third is small with a triangular crown. In the lower jaw there are anteriorly three teeth corresponding to the seven anterior teeth above, of which the first is almost horizontal in direction, with its upper surface marked by three notches, which receive the points of the three upper front teeth; then follow two small



The Common Shrew (*Sorex araneus*).

teeth and three molars. The body is clothed with closely set fur, soft and dense, varying in colour from light reddish to dark brown above; the under surface of both body and tail being greyish; the basal four-fifths of all the hairs above and beneath are dark bluish grey. On each side of the body, about one-third of the distance between the elbow and the knee, is a gland covered by two rows of coarse inbent hairs, which secretes a fluid with an unpleasant cheesy odour, and which is protective, rendering the creature secure against the attacks of predaceous animals.

The lesser or pigmy shrew (*S. minutus*) is not so abundant in England and Scotland, but common in Ireland, where the other species is unknown. It appears at first sight to be a diminutive variant of that species, which it closely resembles in external form, but the third upper incisor is shorter, or not longer than the next following tooth, whereas in *S. araneus* it is longer, and the length of the forearm and foot is less in the former species than in the latter.

Both these shrews live in the neighbourhood of woods, making their nests under the roots of trees or in any slight depression, occasionally even in the midst of open fields, inhabiting the disused burrows of field-mice. Owing to their small size, dark colour, rapid movements and nocturnal habits, they easily escape observation. They seek their food, which consists of insects, grubs, worms and slugs, under dead leaves, fallen trees and in grassy places. They are pugnacious, and if two or more are confined together in a limited space they invariably fight fiercely, the fallen becoming the food of the victorious. They are also exceedingly voracious, and soon die if deprived of food; and it is probably to insufficiency of food in the early dry autumnal season that the mortality among them at that time is due. The breeding-season extends from the end of April to the beginning of August, and five to seven, more rarely ten,

[1] This word, whence comes the participial adjective "shrewd," astute, originally meant malicious, and, as applied to a woman, still means a vexatious scold. From their supposed venomous character it was applied to the Soricidae.

young may be found in the nests; they are naked, blind and toothless at birth, but soon run about snapping at everything within reach.

The alpine shrew (*S. alpinus*), restricted to the alpine region of Central Europe, is slightly longer than the common shrew and differs in its longer tail, which exceeds the length of the head and body, in the colour of the fur, which is dark on both surfaces, and in the large size of the upper antepenultimate premolar.

The water-shrew (*Neomys fodiens*), the third species inhabiting England, differs from the common shrew in being larger with a shorter and broader muzzle, smaller eyes and larger feet adapted for swimming—the sides of the feet and toes being provided with comb-like fringes of stiff hairs. The tail is longer than the body, and has a fringe of moderately long regularly ranged hairs, which extend along the middle of the under surface from the end of the basal third to the extremity. The fur is long and dense, varying in colour in different individuals; the prevailing shades are dark, almost black, brown above, beneath more or less bright ashy tinged with yellowish; but occasionally we find individuals with the under surface dark-coloured. In the number and shape of the teeth the water-shrew differs from the common shrew: there is a premolar less on each side above; the bases of the teeth are more prolonged posteriorly; and their cusps are less stained brown, so that in old individuals they often appear white. This species is aquatic in habits, swimming and diving with agility. It frequents rivers and lakes, making burrows in the banks, from which when disturbed it escapes into the water. Its food consists of water insects and their larvae, small crustaceans and probably the fry of small fishes. It is generally distributed throughout England, is less common in Scotland and not recorded in Ireland.

The geographical range of the common shrew is wide, extending eastwards through Europe and Asia to Amurland. The lesser shrew extends through Europe and Asia to Sakhalin Island; and specimens of the water-shrew have been brought from different parts of Europe and Asia as far east as the Altai. In Siberia the common shrew is abundant in the snow-clad wastes about the Olenek river within the arctic circle. Other species of red-toothed shrews are restricted chiefly to North America, where they are found in greater variety than in the Old World, though *Neomys* is not represented. Its place is taken by *Sorex palustris* east of the Rocky Mountains, and *S. hydrodromus* in Unalaska Island, which, like the water-shrew, have fringes of hair on the feet, but the unfringed tail and dentition of the common shrew. Of the American forms *S. bendiri* is the largest. Other red-toothed shrews belonging to the genus *Blarina*, distinguished from *Sorex* by the dentition and the shortness of the tail, are common in North America. All red-toothed shrews (except the aquatic forms) closely resemble one another in habits, but the short-tailed North American shrew supplements its insectivorous fare by feeding on beech nuts. In destroying numbers of slugs, insects and larvae, shrews aid the farmer and merit protection. Although their odour renders them safe from rapacious animals, they are destroyed in numbers by owls. (G. E. D.)

SHREWSBURY, EARLS OF. The earldom of Shrewsbury, one of the most ancient in the English peerage, dates from the time of William the Conqueror. Roger de Montgomery (*c.* 1030–1094), son of another Roger de Montgomery, known as "the Great," was a councillor of William, duke of Normandy, before his invasion of England, and was probably entrusted by William with the government of Normandy during the expedition of 1066. Roger came to England in the following year and received extensive grants of land in different parts of the kingdom. Obtaining thus a large territory in Sussex, including the city of Chichester and the castle of Arundel, he became earl of Arundel, or probably and more correctly earl of Sussex. In 1071 the greater part of the county of Shropshire was granted to him, carrying with it the title of earl of Shropshire, though, from his principal residence at the castle of Shrewsbury, he like his successors was generally styled earl of Shrewsbury. He probably exercised palatine authority. He was the founder of Shrewsbury Abbey in 1083. His first wife was Mabel, daughter of the seigneur of Belesme and Alençon; hence his son Robert, who, after the death of another son Hugh, succeeded to the earldoms of Shrewsbury and Arundel, was generally known as Robert de Belesme (*q.v.*), one of the most celebrated of the feudal nobles in the time of Henry I. Robert having been deprived of all his English estates and honours in 1102, the earldom of Shrewsbury was next conferred in 1442 on John, 5th baron Talbot, whose descendants have borne the title to the present day. (See TALBOT; and SHREWSBURY, 1ST EARL OF, below.)

SHREWSBURY, CHARLES TALBOT, DUKE OF (1660–1718), only son by his second wife of Francis Talbot, 11th earl of Shrewsbury, was born on the 24th of July 1660. His mother was a daughter of Robert Brudenell, 2nd earl of Cardigan, and the notorious mistress of the 2nd duke of Buckingham, by whom his father was killed in a duel in 1668. Charles was a godson of King Charles II., after whom he was named, and he was brought up as a Roman Catholic, but in 1679 under the influence of Tillotson he became a member of the Church of England. On his father's death in 1668 he succeeded to the earldom of Shrewsbury; he received an appointment in the household of Charles II., and served in the army under James II. But in 1687 he was in correspondence with the Prince of Orange, and he was one of the seven signatories of the letter of invitation to William in the following year. He contributed towards defraying the expenses of the projected invasion, and having crossed to Holland to join William, he landed with him in England in November 1688. Shrewsbury became a secretary of state in the first administration of William and Mary, but he resigned office in 1690 when the tories gained the upper hand in parliament. While in opposition he brought forward the triennial bill, to which the king refused assent. In 1694 he again became secretary of state; but there is some evidence that as early as 1690, when he resigned, he had gone over to the Jacobites and was in correspondence with James at St Germains, though it has been stated on the other hand that these relations were entered upon with William's connivance for reasons of policy. However this may be, William appears to have had no suspicion of Shrewsbury's loyalty, for on the 30th of April 1694 the latter was created marquess of Alton and duke of Shrewsbury, and he acted as one of the regents during the king's absence from England in the two following years. In 1696 definite accusations of treason were brought against him by Sir John Fenwick, which William himself communicated to Shrewsbury; and about this time the secretary of state took but a small part in public business, again professing his anxiety to resign. His plea of ill-health was a genuine one, and in 1700 the king reluctantly consented to his retirement into private life.

For the next seven years Shrewsbury lived abroad, chiefly at Rome, whence in 1701 he wrote a celebrated letter to Lord Somers expressing his abhorrence of public life and declaring that if he had a son he "would sooner bind him to a cobbler than a courtier, and a hangman than a statesman." On the accession of Queen Anne the whig leaders made an ineffectual attempt to persuade Shrewsbury to return to office. When, however, at last he did return to England in 1707 he gradually became alienated from his old political associates, and in 1710 he accepted the post of lord chamberlain in the tory administration to which the queen appointed him without the knowledge of Godolphin and Marlborough, while his wife was at the same time made a lady of the bedchamber. After a diplomatic mission to France for the purpose of negotiating preliminaries of peace, Shrewsbury became lord lieutenant of Ireland in 1713; but he was in London in July 1714 during the memorable crisis occasioned by the impending death of Queen Anne. On the 27th of July, when the queen was dying, the earl of Oxford received his long-delayed dismissal from the office of lord treasurer. On the 30th Shrewsbury and other ministers assembled at Kensington Palace, and being admitted to the queen's bedchamber Bolingbroke recommended the appointment of Shrewsbury to the vacant treasurership; Anne at once placed the staff of that high office in the duke's hands. When

the queen died on the 1st of August Shrewsbury was thus in a position of supreme power with reference to the momentous question of the succession to the crown. He threw his influence into the scale in favour of the elector of Hanover, and was powerfully influential in bringing about the peaceful accession of George I., and in defeating the design of the Jacobites to place the son of James II. on the throne. His disinclination for the highest political offices remained, however, as great as before; and having resigned the lord-treasurership and the lord-lieutenancy of Ireland, he was appointed lord chamberlain. This place he resigned in July 1715, and he died on the 1st of February 1718.

The duke of Shrewsbury was one of the greatest noblemen of the reign of Queen Anne. Strikingly handsome in person, his demeanour was dignified and his manners full of grace and courtesy. Swift described him as "the finest gentleman we have," and as "the favourite of the nation," while William III. spoke of him as "the king of hearts." Like most of his contemporaries he endeavoured to keep himself in favour both with the exiled house of Stuart and with the reigning sovereign in England; but at the two critical junctures of 1688 and 1714 he acted decisively in favour of the Protestant succession. At other times he appeared weak and vacillating, and he never whole-heartedly supported either whigs or tories, though he co-operated with each in turn. His magnanimous disposition saved him from the vindictiveness of the party politician of the period; and the weak health from which he suffered through life probably combined with a congenital lack of ambition to prevent his grasping the power which his personality and talents might have placed in his hands.

In 1705 Shrewsbury married Adelaide, daughter of the Marquis Paleotti of Bologna. This lady, who is said to have had "a great many engaging qualities" besides many accomplishments, was the subject of much malicious gossip. She was the widow, or as some declared, the mistress of a Count Brachiano; and Lady Cowper reported that the lady's brother had forced Shrewsbury to marry her "after an intrigue together." After Shrewsbury's return to England the duchess became conspicuous in London society, where the caustic wit of Lady Mary Wortley-Montagu was exercised at her expense. On the accession of George I. the duchess of Shrewsbury became a lady of the bedchamber to the princess of Wales, a position which she retained till her death on the 29th of June 1726. Shrewsbury left no children, and at his death the dukedom became extinct, the earldom of Shrewsbury passing to his cousin Gilbert Talbot (see TALBOT).

See *Correspondence of Charles Talbot, Duke of Shrewsbury, with King William, the Leaders of the Whig Party, &c.*, edited by W. Coxe (London, 1821); Gilbert Burnet, *History of his own Time* (6 vols., 2nd ed., Oxford, 1833); F. W. Wyon, *History of Great Britain during the Reign of Anne* (2 vols., London, 1876); Earl Stanhope, *History of England comprising the Reign of Anne until the Peace of Utrecht* (London, 1870), and *History of England from the Peace of Utrecht*, vol. i. (7 vols., London, 1836–1854); *The Wentworth Papers*, edited by J. J. Cartwright (London, 1883); W. E. H. Lecky, *History of England in the Eighteenth Century*, vol. i. (new edition, 7 vols., London, 1892); and G. E. C., *Complete Peerage*, vol. vii. (London, 1896). (R. J. M.)

SHREWSBURY, ELIZABETH TALBOT, COUNTESS OF (1518–1608), better known by her nickname "Bess of Hardwick," was the daughter and co-heiress of John Hardwicke of Hardwicke in Derbyshire. At the age of fourteen she was married to a John Barlow, the owner of a large estate, who did not long survive the marriage, and as his estates had been settled on her and her heirs, she became a wealthy widow. She remained single till the 20th of August 1549, when she married Sir William Cavendish, who, to please her, sold his lands in the south of England and purchased the Chatsworth estates in Derbyshire. Six children were born of the marriage, three sons and three daughters. One of the sons was the founder of the ducal family of Devonshire, and another of the ducal family of Newcastle. Sir William Cavendish having died on the 25th of October 1557, her third husband was Sir William St Lo (or St Loe or St Lowe), captain of the guard to Queen Elizabeth and owner of an estate at Tormarton in Gloucestershire. She insisted that his lands should be settled on her and her heirs, and when Sir William died without issue, she made good her claim to all his property to the detriment of his sister and cousins. Bess of Hardwick was now the wealthiest subject in England. Her income was calculated to amount to £60,000, which was relatively a far more important sum then than it is to-day. She still retained much of her good looks; her charms and her wealth outweighed her reputation for rapacity, and she was much sought in marriage. With the approval of Queen Elizabeth, who was not by habit a matchmaker, she was married in 1568 for the fourth time to George Talbot, 6th earl of Shrewsbury. Bess made her usual good bargain as to settlements, and also insisted on arranging marriages between two of her children by Sir William Cavendish and two of the earl's by a former marriage. In 1574 the countess took advantage of a visit of the countess of Lennox to marry her daughter Elizabeth to Charles Stuart, the younger son of the Lennoxes and brother of Lord Darnley, the second husband of the queen of Scots. She acted without the knowledge of her husband, who declined to accept any responsibility. As the Lennox family had a claim to the throne this match was considered as a proof of the ambition of the countess of Shrewsbury, and she was sent to the Tower by the queen, but was soon released. The child of the marriage was Arabella Stuart, whom her grandmother treated at first with favour but later on with cruelty and neglect.

By this time the earl of Shrewsbury and his wife were on very bad terms with one another, and the former tried to obtain a divorce. The countess revenged herself by accusing him of a love intrigue with the queen of Scots, a charge which she was forced to retract before the council. In the meantime she had told some filthy scandal about Queen Elizabeth to Queen Mary, who made use of it in the extraordinary letter she wrote some time in 1584. In 1583 the countess of Shrewsbury went to live apart from her husband, with whom she was afterwards reconciled formally by the queen. After his death in 1590 she lived mostly at Hardwicke, where she built the noble mansion which still stands. She was indeed one of the greatest builders of her time at Hardwicke, Chatsworth and Oldcoates. It is said that she believed she would not die so long as she was building. Her death came on the 13th of February 1608 during a frost which put a stop to her building operations. She was buried in All Saints' Church, Derby, under a fine monument with a laudatory inscription which she took care to put up in her lifetime. Two portraits of her exist at Hardwicke, one taken in her youth, while the second, by Cornelius Janssen, engraved by Vertue, represents her as an old woman. She had no children except by her second husband, and to them she left the vast estates she accumulated by her successive marriages.

See White Kennett, *Memoirs of the Cavendish Family* (London, 1708); and Mrs Murray Smith (Miss E. T. Bradley), *Life of Arabella Stuart* (London, 1889); Mrs Stepney Rawson, *Bess of Hardwicke* (1910).

SHREWSBURY, JOHN TALBOT, 1ST EARL OF (d. 1453), was second son of Richard, 5th baron Talbot, by Ankaret, heiress of the last Lord Strange of Blackmere. He was married before 1404 to Maud Neville, heiress of the barons Furnivall, and in her right summoned to parliament from 1409. In 1421 by the death of his niece he acquired the baronies of Talbot and Strange. From 1404 to 1413 he served with his elder brother Gilbert in the Welsh war. Then for five years from February 1414 he was lieutenant of Ireland, where he held the honour of Wexford. He did some fighting, and had a sharp quarrel with the earl of Ormonde. Complaints were made against him both for harsh government in Ireland and for violence in Herefordshire. From 1420 to 1424 he served in France. In 1425 he was again for a short time lieutenant in Ireland. So far his career was that of a turbulent lord of the Marches, employed in posts where a rough hand was useful. In 1427 he went again to France, where he fought with distinction in Maine and at the siege of Orleans; but his exploits were those of a good fighter rather than of general, and it was his stubborn rashness that was chiefly to

blame for the English defeat at Patay in June 1429. After Patay Talbot was four years a prisoner. On his release he became one of the foremost of the English captains. In 1434 he recovered the county of Clermont, next year took part in the siege of St Denys, and in 1436 by reducing and harrying the revolted Pays de Caux saved Normandy. He was rewarded with the offices of captain of Rouen and marshal of France. During five years as a dashing fighter he was the mainstay of the English cause. His chief exploits were the defeat of the Burgundians before Crotoy in 1437 and the recovery of Harfleur in 1440. In 1442 during a visit to England he was created earl of Shrewsbury. In November he was back in France besieging Dieppe; but "fared so foul with his men that they would no longer abide with him" and was forced to break the siege (*Chronicles of London*, p. 150). In March 1445 he was once more sent to Ireland, where he used his old methods, so that the Irish said "there came not from the time of Herod any one so wicked in evil deeds." In 1449 he served for a short time in Normandy. When in 1452 the Gascons appealed for English help, Shrewsbury was the natural leader of the expedition. He landed in Aquitaine on the 17th of October. Bordeaux and the surrounding district returned quickly to their old allegiance, and in the following summer Shrewsbury captured Fronsac. In July the French besieged Castillon. Shrewsbury hurried to its relief, and with foolhardy valour attacked the enemy in their entrenched camp without waiting for his artillery. The English and Gascon footmen charged in vain in face of the French cannon, until Shrewsbury and the flower of his troops had fallen. This happened in July 1453 and was the end of the English rule in Gascony. Shrewsbury's fighting qualities made him something of a popular hero, and in the doggerel of the day he was "Talbot our good dog," whose valour was brought to nought by the treason of Suffolk. But in truth though a brave soldier he was no general. He was twice married, his second wife being Margaret, eldest daughter of Richard Beauchamp, earl of Warwick. He was alleged to be eighty years old at his death; probably he was about sixty-five.

BIBLIOGRAPHY.—For Shrewsbury's French campaigns see especially the *Chronique* of E. de Monstrelet, Jehan de Waurin and Matthieu d'Escouchy (all these are published by the *Société de l'Histoire de France*), and the *Chronicles of London* (ed. C. L. Kingsford, London, 1905). Also H. Ribadieu, *Conquête de Guyenne* (1866); J. T. Gilbert, *Viceroys of Ireland* (1865); and J. H. Wylie's *Henry the Fourth* (1884–1898) for his early career. (C. L. K.)

SHREWSBURY, a municipal and parliamentary borough, market town and the county town of Shropshire, England. Pop. (1901), 28,395. It is situated on both banks of the river Severn, but mainly on a peninsula formed by the river on the left bank. It is served by the London & North-Western and Great Western railways, being 163 m. N.W. from London. The companies use a joint station, and jointly work the line S. to Hereford. There is water communication eastward by the Shrewsbury canal, and by the Severn below the town. Eastward from the peninsula the English bridge crosses the river, westward the Welsh bridge; southward the Kingsland and Greyfriars bridges. The joint railway station is on the peninsula, and is reached from the south by a massive iron bridge. The streets, many retaining ancient names curiously corrupted, are hilly and irregular, but strikingly picturesque from their number of antique timber houses, among which may be mentioned that in Butcher Row, formerly the town residence of the abbot of Lilleshall; the council-house overlooking the Severn, erected in 1620 for the presidents of the council of the Welsh marches; and the two adjacent mansions of Robert Ireland and Richard Owen, citizens *c.* 1590. Of the town ramparts built in the reign of Henry III. the principal remains are a portion to the south-west, used as a public walk, on which stands a square embattled tower. The castle built by Roger de Montgomery was dismantled in the reign of James II., and is modernized as a residence, but there remain the archway of the interior gateway, the walls of the inner court and two large round towers of the time of Edward I. The rich abbey of St Peter and St Paul was also founded by Roger, on the site of an earlier church. Of the abbey church (Holy Cross) the nave of massive Norman work remains, especially impressive owing to the warm red stone of which it is built; there are further two Early English arches and the western tower. Of the monastic buildings little is left, save a remarkable roofed pulpit of ornate Decorated work. Among other churches St Mary's, founded in the 10th century, is a fine cruciform structure with a lofty tower and spire, displaying examples of various styles of architecture from early Norman to Perpendicular, the base of the tower, the nave and the doorways being Norman, the transept Early English and the aisles 15th century, while the interior is specially worthy of notice for its elaborate details, its early stained glass, including a Jesse window, and its ancient monuments. Some 50 ft. of the spire fell in 1894, severely injuring the church and necessitating extensive restoration. St Julian's was originally built before the Conquest, but rebuilt in 1748, except the tower, the older portion of which is Norman and the upper part of the 15th century. St Alkmond's also dated from the 10th century, but was rebuilt towards the close of the 18th century, with the exception of the tower and spire. It has a beautiful half-timbered rectory. St Giles's, originally the church of the leper hospital, dating from the time of Henry I., was altered at various periods. The hollow base of the old churchyard cross bears the name of the Pest Basin, because the citizens cast alms into it in the 16th century during the visitation of the plague, which, according to tradition, first appeared here. The old church of St Chad, supposed to have occupied the site of a palace of the princes of Powis, was destroyed by the fall of the tower in 1788, and of the ancient building the bishop's chancel alone remains. The new church of St Chad was built on another site in 1792. Shrewsbury is not fortunate in its ecclesiastical architecture of the late 18th century. There are slight remains of a Franciscan house (Grey Friars) founded in 1291, of an Augustinian friary (1255) and of a Dominican house (1222). The old buildings completed in 1630 for the grammar school of Edward VI., founded in 1551, are now occupied by the county museum and free library, the school having been removed in 1882 to new buildings in the suburb of Kingsland S. of the river. It takes rank among the first public schools in England. The ground it occupies in Kingsland was formerly the scene of the Shrewsbury show, a pageant and festival held during the festival of Trinity. Among the principal secular buildings of the town are the fine market house in the Elizabethan style (completed according to an inscription over the northern arch in 1595), the shire hall and guildhall (rebuilt in 1837, and again, after a fire, in 1883), the general market and corn exchange (1869), and the drapers' hall, a timbered structure dating from the 16th century. The principal benevolent institutions are the county infirmary (1747), Millington's hospital (1734) and the eye, ear and throat hospital (1881). A monument to Lord Clive, who was member for the borough 1761–1764, was erected in the market-place in 1860, and a Doric memorial pillar to General Lord Hill in 1816 at the top of the Abbey Foregate. The town race-course occupies a portion of the "Soldiers' Piece," where Charles I. addressed his army in 1642. To the south-west of the town is a park of 23 acres, known as the Quarry, with beautiful avenues of lime-trees, descending to the river. Glass-staining, the spinning of flax and linen yarn, iron-founding, brewing, malting, the preparation of brawn and the manufacture of the well-known Shrewsbury cakes are now the principal industries. Shrewsbury is a suffragan bishopric in the diocese of Lichfield, and the seat of a Roman Catholic bishop. The parliamentary borough returns one member. The town is governed by a mayor, 10 aldermen and 30 councillors. Area, 3525 acres.

Shrewsbury (Pengwerne, Scrobsbyryg, Salopesberie), then known as Pengwerne or Pengwyrn, was the capital of the kings of Powis during the 5th and 6th centuries, but was taken in 779 by Offa king of Mercia, who changed its name to Shrewsbury (Scrobsbyryg). Owing to its position on the Welsh borders it became one of the chief cities of the Saxon kings, and a mint was established here in the reign of King Æthelstan. After the Conquest the town was included in the earldom of Shrewsbury, and the Domesday Survey shows that the Saxon burgesses

paid the same danegeld as in the reign of Edward the Confessor. Until Wales was annexed to England in the 13th century, Shrewsbury was one of the chief border towns, and as such it was besieged by Owen Gwynedd in 1067, but was relieved by William the Conqueror. In the reign of Henry I. it was garrisoned by Robert de Belesme, but surrendered to the king in 1102. It was several times burnt by the Welsh and was taken and held by them from 1215 to 1221. During he Welsh war in the reign of Edward I., the king made the town his head-quarters, and in 1283 David, the last native prince of Wales, was tried and condemned to death by a parliament held here. In 1403 Henry Percy, son of the earl of Northumberland, was defeated and killed at Shrewsbury by Henry IV. At the beginning of the Civil War, Charles I. stayed in the town for some time, but it surrendered to parliament in 1645. The first extant charter, dated 1199, is a grant by Richard I. to the burgesses of the town at a fee farm of 40 marks, but Henry II. is known to have granted an earlier charter which was confirmed by King John in 1200. The same king granted two other charters, one in 1200 giving the right of electing the reeves, and the other in 1205 providing that their lands and tenements should be governed by the "laws of Breteuil, the laws of the Barony and the laws of the Englishry." Henry II. in 1227 granted a gild merchant with a house. Besides these charters there are numerous confirmations before the incorporation charter of Elizabeth of 1586. Charles I. in 1638 altered the corporation to a mayor, 24 aldermen and 48 assistants. In 1684 the burgesses surrendered their charter to the king and received a new one in the following year which, however, did not change the form of government. From 1295 to 1885 Shrewsbury returned two members to parliament, but then the number was reduced to one.

See H. Owen and J. C. Blakeway, *A History of Shrewsbury* (1825); Thomas Phillips, *The History and Antiquities of Shrewsbury* (1837); *Victoria County History, Shropshire.*

SHRIKE, a bird's name, so given by Turner (1544), but solely on the authority of Sir Francis Lovell, for Turner had seen the bird but twice in England, though in Germany often, and could not find anyone else who so called it. However, the word [1] was caught up by succeeding writers; and, though hardly used except in books—for butcher-bird is its vernacular synonym—it not only retains its first position in literary English, but has been largely extended so as to apply in general to all birds of the family Laniidae and others besides. The name *Lanius*, in this sense, originated with C. Gesner [2] (1555), who thought that the birds to which he gave it had not been mentioned by the ancients. C. J. Sundevall, however, considers that the *Malacocraneus* of Aristotle was one of them, as indeed Turner had before suggested, though repelling the latter's supposition that Aristotle's *Tyrannus* was another, as well as P. Belon's reference of *Collyrion.*

The species designated shrike by Turner is the *Lanius excubitor* of Linnaeus and nearly all succeeding authors, nowadays [3] commonly known as the greater butcher-bird, ash-coloured or great grey shrike—a bird which visits the British Islands pretty regularly, though not numerously, in autumn or winter, occasionally prolonging its stay into the next summer; but it has never been ascertained to breed there, though often asserted to have done so. This is the more remarkable since it breeds more or less commonly on the continent from the north of France to within the Arctic Circle. Exceeding a song-thrush in linear measurements, it is a much less bulky bird, of a pearly grey above with a well-defined black band passing from the forehead to the ear-coverts; beneath it is nearly white, or—and this is particularly observable in Eastern examples—barred with dusky markings. The quill-feathers of the wings, and of the elongated tail, are variegated with black and white, mostly the former, though what there is of the latter shows very conspicuously, especially at the base of the remiges, where it forms either a single or a double patch. Much smaller than this is the red-backed shrike, *L. collurio*, the best-known species in Great Britain, where it is a summer visitor, and, though its distribution is rather local, it may be seen in many parts of England and occasionally reaches Scotland. The cock is a sightly bird with his grey head and neck, black cheek-band, chestnut back and pale rosy breast, while the hen is ordinarily of a dull brown, barred on the lower plumage. A more highly coloured species is called the woodchat, *L. auriculatus* or *rutilus*, with a bright bay crown and nape, and the rest of its plumage black, grey and white. This is an accidental visitor to England, but breeds commonly throughout Europe. All these birds, with many others included in the genus *Lanius*, which there is no room here to specify, have, according to their respective power, the very remarkable habit (whence they have earned their opprobrious name) of catching insects, frogs, lizards or small birds and mammals, and of spitting them on a thorn or of fixing them in a forked branch, the more conveniently to tear them in pieces and eat them.

The shrikes belong to the Passerine family Laniidae, the limits of which are doubtful, but which is divided into five sub-families: Gymnorhininae, Malaconotinae, Pachycephalinae, Laniinae and Prionopinae. The Laniinae or true shrikes occur in the Old and New Worlds, the other sub-families are limited to the Old World. The shrikes and their immediate allies are active and powerful birds, with stout bills often strongly hooked. Their diet is chiefly insects and small frogs, lizards, birds and mammals, but they also take seeds and fruits. The "greenlets" of North and South America are active and fearless birds, similar in general habits to the Laniidae and formerly regarded as forming a sub-family of that group, but now placed in a separate family the Vireonidae. (A. N.)

SHRIMP, a name applied in general to the smaller crustacea of the order Macrura and in particular to an edible species found on the coasts of northern Europe (*Crangon vulgaris*). The shrimps and their allies are distinguished from the larger Macrura, such as the lobsters and crayfishes, by greater development of the paddle-like limbs of the abdomen or tail, which are used in swimming. The abdomen is usually sharply bent between the third and fourth segments and has a characteristically humped appearance when straightened out.

The common shrimp is found abundantly on the coasts of the British Islands, in shallow water wherever the bottom is sandy. It is 2 or 3 in. long, slightly flattened and with the rostrum or beak, in front of the carapace, very short. It is of a translucent greyish colour, speckled with brown and closely resembles the sand in which it lives. On many parts of the coast the shrimp fishery is of considerable importance. The instrument generally employed is a bag-shaped net attached to a semicircular hoop, provided with a long handle and pushed over the surface of the sand by a fisherman wading in the water at ebb-tide. When boiled, the body becomes of a brownish colour and on this account the species is sometimes termed the "brown shrimp." The name of "pink shrimp" is given to *Pandalus montagui* or *annulicornis*, which turns red on boiling and which resembles in form the larger "prawns," having a long rostrum or beak, saw-edged above and below. The smaller species of *Leander*, especially *L. squilla*, are sold as "cup-shrimps" in some places.

The larger shrimp-like crustacea are generally known as "prawns," the name being especially applied in Britain to the species *Leander serratus*, formerly called *Palaemon serratus*, which is highly esteemed for the table. In warmer seas many other kinds of prawns are caught for food. These are generally species of the genus *Penaeus* (like *P. caramote* of the Mediterranean) which are distinguished from all those already mentioned by having pincers on the first three, instead of only on the first two pairs of legs. The large river-prawns of the genus *Palaemon*,

[1] Few birds enjoy such a wealth of local names as the shrikes. M. Rolland (*Faune pop. de la France*, ii. 146-151) enumerates upwards of ninety applied to them in France and Savoy; but not one of these has any affinity to our word "shrike."

[2] He does not seem, however, to have known that butcher-bird was an English name; indeed it may not have been so at the time, but subsequently introduced.

[3] According to Willughby, Rae and Charleton, it was in their day called in many parts of England "Wierangle" (Ger. *Würgengel* and *Würger*, the strangler); but it is hard to see how a bird which few people in England could know by sight should have a popular name, though Chaucer had used it in his *Assemblye of Foules.*

(closely allied to *Leander*) found in most tropical countries are also often used as food. In the West Indies *Palaemon jamaicensis*, and in the East Indies *Pal. carcinus* attain almost the dimensions of full-grown lobsters.

The name of shrimps is sometimes given to members of the order Schizopoda, which differ from most of the Macrura in having swimming branches or exopodites on the thoracic legs. In particular the Schizopods of the family Mysidae, which are abundant in the sea round our coasts, are often called "Opossum-shrimps" from the fact that the female is provided with a ventral pouch or "marsupium" in which the eggs and young are carried. (W. T. Ca.)

SHRINE (Lat. *scrinium*, a case or chest for books, hence a casket; from *scribere*, to write, Fr. *écrin*, Ital. *scrigno*), the term given to the repository or chest to hold sacred relics. Sometimes shrines are merely small boxes, generally with raised tops like roofs; sometimes actual models of churches; sometimes large constructions like that at St Albans, that of Edward the Confessor at Westminster, of Ste Geneviève at Paris, &c. Many are covered with jewels in the richest way, such as the example at St Taurin, at Evreux in Normandy, and that of San Carlo Borromeo, at Milan, of beaten silver; the largest series are those which were enriched with enamels. Sometimes the term is given to the chapel in which the shrine is deposited.

SHROPSHIRE (Salop), a western county of England on the Welsh border, bounded N. by Cheshire and a detached portion of Flint, E. by Staffordshire, S.E. by Worcestershire, S. by Herefordshire, S.W. by Radnorshire, W. by Montgomeryshire and N.W. by Denbighshire. The area is 1343 sq. m. The name of Salop, in common use, comes from an early name of the county town of Shrewsbury. Towards the west Shropshire partakes of the hilly scenery of Wales, from which several ranges are continued into it. South of the river Severn and partly in Montgomeryshire, the Breidden Hills rise abruptly in three peaks; and in the south-west there is a broad range of rough rounded hills known as Clun Forest, extending from Radnorshire. South and west of the Severn there are four other principal chains of hills extending from S.W. to N.E.—the Long Mynd (1674 ft.), west of Church Stretton; the Caradoc Hills, a little to the north, which are continued across the Severn and terminate in the isolated sugarloaf hill of the Wrekin (1335 ft.); Wenlock Edge, east of Church Stretton, a sharp ridge extending for 20 m., and at some points rising above 1000 ft.; and the Clee Hills near the south-eastern border (Brown Clee, 1805 ft.; Titterstone Clee, 1749 ft.). The remainder of the county is for the most part pleasantly undulating and well cultivated. It lies almost entirely in the basin of the Severn, which enters from Montgomeryshire and flows eastward to Shrewsbury, after which it turns south-eastward to Ironbridge, and then continues in a more southerly direction past Bridgnorth, entering Worcester near Bewdley. The scenery on its banks is striking at some places, as near the finely situated town of Bridgnorth, but it is spoilt in one of the most beautiful stretches, that near Coalbrookdale, by the great factories in the neighbourhood. Its principal tributaries within Shropshire are: from the right the Rea, the Cound and the Borle; from the left the Vyrnwy, a well-known trout-stream forming part of the boundary with Montgomeryshire, the Perry, the Tern, which receives the Roden, and the Worf. The Dee and its tributary the Ceiriog touch the north-western boundary of the county with Denbighshire. In the south the Teme, which receives the Clun, the Onny and the Corve, flows near the borders of Herefordshire, which it occasionally touches and intersects. Salmon are taken in the Severn, and the Teme with its tributaries are frequented for trout and grayling fishing. There is a cluster of picturesque meres or small lakes in the north-west near the borders of Denbighshire, of which the largest is Ellesmere, and there are a number of others in various parts of the county.

Geology.—The Pre-Cambrian rocks of Shropshire include the granitoid and gneissic rocks of the Ercall and Primrose Hill (Wrekin), the schists of Rushton, the lavas and ashes of the Wrekin, Caer Caradoc and Pontesford, and the purple slates, grits and conglomerates of the Longmynd. The Wrekin Quartzite, Comley Sandstone and Shineton Shales are the local representatives of the Cambrian system. These are followed by the Ordovician formations which occupy three areas: the Breidden Hills, the Shelve district and the Caer Caradoc district, and include strata referable to the Arenig, Llandeilo and Bala series; the rocks are fossiliferous shales, grits and volcanic ashes, with dolerite intrusions. The Silurian rocks which follow unconformably are represented in the Long Mountain and Clun Forest regions by sandstones and shales, and along Wenlock Edge by highly fossiliferous mudstones and limestones; they include the Llandovery, Wenlock and Ludlow series, and the limestones are famed for their rich marine fauna. The Old Red Sandstone, a great series of red marls, sandstones and thin impure limestones (cornstones), conformably succeeds the Silurian rocks, and occupies the south-eastern area (whence it extends into Herefordshire); it also makes extensive out-liers at Clun and Bettws-y-Crwyn; the rocks have yielded fish and crustacea. The highest beds are conglomeratic and are seen only round the Titterstone Clee Hill. The Carboniferous Limestone and Millstone Grit of the Denbighshire coalfield enter the county near Oswestry; they appear also at Lilleshall and Coalbrookdale on the western border of the Coalbrookdale coalfield, and underlie the little coalfield of the Titterstone Clee Hill. The Coal Measures with their coal-seams and bands of ironstone are present at Oswestry (extending south from Denbighshire) and form also the coalfields of Shrewsbury, Leebotwood, Coalbrookdale, Wyre Forest and the Clee Hills. In the last two districts basalt (dhustone) has been intruded into the Measures, and at Clee Hill is extensively quarried for roadstone and paving-cubes. The so-called Permian rocks (red sandstones and marls) are now grouped with the Coal Measures. The succeeding Triassic rocks—red sandstones, marls and conglomerates (Bunter and Keuper)—occupy the north-eastern part of the county, and are capped near Market Drayton by Rhaetic and Lias. Glacial deposits—boulder-clay, gravel and sand, often shell-bearing—overspread much of the Triassic plain in the north and east of the county; they were laid down by ice-sheets which moved in from the Irish Sea and from the Aran and Arenig mountains in Merioneth. Some peat-bogs in the drift-covered regions appear to occupy the sites of lakes. Coal and ironstone, silver-lead and zinc from the Ordovician rocks of Shelve, with limestone, building-stone and roadstone, are the chief mineral products.

Industries.—More than four-fifths of the total area is under cultivation. The principal grain crops are barley and oats, the acreage under each of which is nearly double that under wheat. Some five-eighths of the total acreage cultivated is in permanent pasture, and there are besides considerable tracts of hill pasture. Turnips and swedes form the bulk of the green crops, as cattle are largely kept for the dairy. The cattle are chiefly Herefords and the sheep Shropshires. Cheshire cheese is made in the northern districts. A small acreage is under hops.

Apart from agriculture there are several important branches of industry. Coalbrookdale and the neighbourhood is the principal coal-mining centre, and was an early home of the ironfounding trade, under the famous family of Darby, and this industry is prosecuted here and at Ironbridge, Shifnal and elsewhere. There are also considerable manufactures of machinery, tools and agricultural implements, as at Ludlow, Oswestry, Shrewsbury and Wellington. There are great encaustic tile and brick works in the Broseley district, where also is an old-established manufacture of tobacco-pipes; while at Coalport there are china works. Some woollen goods are made. In the Minsterley and Stiperstones district in the west, lead and barytes are obtained.

Communications.—The railways, for which Shrewsbury is the most important centre, belong mainly to the Great Western and London & North-Western companies. Of the first the main route to the north-west runs from Wolverhampton by Wellington, Shrewsbury and Gobowen to Chester, with a branch from Wellington to Crewe. Another line comes from Worcester and Bewdley, following the Severn valley by Bridgnorth and Ironbridge to Shrewsbury, with several branches through the Coalbrookdale and Wenlock districts. The two companies jointly work the line from Stafford by Newport, Wellington and Shrewsbury to Welshpool, and the Crewe-Hereford line by Whitchurch, Shrewsbury and Craven Arms. From Craven Arms a branch of the North-Western system runs into South Wales and the short Bishops Castle railway serves that town. The Cambrian line starts from Whitchurch and runs by Oswestry into Wales. The chief canals are the Shropshire Union, Shrewsbury and Ellesmere in the northern part of the county. The Severn is to some extent used for navigation up to Shrewsbury.

Population and Administration.—The area of the ancient county is 859,516 acres, with a population in 1891 of 236,339, and in 1901 of 239,324. The area of the administrative county is 861,802 acres. The county contains 14 hundreds. The municipal boroughs are—Bishops Castle (pop. 1378), Bridgnorth (6052), Ludlow (4552), Oswestry (9579), Shrewsbury (28,395), Wenlock (15,866). The urban districts are Church Stretton (816), Dawley (7522), Ellesmere (1954), Newport (3241), Oakengates (10,906), a mining town, Wellington (6283), Wem (2149),

Whitchurch (5221). The more important towns not mentioned above are Broseley, Coalbrookdale, Madeley (this parish including Ironbridge and Coalport) and Much Wenlock, which are embraced wholly or in part by the borough of Wenlock; Market Drayton (5167) and Shifnal (3321). Lesser towns are Clun (1915) which gives name to Clun Forest, and Cleobury Mortimer (1810) in the south. The county is in the Oxford circuit, and assizes are held at Shrewsbury. It has one court of quarter sessions, and is divided into 18 petty sessional divisions. The boroughs of Bridgnorth, Ludlow, Oswestry, Shrewsbury and Wenlock have separate commissions of the peace and courts of quarter sessions. There are 267 civil parishes. Shrewsbury is divided between the dioceses of Lichfield and Hereford, with a small part in the diocese of St Asaph, and contains 284 ecclesiastical parishes or districts, wholly or in part. There are four parliamentary divisions—Mid or Wellington, North or Newport, South or Ludlow, and West or Oswestry, each returning one member, while Shrewsbury returns one member.

History.—The district which is now Shropshire was annexed to the kingdom of Mercia by Offa, who in 765 constructed Watt's Dike to defend his territory against the Welsh, and in 779, having pushed across the Severn, drove the king of Powys from Shrewsbury, then known as Pengwerne, and secured his conquests by a second defensive earthwork known as Offa's Dike, which, entering Shropshire at Knighton, traverses moor and mountain by Llanymynech and Oswestry, in many places forming the boundary line of the county, and finally leaves it at Bron y Garth and enters Denbighshire. In the 9th and 10th centuries the district was frequently overrun by the Danes, who in 874 destroyed the famous priory of Wenlock, said to have been founded by St Milburg, granddaughter of Penda of Mercia, and in 896 wintered at Quatford. In 912 Æthelflead, the lady of Mercia, erected a fortress at Bridgnorth against the Danish invaders, and in the next year at Chirbury. Mercia was mapped out into shires in the 10th century after its recovery from the Danes by Edward the Elder, and Shropshire stands out as the sole Mercian shire which did not derive its name from its chief town. The first mention of it in the Saxon Chronicle occurs under 1006, when the king crossed the Thames and wintered there. In 1016 Edmund Ætheling plundered Shrewsbury and the neighbourhood.

After the Conquest the principal estates in Shropshire were all bestowed on Norman proprietors, pre-eminent among whom is Roger de Montgomery, the 1st earl of Shrewsbury, whose son Robert de Belesme forfeited his possessions for rebelling against Henry I., when the latter bestowed the earldom on his queen for life. At this period a very large portion of Shropshire was covered by its vast forests, the largest of which, Worf Forest, at its origin extended at least 8 m. in length and 6 m. in width, and became a favourite hunting-ground of the English kings. The forest of Wrekin, or Mount Gilbert as it was then called, covered the whole of that hill and extended eastward as far as Sheriff Hales. Other forests were Stiperstones, the jurisdiction of which was from time immemorial annexed to the barony of Caus, Wyre, Shirlot, Clee, Long Forest and Brewood. The constant necessity of defending their territories against the Welsh prompted the Norman lords of Shropshire to such activity in castle-building that out of 186 castles in England no less than 32 are in this county. Of these the most famous are Ludlow, founded by Roger de Montgomery; Bishop's Castle, which belonged to the bishops of Hereford; Clun Castle, built by the Fitz-Alans; Cleobury Castle, built by Hugh de Mortimer; Caus Castle, once the barony of Peter Corbett, from whom it came to the Barons Strafford; Rowton Castle, also a seat of the Corbetts; Red Castle, a seat of the Audleys. Other castles were Bridgnorth, Corfham, Holgate, Pulverbatch, Quatford, Shrewsbury and Wem.

Among the Norman religious foundations were the Cluniac Priory at Wenlock, re-established on the Saxon foundation by Roger Montgomery in 1080; the Augustinian abbey of Haughmond founded by William Fitz-Alan; the Cistercian abbey of Buildwas, now a magnificent ruin, founded in 1135 by Roger, bishop of Chester; Shrewsbury Abbey, founded in 1083 by Roger de Montgomery; the Augustinian abbey of Lilleshall, founded in the reign of Stephen; the Augustinian priory of Wombridge, founded before the reign of Henry I.; the Benedictine priory of Alberbury founded by Fulk Fitz-Warin in the 13th century; and Chirbury Priory founded in the 13th century.

The fifteen Shropshire hundreds mentioned in the Domesday Survey were entirely rearranged in the reign of Henry I., and only Overs and Condover retained their original names. The Domesday hundred of Ruesset was replaced by Ford, and the hundred court transferred from Alberbury to Ford. Hodnet was the meeting-place of the Domesday hundred of Odenet, which was combined with Recordin, the largest of the Domesday hundreds, to form the modern hundred of Bradford, the latter also including part of the Domesday hundred of Pinholle in Staffordshire. The hundred of Baschurch had its meeting-place at Baschurch in the time of Edward the Confessor; in the reign of Henry I. it was represented mainly by the hundred of Pimhill, the meeting-place of which was at Pimhill. Oswestry represents the Domesday hundred of Mercete, the hundred court of which was transferred from Maesbury to Oswestry. Munslow hundred was formed in the reign of Henry I., but in the reign of Richard I. a large portion was taken out of it to form a new liberty for the priory of Wenlock, the limits of which correspond very nearly with the modern franchise of Wenlock. The Domesday hundred of Alnodestreu, abolished in the reign of Henry I., had its meeting-place at Membrefeld (Morville). The hundreds at the present day number fourteen.

Shropshire was administered by a sheriff, at least from the time of the Conquest, the first Norman sheriff being Warin the Bald, whose successor was Rainald, and in 1156 the office was held by William Fitz-Alan, whose account of the fee-farm of the county is entered in the pipe roll for that year. The shire court was held at Shrewsbury. A considerable portion of Shropshire was included in the Welsh marches, the court for the administration of which was held at Ludlow. In 1397 the castle of Oswestry with the hundred and eleven towns pertaining thereto, the castle of Isabel with the lordship pertaining thereto, and the castle of Dalaley, were annexed to the principality of Chester. By the statute of 1535 for the abolition of the marches, the lordships of Oswestry, Whittington, Masbroke and Knockin were formed into the hundred of Oswestry; the lordship of Ellesmere was joined to the hundred of Pimhill; and the lordship of Down to the hundred of Chirbury. The boundaries of Shropshire have otherwise varied but slightly since the Domesday Survey. Richard's Castle, Ludford, and Ludlow, however, were then included in the Herefordshire hundred of Cutestornes, while several manors now in Herefordshire were assessed under Shropshire. The Shropshire manors of Kings Nordley, Aveley, Claverley and Worfield were assessed in the Domesday hundred of Saisdon in Staffordshire; and Quatt, Romsley, Rudge and Shipley in the Warwickshire hundred of Stanlei. By statute 34 and 35 Henry VIII. the town and hundred of Aberton, till then part of Merionethshire, were annexed to this county.

Shropshire in the 13th century was situated almost entirely in the dioceses of Hereford and of Coventry and Lichfield; and formed an archdeaconry called the archdeaconry of Salop. That portion of the archdeaconry in the Hereford diocese included the deaneries of Burford, Stottesdon, Ludlow, Pontesbury, Clun and Wenlock; and that portion in the Coventry and Lichfield diocese the deaneries of Salop and Newport. In 1535 the Hereford portion included the additional deanery of Bridgnorth; it now forms the archdeaconry of Ludlow, with the additional deaneries of Montgomery, Bishops Castle and Church Stretton. The archdeaconry of Salop, now entirely in the Hereford diocese, includes the deaneries of Condover, Edgmond, Ellesmere, Hodnet, Shifnal, Shrewsbury, Wem, Whitchurch and Wrockwardin. Part of Welsh Shropshire is included in the diocese of St Asaph, comprising the deanery of Oswestry in the archdeaconry of Montgomery, and two parishes in the deanery of Llangollen and the archdeaconry of Mexham.

The early political history of Shropshire is largely concerned with the constant incursions and depredations of the Welsh from across the border. The Saxon Chronicle relates that in 1053 the Welshmen slew a great many of the English wardens at Westbury, and in that year Harold ordered that any Welshman found beyond Offa's Dike within the English pale should have his right hand cut off. Various statutory measures to keep the Welsh in check were enforced in the 14th and 15th centuries. In 1379 Welshmen were forbidden to purchase land in the county save on certain conditions, and this enactment was reinforced in 1400. In 1379 the men of Shropshire forwarded to parliament a complaint of the felonies committed by the men of Cheshire and of the Welsh marches, and declared the gaol of Shrewsbury Castle to be in such a ruinous condition that they had no place of imprisonment for the offenders when captured. In 1442 and again as late as 1535 acts were passed for the protection of Shropshire against the Welsh. But apart from the border warfare in which they were constantly engaged, the great Shropshire lords were actively concerned in the more national struggles. Shrewsbury Castle was garrisoned for the empress Maud by William Fitz-Alan in 1138, but was captured by Stephen in the same year. Holgate Castle was taken by King John from Thomas Mauduit, one of the rebellious barons. Ludlow and Shrewsbury were both held for a time by Simon de Montfort. At Acton Burnell in 1283 was held the parliament which passed the famous Acton Burnell statute, and a parliament was summoned to meet at Shrewsbury in 1398. During the Percy rebellion Shrewsbury was in 1403 the scene of the battle of King's Croft, in which Hotspur was slain. On the outbreak of the Civil War of the 17th century the Shropshire gentry for the most part declared for the king, who visited Shrewsbury in 1642 and received valuable contributions in plate and money from the inhabitants. A mint and printing-press were set up at Shrewsbury, which became a refuge for the neighbouring royalist gentry. Wem, the first place to declare for the parliament, was garrisoned in 1645 by Richard Baxter. Shrewsbury was forced to surrender in 1644, and the royalist strongholds of Ludlow and Bridgnorth were captured in 1646, the latter after a four weeks' siege, during which the governor burnt part of the town for defence against the parliamentary troops.

Shropshire is noted for the number and lustre of the great families connected with it. Earl Godwin, Sweyn, Harold, Queen Edith, Edward the Confessor and Edwin and Morcar are all mentioned in the Domesday Survey as having held lands in the county before the Conquest. The principal landholders at the time of the survey were the bishop of Chester, the bishop of Hereford, the church of St Remigius, Earl Roger, Osbern Fitz-Richard, Ralph de Mortimer, Roger de Laci, Hugh Lasne and Nicholas Medicus. Earl Roger had the whole profits of Condover hundred and also owned Alnodestreu hundred. The family of Fitz-Alan, ancestors of the royal family of Stuart, had supreme jurisdiction in Oswestry hundred, which was exempt from English law. Richard Fitz-Scrob, father of Osbern Fitz-Richard and founder of Richard's Castle, was lord of the hundred of Overs at the time of the Conquest. Gatacre was the seat of the Gatacres. The barony of Pulverbatch passed from the Pulverbatches, and was purchased in 1193 by John de Kilpeck for £100. The family of Cornwall were barons of Burford and of Harley for many centuries. The family of Lestrange owned large estates in Shropshire after the Conquest, and Fulk Lestrange claimed the right of holding pleas of the crown in Wrockworthyn in 1292. Among others claiming rights of jurisdiction in their Shropshire states in the same year were Edmund de Mortimer, the abbot of Cumbermere, the prior of Lanthony, the prior of Great Malvern, the bishop of Lichfield, Peter Corbett, Nicholas of Audley, the abbot of Lilleshall, John of Mortayn, Richard Fitz-Alan, the bishop of Hereford and the prior of Wenlock.

The earliest industries of Shropshire took their rise from its abundant natural resources; the rivers supplying valuable fisheries; the vast forest areas abundance of timber; while the mineral products of the county had been exploited from remote times. The lead mines of Shelve and Stiperstones were worked by the Romans and in 1220 Robert Corbett conferred on Shrewsbury Abbey a tithe of his lead from the mine at Shelve. In 1260 licence was granted to dig coal in the Clee Hills, and in 1291 the abbot of Wigmore received the profits of a coal-mine at Caynham. Iron was dug in the Clee Hills and at Wombridge in the 16th century. Wenlock had a famous copper-mine in the reign of Richard II., and in the 16th century was noted for its limestone. The Domesday Survey mentions salt-works at Ditton Priors, Caynham and Donnington. As the forest areas were gradually cleared and brought under cultivation, the county became more exclusively agricultural. In 1343 Shropshire wool was rated at a higher value than that of almost any other English county, and in the 13th and 14th centuries Buildwas monastery exported wool to the Italian markets. Shropshire has never been distinguished for any characteristic manufactures, but a prosperous clothing trade arose about Shrewsbury and Bridgnorth, and Oswestry was famous in the 16th century for its fine Welsh cottons.

Antiquities.—The ecclesiastical ruins and buildings of Shropshire are numerous and beautiful. Among the numerous monastic buildings the finest remains are those of Shrewsbury Abbey, Lilleshall near Newport, White Ladies nunnery near Shifnal, Much Wenlock priory and Bromfield priory near Ludlow (see the towns named). Besides these, Haughmond, 5 m. N.E. of Shrewsbury, an Augustinian foundation of the 12th century, has left extensive remains including a chapter-house, hall, monks' well and other domestic buildings. Of Buildwas Abbey, on the Severn above Coalbrookdale, a Cistercian foundation of 1135, there are fine Norman and Early English remains of the church and chapter-house, together with the abbot's house and a series of passages below ground. Among the churches of the larger towns, those of Bridgnorth and Ludlow are conspicuous. Among village churches, those of Stottesdon and Stanton Lacy in the south of the county, show considerable traces of pre-Conquest construction. Of Norman date those of Wroxeter, in which fragments from Uriconium are incorporated, Claverley E. of Bridgnorth, Holdgate or Holgate in Corvedale and Clun, are good examples, but there is a remarkable number of Norman doors and fonts throughout the county. The church of Cleobury Mortimer is good Early English, and that of Tong near Shifnal fine Perpendicular with a splendid series of tombs, while the churchyard cross at Bitterley, near Titterstone Clee, is a beautiful specimen of the work of the same period. The solitary church of Battlefield, N. of Shrewsbury, marks the scene of the fight between Henry IV. and the Percies in 1403

The remains of castles are generally slight, but the noble ruins at Ludlow are a noteworthy exception. The powerful fortress of Clun and the castle at Holdgate are Norman. Of the 13th century are those at Hopton near Clun and Acton Burnell, S.E. of Shrewsbury, where Edward I. held parliament in 1283. Middle Castle between Shrewsbury and Wem shows small ruins of the 14th century. At Moreton Corbet on the Roden, N.E. of Shrewsbury, there is an old castellated mansion, but by far the finest example of this type in the county, and one of the best in England, is Stokesay Castle near Craven Arms. This beautiful relic dates from the 13th century, and is almost perfect, having a large hall and massive southern tower, and a remarkable half-timbered gatehouse. Shropshire is also rich in medieval domestic buildings, and in the streets of Ludlow and Shrewsbury are many beautiful examples of half-timbered architecture. Among old country mansions may be specially noted the half-timbered Pitchford Hall, near Shrewsbury and Benthall Hall, near Broseley, dating from 1535.

See *Victoria County History, Shropshire*; W. Pearson, *Antiquities of Shropshire* (London, 1807); R. W. Eyton, *Antiquities of Shropshire* (12 vols., London, 1853–1860); J. C. Anderson, *Shropshire: Its Early History and Antiquities* (London, 1864); C. H. Hartshorne, *Salopia Antiqua* (London, 1841); Walcott, *Introduction to Sources of Salopian Topography* (Shrewsbury, 1879); La Touche, *Handbook to the Geology of Shropshire* (1886); Borderer, *Hunting and Sporting Notes in Shropshire* (London, 1885–1886); Hughes, *Sheriffs of Shropshire, 1831–1886* (Shrewsbury, 1886); Waiter, *An Old Shropshire Oak* (4 vols., London, 1886–1891); Fletcher, *Religious Census of Shropshire in 1676* (London, 1891); Cranage, *Architectural Account of the Churches of Shropshire* (Wellington, 1894–1899); Timmins, *Nooks and Corners of Shropshire* (London, 1899); *Shropshire Notes and Queries* (1885, &c.); *Shropshire Archaeological and Natural History Society* (1877, &c.); *Salopian Shreds and Patches* (1874–1891).

SHROUD (O. Eng. *scrud*, garment; cf. Icel. *skrudh*, in the secondary sense of rigging, allied with "shred," O. Eng. *screade*, a piece, strip), originally a word meaning garment, clothing or covering, but now particularly applied to the garment in which a dead body is wrapped preparatory to burial, a winding sheet. The shroud is usually a long linen sheet wrapping the entire body. This was formerly dipped in melted wax (Lat. *cera*), whence the name "cerecloth," often wrongly written *serecloth* or *searcloth* and "cerements." In nautical usage the Icelandic meaning of *skrudh*, tackle, rigging of a ship, has been adopted in English; the "shrouds" of a ship are the set of

ropes which stretch from the heads of a ship's masts to the sides as supports (see RIGGING).

SHROVE TUESDAY, the day before Ash Wednesday, the first day of Lent, so called as the day on which "shrift" or confession was made in preparation for the great fast. Skeat (*Etym. Dict.*) derives the word "shrive," of which "shrove" is the past tense, ultimately from the Lat. *scribere*, to write, to draw up a law, and hence to prescribe (cf. Ger. *schreiben*), through the Anglo-Saxon *scrifan*, to shrive, impose a penance, to judge. Shrove Tuesday is called by the French *Mardi gras*, "Fat Tuesday," in allusion to the fat ox which is ceremoniously paraded through the streets. The Germans know it as *Fastendienstag*. It is celebrated in Catholic countries, as the last day of the carnival, with feasting and merrymaking, of which, in England, the eating of pancakes alone survives as a social custom, the day having been called at one time "Pancake Tuesday." The association of pancakes with the day was probably due to the necessity for using up all the eggs, grease, lard and dripping in stock preparatory to Lent, during which all these were forbidden.

SHRUB. (1) A bushy plant whose stem is woody and branches out thickly from the ground, not attaining sufficient height to be called a tree; this smallness of vertical growth is natural or is effected by cutting and lopping at an early stage or at stated seasons. The term is loose in application and the line between shrubs, trees and certain woody herbaceous plants is not easy to draw. The holly, the yew, the laurel, if allowed to grow from a single stem, become trees, other plants such as rhododendron, syringa, the euonymous are properly shrubs. The word is the same as "scrub," low, stunted undergrowth, in O. Eng. *scrob*; the root, which is also seen in "shrimp" and "shrivel," means to contract. Many English place-names contain the word, the most familiar being Shrewsbury (*Scrobbesbyrig*) and Wormwood Scrubs. (2) The name of a drink or cordial, now rarely found except in country districts. It is made of currant juice boiled with water and sugar to which some spirit, usually rum, is added. Another form of the drink is made of rum, orange and lemon juice, peel, sugar and water. The word is an adaptation of the Arabic *sharb* or *sharab*, beverage, drink, *shariba*, he drank, and is thus directly related to "sherbet" and "syrup" (*q.v.*).

SHUFFLE-BOARD, or SHOVEL-BOARD (originally "shove-board"), a game in which wood or metal disks are "shoved" by the hand or with an implement so that they shall come to a stop on or within certain lines or compartments marked on the "board"—a table or a floor. It was formerly very popular in England, especially with the aristocracy, under the names *shove-groat*, *slide-groat* and *shovel-penny*, being mentioned as early as the 15th century. It was a favourite pastime at the great country houses, some of the boards having been of exquisite workmanship. That at Chartley Hall in Staffordshire was over 30 ft. long and was made up of 260 pieces. Shuffle-board enjoys considerable vogue in the United States, the board being from 28 to 30 ft. long and from 18 to 20 in. wide, of pine, poplar or white wood, with a gutter 4½ in. wide extending entirely round the board. The surface is slightly sanded and sometimes oiled. About 5 in. from each end of the board is drawn a line called the *deuce line*. Each side, whether composed of two or four persons, used four disks of polished brass or iron, generally about 2 in. in diameter and ½ in. thick. When two persons play they shove first from one end of the board and then from the other; but when four play one of each side remains permanently at each end. The disks, four of which are marked A and four B, are shoved alternately by each side. A disk resting between the deuce line and the end of the board is *in* and scores two. One protruding over the end sufficiently to be lifted by the finger is called a *ship* and counts three. A disk resting on the board but not crossing the line counts one. In scoring only the best of the eight disks counts, unless one side has two that are better than any of their opponents', in which case both count. The side first scoring 21 points wins.

A variety of shuffle-board is very popular as a deck game on board steamers and yachts. It is played by pushing wooden disks by means of crutch-shaped cues, or *shovels*, into which the disks fit, so that they come to a stop within the lines of a large rectangle drawn with chalk on the deck and divided into squares numbered from 1 to 10 with an extra square nearest the player, numbered – 10. The game is usually 21 points.

SHUKRIA, a large tribe of African nomads living in the "Island of Meroë," *i.e.* the country between the Atbara and the Blue Nile. The family name of the principal branch of this tribe is Abu Sin, and Gedaref, an important town in the centre of the Shukria country, was formerly called Suk Abu Sin.

SHUMLA (Bulgarian *Shumen*, Turkish *Shumna*), a fortified town of Bulgaria, 50 m. W. of Varna, on the railway from Trnovo to Shumla Road (a name given to a station on the Varna-Rustchuk railway by the English builders of the line). Pop. (1906) 22,290, about one-third being Moslems. The town is built within a cluster of hills, northern outliers of the eastern Balkans, which curve round it on the west and north in the shape of a horse-shoe. A rugged ravine intersects the ground longitudinally within the horse-shoe ridge. From Shumla roads radiate northwards to the Danubian fortresses of Rustchuk and Silistria and to the Dobrudja, southwards to the passes of the Balkans, and eastwards to Varna and Baltchik. Shumla has, therefore, been one of the most important military positions in the Balkan Peninsula. A broad street and rivulet divide the upper quarter, Gorni-Mahlé, from the lower, Dolni-Mahlé. In the upper quarter is the magnificent mausoleum of Jezairli Hassan Pasha, who in the 18th century enlarged the fortifications of Shumla. The principal mosque, with a cupola of very interesting architecture, forms the centre of the Moslem quarter. The town has an important trade in grain and wine, besides manufactures of silk, red and yellow slippers, ready-made clothes, richly embroidered dresses for women, and copper and tin wares.

In 811 Shumla was burned by the emperor Nicephorus, and in 1087 it was besieged by Alexius I. In 1388 the sultan Murad I. forced it to surrender to the Turks. In the 18th century it was enlarged and fortified. Three times, in 1774, 1810 and 1828, it was unsuccessfully attacked by Russian armies. The Turks consequently gave it the name of Gazi ("Victorious"). In 1854 it was the headquarters of Omar Pasha and the point at which the Turkish army concentrated (see CRIMEAN WAR). On the 22nd of June 1878 Shumla capitulated to the Russians.

SHUSHA, a town, formerly a fortress, of Russian Transcaucasia, in the government of Elisavetpol, in 39° 46′ N. and 46° 25′ E., 170 m. S.E. of Tiflis, on an isolated rocky eminence, 3865 ft. above sea-level and accessible only from one side. Pop. about 25,000, consisting of Armenians and Tatars. Shusha was formerly the capital of the khanate of Kara-bagh. The town is locally renowned for its carpets, and the district for its excellent breed of Kara-bagh horses. Leather and silk are also made.

The fortress, constructed in 1789, successfully withstood a siege by Aga Mahommed of Persia in 1795, but was constrained to surrender two years afterwards. In 1805 Ibrahim Khan of Kara-bagh invoked the protection of Russia, but the annexation was not completed until 1822.

SHUSHTER, a district and town of the province of Arabistan (former Khuzistan) in Persia, S. of Dizful, and N. of Ahvaz. The district contains the town of the same name and 22 villages, and, including about 3700 nomad families of the Kunduzlu, Saad, Anafijeh and Al i Kethir tribes, has a population of about 40,000 and pays a yearly revenue of £6000. The district produces grain, opium, cotton, wool, limes (their juice, made into green extract, is exported in little earthenware jars), and manufactures *gilims* (woollen carpets without pile).

The town of SHUSHTER, with a population of 15,000, is situated at the point where the river Karun, after breaking through the Fedelek hills, bifurcates into the Gerger canal, flowing E., and the Shutait river flowing W. of it, in 32° 3′ N. and 48° 53′ E., and built on slightly elevated ground which rises gradually from the south-west to the citadel, Kalah Salasil,[1] standing in the

[1] Considered to represent the Sele of Ammianus Marcellinus (xxiii. c. 6, 26), a city in Susiana, and of Ptolemy (Tab. v.).

north-eastern corner on a sandstone hill ending with a precipice about 80 ft. in height towards the river on the north. The ground covered by the citadel measures nearly 350 by 150 yds., and the town occupies a space of a square mile.

At the point of the divergence of the Gerger from the Karun, 600 yds. above the town, an artificial dike constructed of large blocks of hewn stone is thrown across the opening of the former. It was known as the Band i Kaisar (the Caesar's Dike), but after having been repaired by Mahommed Ali Mirza, a son of Fath Ali Shah, in the early part of the 19th century, it was called Band i Shahzadeh, or Prince's Dike. A little distance below this dike begins the artificial cutting in the sandstone rock and at half a mile from it is a second band, 60 yds. long, 65 ft. high, which completely blocks the progress of the stream. It has a roadway on the top, and, as it connected the town with the village Bulaiti (now deserted) on the other side, was called Pul i Bulaiti, *i.e.* Bridge of Bulaiti. At a short distance above it some tunnels have been pierced in the rock below the canal level on either side of the Gerger. From the point where the principal river parts with the Gerger down to a point 500 yds. below the citadel the river bed was paved with great flags of stone, the pavement being called Shadurvan. At the end of the pavement stand the band and bridge ascribed to the Roman emperor Valerian. The band is called Band i Mizan, the bridge Pul i Kaisar. The bridge has been built and rebuilt several times and its forty-one arches differ in material, style and size. Its length is 560 yds., and its roadway is 7 yds. wide. Seventy yards of band and bridge were swept away in 1885. Between the bridge and the Gerger opening and cut into the rock on which the western part of the citadel stands is a tunnel leading to a canal formerly called Darian, now Minab, *i.e.* Mian-do-ab, "between two rivers," because it waters the district south of the town lying between Gerger and Shutait. With the break of the band in 1885 the level of the main river has fallen and the Minab canal is not properly filled, causing much damage to cultivation in the district.

Persian tradition has it that Ardashir (either Artaxerxes of the old Persian kings or Ardashir of the Sassanians) built the first dike across the river in order to raise the water of the river to the level of the Darian canal. The dike became destroyed and was renewed under the Sassanian Shapur I. by Roman workmen sent for by Valerian who had been captured by the Persian king in 260. That Valerian had a part in constructing these remarkable works does not rest upon any historical basis; we may, however, believe that the Sassanian Ardashir, or his son Shapur I, finding that the river, having its bed in friable soil, was daily getting lower and finally threatened to leave the town and the Mian-do-ab district dry by not filling the Darian canal, engaged Roman workmen. The Gerger canal was cut and the river diverted from west to east of the town. The old river then became emptied and its bed was raised and, to prevent further erosion and washing away of the soil and a consequent fall of the river, was paved with huge flags. Then the Band i Mizan and the great bridge were erected across the river and finally a dam was constructed across the Gerger canal, where is now the Pul i Bulaiti, so as to turn back the Karun into its original channel, but later, by means of sluices and tunnels, the flow of water was regulated in such a manner that two-sixths of the water flowed east and four-sixths west of the town. This gave rise to the later appellations Do-Dank and Chahar Dank, *i.e.* two-sixths and four-sixths for the Gerger and Shutait respectively. (A. H.-S.)

SHUTER, EDWARD (*c.* 1728–1776), English actor, was born in London of poor parents. He made his first appearance on the London stage in 1745 in Cibber's *Schoolboy*. He made a great reputation in old men's parts. He was the original Hardcastle in *She Stoops to Conquer* (1773), and Sir Anthony Absolute in *The Rivals* (1775).

SHUTTLE (O. Eng. *shitel*, &c.; from the same word as "shoot"), a boat-shaped implement used in weaving to pass a thread of weft to and fro between two lines of warp. The origin of this implement is lost in the mists of a remote antiquity, and yet it was long preceded by the loom. Several wall paintings at Thebes depict looms that are apparently provided with a hooked rod for drawing weft through the warp, but with such a device either two weft threads would be simultaneously placed in one division of the warp, or the selvages would be imperfect. Since neither of these conditions obtain in the ancient Egyptian fabrics that have been recovered, it may be concluded that some other plan was also adopted. Netting needles have been found in Egyptian tombs, and as these would be more suitable for weaving than a hooked rod, it is conceivable they were so employed. Or a spinning spindle charged with weft might be conveyed through the warp, as was customary, at a much later period, with Greek, Roman and other weavers. So long as a shuttle was thrown from hand to hand, the breadth of cloth which one weaver could produce was limited to his ability to reach from selvage to selvage of the piece. But from 1733, when John Kay invented the "fly shuttle," these implements have been made straight, and propelled mechanically, also, to secure light running, they have been mounted upon rollers which project slightly on the under side. Shuttles are now made in various forms and sizes from box, and other hard-grained, smooth woods, as well as from vulcanized fibre and metals. For silk weaving by hand, they are approximately 12 in. long by 1 in. square in section, and weigh about 3 oz.; those for calico weaving by power, are about 12½ in. long, 1¼ in. wide, 1¼ in. deep, and weigh about 9¼ oz.; they are also provided with conical steel tips which abut upon short coiled springs let into the shuttle. The construction, fixing and control of shuttle tongues that hold the weft, together with numerous devices for putting the thread under an elastic tension, have formed the subjects for many patents. The tongues intended to hold cops are split to form a spring whose strength suffices to fix the cop in position while the thread is drawn from the outer end through a porcelain eye in the shuttle front, the tension being regulated by deflection.

The small shuttles employed to weave ribbons, and other narrow goods, are bowed in front, recessed to hold a spool of weft, and have an eye fixed at the centre of the bow for the thread to pass through as it unrolls. These shuttles are formed into sets, which correspond with the number of fabrics to be manufactured simultaneously and may be placed on one level, or in tiers; in either event, all in one horizontal plane are moved to and fro together across different webs, by means of racks and pinions; for a rack is inserted lengthwise in each shuttle, and by engaging the racks with intermittently driven pinions, the shuttles receive their requisite movements.

For further information regarding weaving and looms, see WEAVING and WEAVING MACHINERY. (T. W. F.)

END OF TWENTY-FOURTH VOLUME

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